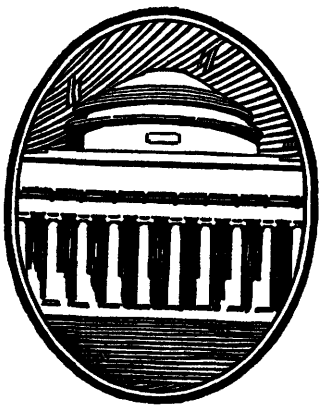
BULLETIN, MASSACHUSETTS INSTITUTE OF TECHNOLOGY

PRESIDENT'S REPORT
ISSUE

VOLUME 67 NUMBER 3



OCTOBER, 1931

Published by

Massachusetts Institute of Technology

Cambridge, Massachusetts

Published by the Massachusetts Institute of Technology, Cambridge Station, Boston, Massachusetts, in October, November, February, March, April and May.

Entered December 3, 1904, at the Post Office, Boston, Mass., as second-class matter, under Act of Congress of July 16, 1894.

VOLUME 67 NUMBER 3

MASSACHUSETTS INSTITUTE OF TECHNOLOGY

President's Report

1930–1931

Covering period from meeting of Corporation October 8, 1930
to meeting of Corporation October 14, 1931

THE TECHNOLOGY PRESS
CAMBRIDGE, MASSACHUSETTS
1931

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* Died October 18, 1931
† Address correspondence to Massachusetts Institute of Technology.

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REPORT OF THE PRESIDENT

TO THE MEMBERS OF THE CORPORATION:

In accordance with the by-laws of the Corporation I have the honor to submit to you a report for the past year, covering changes in personnel, the more important points of progress in the work of the various departments, various problems of the future, and reports of other administrative officers with reference to the work of their offices.

CHANGES IN PERSONNEL

During the year, the Corporation has lost three of its most active and eminent members: Mr. Frederick P. Fish died on November 6, 1930, having been a life member for more than twenty-eight years; Mr. Coleman du Pont died on November 11, 1930, after a membership of twenty-four years; Mr. George Wigglesworth died on November 26, 1930, having served as life member for thirty-nine years during sixteen years of which time he held the important office of Treasurer of the Institute.

On the side of gains, the Corporation has been strengthened during the year by the election to Life Membership of Mr. Albert H. Wiggin, Mr. Alfred L. Loomis, Mr. John J. Pelley and Mr. John R. Macomber, the latter having served for four years as Term Member.

The only other changes in the Corporation have been those due to the expiration of the term of service of Messrs. Paul W. Litchfield and Alfred P. Sloan, Jr. The new Term Members elected in June last were Messrs. Thomas C. Desmond, H. E. Worcester and Francis J. Chesterman to serve until June 1936 and Mr. William S. Forbes to serve until June 1933, filling the unexpired term of Mr. William E. Nickerson.

Faculty losses have been as follows: Professor Frank Vogel retired on July 1, 1931, with the title "Professor Emeritus"; Colonel Robert C. Eddy has retired as Professor of Military Science and Tactics and has been appointed Associate Professor in the Department of Business and Engineering Administration; H. O. Forrest, Associate Professor of Chemical Engineering and Director of the Research Laboratory of Applied Chemistry has

resigned, as have also the following Assistant Professors: W. R. Barss, W. G. Brown, F. L. Cronin, G. S. Eyster, T. H. Frost, M. Knobel, R. M. Langer, and L. H. Young.

Additions to the Faculty have been as follows: Colonel S. C. Vestal has been appointed Professor of Military Science and Tactics in charge of the Department; W. Spannhake, Visiting Professor of Hydraulics; Commander H. E. Rossell, Professor of Naval Construction; L. J. Bircher, Visiting Professor of Chemistry; R. D. Bennett, Associate Professor of Electrical Measurements; Robert B. Brode, Associate Professor of Physics; Ralph E. Freeman, Associate Professor of Economics; L. B. Slichter, Associate Professor of Geophysics; G. A. Bicher, Assistant Professor of Military Science and Tactics; V. Guillemin, Jr., Assistant Professor of Physics; Philip M. Morse, Assistant Professor of Physics; W. B. Nottingham, Assistant Professor of Physics. Mr. T. P. Pitre has been appointed Assistant Dean.

Professor E. H. Schell has been appointed Head of the Department of Business and Engineering Administration; Professor C. F. Taylor, Head of the Department of Aeronautical Engineering; and Professor Hoyt C. Hottel, Acting Head of the Course in Fuel and Gas Engineering.

The following promotions in grade have been made within the Faculty, from the grade of Associate Professor to that of Professor: A. A. Blanchard, Earle Buckingham, O. G. C. Dahl, L. J. Gillespie, F. K. Morris, Richard H. Smith, Robert H. Smith and W. C. Voss.

The following Assistant Professors have been advanced to the grade of Associate Professor: Evers Burtner, W. A. Crosby, H. C. Hottel, W. H. Jones, C. E. Lansil, F. E. Raymond, Penfield Roberts, F. J. Robinson and F. H. Slack.

The following Instructors have been promoted to the rank of Assistant Professor: F. L. Foster, R. H. Frazier, W. C. Greene, J. F. G. Gunther, H. L. Hazen, J. R. Lambirth, P. H. Moon, Johnson O'Connor, J. W. Pratt, A. A. Schaefer, J. P. Walsted, S. D. Zeldin and I. N. Zavarine.

MATTERS OF GENERAL POLICY

In principle and generally in practice the Institute has always aimed at technological rather than technical education,

by which I mean education in fundamental principles and training in their application to important basic processes and problems as contrasted with training in manipulation or technique of routine, through skilled, technical operations. Though both types of training have their uses, we believe that that type which we try to emphasize is the one which can produce leaders who will be able to handle the big and difficult problems of organization, production and new development.

As prerequisites to success in achieving these aims we must draw and select a student body of high calibre; we must plan the courses of study which will most effectively give this desired training; and we must have a teaching staff and an atmosphere whose activities and spirit will stimulate that type of achievement for which our students are being trained.

As moves which will bring us nearer to the satisfactory meeting of these prerequisites, the following matters of general policy have received constructive attention during the year.

NEW SCHOLASTIC RATING SYSTEM AND UNDERGRADUATE ELIGIBILITY RULES. Our enrollment is such as to tax the capacity of the present physical plant. Any appreciable increase in enrollment would certainly lead, through overcrowding of facilities, to deterioration in the quality of work done. In fact, despite all efforts at adjustment, there are probably even now certain aspects of our work which are thus suffering from overcrowding. In order, therefore, to maintain the high standing which is our ideal, it is necessary in some way to limit enrollment. Some institutions have done this through continually increasing the severity of entrance requirements. We believe that our entrance requirements are already as severe as is advisable and that further tests for eligibility should be based on the student's performance in the Institute following his admission. In order to facilitate the selection of those students who shall be allowed to continue their work in the Institute, as well as for other purposes, the Faculty has adopted the following new scholastic rating system.

To each of the six grades which we give in subjects, FF, F, L, P, C and H, in ascending order of excellence, is attached a numerical weight of 0, 1, 2, 3, 4 and 5, respectively. Any student's scholastic rating is then given by some number

between 0 and 5, which is the weighted average of these numerical grades in all his subjects, and which is obtained by adding together, for all subjects, the products of each numerical grade by the number of hours assigned to that subject, and dividing by the aggregate number of hours of all his subjects.

A student will be disqualified at once if at any time his scholastic rating for the *term* falls below a certain number (such as 1.40), or he will be placed on probation if his *term* rating is below a somewhat higher number (such as 2.00), or he will be placed on probation if his total *accumulated* rating to date falls below a third number (such as 2.15), although this probation will be waived if his present *term* rating falls above a fourth number (such as 2.50).

Provision is made to avoid unsympathetic or ill-advised mechanical application of these rules through the provision that the above action is taken unless the student presents extenuating circumstances which in the opinion of a special committee justify temporary waiving of the rule.

The critical numbers below which a student's scholastic rating may not fall, without penalty, have been arbitrarily selected for the present in such a way as to make the scholastic requirements for remaining in the Institute only slightly more severe than they have been previously. The present system has the advantage that our standards for eligibility may be systematically raised at will by any desired amount simply by raising the minimum numbers described above.

As a result of the first year of operation of this new rating system 314 were required last year to withdraw from the Institute. The corresponding numbers during the last four years, according to the older system, are: 227, 147, 146 and 145. The fact that the past year's number is larger is attributed not so much to the increased severity of the requirements as to the ability of the new system earlier to detect the cases of dismissal, which is advantageous from the point of view both of the student and of the Institute.

REVISED STANDARDS OF ADMISSION TO GRADUATE WORK. During the past few years and despite gradually stiffening standards of admission, enrollment for postgraduate work at the Institute has been increasing at the rate of about twenty-

one per cent per year. On the one hand this is very gratifying since it is a tribute to the high standing of the Institute. The extent of this tribute may be realized from the fact that we have awarded approximately one third of the advanced degrees in engineering for the entire country. It is furthermore absolutely necessary that the Institute should foster such work for the sake of its prestige, because the graduate students are in general the most highly selected group, because their presence is a stimulus to and an incentive in holding outstanding members of our staff, because the atmosphere created by graduate students is stimulating and illuminating to the undergraduates, and because statistics show that the rapid development of postgraduate work is nation-wide. We must therefore adequately care for this work if we are to maintain our preëminent position in the field of engineering education. On the other hand, postgraduate work has a relatively high per capita cost and its value is not measured in terms of size of enrollment but rather in terms of quality of achievement. Consideration of other universities shows many examples of very large graduate schools whose standing and significance are low and other quite small graduate schools whose remarkable achievement has given them places of preëminence.

In line with these considerations, it has therefore seemed advisable to adopt a higher standard of selection for the admission of graduate students. The Faculty has therefore voted to admit to graduate work only students whose scholastic attainment corresponds essentially to having graduated in the upper two-thirds of a class; who furthermore are favorably recommended as regards character, skill, reasoning power, initiative, persistence, resourcefulness and enthusiasm. To make these requirements sufficiently elastic to take care of unusual cases, provision is made whereby doubtful cases may be admitted for one year of trial. Such a year is in general required before acceptance of any candidate for a doctor's degree.

Had these new standards been in effect during the past year, there would have been eliminated nearly 100 out of our total graduate enrollment of 539. It is proposed to continue to increase the severity of these requirements for admission to graduate work rather than to allow the number of graduate students to increase to an unwieldy extent.

SIMPLIFICATION OF UNDERGRADUATE CURRICULUM. In his report a year ago, Chairman Stratton called attention to action by the Faculty in simplifying the curriculum of the freshman year so that all freshmen except architects take the same course of basic studies. During the past year the Faculty has continued this revision into the sophomore year, so as to consolidate a number of subjects, eliminate others which appeared to be too specialized for this stage of study, and in general make it unnecessary for the student to make his irrevocable choice of field of study until the close of his sophomore year.

As the curriculum now stands, all freshmen in the Institute take the same basic course. The sophomore may select either of two broad divisions, the one engineering, the other science, which are identical except for one subject. In addition to this, they have the opportunity to select one subject which is introductory to the field in which they expect to specialize. A student, however, who decides at the close of the sophomore year to change his special field, may do so by taking one or at the most two subjects in the summer session. These statements do ot apply to students in Architecture, who have their own special course throughout.

These modifications of curriculum have effected economy of time, effort and expense and have at the same time resulted in a course of study which is believed to give the student a more powerful basic training on which to superpose his later upper class specialization.

MORE FLEXIBLE PROVISION FOR POSTGRADUATE COURSES OF STUDY. Partly by tradition and partly for purposes of efficient organization, the work of every educational institution tends to become strongly departmentalized. Each department has a high degree of autonomy in determining the schedule of courses and other requirements of candidates for advanced degrees. On the whole this plan works well, but there is one difficulty which is becoming continually more evident. The inter-relations between various branches of science and engineering are so complicated that there are many border-line cases or important special activities which have their roots equally in several different departments. For example, a man wishing to qualify as a specialist in the important field of prop-

erties of materials would need advanced work in mechanical engineering, in physics, in physical chemistry, in mathematics, and perhaps also in mineralogy. A student desiring such training should not be forced into the groove of any one of these departments. To provide for such special cases, the Committee on Graduate Courses and Scholarships has made the following provision.

Any candidate for an advanced degree who has good reason for selecting a course of study which does not conform to the specialized requirements of any one department, may present and defend his case before the committee and, if his course is approved, may proceed with his studies and take his examinations under the supervision of a special committee appropriately selected by the Dean of Graduate Students to handle the case.

The number of such cases will always be relatively small, but many of them will be important.

PUBLICITY. Suitable, adequate, dignified publicity is one of the prerequisites to securing good students and to taking proper care of them. By all odds the most valuable and legitimate publicity is that which follows naturally from the achievements of the alumni and staff of the Institute. Certain things may properly be done, however, in the direction of securing adequate recognition of and returns from such achievement, of which the following are perhaps deserving of mention.

Our News Service, consisting of the Director and his assistant, has obtained excellent coöperation from the press. It has served as an intermediary between the press and the staff. As a result of its good personal relations with the members of the press, it has been successful not only in securing desirable publicity, but also in securing the coöperation of the press in avoiding sensationalism and undesirable publicity which may so easily result from unfortunate occurrences inevitable from time to time in so large a group.

Extending previous policy here and elsewhere, a somewhat more liberal policy of traveling allowances has been adopted for members of the staff. This has encouraged them to participate in the programs of the professional and learned societies and in the construction work of important professional com-

mittees. It has resulted in favorable reaction from the professional societies and increased enthusiasm and activity among the staff, which amply justified the relatively small additional expenditure.

Mimeographed sets of news releases have been sent monthly by the Director of our News Service, to the secretaries of all Technology Clubs, to members of the instructing staff, alumni and corporation. Probably this will be continued in a slightly different way during the coming year by presenting these news releases or their equivalent in three or four additional pages of *The Technology Review* instead of distributing them as a sheaf of mimeographed pages.

Successful reactions have been received from the new plan of publishing after the close of each term, a list of Students of High Scholastic Standing in the form of a small leaflet in which are recorded the name, class, preparatory school and home of all students whose preceding term scholastic rating falls within about the highest twenty per cent. Copies of this list are posted prominently throughout the Institute, and marked copies are mailed to principals of preparatory schools and editors of the home papers of all students appearing in the list. Public recognition is thus given to the good work of all students and attention is called to the fact that this good work and the preparatory school and home back of it are recognized by the Institute.

Following recent successful practice of several other educational institutions, the President has appointed in about seventy strategically located cities throughout the United States and Canada, a group of Honorary Secretaries to represent the administration of the Institute in these localities. These secretaries are provided with full information regarding the Institute entrance requirements, etc., and have as their principal duty to serve as local representatives of the Institute, as sources of help and information to prospective students, parents, preparatory school teachers, etc. They are men of prominence in their communities, and there is a distinct advantage in having such quasi-permanent representatives who may become locally known and recognized. It is not expected that these honorary secretaries will in any way undercut or interfere with the organized activities of alumni clubs, although there are obviously opportunities for coöperation.

On Open House day the Institute and its activities are open for public inspection, and invitations to it are sent out to neighboring high schools, preparatory schools and other groups. Originally begun nine years ago as a student activity, the Open House had gradually come more and more under faculty control. For the Open House last spring the students were once again given complete responsibility and the occasion was the most successful of its kind. The attendance of visitors during the afternoon and evening was nearly thirty thousand and the occasion was one of great educational as well as publicity value.

LOAN AND SCHOLARSHIP AID. In this first year of operation of the Technology Loan Fund the results are of particular interest. During the year 292 applications for loans were acted upon, 226 of them favorably. The total amount loaned was $54,073, an average of $239 per person. Of these loans 11 were to freshmen, 46 to sophomores, 72 to juniors, 68 to seniors, 26 to graduate students, and three to unclassified students.

A systematic plan of notes, notices of interest or of notes due, and of follow-up notices has been set up under the immediate jurisdiction of Assistant Bursar, D. L. Rhind, who is Secretary of the Technology Loan Fund Board.

In acting on applications the Board has continually had in mind the twofold objective of the Loan Fund. Consequently each applicant has been judged not only as to his character, record and personality, but also as a financial risk. As a result of its experience in examining these hundreds of individual cases the Board has been greatly impressed with the value and appropriate character of this form of student aid. The indications are that the loans for next year will amount to three or four times those of the past year.

In addition to these loans, undergraduate scholarship awards were made to 486 undergraduates totalling $91,805, and fellowship and scholarship awards to 230 graduate students totalling $68,260. Five of these fellowships were awarded for special study abroad.

All of these forms of aid are of extreme importance, the loans primarily for enabling promising and deserving students to obtain an education at the Institute, the scholarships pri-

marily as prizes adding to the incentive for and the satisfaction of exceptional work, and the fellowships as the most coveted prizes which may also carry in addition special opportunities such as in research or in travel.

NEW PLAN OF FACULTY APPOINTMENTS. Probably the most far-reaching development in general policy of the Institute during the past year was the inauguration of a new plan of faculty appointments, designed to promote coöperative effort, to provide more nearly equal financial remuneration to members of the staff who may be doing equally effective work in different fields, and to decrease the pressure due to inadequate salaries which practically forced some members of the staff to supplement their income from the Institute by outside work which might not have distinctive professional value. This type of problem is a troublesome one in nearly all educational institutions and is particularly acute in institutions like this one whose staff is composed of experts in professional and industrial fields. Our own problem is particularly acute because of the organized effort which has been made during past years to facilitate the making of outside contacts by members of the staff.

In order to alleviate the detrimental and retain the valuable aspects of expert services rendered by the staff to outside parties, the following plan was adopted last spring and has gone into effect with the present academic year. The Executive Committee voted to make promotions and future appointments in the professional grades subject to agreement by the appointees to pay fifty per cent of net income received from services rendered to parties outside the Institute, into a common fund which will be used for the benefit of the professors appointed on this plan. This common fund is designated as "The Professors' Fund" and the President has appointed a committee of five professors, nominated by the appointees on this plan, to advise him in regard to its disposition. For example, it is possible that the fund may annually be distributed equally, or in some designated ratio, among the appointees, or part of it may be so distributed and the balance used for a more liberal plan of leaves of absence, retiring allowances, etc. In initiating the plan each professor who was

recommended for promotion was given the option of accepting this promotion on the new plan or of retaining his present status without obligation to participate in the plan. One hundred fifty-six out of 165 members of the staff who were offered this option have elected to accept the appointment on this new plan, and several others have indicated their desire to do so after the lapse of a year or two.

This plan retains a certain reward for any man whose energy and ability enable him to perform useful services to business or industry in addition to performing his scheduled duties in the Institute. In reducing by fifty per cent the return for such services, the individual will be less likely to undertake outside work of an unimportant character. We believe that the plan will not deter him from undertaking outside work which is of real professional or scientific importance.

It is distinctly understood that this plan of appointment is an experiment in educational administration and that it may be modified or superseded in case it should not achieve the desired results. It is hoped, however, that it will result in an improved *esprit de corps* and in a relatively increasing tendency for the members of the staff to concentrate their outside activities in directions in which they can render a unique professional service and from contact with which the effectiveness of their teaching work may be increased. I am glad to report that the new plan has been received in an excellent spirit by our staff, and also that a number of other educational institutions have expressed keen interest in it and a desire to know of its details and results.

FACULTY SALARIES. It has been recognized that the scale of salaries at the Institute is inadequate, being far below that in universities of comparable rank, despite the fact that competition in retaining the services of the staff is much more serious here than in most educational institutions on account of the higher salaries which are continually being offered to members of our staff by industrial concerns.

Believing that more adequate salaries are essential and in fact are the most pressing need of the Institute, nearly all of the additional income expected from the increased tuition has been allocated to increases in salaries taking effect this fall. As noted above, these salary increases have been dependent upon

acceptance of the new plan of appointment. By this means the general salary scale has been raised to a point intermediate amongst the salary scales of other outstanding educational institutions in this country. Instead of adopting a uniform set of salary ranges for the various academic ranks, each case has been treated in so far as possible on its merits, subject to a few guiding principles. Helpful as these salary increases have been, the funds now available are still inadequate for properly adjusting the faculty salaries.

BUILDINGS

THE NEW DORMITORIES. The new dormitory units have been in use for one year and have proven highly satisfactory. Taken together with the two earlier units we now have housing facilities for 630 students. The experience of the past year indicates that these housing facilities are approximately adequate for the present needs of those who are not living in fraternity houses or private homes. A plot of ground immediately surrounding the new dormitories has been attractively planted, and an adjoining plot has been suitably fitted for out-of-door exercises in such games as volley ball and badminton.

In accordance with the recommendations of a committee of the alumni the units of the new dormitories have been named after

Charles W. Goodale '75	A. Farwell Bemis '93
James P. Munroe '82	Kenneth F. Wood '94
Charles Hayden '90	William Wright Walcott '01

and the Common Room, or lounge, which serves as a social center for all the present dormitories, has been named the Burton Room in honor of Dean Alfred E. Burton.

THE GEORGE EASTMAN RESEARCH LABORATORIES. We were happy to report last spring that Mr. Eastman had given his consent to this inscription upon the new research laboratories for physics and chemistry, the cost of which is being charged against the George Eastman fund for educational buildings.

These laboratories will embody the most approved features of modern laboratory design, with particular attention to flex-

ibility of arrangement and equipment, and to that high degree of stability and rigidity which is so often required in modern scientific work of high precision and for which our location near heavy traffic and on filled land offers somewhat unusual problems. It is expected that the main structural work on the main laboratories will have been completed before freezing sets in, in the late fall, and that the building will be ready for occupancy approximately with the opening of the second term of this academic year. The supplementary spectroscopic laboratory, which is a unique structure embodying hitherto unapproached precautions against vibrations and temperature changes, is expected to be ready for use by about the first of November.

I wish here to give tribute to the skill and devotion to this project on the part of the firm Coolidge and Carlson as architects of the main laboratories, of the firm Charles T. Main, Inc., engineers of the buildings and designers of the spectroscopic laboratory, of Stone and Webster, Inc., builders, of the building committee, Everett Morss and Charles T. Main, and of the coöperating members of the Departments of Physics and Chemistry.

NEEDS OF THE INSTITUTE

In mentioning several of the more pressing needs of the Institute I will divide them into two categories: first, requirements without which the work of the Institute definitely suffers in effectiveness; second, those things which may be considered as highly desirable for increasing the scope and usefulness of our work. In approximate order of importance among the first group, I would suggest the following needs.

MORE ADEQUATE ATTENTION TO POSTGRADUATE TRAINING. The importance of postgraduate work has been discussed above in another connection and need not be repeated here. It is important to realize that one-third of the degrees awarded by the Institute during the past few years have been advanced degrees for postgraduate work. This work is certainly an essential part of our general program. It should and can be given maximum effectiveness, not only without curtailing the undergraduate work, but actually with great benefit to it. Whether we wish it or not, the trend of the times and our position as the

leading technological institution have thrust this problem upon us. I believe that we should immediately make a careful study as to the form of organization and procedure which will enable us most effectively to handle the educational problems and opportunities of postgraduate training. At the last meeting of the Corporation you instructed me to bring proposals along this line for your early consideration. Committees of the Faculty are at present engaged in studying this problem with a view to formulating such recommendations.

A RESEARCH FUND. Even before taking office my first survey of the situation in the Institute led me to express to members of the Executive Committee my conviction that one of the most important needs of the Institute is a large fund for support of important research projects. The more intimate acquaintance with the situation during the past year has confirmed this belief. The effectiveness of the Institute as a center for the development of science and of its really great applications to human welfare, and at the same time the creation of a more vigorous and constructive atmosphere within the staff and student body, would be enormously enhanced by the activities which would be made possible by an annual income of $250,000, or an endowment of $5,000,000.

Of course we have already a considerable amount of research work in progress. Part of it is of a somewhat routine character; part of it is of really striking interest and importance; some of it must be kept going as a part of the training of our students in their ability independently to attack and solve problems. All such work is valuable and must be continued. From time to time, however, there arise opportunities for research which are extraordinary because of their possible importance and which we have a particular reason for undertaking, either because they are the projects of members of our own staff, or because they have developed from preliminary studies which we have made, or because they have not yet been developed to a stage where an industrial organization would take them over. I have in mind at the present time five or six projects of this type whose preliminary tests have proven their feasibility and importance, and which ought immediately to be pushed ahead on an impressive scale. If funds were available

which could be allocated particularly to such big projects as they arise, the return in the line of the stated objectives of the Institute would amply justify the existence of such a fund.

It was to enable us to make some sort of demonstration of the value of such a fund that the Rockefeller Foundation last year made its generous contribution of $170,000 to be expended for such purposes during the next six years.

INCREASED LABORATORY FACILITIES. Our laboratory facilities need extension in three principal aspects. In the first place, we need a small *cryogenic laboratory* for the production of liquid nitrogen, liquid hydrogen and liquid helium, and the attainment thereby of low temperatures. Liquid air or nitrogen is essential in all modern physical and chemical laboratories, and liquid hydrogen and helium are needed if we are to carry on to the next stage a unique program of determining the physical-chemical properties of substances over a large range of pressures and temperatures, in which field our Institute has established a great international reputation in that part of this program which has now practically been completed. The purpose of this cryogenic laboratory is therefore twofold: first, to provide a service which is essential in all modern laboratories, and second, to provide facilities for carrying on to the next stage an important program of research. As regards the providing of this service, it should be noted that this service is needed both by the laboratories of Harvard and of the Institute, and that through the courtesy of a neighboring industrial plant this service is now available to us, but at a considerable inconvenience, to a limited extent, and at a cost considerably in excess of that which could be obtained from our own plant. Furthermore, the heads of the laboratories at Harvard and at the Institute have agreed that a single plant could provide the needed service for both institutions, and that such a plant had best be located at the Institute on account of the additional feature of the research program mentioned above. From this plant, when established, we propose to supply Harvard University with liquid nitrogen at cost.

The second laboratory need is for additional space for the Department of Electrical Engineering, as was so emphatically presented to the Corporation by its Visiting Committee last

spring. This Department having been so clearly the leader in the country in developing advanced training in electrical engineering, and drawing therefore so many well qualified students for advanced study, it is distinctly unfortunate that the subjects of theses and other research projects by the students have to be determined with first consideration as to whether there is space in which to carry out the desired work.

The third laboratory need is for an adequate and well equipped *hydraulics laboratory*. The need and opportunities for work in this field have been realized for several years and have received particular attention from several members of our Corporation. Mr. John R. Freeman has taken a leading part in planning the new developments in this field for the United States Government, and has assisted and encouraged the development of work in hydraulics at the Institute through gifts for fellowships and publications, and also through a great deal of personal thought and effort. Through the generosity of Mr. John E. Aldred a small experimental laboratory to carry on certain aspects of hydraulic work has been built and operated so successfully during the past year and a half as to demonstrate the varied and important opportunities in this line of work. He has also made it possible for us to bring to the Institute this year a preëminent European pioneer in this field primarily to assist in preparing detailed plans for an adequate laboratory of hydraulics.

Closely related to the hydraulics laboratory is a *Naval Towing Tank* for investigating the behavior of projected designs of ships through tests on small models. Enough experience has been accumulated to prove the value of such work to the shipbuilding profession and its power in solving related scientific problems of hydrodynamics. The present plans contemplate a towing tank and small laboratory immediately adjoining the proposed hydraulics laboratory.

THE LIBRARY. A survey of the activities of the library in the Institute has shown that in addition to the rather crowded main library, located beneath the great dome, there are scattered throughout the Institute 17 branch and departmental libraries and 28 minor deposits, most of them without adequate supervision or definite library coördination. The survey has also

shown that the Institute is at present inadequately supplied with reading room space in which students between classes can sit down to read or study. We find the available space used to capacity and additional students sitting between classes on the stairways, in the corridors, laboratories, etc. The survey has further shown that it will be possible to consolidate most of these departmental libraries into about half a dozen branch libraries, each provided with a reading room and located at convenient intervals throughout the buildings. Each of these units will be large enough to justify the full-time attendance of a trained library supervisor. This rearrangement will entail little or no additional total space requirement, but rather a redistribution of space. It will, however, require an appropriation to defray the cost of properly fitting up the quarters for these branch libraries and of moving into them.

The first move in the direction of this consolidation should be made in connection with moving into the new physics-chemistry laboratories, where the architects have provided special quarters for a model branch library serving jointly the Departments of Physics, Chemistry and probably also Mathematics.

Funds to defray the expense of these library improvements are not at present available in the budget.

The second group of needs of the Institute includes those things with which the work of the Institute would be distinctly improved but whose lack cannot be said to cause our present work to suffer. It is realized that the distinction between these two groups is somewhat arbitrary. This second group could be greatly enlarged but I will confine myself to the following suggestions.

PROFESSORSHIPS OF DISTINCTION. Since it is universally agreed that the success of any institution depends primarily upon the personnel of its teaching force, and since even with our new schedule of salaries these are inferior by forty per cent to the outstanding salaries paid in some other educational institutions, it would obviously be very desirable to endow in the various departments distinguished professorships on a par with the best which are found elsewhere. It is further suggested that such professorships in the several departments might well be

named for men who in the history of the Institute have performed distinctive service and made international reputations in their fields.

AN EXTENSION TO THE WALKER MEMORIAL. This would be very effective in increasing the usefulness of that already invaluable building. Caring as it does for the dining service of the Institute, for reading rooms, for a certain amount of recreation, and headquarters for various student activities, the building is too crowded to function properly as a student social center, or to care for a number of student activities which now must be located in other places, sometimes outside of the Institute grounds. Tentative plans for such an extension were prepared at the urging of the student Institute Committee more than a year ago. This is without doubt that phase of student life which the students themselves feel to be of most urgent importance.

AUDITORIUM AND MUSEUM. The remarkable success of the Society of Arts lectures which are given at the Institute, and for which lack of space prevents us from issuing the requested number of tickets to the public and to the surrounding high schools and preparatory schools — even by repeating the lectures three or four times — is evidence of the fact that there is an opportunity for the Institute to perform a still greater service to the community by making more adequate provision for lectures and other public education in the field of science and technology. There is no region of corresponding area in America where there are so many boys' and girls' schools. There is probably no city in America where there is so great public interest in lectures. Museums of science and industry, patterned more or less after the great Deutsches Museum, are being established in various other cities in America, notably in New York, Philadelphia, Chicago, and Detroit. Because of these facts a very interesting and useful addition to our plant would be a museum of science and industry including an auditorium for public lectures which would incidentally serve the additional very useful purpose of providing a place in the Institute where more than one-eighth of our present personnel could meet, this representing the capacity of our present largest room.

BUILDINGS FOR BUSINESS AND ENGINEERING ADMINISTRATION AND FOR BIOLOGY AND PUBLIC HEALTH. Whenever occasion or opportunity arises to add to our main group of buildings, these two buildings may be suggested as perhaps next in importance to increased space for the Department of Electrical Engineering. The Department of Business and Engineering Administration is an offshoot from the Department of Economics and is now the third largest and one of the most active departments in the Institute. It occupies crowded quarters which have been cut away principally from the Departments of Civil Engineering and Economics. Dealing with a field not ordinarily implied in the name "Institute of Technology," there would be publicity value as well as improved facilities and convenience if it were housed in a small building suitably planned for it, thus releasing again to Civil Engineering space which that department can advantageously use. The Department of Biology and Public Health also is in a position very considerably to increase its scope of activities, not only because of the increasing feeling that great developments are nascent in the field of biology, but also because of the unique opportunity which this Department has made for itself in the fields of food technology and of public health. Very few people indeed realize the leading part which this Department has played and is now playing in the development of public health and public health education.

SUMMARY OF REPORTS OF OTHER ADMINISTRATIVE OFFICERS

The following paragraphs call attention to some points of particular interest in the reports of administrative officers, including heads of departments, which are given in detail later in this report.

DEAN'S REPORT. The administrative responsibilities of annually assimilating into the Institute a group of new students, which has grown so rapidly and which enters with such a diversity of background in training and home environment, have grown to such an extent as to demand assistance in the Dean's Office. Mr. Thomas P. Pitre, who had been for ten years on the staff of the Department of Chemistry, has been appointed

Assistant Dean after a year of satisfactory trial in the position of Acting Assistant Dean.

In fulfilling the Dean's responsibility for student life of the Institute and the enforcement of discipline and scholastic standards, the new scholastic rating system, the Technology Loan Fund, and the M. I. T. Student House, gave new opportunities during the past year. An examination of the Dean's report gives evidence of the healthy condition of undergraduate life and spirit.

REPORT OF THE DEAN OF GRADUATE STUDENTS. One-sixth of all the students in the Institute are now graduate students, and advanced degrees constitute one-third of all the degrees awarded by the Institute during the past few years. The distribution of the degrees for which students registered during the past year was as follows:

Doctor of Philosophy	70
Doctor of Science	71
Doctor of Public Health	1
Master of Science	364
Master in Architecture	17
Total	523

Graduate students were registered from all but four states in the union and from thirty foreign countries.

REGISTRAR'S REPORT. Last year's enrollment of 3,209 was the largest in the history of the Institute with the exception of the abnormal years 1920–22. There has been a noticeable improvement in the quality of the entering students as indicated by the much smaller proportion which have come without entrance conditions. As compared with the year 1929–30, the entering class in 1930–31 showed an increase of 6 per cent, the postgraduate enrollment an increase of 21.1 per cent, and the total enrollment an increase of 4.7 per cent. Those courses which showed an increase in enrollment of 20 or more were: Business and Engineering Administration, Chemical Engineering, Mechanical Engineering, Mining and Metallurgy, and Chemistry. Those courses showing a decrease in enrollment of 20 or more were: Aeronautical Engineering, Building Construction and Architecture.

Particular interest is attached to the enrollment of the academic year just beginning. The corresponding figures are as follows: There is a decrease of 107, or 14.5 per cent, in the entering class; an increase of 49, or 9.6 per cent, in postgraduate enrollment; a decrease of 25, which is less than 1 per cent, in the total enrollment, as compared with last year. Two courses, Physics and Business and Engineering Administration, show an increase in enrollment this year of more than 20, while three courses, namely Mechanical Engineering, Electrical Engineering and Aeronautical Engineering, show a decrease this year of more than 20.

REPORT OF THE CHAIRMAN OF THE COMMITTEE ON THE SUMMER SESSION. Elimination of inferior students resulted in a 5 per cent decrease in the registration for the Summer Session of 1931, as compared with that of 1930, but resulted in a much higher quality of scholarship. Slightly over 100 persons attended the special courses given for secondary school teachers. Special courses were given in coöperation with industry, and for 78 Reserve Officers who were sent by the War Department for instruction in Ordnance and Chemical Warfare. Nineteen graduate subjects were offered with a total registration of 135. There is a growing demand for special summer schools for teachers of engineering. Our facilities and interests should enable us to take a leading part in meeting this demand, perhaps through coöperation with such an agency as the Society for the Promotion of Engineering Education.

REPORT OF THE LIBRARIAN. During the past year there was a notable increase in the use of the Library. The number of books borrowed increased from 44,913 in 1929–30 to 54,983 in 1930–31, an increase of about 20 per cent. The net increase in accessions was 4,912, not including numerous pamphlets. The library of the Institute now contains 267,478 volumes. Outstanding needs of the library are consolidation and better coördinated operation of branch libraries in respect to the central library, funds for the purchase of the Engineering Index and certain duplicates of much used books and periodicals for branch libraries, and additional staff to care for particular aspects of the library facilities.

REPORT OF THE MEDICAL DIRECTOR. The Department of Hygiene took care of 28,119 calls, as compared with 24,175 calls made during the preceding year. The increased number does not indicate worse physical condition but greater appreciation and use of the facilities available. Out of 2,817 men given physical examinations 930 were found to have some defect and were advised regarding its correction. There were only eight contagious cases during the year, which is evidence of the care with which quarantine regulations have been carried out. Thirty-three men enrolled in a physical fitness class showed interesting improvements in physical condition during the year.

REPORT OF THE DIVISION OF INDUSTRIAL COÖPERATION AND RESEARCH. During the year the Personnel work carried on by the Division of Industrial Coöperation and Research has been greatly increased because of the unusual number of graduates of the Institute who have consulted us concerning new positions.

There has been a further increase in the proportion of the industrial activities of the staff which have been carried on through the Division rather than by personal contact, but the total amount of such work has not been increased. The work in Ceramics has been transferred to the Industrial Division until such time as it may be sufficiently developed to stand on its own feet.

Typical researches being carried on under the care of the Division are: the Study of the Flow of Steel at High Pressures and Temperatures, the Development of Refractory Materials, the Study and Development of Internal Combustion Engines of a Special Type, an Investigation of the Use of Aluminum Foil as a Heat Insulating Material in Cold Storage and Building Construction, and a Comparison of Daylight and Artificial Illumination with Especial Reference to Schoolhouse Lighting.

REPORT OF THE ACTING DIRECTOR OF THE DIVISION OF MUNICIPAL AND INDUSTRIAL RESEARCH. The absence of available funds on the part of municipal governments and industrial firms interested in community promotion, has prevented the securing of any new survey contracts during the past academic year. The activities of the Division have therefore been of a

promotional character, including publicity, the accumulation of data in anticipation of later surveys, and the completion of the El Paso survey. Numerous cities have been visited and several have given assurance of taking the first favorable opportunity to take up the matter of engaging the services of the Division. Perhaps the most interesting feature of the Division's work has been a series of bulletins on municipal problems including assessment, budget making, municipal revenues, forms of government, principles of sewage disposal, etc., which subjects were suggested by the chief executives of New England cities themselves.

REPORT OF THE SECRETARY OF THE SOCIETY OF ARTS. Four lectures were given during the past year. In December Professor W. S. Hutchinson lectured on "Grand Adventure with the Mining Engineer." In January Professor E. L. Bowles lectured on "Recent Developments in Communication by Radio." In February Professor E. H. Huntress lectured on "Some Contributions of Organic Chemistry to Daily Life." In March Professor B. E. Warren lectured on "X-rays and the Structure of Crystals." Each of these lectures was given on three consecutive days to capacity audiences, and neighboring schools reported that even with this only a small proportion of their students who desired to attend the lectures could be accommodated with tickets of admission.

REPORT OF THE COURSE IN AERONAUTICAL ENGINEERING. At a particularly helpful meeting of the Advisory Committee held in May, increased emphasis was given to the necessity of training in basic scientific and engineering principles and it was recommended that a moderate amount of actual flying be included in the curriculum if funds for this purpose can be obtained. A new summer course including a program of factory visiting and airplane shop work has been successfully inaugurated. It is still deemed advisable to limit the number of students admitted to this course.

Important research projects include the effect of turbulence on the air resistance of airships, a large scale study of boundary layer formation and its behavior under the influence of pressure gradient and Reynold's Number variation, the air forces on

bodies when moved through still air, studies of local skin friction on air surfaces, and investigations of air flow in a propeller spring. An active program of work has had to do with obtaining basic data on the strengths of materials used for airplane structures. In the field of power plant research activity has continued in investigation of heat transfer from metal surfaces to air at high velocity, the development of simple apparatus for photographing ultra high speed phenomena, the development of several types of high-speed-engine indicators, studies of fuel injection, methods for evaluating the knocking tendency of fuels, and studies of the effect of fuel spray variations in high-speed Diesel engines. Several projects have been carried on in coöperation with industrial organizations and six research publications not including those of minor importance, have appeared by members of the staff.

REPORT OF THE DEPARTMENT OF ARCHITECTURE. During the leave of absence of the head of the Department, Professor Emerson, there have been no radical alterations in the curriculum. The principal adjustments have had to do with the changing of the course in Architecture from a four-year to a five-year course. As in preceding years, graduates of this Department have been outstandingly successful in the competitions for coveted architectural scholarships and prizes.

REPORT OF THE DEPARTMENT OF BIOLOGY AND PUBLIC HEALTH. In addition to changes in curriculum associated with the general modification of the undergraduate curriculum mentioned above, a fourth year program for the new optional course in public health engineering has met with approval, not only by the Faculty, but also by many men engaged professionally in this field. Members of the staff have been active in research in biophysics, bacteriology and food technology, and also in developing a national program of public health education.

REPORT OF THE COURSE IN BUILDING CONSTRUCTION. After five years of operation, in which three classes have been graduated, the results to date indicate the value of and demand for this course. Beginning with next year it is proposed to

change the name of the course to "Building Engineering and Construction" and to modify the character of the course so as to give greater stress to the fundamental engineering aspects of building construction. The revised schedule will also give better preparation for certain projected graduate courses in city planning, building management and materials, for which there is a real need.

REPORT OF THE DEPARTMENT OF BUSINESS AND ENGINEERING ADMINISTRATION. This Department shows a healthy growth and remarkable activity. Outstanding developments during the year include (1) the establishment of six honorary fellowships of $1,500 each, contributed by Messrs. Lammot du Pont, F. Wright Fabyan, Charles Hayden, John R. Macomber, Alfred P. Sloan, Jr., and Charles A. Stone, designed to give six carefully chosen graduate students a year of work which will include a number of unusual opportunities for making the acquaintance of personalities and methods which have been strikingly successful in business administration, and for carrying on study and research under the most favorable circumstances; (2) a series of industrial addresses by distinguished administrators; (3) the installation of the new motion picture film library in which students may witness films dealing with manufacturing processes; (4) a six-weeks summer trip by ten students of the Department under the auspices of the Thorne-Loomis Foundation, Inc., in which visits were made to more than thirty representative industrial plants throughout the midwestern, southern and Atlantic states. Members of the staff have been active and productive in research and writing.

REPORT OF THE DEPARTMENT OF CHEMICAL ENGINEERING. The revision of the first and second year curricula throughout the Institute has enabled this Department advantageously to revise the work of the third and fourth years in the interests of better correlation among the various subjects of study. Conferences with the alumni group in New York and the Society for the Promotion of Engineering Education at the University of Michigan indicated a consensus of opinion that the professional training offered in this course is well organized, and also that instruction all over the country is becoming standardized

along lines in which this Department has done much of the pioneer work. Particular emphasis during the past year has been given to the important field of thermodynamics, both from the standpoint of theory and also of application to industrial thermal processes. Once again industry stepped in to take the services of the Director of our Research Laboratory of Applied Chemistry, Professor Forrest, who has been succeeded by Professor Marek. This Research Laboratory has had an unsatisfactory year from the financial standpoint, owing to the cancelling of industrial contracts on account of the general financial depression. The staff has therefore been reduced to skeleton proportions until such time as industrial conditions may justify a resumption of former activities.

REPORT OF THE DEPARTMENT OF CHEMISTRY. The introduction of a single fundamental course in freshman chemistry in place of the former two courses designated as the Engineering group and the Chemistry group, enable the staff to concentrate more effectively in using the subject matter of Chemistry, not only to fix principles and facts, but to prepare the students' minds to deal intelligently and resourcefully with the general phenomena of Chemistry. No other department has been so overtaxed for space and facilities to handle elementary students, since the enrollment in Chemistry has gone far beyond that which was contemplated in the original planning of the laboratory. The overcrowded condition of advanced laboratories will be relieved with the completion of the new buildings. A total of 59 scientific publications during the year bears witness to the productive activity of the staff. Much time and work during the year have been devoted to coöperation in planning the details of the new laboratories.

REPORT OF THE DEPARTMENT OF CIVIL AND SANITARY ENGINEERING. Curriculum changes include those necessitated by the revision of the general undergraduate schedule for all first and second year students and also the addition of courses in geodesy and seismology, river hydraulics and harbor works engineering.

Coöperative investigations have been continued under agreement with the Bureau of Public Roads of the United

States Department of Agriculture dealing with the effect of frost on roads and the study of factors which influence soil movements. Under arrangement with the committee on Earths and Foundations of the American Society of Civil Engineers, investigations have been made on the settlement of buildings resting on compressible substrata. In coöperation with the Massachusetts State Association of Master Plumbers, a program of research has been carried out on the subject of plumbing fixtures. In addition to these coöperative projects, a considerable amount of experimental research has been carried on in the fields of soil mechanics, river hydraulics and seismology.

Tentative plans for an important research program for water and sewage treatment have been prepared by the Department, and discussed in a conference with leading sanitary engineers. During the summer Professor Camp has made a tour of inspection of different treatment plants and laboratories in this country and Canada to secure further information for guidance in this project, whose undertaking is now dependent upon the necessary funds.

REPORT OF THE DIVISION OF DRAWING. An entire reconstruction of the course in descriptive geometry, that has occupied the attention of the staff during the last three years, has produced most satisfactory results. During the past year a similar study and revision have been made of the work in drawing.

REPORT OF THE DEPARTMENT OF ECONOMICS. The ordinary and important activities of this Department have continued as before, but under a somewhat altered setting, owing to the completely independent status of the new Department of Business and Engineering Administration. The two departments, however, are coöperating closely. Owing to the rapid changes which are taking place in our economic life it is becoming increasingly difficult to find a single satisfactory textbook, so that special efforts were made during the past year to remedy this deficiency through selected readings dealing with current problems.

REPORT OF THE DEPARTMENT OF ELECTRICAL ENGINEERING. Selection of students for various sections of undergradu-

ate classes according to students' interests and mental speeds, and also the formation of honors groups in the junior and senior classes, continue to give satisfactory results. Students are being given greater freedom in their choice of work in the Electrical Engineering laboratories, with the result that the interest of the student, the vitality of the instruction, and the level of importance of the laboratory work, have been improved. An important need in the Department will be filled by the work of the newly appointed Associate Professor of electrical measurements, who will aid in effectually generalizing this important laboratory subject and in introducing laboratory measurements and research which are in line with the present extraordinarily rapid developments in methods of electrical measurement and control. This Department has received the consent of the Faculty to an experimental plan of comprehensive examination of the senior honors group.

Outstanding research and development projects in the Department are: the new mechanical integraph which has proven its ability to make rapid and accurate solutions of important and difficult differential equations in a great variety of fields of engineering and pure science; the work of the network analyzer in solving six commercial power circuit problems; the stroboscopic and theoretical study of transient phenomena; the contributions of the laboratory at Round Hill to the knowledge of the penetration of light through fogs, and the study of the distribution of intensity of radio signals about an antenna, to which investigations Colonel Green has made very considerable financial contributions. The department staff have produced 28 publications during the year in the field of electrical engineering.

Although this is not included in the report of the head of the department, it should be mentioned that Professor Jackson was recently awarded the Lamme Medal by the Society for the Promotion of Engineering Education for his contributions to this field. These contributions deal largely with the plan for honors students and comprehensive examinations, to which I have just alluded.

REPORT OF THE COURSE IN ELECTROCHEMICAL ENGINEERING. The chief changes in curriculum have been the substitu-

tion for certain mechanical engineering studies of new work in electronic physics in the endeavor to concentrate on fewer subjects and to treat them with greater thoroughness. The research work by students and staff has dealt principally with overvoltages, electrical conductivities, corrosion tests, various metallic deposition studies, and the formation of certain nickel alloys.

REPORT OF THE DEPARTMENT OF ENGLISH AND HISTORY. In the interests of giving more thorough training along needed lines, the size of sections has been decreased, the number of conferences between instructors and students has been increased, more theme writing has been required, and several methods have been developed to increase the interest in and attention to the art of oral and written expression. As an illustration of the serious desire of students to improve themselves in this field, 61 fourth year students voluntarily enrolled for an extra course, without credit, with a view to improving their form in written work. The Department has coöperated particularly with the Departments of Architecture, Chemical Engineering and Mechanical Engineering in giving men special practice in presenting reports before groups of students organized as committees or boards of directors.

REPORT OF COURSE IN FUEL AND GAS ENGINEERING. The course in automotive fuels has been modified to include less of refinery practice and more of the thermodynamics and mechanism of combustion processes. Activities of the staff include a short series of lectures to the employees of the gas companies, satisfactory progress on two industrial gas metering projects sponsored by public utilities groups, progress on the mechanism of combustion of solid carbons, and other researches including luminous flame and non-luminous gas radiation studies, industrial furnace design study, cracking of heavy hydrocarbons under pressure, etc.

REPORT OF THE DEPARTMENT OF GEOLOGY. During the leave of absence of Professor W. Lindgren, Head of the Department, from March first to the end of the term, Professor H. W. Shimer acted as Head. The number of students specially en-

rolled in the Department, which is 20, does not adequately represent the importance of the Department, since instruction is given to about 170 students from other Departments. Acquisitions by the Department includes a new goniometer, a set of new and adequate polishing machines, additional microscopic equipment, a morphological set of ammonites, and an adequate X-ray equipment for studying crystal structure which has been purchased from a grant from the Rockefeller Research Fund.

The staff continued active in investigation and publication and is to be strengthened next year by the addition of Associate Professor Louis B. Slichter, who will have charge of the development of a new phase of study — Geophysics.

REPORT OF THE DEPARTMENT OF MATHEMATICS. Professor F. S. Woods has succeeded Professor H. W. Tyler as Head of this Department. During the past year the growth and achievements of the Department have been very gratifying. Counting the first and second terms together, 293 graduate students have been enrolled in Mathematics courses. Several distinguished foreign lecturers have added greatly to the work of this Department during the year. Professor J. A. Schouten, of the Delft Technical School, spent nearly the whole first term at the Institute as Visiting Professor under the Rockefeller Foundation. Professor Blaschke, of the University of Hamburg, and Professor Bompiani, of the University of Rome, also gave lectures in Differential Geometry and Projective Construction respectively.

REPORT OF THE DEPARTMENT OF MECHANICAL ENGINEERING. During the past year there have been important additions to the equipment of this Department. This includes equipment for air conditioning which will be suitable both for class demonstration and for experimental and research work. It also includes various vacuum and compression pumps. Perhaps most important is the exchange of the old 300,000 pound Emery Testing Machine after 30 years of service for a modern machine fitted with all the most recent conveniences and developments, and of the same capacity. This new machine is now in course of installation.

In the Textile Laboratory new spinning and loom equip-

ment and several testing machines have been installed. During the year a group of mill men was given an intensive course in textile technical analysis and textile microscopy. The work in the textile microscopical laboratory has been quite successful and is directly responsible for the issuance of a 100-page catalogue devoted entirely to optical instruments for the textile industry recently published by the Bausch and Lomb Optical Company. Our textile laboratory is working in coöperation with the newly formed United States Institute for Textile Research.

Professor Hencky, a notable addition to the staff coming from Delft, Holland, has spent the greater part of his time during the year on an investigation of the plastic flow of materials under stress, and in lectures on Rheology to a class of graduate students. A number of interesting investigations have been carried on by members of the staff and there have been ten lectures given by men who are prominent in various aspects of mechanical engineering in industrial organizations.

Although about $10,000 worth of tools have been donated to the Tool Laboratory, it is pointed out that much of the equipment there is forty years old and needs replacement as soon as funds may be available.

REPORT OF THE COURSE IN METEOROLOGY. During the year graduate studies in the Department were pursued by four naval officers and four civilian students. Valuable coöperation in courses and in research has been carried on with the Museum of Comparative Zoölogy at Harvard University, with the Oceanographic Institute, and the Scripps Institution. Theoretical studies of air masses and well-analyzed weather charts for the North American continent have been important objectives during the year. The high standing of the Department is evidenced by the important part which its staff has played during the past year in the published activity of the National Research Council and in the proceedings of the Meteorological section of the International Geophysical Union held in Stockholm last summer.

REPORT OF THE DEPARTMENT OF MILITARY SCIENCE AND TACTICS. Because of the increased enrollment at the Institute,

the students' battalion of four companies has been expanded to a student regiment of a band and two battalions of three companies each. New uniforms have greatly improved the appearance of the regiment. The requirements instituted last year that all students registered for advanced Military Science should devote at least one hour per week to practical instruction in drill and command, has resulted in improved leadership and greater ease in positions of command among the advanced students.

REPORT OF THE DEPARTMENT OF MINING AND METALLURGY. The increasing demand of industry for men trained in metallurgy has resulted in a substantial increase in the number of students electing courses in this Department. Associate Professor John T. Norton has been granted a half year's leave of absence to enable him to study in Stockholm under Professor Westgren in the field of Radiology. Outstanding outside lecturers of the year include Professor Westgren, Mr. P. P. Alexander, Research Engineer of the Thomson Laboratory of the General Electric Company, and Mr. Hans F. T. Lundberg, Vice-President and Field Manager of the Swedish American Prospecting Corporation, Mr. Charles S. Hurter of the du Pont Company, Mr. R. S. Dean of the Bureau of Mines, Mr. George H. Gilman of the Worthington Pump and Machinery Company. The members of the staff have been quite active during the year in important contributions to the solution and development of industrial projects.

During the past year a considerable amount of new equipment was added including nitriding furnaces, an induction melting furnace, several furnaces for fire metallurgy, two flotation cells, an electrostatic separator, a sand box for small scale studies of equipotential prospecting, and some polishing equipment.

REPORT OF THE DEPARTMENT OF MODERN LANGUAGES. The combination of the two former Departments of German and Romance Languages into the one Department of Modern Languages has proceeded with satisfactory results. Mention is made of the excellent coöperation of other departments and the increasing appreciation on the part of the students of the

advantage of foreign language study. The Department is attempting to stimulate and encourage the staff by arranging for their summer visits to Europe. Attention is called to the pitiably small fund allotted to the Central Library for the purchase of recreational books in foreign languages, this fund amounting to only $15.

The Department reports with deep regret the serious illness of Professor Vogel early in the first term, necessitating the suspension of his work early in the year and his retirement in July.

REPORT OF THE DEPARTMENT OF NAVAL ARCHITECTURE AND MARINE ENGINEERING. An important development in this Department is the assignment to duty at the Institute of Commander H. E. Rossell to assist Professor Hovgaard. The Executive Committee has voted to confer on Commander Rossell the title of Professor of Naval Construction. Commander Rossell has recently been the Head of the Department of Mathematics at the United States Naval Academy.

Professor Hovgaard has published an important series of articles on the distribution of stresses and was invited to report on this work at an international conference in London. The Head of the Department, Professor Jack, attended meetings of the Institution of Naval Architects and the Association Technique Maritime et Aeronautique held in Paris, and took part in the discussion. Professor Burtner also had an opportunity to visit a number of European shipyards.

REPORT OF THE DEPARTMENT OF PHYSICS. The present year has been one of transition in this Department, and much energy has been expended in making plans for future development. The design of the new Research Laboratory has been completed and construction is well under way. At the same time a research program has been developed and expanded and a number of new appointments have been made to the staff.

There has been a rather thorough revision of the entire course of study in the Department. A modification in the method of presenting the first year physics caused considerable difficulty both to students and instructors for a time, but resulted in the end in increased interest in and mastery of the

subjects. The advanced courses have been made largely elective, and a list of elective subjects has been provided which covers without duplication the important developments in experimental and theoretical physics.

This has been the first year of the Department in charge of its new Head, Professor John C. Slater. Another new appointee, Professor G. R. Harrison, has been appointed Director of the Laboratory. The Department was fortunate during the first term in having present as Visiting Lecturer Professor P. Scherrer of the Technische Hochschule in Zurich. His lecture demonstrations proved to be most popular to the Institute in general, as was proved by the fact that even standing room was not available to all who desired to attend clear up to the close of his course.

Among the subjects actively investigated by the research group may be mentioned Spectroscopy, Applied Optics, Discharge of Electricity in Gases, Magneto-Optical Phenomena, Studies of Dielectrics, and various aspects of modern and classical theoretical physics.

Report of Technology Loan Fund Board

Loans Made for 1930–1931

	Number of Applicants	*Number Granted Loans*	*Amounts Granted*	*Number Refused*
Graduate	32	26	$5,631	6
Class of 1931	79	68	16,683	11
Class of 1932	96	72	17,564	24
Class of 1933	60	46	11,045	14
Class of 1934	20	11	2,150	9
Unclassified	5	3	1,000	2
Totals	292	226	$54,073	66

Summary of Loans for 1931–32 (to 9–14–31)

	Number of Applicants	*Number Granted Loans*	*Amounts Granted*	*Number Refused*
Graduate	39	31	$12,641	8
Class of 1932	143	122	48,440	19
Class of 1933	161	115	46,126	46
Class of 1934	112	67	26,150	44
Class of 1935	4	2	750	2
Grand Totals	459	337	$134,107	119

The detailed reports of the various administrative officers and heads of departments follow.

Karl T. Compton

REPORTS OF OTHER ADMINISTRATIVE OFFICERS AND HEADS OF DEPARTMENTS

Dean. In September, 1930, the size of the entering class for the first time, except for a single year during the War, exceeded 700. This freshman Class of 1934, which totalled 734, was 41 larger than its predecessor, and it was the fourth successive freshman class to show an increased registration.

The administrative responsibilities of annually assimilating into the Institute system such a sizable group have made especially exacting one of the primary functions of the Dean's office. Coming as they do from widely assorted home and geographical environments, with their preliminary training founded upon such diverse backgrounds as are afforded by American private and public secondary schools, private tutors, or by American or foreign colleges or universities, with some laboring under physical handicaps and others whose financial resources are well-nigh non-existent, it is apparent that, in the non-academic sense at least, there is no "typical" freshman.

A moment's reflection will make clear, therefore, that, in seeking the causes of a freshman's academic failure an inquiry into his non-academic background is imperative. Baffling and unfruitful though such an inquiry often seems, its prosecution not infrequently discloses a symptom which, when an adjustment is practicable, points the way to salvation from academic disaster.

To continue and expand the provisions for such individual treatment of the larger number of first-year students, Mr. Thomas P. Pitre was appointed Acting Assistant Dean for 1930–31. He assumed his duties fortified by experience in preparatory school teaching and by some ten years' of service on the Institute's staff as an instructor of first-year inorganic chemistry. The results of his experimental year's association in the program of the Dean's office, not only in counseling freshmen but in carrying out other duties, amply justified his appointment as Assistant Dean beginning with 1931–32.

While a vastly increased student body is by no means the Institute's primary objective, a continued growth in the number of applicants for the first year class is refreshing evidence that her prestige, both nationally and internationally, is being

maintained and enhanced. Moreover, such a continuing increase, by constantly pressing to the fore the acute needs for an enlarged staff, and for more space and equipment to handle the larger numbers, provokes renewed consideration of the proposition to limit the size of our freshman class by selecting for its membership only those who give definite promise of possessing a more than ordinary aptitude for Institute work.

The citation that the size of the entering class moved from 495 in 1926–27 to 734 in 1929–30, striking though it be, becomes even more cogent when accompanied by the statement that each intervening year has witnessed a more rigid application of the entrance requirements.

Though shifting economic conditions may cause, from time to time, a fluctuation in the rate of growth of the entering class, and in certain years may operate to cause a temporary numerical decrease, it is patent that the question of limitation merits earnest and thoughtful study. In the prosecution of such a study the data obtainable through the agency of the "Scholastic Rating System," which was placed in effect for the Classes of 1933 and 1934 this past year, should prove of the utmost help.

This Rating System, formulated through studies carried out by the Registrar over the previous three years, provides an index of a student's accomplishment at the end of each term, and, in addition, a cumulative up-to-date index of his entire academic career. Its immediate purpose is twofold: first, to afford the student and his parents an unavoidable, direct measure of the academic benefit he is deriving from continuance at the Institute; and second, to substitute for the hitherto cumbersome series of Faculty Committee meetings at the conclusion of the terms a more equable and earlier elimination of those students unfitted to meet minimum requirements. It may be stated conservatively that in its year of trial the Rating System proved both to Faculty and student body that it is a desirable improvement over the discarded system of "Faculty Votes" by which students were previously warned of low standing or dismissed from the Institute.

But the Rating System is also a most helpful instrument for comparing the relative scholarship of different undergraduate groups, for determining an individual's fitness for the pursuit of

post-graduate study, and for expediting the general administrative work attendant upon the award of scholarships and loans. For example, the Rating System readily enabled the following comparison of the average scholastic achievement of dormitory and fraternity groups for the two terms of 1930–31, an index of 3.00 representing a "Pass" average:

		Dormitories	*Fraternities*
First Term	Freshmen	3.15	2.76
	Sophomores	2.87	2.60
	Juniors	2.97	2.76
	Seniors	3.11	3.00
	Total	3.04	2.78
Second Term	Freshmen	3.12	2.77
	Sophomores	2.99	2.72
	Juniors	3.12	2.71
	Seniors	3.30	3.26
	Total	3.15	2.93

This favorable accomplishment of the dormitory residents was particularly gratifying, coming as it did during the first year's operation of the new halls now designated as the Alumni Group. From an experimental building providing for less than 150 students in 1916, the Institute's dormitory facilities have now been expanded over fourfold.

The fundamental — and somewhat unique — operating principles have been maintained during the decade and a half without change: first, to make the Institute's dormitories so attractive in price, equipment, and living conditions that there need be no regulation requiring any student, or group of students, to live therein but instead to have the demand for rooms exceed the supply; second, that student government shall prevail throughout the dormitories in fact as well as name. It is believed that Technology now has the only university dormitory system of its size operated entirely without the presence of proctors.

On a smaller scale the past year saw the successful inauguration of a student housing project under the auspices of the Technology Christian Association, the funds for which were received through the generosity of an anonymous donor. This venture, carried out in a dwelling house in the Back Bay section of Boston and known as the "M. I. T. Student House," has

accommodated approximately fifteen undergraduates. It has been an experiment of living at a minimum expense, with the participating students themselves performing the ordinary operations of housekeeping.

All credit for the sponsoring of this worthwhile project is due the Technology Christian Association, which body this past year also fostered the new "Tech Cabin," a week-end resort for students and members of the Instructing Staff located at Camp Massapoag, near Dunstable, Massachusetts. By its commendable administration of these two new features of its program for improving the conditions of a student's non-academic life at Technology, the T. C. A. has added appreciably to the Institute's existing obligations for its activities, among which may be mentioned the annual Freshman Camp, held in September, 1930, for the fifth consecutive year, and the Undergraduate Employment Bureau, as well as its other service departments.

It is possible to report that 1930–31 witnessed a continued demonstration of the student body's inclination to treat Walker Memorial more and more as the center of undergraduate activity and social life. For the second successive year it has been the scene of the Junior Promenade, and practically every other important general student dance of the year was held there. The proximity of some two hundred additional dormitory residents has, of course, tended to center more of the day-to-day student life in Walker. It is to be hoped that the time is not far distant when the recreation facilities of Walker, especially the lounge rooms, may be increased. The newly opened Burton Room in the Alumni Group serves as a needed center for dormitory men and has helped to ease the need of a larger recreation hall, or halls, to supplement the existing space devoted to that purpose in Walker.

Outstanding among the successful student activities during 1930–31 were the conduct of the Institute Committee under the able chairmanship of H. P. Champlain '31, the Ninth Annual Open House, reaffirmed as a project entrusted to student management, and the *Technique*. Resplendent in a new and larger format, exhibiting a commendable willingness to depart from tradition in year-book editing, this volume justified the ambition of its editors and managers by its appearance and by its reception.

This past year Tech Show gave a performance outside of Greater Boston for the first time since 1928. This appearance at Mount Holyoke College, together with five performances at the Fine Arts Theatre in the Back Bay, however, were operated at a financial loss which was, of course, a disappointment to the Show's management and its Alumni Advisory Council. The loss was occasioned by decreased revenues from the sale of tickets. Whether this situation was due to transient conditions, or whether the fundamental interest of the undergraduate body and general public in student musical comedies and revues has been dissipated to such an extent as to out-mode this phase of activity, at least on the scale it flourished before the War, is a problem which must be dealt with in considering the future of Tech Show. This problem is occupying, and doubtless will continue to occupy, the immediate attention of the Show's Advisory Council, for some time to come.

The undergraduate athletic program showed no important innovations or changes. The effort to increase the size of the several squads, which has long been a fundamental feature, has continued with gratifying results. Squash, noted a year ago as a promising club activity, has now attained the dignity of recognition as an accepted intercollegiate competition. Naturally this has stimulated interest and increased the number practicing the game.

One very definite tendency in the operation of sane college athletics today is the increasing emphasis which is being laid on the so-called "carry-over" sports, or games for which graduates have opportunity after they have left the well-equipped confines of the college. Squash, tennis, and golf are perhaps most commonly available to the young graduate, and a measure of proficiency acquired during his undergraduate years is justly recognized as an asset. Also a selective few will continue in such activities as swimming, fencing and boxing, though the latter would not normally fall in the category of the "carry-over" games. Crew is likewise properly listed among those activities that need not be relinquished upon graduation, especially in Greater Boston and Philadelphia, which are at present peculiarly fortunately situated both in the facilities for aquatics and in the number of older men who still follow the game.

Another matter may be regarded as apposite to a considera-

tion of Technology athletics of this past year though it deals with extra, rather than intra-mural, conditions. A year ago mention was made of the report of the Carnegie Foundation for the Advancement of Teaching in its Bulletin No. 23, and the favorable comment voiced therein on our method of conduct of athletics. The effects of this report naturally have been far-reaching and a number of institutions are already conforming more nearly to the criteria which the report offered for consideration. Curiously enough, in New England a counter current has developed in certain quarters, and it was seriously proposed at an intercollegiate conference last spring that the amateur rule be deleted from the college sports code. As might well be anticipated, the suggestion met with scant favor, but that it should have been made is indicative of an unfortunate trend.

The ever-present problem of the financially embarrassed student of superior academic ability assumed even more import during this past year than previously. This was occasioned by the generally depressed economic conditions but, more particularly, because the Technology Loan Fund became operative initially for 1930–31. Its introduction at such a timely period markedly increased the Institute's sources for extending financial aid to assist students in meeting their tuition bills.

For 1930–31, 292 applications were received and 226 of these were acted upon favorably by The Technology Loan Fund Board. The total amount lent was $54,073, an average of $239 per person.

During 1930–31, students who expected to negotiate loans to meet a part, or all, of their 1931–32 tuition bills were asked to make early applications and 413 such requests were received during the spring of 1931. This increased number over those applying for 1930–31 was probably due to the expected increase in the tuition fee for 1931–32, as well as to a continuance of the business depression.

In addition to the financial aid extended through loans, undergraduate scholarship awards for 1930–31 were made to 469 men and 17 women, totalling $85,605 and $6,200 respectively. Approximately these same amounts will be available for 1931–32 and tentative assignments to 362 men and 12 women, totalling $73,096 and $4,500 respectively, have already been made.

As in previous years, the average undergraduate scholarship grant to women during 1930–31 ($365) was appreciably larger than the average amount to men ($182) because the funds restricted to women by their deeds of gift greatly exceed, in proportion to the number of qualified applicants, the unrestricted funds. The percentage of the undergraduate body receiving scholarship aid during 1930–31 was 18.2 as compared with 15.8 in 1929–30, 15.0 in 1928–29, and 13.7 in 1927–28.

During 1930–31, 171 were disqualified from attendance at the Institute for one term because of poor scholarship, 85 for one year, and 54 finally.

Disciplinary cases during 1930–31 included two students who were dismissed by the Faculty on account of misconduct and one who was placed on probation by the Dean.

H. E. LOBDELL.

Dean of Graduate Students. The registration of graduate students pursuing courses leading to higher degrees has shown a steady and rapid growth during the past decade. The official figures* on November 1 were 523, representing a 25 per cent increase over the preceding year. As the total enrollment was 3,209, it is seen that one-sixth of all the students in the Institute were college graduates working for higher degrees.

With the increasing number of applications for admission, the Committee on Graduate Courses and Scholarships has been faced with the difficult problem of selection, as the success of our graduate work is measured by quality rather than number of students. Although no attempt has been made to place a definite limit on the number of graduate students admitted, the Committee voted during the past year to restrict admission to those whose undergraduate scholastic rating placed them in the upper two-thirds of a graduating class of the Institute. In applying this criterion to students from other institutions, all information which it is possible to obtain regarding the applicant's qualifications is taken into consideration. Not only are his scholastic records carefully scrutinized, but also confidential reports received from the Dean of the college and from professors, on the applicant's standing in his class and his probable

*Note: including students pursuing courses leading to the Certificate of Public Health, and without reference to an advanced degree, the number was 539.

success in undertaking advanced study and research, are given due weight. The Registrar is making a statistical study of the undergraduate records of graduate students entering from other colleges and their subsequent standing at the Institute. This will eventually afford a basis of estimating the relative standards of marking in the various institutions from which our graduate students come. The rating system which he has introduced is proving of great assistance to the Committee. This year a number of our own graduates were refused admission to advanced work because their undergraduate records gave no evidence of ability to meet the more exacting requirements of a higher degree.

It has been a rule of the Faculty for many years that to meet the requirements of the Master's Degree the student must not only pass all subjects in his approved course of study but his scholastic standing must be of a distinctly high grade. During the past year the minimum rating which it is expected the student shall attain has been somewhat raised. The first year of study of students working for the Doctorate is regarded as a probationary year during which the department in which the student is majoring endeavors to determine whether he possesses those qualifications, particularly in the field of research, which are essential to a candidate for the Doctorate. If a student fails to meet these requirements he is advised to limit his graduate work to the attainment of a Master's degree or to discontinue it entirely.

The registration for the past two years tabulated according to the degrees applied for, is given below:

Degree	*1929*	*1930*
Doctor of Philosophy	55	70
Doctor of Science	63	71
Doctor of Public Health	1	1
Master of Science	296	364
Master in Architecture	8	17
Total	423	523

The percentage increase in registration is distributed about equally between the applicants for the Master's and for the Doctor's degree. Of the total number of graduate students, 109 were members of the instructing staff; of these 58 were working

towards the Doctor's degree and 51 towards the Master's degree. Every state and the District of Columbia were represented in the registration with the exception of Mississippi, South Dakota, Wyoming, New Mexico and Nevada; also the following foreign countries:

Austria	Germany	Porto Rico
Belgium	Guatemala	Russia
Brazil	Hawaii	Siam
British West Indies	Iceland	South Africa
Canada	India	Spain
China	Italy	Straits Settlement
Danish West Indies	Japan	Sweden
Egypt	Lithuania	Switzerland
England	Mexico	Syria
Esthonia	Philippines	Turkey

The number of colleges, universities and technical schools sending representatives was 168, of which 27 were in countries outside of the United States.

The greater number of students entering the Institute for graduate work have specialized in science or engineering in their undergraduate work, and in general have received the degree of Bachelor of Science. However, an increasing number of students with the Bachelor of Arts degree are coming to the Institute for their professional education, and, provided they have judiciously selected in college fundamental courses in mathematics, physics and chemistry, are usually able to complete the work for a higher degree in two or three years. Many of these students with their broad training in the humanities rank among our outstanding graduates.

The degrees upon which graduate students were admitted the past year were as follows:

Degrees from M. I. T.	
Bachelor of Science	183
Master of Science	37
Doctor of Science	1
Total	221

Degrees from Other Colleges	
Bachelor of Science	176
Master of Science	21
Bachelor of Arts	60
Master of Arts	6
Doctor of Philosophy	1
Doctor of Medicine	1
United States Military Academy	1
United States Naval Academy	25
Credentials from Foreign Universities	27
Total	318

From these figures it appears that 60 per cent of our graduate students come from other Institutions. As a graduate school the Institute is becoming distinctly national in character. The number of advanced students coming from foreign countries,— approximately 5 per cent — is indicative of the increasing recognition accorded the Institute abroad.

The number of advanced degrees conferred in December, 1930 and June, 1931 was as follows:

Doctor of Philosophy	8
Doctor of Science	8
Master of Science	190
Master in Architecture	9
Total	215

This represents about 30 per cent of all degrees, 704, conferred during this period.

The appeal for graduate scholarship aid the past year has been more urgent than ever before, due probably in part to the business depression. The Committee considered 358 applications. The appropriation placed at the disposal of the Committee consisted of $35,760 from endowed fellowship and scholarship funds; $10,500 from special fellowships annually provided, and $22,000 from general institute funds, a total of $68,260. Of this, $19,722 was awarded as 18 fellowships carrying stipends from $500 to $1,500 each; $48,538 was applied to 212 scholarships not exceeding in any case the amount of tuition. Fellowships were reserved, in general, for students working towards the Doctorate. Five fellowships were awarded to enable students to study abroad, two in France and three in

Germany. Of the tuition scholarships 87 were awarded to members of the staff and 125 to full-time students. Approximately 43 per cent of all graduate students received some financial assistance from scholarship funds.

The possibility of obtaining tuition loans from the Technology Loan Fund by students to whom the Committee on Graduate Courses and Scholarships was unable to make awards because of lack of funds, has made it possible for a number of excellent students to continue graduate work who would otherwise have been unable to do so. The extent to which graduate students have been thus aided will doubtless be summarized in the report of the Loan Fund Committee. It should be emphasized, however, that ample fellowships and graduate scholarships are necessary if the Institute is to attract the best graduate students in view of the financial inducements which other graduate schools are now offering.

With $500 tuition effective the coming year the older fellowships endowed to yield a stipend of $500 will suffice hereafter for tuition only, and will have to be supplemented from other funds if a fellowship is to signify more than a tuition scholarship.

It is gratifying to announce in this connection that Mr. Redfield Proctor has established for a period of three years the Redfield Proctor Traveling Fellowship, carrying a stipend of $1,500 for graduate study abroad, in an English-speaking University. This will enable an Institute graduate to enjoy opportunities corresponding to those offered to English students coming to the United States under the Commonwealth Foundation. It is hoped that other fellowships of this character may be established.

Mr. Gerard Swope has continued the three fellowships which he has so generously provided in the past, namely two fellowships of $1,000 and $500 respectively, for students in Electrical Engineering, and one fellowship of $1,000 for students in the Department of Physics.

The du Pont de Nemours Company has also established an Engineering Fellowship in Physics and Engineering of $750 in addition to that previously provided in the field of Chemistry.

H. M. GOODWIN.

The Registrar. The freshman class last September was the largest in the history of the Institute, except for the class which entered without examinations in 1918 under the Student Army Training Corps. The number of graduate students was also the largest. The increase in these two groups shows that Technology is assuming a leading position in graduate work, but that it is not becoming a graduate school as is frequently heard rumored. The total registration (3,209) has been exceeded only twice, namely, during two abnormal years (1920 and 1921) after the war.

There was a noticeable improvement in the quality of the preparation of the members of the entering class. During the preceding three years about 60 per cent entered without conditions, and previous to that, the average was 50 per cent. Last year 69 per cent entered without conditions; 18 per cent with one condition; 9 per cent with two; 3 per cent with three; and less than 1 per cent with more than three conditions.

Aeronautical Engineering again attracted a large proportion of the freshmen, although it was not the most popular course this year. There were 112 registered as compared with 148 last year, and present indications are that about 80 to 90 will select Aeronautical Engineering the coming year.

During the last decade the science group of courses has gradually become a larger proportion of our total registration, increasing from 7 to 12 per cent notwithstanding that two popular engineering courses, namely, Aeronautical Engineering and Building Construction have been added during this period.

The number of students entering from other colleges to pursue undergraduate study has been decreasing slightly in recent years, while the number applying for graduate instruction has been increasing. Moreover, a larger proportion of our own graduates continue graduate work. These two factors have increased our Graduate school until last year the 539 Graduate students represented 17 per cent of our total registration. Of the total number of degrees awarded each year for the past few years about one-third have been advanced degrees. This again emphasizes the increasing importance of our graduate instruction.

Statistics for the year 1930–31 follow:

All statistics on registration are as of November 1, 1930
All statistics on degrees are through June, 1931

TABLE 1

THE CORPS OF INSTRUCTORS

	'18	'19	'20	'21	'22	'23	'24	'25	'26	'27	'28	'29	'30
Faculty Members of the Staff	120	124	139	170	174	175	174	179	185	199	215	220	240
Professors	58	52	56	56	56	61	64	63	68	73	82	81	86
Associate Professors	29	33	34	35	40	43	42	49	55	58	61	59	63
Assistant Professors	33	39	49	54	48	46	51	53	51	58	64	71	80
Ex-Officio	—	—	—	—	—	—	—	—	—	—	—	2	4
Instructors	—	—	—	25	30	25	17	14	11	10	8	7	7
Other Members of the Staff	121	169	236	224	217	200	220	236	264	268	272	295	323
Instructors	67	99	109	84	80	92	98	112	116	115	119	116	123
Assistants	35	39	79	93	87	60	59	53	63	55	53	68	70
Lecturers	13	13	14	15	15	6	16	21	23	30	29	32	32
Research Associates	1	8	19	19	19	25	26	21	24	29	22	21	31
Research Assistants	5	10	15	13	16	17	21	29	38	39	49	58	65
Research Fellows (D. I. C. & R.)	—	—	—	—	—	—	—	—	—	—	—	—	2
Total	241	293	375	394	391	375	394	415	449	467	487	515	563
Other Members of the Faculty	13	13	14	14	16	16	15	17	14	13	11	14	15
Professors: Emeriti	5	5	6	5	8	8	7	7	6	6	4	4	6
Retired	6	6	6	7	6	5	5	7	5	4	3	4	3
Non-Resident	2	2	2	2	2	3	3	3	3	3	4	6	6

TABLE 2

REGISTRATION SINCE THE FOUNDATION OF THE INSTITUTE

Year	Number of Students	Year	Number of Students	Year	Number of Students
1865–66	72	1887–88	720	1909–10	1,479
1866–67	137	1888–89	827	1910–11	1,506
1867–68	167	1889–90	909	1911–12	1,559
1868–69	172	1890–91	937	1912–13	1,611
1869–70	206	1891–92	1,011	1913–14	1,685
1870–71	224	1892–93	1,060	1914–15	1,816
1871–72	261	1893–94	1,157	1915–16	1,900
1872–73	348	1894–95	1,183	1916–17	1,957
1873–74	276	1895–96	1,187	1917–18	1,698
1874–75	248	1896–97	1,198	1918–19	1,819
1875–76	255	1897–98	1,198	1919–20	3,078
1876–77	215	1898–99	1,171	1920–21	3,436
1877–78	194	1899–00	1,178	1921–22	3,505
1878–79	188	1900–01	1,277	1922–23	3,180
1879–80	203	1901–02	1,415	1923–24	2,949
1880–81	253	1902–03	1,608	1924–25	2,938
1881–82	302	1903–04	1,528	1925–26	2,813
1882–83	368	1904–05	1,561	1926–27	2,671
1883–84	443	1905–06	1,466	1927–28	2,712
1884–85	579	1906–07	1,397	1928–29	2,868
1885–86	609	1907–08	1,415	1929–30	3,066
1886–87	637	1908–09	1,461	1930–31	3,209

TABLE 3

Classification of Students by Courses and Years

Course Name and Number	1928–29						1929–30						1930–31					
	YEAR						YEAR						YEAR					
	1	2	3	4	G	Total	1	2	3	4	G	Total	1	2	3	4	G	Total
Aeronautical Engineering XVI	93	36	37	31	27	224	148	34	35	31	30	278	112	27	26	38	30	233
Architectural Engineering IV-A	22	15	16	28	3	84	16	21	16	14	6	73	19	18	17	13	5	72
Architecture IV	54	45	61	47	11	218	48	55	40	77	8	228	47	35	45	56	17	200
Army Ordnance	—	—	—	9	—	9	—	—	—	11	—	11	—	—	—	11	—	11
Biology and Public Health VII	10	14	15	16	13	68	10	19	30	16	18	93	13	16	21	28	21	99
Building Construction XVII	25	27	24	14	—	90	23	29	23	27	—	102	16	26	22	18	—	82
Business and Engineering Administration XV	68	80	76	72	7	303	63	90	72	71	3	299	94	102	72	70	9	347
Chemical Engineering X	60	60	59	43	39	261	89	66	59	43	64	321	88	70	60	37	80	335
Chemical Engineering Practice X-A, X-B	—	—	—	11	46	57	—	—	—	12	51	63	—	—	—	10	59	69
Chemistry V	26	23	16	17	41	123	15	24	16	14	49	118	30	18	26	11	61	146
Civil Engineering I	67	54	49	48	25	243	42	42	57	47	26	214	47	46	39	52	33	217
Electrical Engineering VI	70	44	49	73	63	299	57	42	60	54	65	278	63	42	53	65	69	292
Electrical Engineering (Coöperative) VI-A	45	59	35	32	43	214	53	49	44	31	29	206	61	64	32	42	32	231
Electrochemical Engineering XIV	18	11	6	11	4	50	12	12	6	10	7	47	13	10	6	6	2	37
Fuel and Gas Engineering	—	—	—	—	13	13	—	—	—	—	7	7	—	—	—	—	11	11
General Engineering IX-B	6	6	4	14	—	30	6	10	9	12	—	37	4	5	14	23	—	46
General Science IX-A	3	1	2	5	—	11	2	6	3	2	—	13	3	1	1	4	—	9
Geology XII	5	2	3	5	11	26	2	6	3	5	8	24	1	1	3	3	9	17
Mathematics IX-C	4	4	1	5	5	19	3	7	5	1	8	24	6	4	6	3	10	29
Mechanical Engineering II	47	87	57	60	32	283	64	78	78	55	28	303	70	117	68	73	41	369
Metallurgy $III_{3,4}$	3	—	2	7	6	18	7	9	3	3	12	34	7	21	13	3	15	59
Mining Engineering $III_{1,2}$	9	11	8	4	1	33	3	11	10	8	1	33	10	11	10	12	3	46
Naval Architecture and Marine Engineering XIII	17	18	13	6	1	55	9	19	18	9	1	56	14	12	16	6	1	49
Naval Construction XIII-A	—	—	—	6	6	12	—	—	—	8	6	14	—	—	—	7	8	15
Physics VIII	6	8	10	7	13	44	10	20	10	13	16	69	7	23	21	9	18	78
Railroad Operation I-A	7	7	3	—	—	17	9	7	7	3	—	26	1	4	4	7	3	19
Sanitary Engineering XI	3	3	6	5	2	19	2	5	1	4	2	14	1	2	6	2	2	13
Ship Operation XIII-C	—	—	—	—	—	—	—	—	—	—	—	—	7	3	6	6	—	22
Unclassified	—	—	—	—	—	45	—	—	—	—	—	81	—	—	—	—	—	56
Totals	668	615	552	576	412	2,868	693	661	605	581	445	3,066	734	678	587	615	539	3,209

TABLE 4-A

Number of Students Registered by Courses, Options and Years

NO.	COURSE NAME	OPTION	YEAR 1 Opt.	YEAR 1 Tot.	YEAR 2 Opt.	YEAR 2 Tot.	YEAR 3 Opt.	YEAR 3 Tot.	YEAR 4 Opt.	YEAR 4 Tot.	GRAD. Opt.	GRAD. Tot.	TOTAL Opt.	TOTAL Tot.	COURSE NUMBER
I	Civil Engineering.	1. General	—		—		8		18		—		—		
		2. Transportation Engineering	—	47	—	46	10	39	10	52	—	33	—	217	I
		3. Hydroelectric Engineering	—		—		21		24		—		—		
		4. Geodesy & Seismology	—		—		—		—		—		—		
I-A	Railroad Operation		—	1	—	4	—	4	—	7	—	3	—	19	I-A
II	Mechanical Engineering		—	70	—	117	—	68	—	73	—	41	—	369	II
III	Mining Eng. &	1. Mining Engineering	8		7		9		11		3		38		
	Metallurgy	2. Petroleum Production	2	17	4	32	1	23	1	15	—	18	8	105	III
		3. Metallurgy	2		11		8		3		15		39		
		4. Physical Metallurgy	5		10		5		—		—		20		
IV	Architecture		—	47	—	35	—	45	—	56	—	17	—	200	IV
IV-A	Architectural Engineering		—	19	—	18	—	17	—	13	—	5	—	72	IV-A
V	Chemistry		—	30	—	18	—	26	—	11	—	61	—	146	V
VI	Electrical Engineering		—	63	—	42	—	32	—	40	—	69	—	246	VI
VI-C	Electrical Engineering (Communications Option)		—	—	—	—	—	21	—	25	—	—	—	46	VI-C
VI-A	Electrical Engineering (Coöperative)	Group A	—	61	—	64	16	32	16	42	11	32	—	231	VI-A
		Group B	—		—		16		26		21				
VII	Biology &	1. Biology & Public Health	11		12		14		20		—				
	Public Health	2. Industrial Biology	—	13	3	16	5	21	7	28	—	21	—	99	VII
		3. Public Health Engineering	2		1		2		1		—				
VIII	Physics		—	7	—	23	—	21	—	9	—	18	—	78	VIII
IX-A	General Science		—	3	—	1	—	1	—	4	—	—	—	9	IX-A
IX-B	General Engineering		—	4	—	5	—	14	—	23	—	—	—	46	IX-B
IX-C	Mathematics		—	6	—	4	—	6	—	3	—	10	—	29	IX-C
X	Chemical Engineering		—	88	—	70	—	60	—	37	—	80	—	335	X
X-A	Chemical Engineering Practice — Graduate		—	—	—	—	—	—	—	—	—	59	—	59	X-A
X-B	Chemical Engineering Practice — Undergraduate		—	—	—	—	—	—	—	10	—	—	—	10	X-B
XI	Sanitary Engineering		—	1	—	2	—	6	—	2	—	2	—	13	XI
XII	Geology		—	1	—	1	—	3	—	3	—	9	—	17	XII
XIII	Naval Architecture & Marine Engineering		—	14	—	12	—	16	—	6	—	1	—	49	XIII
XIII-A	Naval Construction		—	—	—	—	—	—	—	7	—	8	—	15	XIII-A
XIII-C	Ship Operation		—	7	—	3	—	6	—	6	—	—	—	22	XIII-C
XIV	Electrochemical Engineering		—	13	—	10	—	6	—	6	—	2	—	37	XIV
XV	Business and	1. Civil Engineering	16		12		9		7		—		44		
	Engineering	2. Mech. & Elec. Engineering	55	94	71	102	53	72	58	70	—	9	246	347	XV
	Administration	3. Chemical Engineering	23		19		10		5		—		57		
XVI	Aeronautical Engineering		—	112	—	27	—	26	—	38	—	30	—	233	XVI
XVII	Building Construction		—	16	—	26	—	22	—	18	—	—	—	82	XVII
	Army Ordnance		—	—	—	—	—	—	—	11	—	—	—	11	A. O.
	Fuel and Gas Engineering		—	—	—	—	—	—	—	—	—	11	—	11	F & G
	Unclassified		—	—	—	—	—	—	—	—	—	—	—	56	Unc.
Total				734		678		587		615		539		3209	Total

TABLE 4-B

NUMBER OF SPECIAL STUDENTS REGISTERED BY COURSES AND YEARS

(Included in Table 4-A)

COURSE	OPT.	YEAR					TOTAL	COURSE
		1	2	3	4	G		
I Civil Engineering	1	—	—	—	1	2	3	I_1
II Mechanical Engineering		2	—	1	1	1	5	II
III Mining Engineering and Metallurgy	1	—	—	—	1	—	1	III_1
	4	—	—	1	—	—	1	III_4
IV Architecture		7	4	7	16	—	34	IV
IV-A Architectural Engineering		—	—	1	1	—	2	IV-A
V Chemistry		1	—	1	—	—	2	V
VI Electrical Engineering		—	—	—	—	1	1	VI
VI-A Coöperative		—	1	—	—	—	1	VI-A
VI-C Communications		—	—	—	2	—	2	VI-C
VII Biology and Public Health	1	1	1	2	8	—	12	VII_1
	2	—	—	—	1	—	1	VII_2
	3	—	—	—	1	—	1	VII_3
Certificate in Public Health		—	—	—	—	3	3	C.P.H.
VIII Physics		1	—	—	—	—	1	VIII
IX-A General Science		1	—	—	—	—	1	IX-A
IX-C Mathematics		—	—	—	—	1	1	IX-C
X Chemical Engineering		—	—	—	—	3	3	X
X-A Chemical Engineering Practice		—	—	—	—	2	2	X-A
XII Geology		—	—	—	1	1	2	XII
XV Business and Eng. Administration		—	1	1	—	1	3	XV
XVI Aeronautical Engineering		—	—	—	1	2	3	XVI
XVII Building Construction		—	1	—	1	—	2	XVII
Army Ordnance		—	—	—	11	—	11	A.O.
Unclassified		—	—	—	—	—	8	Unc.
Total		13	8	14	46	17	106	

TABLE 5

CLASSIFICATION BY COURSES OF STUDENTS SINCE 1922

	1922–23	1923–24	1924–25	1925–26	1926–27	1927–28	1928–29	1929–30	1930–31
Engineering Courses . . . . . Total	2,767	2,599	2,548	2,423	2,253	2,240	2,305	2,405	2,564
Aeronautical Engineering XVI	15	12	14	15	72	170	224	278	233
Architectural Engineering IV-A	38	67	68	92	110	90	84	73	72
Building Construction XVII	—	—	—	—	—	66	90	102	82
Business and Engineering Administration XV	484	417	421	365	334	307	303	299	347
Chemical Engineering X, X-A, X-B	430	370	313	294	286	300	318	384	404
Civil Engineering I, I-A	319	326	322	298	273	233	260	240	236
Electrical Engineering VI, VI-A, VI-C	658	627	676	711	622	554	513	484	523
Electrochemical Engineering XIV	74	79	61	58	50	55	50	47	37
Fuel and Gas Engineering	—	—	—	3	8	14	13	7	11
General Engineering IX-B	75	115	99	81	44	32	30	37	46
Mechanical Engineering II	471	417	397	365	329	297	283	303	369
Military Engineering	—	—	—	—	1	—	—	—	—
Mining Engineering and Metallurgy III	94	85	96	68	57	51	51	67	105
Naval Architecture and Marine Eng. XIII, XIII-C	59	46	40	39	35	39	55	56	71
Naval Construction (Grad. U. S. N. A.) XIII-A	41	12	12	19	15	15	12	14	15
Naval Construction (Not Grad. U. S. N. A.) XIII-A Sp.	—	17	17	—	—	—	—	—	—
Sanitary Engineering XI	9	9	12	15	17	17	19	14	13
Science Courses . . . . . Total	231	226	220	219	227	248	291	341	378
Biology and Public Health VII	26	34	32	41	36	51	68	93	99
Chemistry V	128	130	127	110	122	108	123	118	146
General Science IX-A	11	13	10	10	6	10	11	13	9
Geology XII	20	17	20	21	15	14	26	24	17
Mathematics IX-C	8	10	10	13	17	18	19	24	29
Physics VIII	38	22	21	24	31	47	44	69	78
Architecture IV . . . . . Total	117	88	126	133	150	189	218	228	200
Army Ordnance . . . . . Total	25	18	12	9	8	10	9	11	11
Unclassified . . . . . Total	40	18	32	29	33	25	45	81	56
Grand Total	3,180	2,949	2,938	2,813	2,671	2,712	2,868	3,066	3,209

TABLE 6

Geographical Classification of Students from 1920

United States	1920	1921	1922	1923	1924	1925	1926	1927	1928	1929	1930
North Atlantic . . . Total	2,415	2,467	2,237	2,154	2,151	2,081	1,975	1,965	2,098	2,241	2,361
Connecticut	104	104	88	89	88	87	79	71	81	89	76
Maine	66	61	49	53	50	45	45	53	47	45	41
Massachusetts	1,516	1,540	1,449	1,418	1,479	1,407	1,347	1,349	1,411	1,540	1,612
New Hampshire	41	46	41	49	40	46	53	40	41	36	32
New Jersey	123	123	100	104	87	80	80	79	96	105	109
New York	341	354	314	265	256	263	247	241	278	285	322
Pennsylvania	143	160	134	113	94	100	77	88	102	100	107
Rhode Island	54	49	35	39	40	35	31	24	26	25	43
Vermont	27	30	27	24	17	18	16	20	16	16	19
South Atlantic . . . Total	160	167	149	142	143	128	119	132	138	146	156
Delaware	15	12	10	11	8	9	9	8	10	8	15
District of Columbia	37	39	38	39	43	46	39	58	57	51	46
Florida	14	14	13	10	10	11	14	15	13	10	11
Georgia	8	11	11	9	10	7	7	4	7	6	5
Maryland	18	33	29	28	23	15	15	13	18	22	19
North Carolina	11	7	11	4	10	6	7	9	10	11	13
South Carolina	8	7	6	7	8	11	8	7	5	9	5
Virginia	36	35	28	25	24	14	11	10	12	23	33
West Virginia	13	9	3	9	7	9	9	8	6	6	9
South Central . . . Total	91	111	113	78	77	67	73	71	71	85	86
Alabama	4	8	8	8	7	7	9	7	6	8	6
Arkansas	6	6	9	5	5	5	2	4	2	4	6
Kentucky	20	21	25	14	11	12	14	14	14	15	13
Louisiana	9	7	10	8	4	9	5	7	5	12	10
Mississippi	5	9	4	3	2	1	4	2	4	4	5
Tennessee	12	19	18	14	17	8	8	4	8	9	11
Texas	35	41	39	26	31	25	31	33	32	33	35
North Central . . . Total	337	312	279	251	259	243	240	265	270	290	302
Illinois	67	67	63	63	62	55	61	71	80	86	83
Indiana	27	26	21	14	15	19	18	19	13	15	17
Iowa	18	18	14	7	11	10	9	13	8	10	8
Kansas	6	5	4	9	8	9	9	12	13	9	15
Michigan	29	26	26	27	35	28	24	25	24	35	43
Minnesota	24	31	28	19	22	18	17	13	14	13	20
Missouri	35	33	32	31	29	27	28	38	43	42	36
Nebraska	11	11	6	6	7	6	5	7	5	8	7
North Dakota	4	5	1	3	2	2	4	3	3	4	3
Ohio	85	65	60	56	56	48	48	46	50	53	58
South Dakota	2	5	2	—	—	1	2	—	—	—	—
Wisconsin	29	20	22	16	12	20	15	18	17	15	12
Western . . . Total	139	149	129	117	87	83	78	82	89	98	103
Arizona	5	3	5	5	3	2	3	6	4	5	3
California	47	52	47	37	28	32	27	26	32	27	30
Colorado	23	28	16	19	17	13	10	23	14	15	22
Idaho	4	4	3	3	1	1	1	1	3	2	2
Montana	8	8	9	6	6	7	9	8	7	9	8
Nevada	1	—	—	—	—	—	1	—	—	—	—
New Mexico	4	4	4	3	—	—	1	2	1	3	2
Oklahoma	2	5	4	3	5	5	6	6	3	5	8
Oregon	11	14	17	15	10	8	7	3	9	8	5
Utah	10	8	5	4	4	3	2	5	4	4	3
Washington	20	21	15	19	12	11	11	11	12	18	18
Wyoming	4	2	4	3	1	1	—	1	—	2	2
Territories and Dependencies Total	27	31	26	23	24	22	16	29	19	19	20
Alaska	—	1	1	1	—	—	—	—	1	1	1
Canal Zone	2	2	2	2	3	3	—	8	—	—	—
Hawaii	3	4	6	2	2	4	4	6	3	4	4
Philippine Islands	11	14	9	7	12	11	7	7	8	7	6
Porto Rico	11	10	8	11	7	4	5	8	6	6	8
Virgin Islands	—	—	—	—	—	—	—	—	1	1	1
Total for United States	3,169	3,237	2,933	2,765	2,741	2,624	2,501	2,544	2,685	2,879	3,028

TABLE 6 (*Continued*)

Foreign Countries	1920	1921	1922	1923	1924	1925	1926	1927	1928	1929	1930
Total	267	268	247	184	197	189	170	168	183	187	181
Abyssinia	—	—	1	1	1	—	—	—	—	—	—
Africa	—	—	—	—	—	—	—	—	—	1	—
Albania	—	1	—	—	—	—	—	—	—	—	—
Argentine Republic	5	7	8	2	1	1	—	—	—	—	—
Armenia	2	—	—	1	—	1	—	—	—	—	—
Asia Minor	—	1	—	—	—	—	—	—	—	—	—
Australia	1	—	2	2	1	—	—	—	1	3	1
Austria	—	—	—	—	—	—	—	—	1	1	1
Bahamas	—	—	—	—	—	—	—	1	—	—	1
Barbadoes	—	—	—	1	1	1	—	—	—	—	—
Belgium	2	5	10	4	5	6	5	4	1	3	1
Bermuda	—	—	—	1	1	1	2	2	1	1	—
Bolivia	—	1	1	—	—	—	—	1	—	—	—
Brazil	7	5	3	2	2	2	1	—	2	—	2
British West Indies	—	—	—	—	—	—	—	—	—	—	1
Bulgaria	1	1	1	2	1	1	—	1	—	—	—
Canada	41	41	29	23	34	34	41	32	33	29	32
Chile	8	6	3	4	2	1	—	—	—	1	1
China	58	60	57	46	35	44	33	32	24	29	24
Colombia	2	1	2	—	2	1	2	6	10	6	6
Costa Rica	1	—	—	—	—	—	2	2	2	2	2
Cuba	8	8	11	10	10	5	2	9	7	6	10
Czechoslovakia	3	1	1	1	—	—	1	—	—	—	—
Denmark	3	4	2	—	1	2	1	—	1	1	1
Dominican Republic	—	—	1	—	—	—	—	—	—	1	1
Dutch West Indies	1	1	—	—	—	—	—	—	—	—	—
Ecuador	1	1	—	—	—	—	1	—	1	1	1
Egypt	—	—	1	—	1	—	—	1	2	3	2
England	3	8	4	3	5	4	3	2	3	5	7
Esthonia	—	—	—	—	—	1	1	1	1	1	1
France	2	3	3	4	3	4	2	4	3	4	5
Germany	—	—	—	—	—	1	2	1	3	8	7
Greece	4	3	2	—	3	1	3	1	—	1	1
Guatemala	1	—	—	—	—	1	—	—	—	—	1
Haiti	—	—	—	—	—	—	—	1	2	1	—
Hungary	—	—	1	1	1	1	—	—	—	—	—
Iceland	—	—	—	—	—	—	—	—	—	1	—
India	6	5	6	6	9	8	8	8	8	11	12
Irak	—	—	—	—	—	—	—	1	2	1	—
Ireland	1	1	1	—	—	—	—	1	1	—	1
Italy	—	1	1	2	4	6	1	1	1	1	2
Japan	12	6	6	2	9	10	7	6	10	5	6
Korea	1	1	1	1	1	2	2	1	1	1	—
Liberia	—	—	—	—	—	—	1	—	—	—	—
Lithuania	—	—	—	—	—	—	—	1	1	3	1
Mexico	18	15	12	11	17	12	11	13	16	14	13
Netherlands	—	—	—	—	—	—	—	—	2	1	—
Newfoundland	—	—	—	—	1	3	2	2	—	—	—
New Zealand	—	—	1	1	—	—	—	—	—	—	—
Nicaragua	—	1	—	—	—	—	—	—	—	—	—
Norway	30	21	15	6	7	3	1	—	1	2	2
Palestine	1	1	1	1	1	1	1	—	3	4	3
Panama	—	—	—	—	—	—	7	—	8	8	7
Paraguay	—	1	1	1	—	—	—	—	—	—	—
Peru	3	3	2	2	3	2	2	1	2	1	1
Roumania	—	2	1	1	1	2	2	1	—	—	—
Russia	12	12	16	11	5	6	6	3	3	2	—
Salvador	—	—	—	—	—	—	—	—	1	1	2
Scotland	1	1	1	—	—	—	1	2	1	1	—
Serbia	—	1	1	—	—	—	—	—	—	—	—
Siam	8	8	8	6	6	1	—	2	3	5	4
Smyrna	1	—	1	—	—	—	—	—	—	—	—
South Africa, Union of	4	4	3	4	4	4	3	2	4	4	3
Spain	5	4	6	3	3	2	—	1	3	5	6
Straits Settlements	1	—	—	—	—	—	1	—	1	1	1
Sweden	2	1	—	2	—	—	—	3	1	1	2
Switzerland	—	7	2	3	1	1	2	2	1	1	1
Syria	—	2	4	2	2	2	2	5	3	—	2
Tahiti	—	1	1	2	1	—	—	—	—	—	—
Turkey	1	2	1	2	3	4	3	4	2	2	1
Uruguay	6	9	12	7	6	3	1	1	—	—	—
Venezuela	—	—	—	—	2	3	4	6	6	3	2
West Africa	—	—	—	—	1	1	—	—	—	—	—
Grand Total, United States and Foreign	3,436	3,505	3,180	2,949	2,938	2,813	2,671	2,712	2,868	3,066	3,209

TABLE 7

WOMEN STUDENTS CLASSIFIED BY COURSES AND YEARS

COURSE	YEAR					Total
	1	2	3	4	G	
Aeronautical Engineering XVI	1	1	1	—	1	4
Architectural Engineering IV-A	—	—	1	—	—	1
Architecture IV	3	4	6	—	—	13
Biology and Public Health VII	2	1	4	4	7	18
Business and Engineering Administration XV	—	—	2	—	—	2
Chemistry V	2	—	1	—	2	5
Civil Engineering I	—	1	—	—	—	1
General Engineering IX-B	—	—	—	1	—	1
Geology XII	—	—	—	—	3	3
Mechanical Engineering II	1	—	—	—	—	1
Metallurgy $III_{3,4}$	—	1	1	—	—	2
Physics VIII	—	—	—	—	1	1
Unclassified	—	—	—	—	—	1
Total	9	8	16	5	14	53

TABLE 8

NUMBER OF OLD AND NEW STUDENTS

Year	1925–26	1926–27	1927–28	1928–29	1929–30	1930–31
Students registered at end of last academic year (including specials)	1,856	1,759	1,654	1,749	1,861	1,938
Students who have previously attended the Institute, but were not registered at end of last academic year	137	138	147	132	152	165
New students who entered by examination	405	381	465	483	549	609
New students who entered from other colleges as candidates for degrees	358	341	381	417	434	421
New students (specials, not candidates for degrees)	57	52	65	87	70	76
Total	2,813	2,671	2,712	2,868	3,066	3,209

TABLE 8-A

NUMBER OF NEW STUDENTS ADMITTED BY EXAMINATION

Status of Admission	Year of Entrance							
	1923	1924	1925	1926	1927	1928	1929	1930
Admitted Clear	230	212	211	198	282	298	319	419
1 Condition	107	123	107	94	101	105	134	110
2 Conditions	69	71	56	56	49	46	60	57
3 Conditions	22	25	26	27	22	27	25	21
More than 3 Conditions	6	9	5	6	11	7	11	2
Total	434	440	405	381	465	483	549	609

TABLE 9

LIST OF AMERICAN COLLEGES AND UNIVERSITIES, WITH NUMBER OF GRADUATES ATTENDING THE INSTITUTE

College		College		College	
Alabama Polytechnic Inst.	3	Gooding	1	Rochester	2
Albion	1	Grinnell	1	Sacred Heart	1
Allegheny	1	Harvard	16	St. Lawrence	3
Amherst	7	Haverford	4	St. Olaf	2
Antioch	1	Holy Cross	5	Simmons	3
Arizona	1	Hope	1	Simpson	1
Arkansas	1	Houghton	1	Smith	4
Armour Inst. of Tech.	2	Illinois	8	South Carolina	1
Austin	1	Iowa State	3	Southern California	1
Barnard	1	Johns Hopkins	2	Stanford	9
Bates	4	Kalamazoo	1	Susquehanna	1
Baylor	1	Kansas State Agricultural	2	Swarthmore	2
Boston College	3	Kansas University	3	Syracuse	2
Boston Teachers College	1	Kentucky	5	Tennessee	1
Boston University	4	Lincoln Memorial	1	Texas	6
Bowdoin	3	Lincoln University	1	Texas Agri. and Mech.	2
Brooklyn Polytechnic Inst.	4	Louisiana State	2	Tufts	4
Brown	1	Louisville	1	Tulane	1
Bryn-Mawr	2	Loyola	1	Tulsa	1
Bucknell	1	Maryland	2	Union	2
Buffalo	1	Massachusetts State	1	U. S. Military Academy.	12
California	5	Mass. Inst. of Tech.	204	U. S. Naval Academy.	27
Canisius	1	Miami	5	University of the South.	2
Carleton	1	Michigan	6	Vanderbilt	1
Carnegie Inst. of Tech.	4	Michigan Col. of Mines.	1	Vassar	3
Case School of App. Sci.	1	Michigan State	1	Villanova	1
Catholic Univ. of America	1	Middlebury	1	Virginia	1
Chicago	2	Minnesota	8	Virginia Military Inst.	7
Cincinnati	1	Missouri	3	Virginia Polytechnic Inst.	3
Citadel	1	Montana	2	Wabash	1
City of New York	4	Montana School of Mines	1	Washburn	1
Clarkson	1	Muskingum	1	Washington	4
Clemson Agricultural	1	Nebraska	1	Washington and Jefferson	2
Coe	1	New Hampshire	1	Washington and Lee	1
Colby	2	New Rochelle	1	Washington State	1
Colgate	2	New York	3	Wellesley	3
Colorado College	2	North Carolina State	5	Wesleyan	2
Colorado University	4	North Dakota Agricultural	1	Westminster (Colo.)	1
Columbia	2	Northeastern	10	West Virginia	3
Connecticut	2	Northwestern	2	Whitman	1
Cooper Union	1	Norwich	1	Wichita	2
Cornell	7	Notre Dame	3	William Jewell	1
Dartmouth	19	Ohio State	2	Williams	6
Davidson	1	Ohio Wesleyan	3	Wisconsin	2
Dayton	2	Oklahoma	3	Wittenberg	1
Delaware	4	Oregon	3	Worcester Polytechnic Inst.	2
Denver	2	Pennsylvania State	5	Yale	12
DePauw	1	Pennsylvania University	2		
Drexel Institute	1	Princeton	3	Total	654
Duke	1	Providence	3		
Earlham	1	Purdue	3		
Emory and Henry	2	Randolph-Macon	2	Number of American Colleges Represented	161
Emory University	1	Redlands	1		
Franklin and Marshall	1	Reed	1	Number of Foreign Colleges Represented (Not listed)	41
Furman	2	Regis	1		
Geneva	1	Rice Institute	4	Total	202
George Washington	3	Richmond	4		
Georgia School of Tech	5	Roanoke	2		

TABLE 10

NEW STUDENTS ENTERING FROM OTHER COLLEGES AS CANDIDATES FOR DEGREES

Class Joined at the Institute	Years Spent at College				Total
	One	Two	Three	Four or more	
First year	51	25	5	6	87
Second year	14	31	10	18	73
Third year	—	8	11	25	44
Fourth year	—	—	1	12	13
Graduate year	—	—	5	186	191
Unclassified	—	4	2	7	13
Total	65	68	34	254	421

TABLE 11

REGULAR STUDENTS FROM COLLEGES CLASSIFIED BY COURSES

COURSE	No Previous Degree			Graduates of Other Colleges					Graduates of M. I. T. Taking Graduate Work		
	Entered		Total	Entered				Total	S. B. Degree June 1930	Other Graduates	Total
	Sept. 1930	Previous Years		Sept. 1930		Previous Years					
				Undergrad.	Grad.	Undergrad.	Grad.				
Aeronautical Engineering XVI	8	18	26	—	20	9	3	32	1	4	5
Architecture IV	8	35	43	6	11	9	2	28	4	—	4
Architectural Engineering IV-A	6	15	21	—	—	2	1	3	1	3	4
Biology and Public Health VII	5	3	8	—	5	1	3	9	4	6	10
Building Construction XVII	4	11	15	1	—	4	—	5	—	—	—
Business and Eng. Administration XV	20	50	70	4	5	5	—	14	3	—	3
Chemical Engineering X	19	26	45	1	32	—	26	59	4	15	19
Chemical Engineering Practice X-A	—	—	—	—	21	—	16	37	19	1	20
Chemical Engineering Practice X-B	—	3	3	—	—	—	—	—	—	—	—
Chemistry V	5	8	13	—	14	—	20	34	6	21	27
Civil Engineering I, I-A	17	38	55	6	15	5	6	32	8	5	13
Electrical Engineering VI, VI-A, VI-C	28	65	93	16	32	18	24	90	30	14	44
Electrochemical Engineering XIV	1	2	3	—	—	—	—	—	1	1	2
Fuel and Gas Engineering	—	—	—	—	3	—	2	5	1	5	6
General Science IX-A	—	1	1	—	—	—	—	—	—	—	—
General Engineering IX-B	4	16	20	—	—	1	—	1	—	—	—
Geology XII	—	4	4	—	3	—	4	7	—	1	1
Mathematics IX-C	—	—	—	—	4	—	1	5	1	3	4
Mechanical Engineering II	24	46	70	10	16	10	10	46	4	10	14
Mining Engineering and Metallurgy III	4	11	15	1	5	1	8	15	—	5	5
Naval Architecture XIII	8	7	15	1	—	1	1	3	—	—	—
Naval Construction XIII-A	—	—	—	7	—	—	8	15	—	—	—
Physics VIII	1	8	9	—	5	—	5	10	2	6	8
Sanitary Engineering XI	1	2	3	1	—	—	1	2	—	1	1
Unclassified	7	7	14	6	—	—	—	6	—	—	—
Total	170	376	546	60	191	66	141	458	89	101	190

TABLE 12

AGES OF FIRST-YEAR STUDENTS, OCTOBER 1, 1930
Median age 18½ years

16 and less than 16½	4
16½ and less than 17	22
17 and less than 17½	80
17½ and less than 18	106
18 and less than 18½	140
18½ and less than 19	100
19 and less than 19½	82
19½ and less than 20	54
20 and less than 20½	47
20½ and less than 21	15
21 and less than 21½	21
21½ and less than 22	14
22 and less than 22½	14
22½ and less than 23	10
23 and less than 23½	6
23½ and less than 24	7
24 and less than 24½	0
24½ and less than 25	3
25 and over	9
Total	734

TABLE 13

SUMMARY OF DEGREES AWARDED (1868-1931)	Total
Bachelor of Science	13,368
Master of Science	2,135
Master in Architecture	72
Doctor of Engineering (Discontinued after 1918)	4
Doctor of Public Health	4
Doctor of Science	86
Doctor of Philosophy	135
Grand Total	15,804

TABLE 14

NUMBER OF DEGREES AWARDED IN DECEMBER, 1930 AND JUNE, 1931

Name of Course	S.B.		S.M.		M.Arch.		Ph.D.		Sc.D.		Dr.P.H.		Totals	
	Dec. '30	June '31	Dec. '30	June '31	Dec. '30	June '31	Dec. '30	June '31	Dec. '30	June '31	Dec. '30	June '31	Dec. '30	June '31
Aeronautical Engineering	5	32	—	4	—	—	—	—	—	—	—	—	5	36
Architectural Engineering	1	10	—	3	—	—	—	—	—	—	—	—	1	13
Architecture	6	14	—	—	—	—	—	—	—	—	—	—	6	23
Biology and Public Health	1	11	—	1	—	9	—	—	—	—	—	—	1	12
Building Construction	1	15	—	—	—	—	—	—	—	—	—	—	1	15
Business and Engineering Administration	4	63	—	2	—	—	—	—	—	—	—	—	4	65
Chemical Engineering	5	30	4	10	—	—	—	—	—	3	—	—	9	43
Chemical Engineering Practice	—	10	—	32	—	—	—	—	—	—	—	—	—	42
Chemistry	1	12	—	5	—	—	1	6	—	2	—	—	2	25
Civil Engineering	7	38	1	8	—	—	—	—	—	—	—	—	8	46
Electrical Engineering (Inc. VI-A)	7	63	4	49	—	—	—	—	—	2	—	—	11	114
Electrochemical Engineering	1	6	—	1	—	—	—	—	—	—	—	—	1	7
Fuel and Gas Engineering	—	—	—	4	—	—	—	—	—	—	—	—	—	4
General Engineering	3	20	—	—	—	—	—	—	—	—	—	—	3	20
General Science	—	5	—	—	—	—	—	—	—	—	—	—	—	5
Geology	1	3	1	2	—	—	—	—	—	—	—	—	2	5
Industrial Biology	—	5	—	1	—	—	—	—	—	—	—	—	—	6
Mathematics	—	3	—	4	—	—	—	1	—	—	—	—	—	8
Mechanical Engineering	5	64	—	8	—	—	—	—	1	—	—	—	6	72
Metallurgy	—	2	—	2	—	—	—	—	—	—	—	—	—	4
Meteorology	—	—	—	4	—	—	—	—	—	—	—	—	—	4
Mining Engineering	1	10	1	2	—	—	—	—	—	—	—	—	2	12
Naval Architecture and Marine Engineering	1	6	—	—	—	—	—	—	—	—	—	—	1	6
Naval Construction	—	—	—	8	—	—	—	—	—	—	—	—	—	8
Physics	1	7	—	1	—	—	—	—	—	—	—	—	1	8
Railroad Operation	—	—	—	3	—	—	—	—	—	—	—	—	—	3
Sanitary Engineering	1	2	1	—	—	—	—	—	—	—	—	—	2	2
Ship Operation	—	6	—	—	—	—	—	—	—	—	—	—	—	6
Without Course Classification	—	—	7	17	—	—	—	—	—	—	—	—	7	17
Totals	52	437	19	171	—	9	1	7	1	7	—	—	73	631

TABLE 15

Degrees of Bachelor of Science Awarded by Classes and Courses

Class	Aeronautical Eng.	Architectural Eng.‡	Architecture	Biology or Natural History	Building Constr.	Business and Eng. Admin.	Chemical Eng.	Chemical Eng. Practice X-B	Chemistry	Civil Engineering	Electrical Eng. (Inc. VI-A)	Electrochemical Engineering*	General Eng.	General Science or General Course	Geology	Mathematics	Mechanical Eng.	Military Eng.	Mining Eng. and Metallurgy	Naval Arch.	Physics	Sanitary Eng.	Total	Total by Decades
1868	—	—	—	—	—	—	—	—	1	6	—	—	—	1	—	—	1	—	6	—	—	—	14	
1869	—	—	—	—	—	—	—	—	2	2	—	—	—	—	—	—	2	—	—	—	—	—	5	
1870	—	—	—	—	—	—	—	—	1	4	—	—	—	1	—	—	2	—	2	—	—	—	10	29
1871	—	—	—	—	—	—	—	—	2	8	—	—	—	—	—	—	2	—	5	—	—	—	17	
1872	—	—	—	—	—	—	—	—	3	3	—	—	—	—	—	—	1	—	5	—	—	—	12	
1873	—	—	1	—	—	—	—	—	7	12	—	—	—	1	—	—	2	—	3	—	—	—	26	
1874	—	—	1	—	—	—	—	—	—	10	—	—	—	2	—	—	4	—	1	—	—	—	18	
1875	—	—	1	—	—	—	—	—	1	10	—	—	—	2	—	—	7	—	6	1	—	—	28	
1876	—	—	1	2	—	—	—	—	5	12	—	—	—	4	—	—	8	—	8	3	—	—	43	
1877	—	—	4	—	—	—	—	—	2	12	—	—	—	—	—	—	6	—	8	—	—	—	32	
1878	—	—	3	—	—	—	—	—	3	8	—	—	—	1	—	—	2	—	2	—	—	—	19	
1879	—	—	1	1	—	—	—	—	3	6	—	—	—	—	—	—	8	—	3	1	—	—	23	
1880	—	—	—	—	—	—	—	—	1	3	—	—	—	1	—	—	—	—	3	—	—	—	8	226
1881	—	—	3	1	—	—	—	—	8	3	—	—	—	2	—	—	5	—	6	—	—	—	28	
1882	—	—	3	1	—	—	—	—	6	2	—	—	—	1	—	—	5	—	5	1	—	—	24	
1883	—	—	1	—	—	—	—	—	3	3	—	—	—	—	—	—	7	—	5	—	—	—	19	
1884	—	—	—	—	—	—	—	—	12	5	—	—	—	—	—	—	6	—	13	—	—	—	36	
1885	—	—	2	—	—	—	—	—	4	4	2	—	—	1	—	—	7	—	8	—	—	—	28	
1886	—	—	1	1	—	—	—	—	7	9	10	—	—	1	—	—	23	—	7	—	—	—	59	
1887	—	—	1	1	—	—	—	—	9	10	8	—	—	3	—	—	17	—	8	1	—	—	58	
1888	—	—	5	3	—	—	—	—	10	11	17	—	—	1	—	—	25	—	4	1	—	—	77	
1889	—	—	3	1	—	—	—	—	8	14	17	—	—	2	—	—	24	—	5	1	—	—	75	
1890	—	—	5	3	—	—	—	—	13	25	18	—	—	6	—	—	28	—	3	2	—	—	103	507
1891	—	—	6	3	—	—	7	—	11	18	23	—	—	1	1	—	26	—	4	3	—	—	103	
1892	—	—	13	6	—	—	4	—	7	22	36	—	—	7	1	—	26	—	4	1	6	—	133	
1893	—	—	2	2	—	—	8	—	8	25	41	—	—	6	2	—	30	—	5	—	—	—	129	
1894	—	—	14	1	—	—	12	—	11	21	33	—	—	5	—	—	31	—	4	3	3	—	138	
1895	—	—	15	—	—	—	11	—	14	25	33	—	—	4	—	—	30	—	3	5	2	4	146	
1896	—	—	24	3	—	—	7	—	17	26	48	—	—	7	3	—	34	—	10	5	3	4	191	
1897	—	—	16	2	—	—	12	—	20	25	33	—	—	7	1	—	40	—	7	9	3	4	179	
1898	—	—	29	3	—	—	9	—	25	32	33	—	—	6	—	—	41	—	7	7	4	3	199	
1899	—	—	22	2	—	—	10	—	22	30	32	—	—	1	—	—	37	—	9	8	2	1	176	
1900	—	—	21	3	—	—	11	—	19	32	23	—	—	5	—	—	34	—	21	9	3	4	185	1,579
1901	—	—	21	1	—	—	14	—	17	37	25	—	—	6	1	—	39	—	18	16	1	4	200	
1902	—	—	18	5	—	—	9	—	14	24	35	—	—	3	—	—	46	—	14	14	3	7	192	
1903	—	—	15	1	—	—	10	—	13	26	39	1	—	1	1	—	37	—	27	12	3	4	190	
1904	—	—	24	3	—	—	7	—	15	34	34	8	—	5	1	—	45	—	32	17	5	2	232	
1905	—	—	12	3	—	—	13	—	23	46	31	3	—	3	1	—	54	—	26	24	—	5	244	
1906	—	—	22	2	—	—	10	—	21	47	37	3	—	—	—	—	69	—	38	19	4	6	278	
1907	—	—	21	—	—	—	14	—	10	37	32	5	—	—	2	—	52	—	22	10	—	3	208	
1908	—	—	19	4	—	—	15	—	16	48	38	2	—	—	—	—	62	—	19	5	—	2	230	
1909	—	—	18	5	—	—	13	—	12	51	42	3	—	—	—	—	41	—	30	5	3	9	232	
1910	—	—	18	3	—	—	18	—	10	57	36	3	—	2	—	—	57	—	24	11	—	12	251	2,257
1911	—	—	10	1	—	—	19	—	12	46	49	5	—	2	—	—	49	—	17	6	1	15	232	
1912	—	—	21	4	—	—	31	—	7	55	52	3	—	1	—	—	47	—	21	3	2	14	261	
1913	—	—	26	2	—	—	30	—	12	58	43	8	—	—	—	—	50	—	20	4	1	15	269	
1914	—	—	19	6	—	—	37	—	9	60	51	8	—	4	—	—	65	—	17	8	1	19	304	
1915	—	—	30	3	—	—	33	—	23	49	42	10	—	3	—	—	69	—	5	7	3	12	289	
1916	—	—	37	5	—	—	32	—	11	45	56	14	—	2	—	—	84	—	5	9†	3	18	321	
1917	—	—	27	10	—	37	43	—	12	49	45	10	—	5	2	—	63	—	14	9†	1	17	344	
1918	—	—	28	7	—	29	40	—	10	45	50	11	2	4	1	—	75	—	10	4	3	5	324	
1919	—	—	16	9	—	28	44	—	8	45	50	6	3	1	—	—	66	—	7	7	4	6	299	
1920	—	—	19	2	—	48	63	—	6	52	30	9	1	4	—	—	55	—	13	12	2	2	319	2,962
1921	—	—	11	3	—	70	92	—	9	98	75	15	15	—	3	—	128	—	24	18	1	3	565	
1922	—	—	32	8	—	126	98	15	11	64	109	25	25	1	8	—	56	—	27	16	8	7	636	
1923	—	13	18	6	—	115	73	19	16	64	78	16	23	2	8	3	106	—	23	13	9	3	608	
1924	—	6	15	6	—	81	57	8	13	69	125	17	35	4	2	1	82	—	19	11	3	1	555	
1925	—	6	18	2	—	94	53	8	18	57	108	9	37	2	3	2	98	—	23	10	5	—	553	
1926	—	9	24	5	—	95	45	13	19	76	107	14	33	2	4	1	76	—	20	14	1	2	560	
1927	2	15	19	6	—	89	39	6	13	73	121	8	22	2	3	3	72	1	9	4	4	3	514	
1928	8	19	16	5	—	73	38	7	13	59	114	11	12	2	1	3	67	—	12	3	3	5	471	
1929	29	25	26	7	9	69	37	11	18	46	84	10	14	1	2	5	64	—	11	5	4	6	483	
1930	29	15	44	9	23	59	39	12	11	46	74	8	9	1	2	1	48	—	6	6	10	4	456	5,401
1931	32	10	14	16	15	63	30	10	12	35	36	6	20	5	3	3	64	—	12	12	7	2	407	
Total	100	118	856	188	47	1,076	1,187	109	677	2,036	2,255	251	251	147	56	22	2,507	1	755	357	130	242	13,368	

*Prior to 1909 this Course was designated as Option 3 (Electrochemistry) of Course VIII.
†Two received the degree in XIII-B in 1916 and three in 1917.
‡Prior to 1923 degrees were awarded in Architecture.

TABLE 16

Degrees of Master of Science Awarded

	Aeronautical Engineering	Architectural Engineering	Architecture	Biology and Pub. Health	Business and Eng. Admin.	Chemical Engineering	Chem. Eng. Practice	Chemistry	Civil Engineering	Electrical Eng. (Inc. VI-A)	Electrochemical Eng.	Fuel and Gas Eng.	General Science	Geology	Mathematics	Mechanical Engineering	Metallurgy	Meteorology	Mining Engineering	Naval Architecture	Naval Con., U. S. N.	Naval Con., Foreign Stud.	Physics	Railroad Operation	Sanitary Engineering	Without Course Classification	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	—	—	2	—	—	—	—	—	—	—	—	—	1	—	—	—	—	—	—	1	—	—	—	5
1899	—	—	1	1	—	—	—	1	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	3
1900	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
1901	—	—	2	—	—	—	—	—	—	—	—	—	—	—	—	2	—	—	—	—	—	—	—	—	—	—	4
1902	—	—	3	—	—	—	—	3	—	—	—	—	—	—	—	2	—	—	—	—	—	—	—	—	—	—	8
1903	—	—	5	—	—	—	—	—	—	—	—	—	—	—	—	1	—	—	—	—	—	—	—	—	1	—	7
1904	—	—	4	—	—	—	—	1	—	2	—	—	—	—	—	1	—	—	—	—	3	—	1	—	—	—	12
1905	—	—	9	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	8	—	—	—	1	—	18
1906	—	—	3	—	—	—	—	1	—	—	—	—	—	—	—	—	—	—	—	2	3	—	—	—	—	—	9
1907	—	—	6	—	—	1	—	—	—	—	—	—	—	—	—	—	—	—	—	—	8	—	—	—	—	—	15
1908	—	—	1	—	—	—	—	1	—	3	—	—	—	—	—	—	—	—	—	—	7	—	—	—	—	—	12
1909	—	—	6	—	—	1	—	—	2	1	—	—	—	1	—	1	—	—	2	—	3	—	1	—	—	—	19
1910	—	—	6	1	—	—	—	1	2	1	—	—	—	—	—	1	—	—	—	—	7	—	—	—	—	—	19
1911	—	—	5	2	—	—	—	2	2	4	—	—	—	—	—	2	—	—	—	—	3	—	—	—	—	—	20
1912	—	—	4	2	—	—	—	3	3	2	—	—	—	—	—	—	—	—	2	—	4	—	—	—	2	—	22
1913	—	—	4	1	—	7	—	—	1	1	—	—	—	1	—	2	—	—	1	—	2	—	—	—	—	—	20
1914	—	—	3	2	—	3	—	5	3	2	—	—	—	1	—	1	—	—	—	—	2	—	—	—	3	—	25
1915	1	—	4	—	—	2	—	2	1	10	1	—	—	—	—	4	—	—	1	1	2	—	—	—	—	—	29
1916	5	—	7	1	—	1	—	3	5	6	1	—	—	—	—	4	—	—	—	—	2	5	—	—	1	—	41
1917	4	—	3	—	—	1	—	1	3	5	—	—	—	—	—	1	—	—	1	—	9	—	1	—	2	—	31
1918	5	—	1	1	—	1	—	1	1	2	—	—	—	—	—	2	—	—	1	—	—	—	—	—	—	1	16
1919	2	—	—	—	—	—	—	3	4	4	1	—	—	—	1	1	—	—	—	—	—	—	—	—	—	—	16
1920	—	—	—	1	—	3	—	2	4	7	1	—	—	3	1	5	—	—	1	—	19	—	1	—	—	4	52
1921	3	1	—	—	—	29	—	6	2	4	—	—	—	2	—	10	—	—	—	—	20	—	—	—	—	17	94
1922	5	1	—	—	—	6	32	4	5	37	1	—	—	2	2	4	—	—	3	—	10	—	1	—	—	18	131
1923	10	—	—	—	—	3	34	1	5	45	—	—	—	2	—	15	1	—	—	4	21	—	3	—	—	26	170
1924	4	—	—	—	—	6	41	1	5	34	1	—	—	1	—	8	1	—	1	—	12	—	5	—	—	28	148
1925	5	1	—	—	1	3	35	3	5	35	1	—	—	—	—	10	2	—	1	—	—	—	2	—	1	21	126
1926	6	1	—	—	—	5	20	2	2	60	1	—	—	3	—	6	1	—	—	—	12	—	—	—	—	25	144
1927	9	—	—	1	—	2	26	4	6	54	2	2	—	6	1	13	—	—	2	—	6	—	1	—	—	32	167
1928	9	—	—	—	—	5	14	2	8	63	3	7	—	—	2	13	—	—	—	—	9	—	1	—	—	43	179
1929	5	1	—	—	2	3	21	4	6	79	2	6	—	4	2	16	—	—	—	—	6	—	2	—	1	45	205
1930	3	4	—	—	1	7	22	5	9	51	5	2	—	1	2	5	3	—	1	1	5	—	1	—	1	53	182
1931	4	3	—	2	2	10	32	5	8	49	1	4	—	2	4	8	2	4	2	—	8	—	1	3	—	17	171
Total	80	12	84	15	6	102	277	72	93	561	21	21	1	29	15	139	10	4	19	8	191	5	24	3	13	330	2,135

TABLE 17

DEGREES OF MASTER IN ARCHITECTURE AWARDED

Year	Number
1921	3
1922	2
1923	7
1924	8
1925	5
1926	9
1927	7
1928	6
1929	9
1930	7
1931	9
Total	72

TABLE 18

DEGREES OF DOCTOR OF PUBLIC HEALTH AWARDED

Year	Number
1925	1
1927	1
1928	1
1930	1
Total	4

TABLE 19

DEGREES OF DOCTOR OF SCIENCE AWARDED

Year	Aero. Eng.	Chem. Eng.	Chem-istry	Civil Eng.	Elec. Eng.	Electro-chem. Eng.	Geol-ogy	Math-emat-ics	Mech. Eng.	Metal-lurgy	Min. Eng.	Naval Arch.	Phys-ics	Total
1911	—	—	—	—	1	—	—	—	—	—	—	—	—	1
1912	—	—	—	—	—	—	—	—	—	—	—	—	—	—
1913	—	—	—	—	—	—	—	—	—	—	—	—	—	—
1914	—	—	—	—	—	—	—	—	—	—	—	—	—	—
1915	—	—	—	—	1	—	—	—	—	—	—	—	—	1
1916	1	—	—	—	—	—	—	—	—	—	—	—	—	1
1917	—	—	—	—	1	—	—	—	—	—	—	—	—	1
1918	—	—	—	—	—	—	—	—	—	—	—	—	—	—
1919	—	—	—	—	—	—	—	—	—	—	—	—	—	—
1920	1	—	—	—	—	—	1	—	—	—	1	—	—	3
1921	—	—	—	—	—	—	—	—	—	—	—	—	—	—
1922	1	—	1	—	1	—	—	—	—	—	—	—	—	3
1923	1	—	—	—	—	—	1	—	—	1	—	—	2	5
1924	—	2	—	—	1	—	1	—	—	1	—	—	1	6
1925	1	3	—	—	—	—	—	—	—	3	—	—	—	7
1926	—	1	1	1	1	1	—	—	—	4	—	—	—	9
1927	—	—	—	—	1	—	—	1	1	2	—	—	1	6
1928	1	5	—	1	2	—	—	—	—	1	—	—	—	10
1929	—	3	—	—	—	—	—	—	—	1	—	1	1	6
1930	—	9	—	—	6	—	—	1	3	1	—	—	—	20
1931	—	3	2	—	2	—	—	—	—	—	—	—	—	7
Total	6	26	4	2	17	1	3	2	4	14	1	1	5	86

TABLE 20

DEGREES OF DOCTOR OF PHILOSOPHY AWARDED

Year	Biology	Chemistry	Geology	Mathematics	Physics	Total
1907	—	3	—	—	—	3
1908	—	3	—	—	—	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
1918	—	3	1	—	—	4
1919	—	—	—	—	1	1
1920	—	4	1	—	—	5
1921	1	3	—	—	3	7
1922	—	4	1	—	—	5
1923	—	5	1	—	—	6
1924	2	10	—	—	2	14
1925	—	11	—	—	—	11
1926	—	2	2	—	—	4
1927	2	6	1	1	1	11
1928	1	5	1	1	—	8
1929	4	8	2	1	—	15
1930	—	5	2	3	—	10
1931	—	6	—	1	—	7
Total	11	91	18	7	8	135

TABLE 21

DEGREES OF DOCTOR OF ENGINEERING AWARDED (*Discontinued after 1918*)

Year	Electrical Engineering	Electrochemical Engineering	Total
1910	1	—	1
1914	1	—	1
1916	1	—	1
1917	—	1	1
Total	3	1	4

J. C. MACKINNON.

Summer Session. The registration for the Summer Session 1931 is five per cent less than last year. This decrease may be partly accounted for by the fact that more students than usual were required to withdraw last year, and that those required to leave in June were not permitted to attend during the summer.

The student's load this summer was made dependent upon his scholastic standing. Students having low ratings were not permitted to take over fifty hours per week, more liberal allowances were made for higher ratings and no restrictions were placed upon students who stood in the top fifth of their classes.

The elimination of the inferior students and the restrictions on the load carried by the weaker students resulted in our having a much higher quality of scholarship in our Summer Session.

The program of subjects offered for secondary school teachers had the usual attendance of slightly over 100. Our ideal in establishing these courses was to improve and increase the secondary school teachers' knowledge of science. This has not been realized, as they did not avail themselves of the opportunities for taking advanced work but were interested only in the courses in Methods of Teaching which meet the minimum requirements of most school boards for advancement. The advisability of continuing these courses should be carefully considered before next year.

In accordance with our policy of coöperating with industry, a School for Metermen was conducted by the Electrical Engineering Department for four days. The request for this course came from the National Electric Light Association which sent thirty-six representatives from the New England Companies. The Chemical Engineering Department again offered courses for the petroleum industry.

There were nineteen graduate subjects offered with a total registration of 135. About 40 per cent of these registrations were in the two coöperative courses, Railroad Operation and Electrical Engineering.

The School for Reserve Officers held here in the summer of 1930 was so satisfactory to the Army that seventy-eight officers were sent this summer for instruction in the Ordnance and Chemical Warfare branches of the Reserve. The Army again

expressed its appreciation of the excellent service which Technology has rendered in this work.

E. F. MILLER.

The Librarian. During the past year there was a notable increase in the use both of the Central Library and the branches, as shown below:

	1929–30	*1930–31*
Books borrowed from the Central Library	28,749	33,196
Books borrowed from the branch libraries	16,164	21,787
Total	44,913	54,983

There were borrowed also from the Architecture branch 11,379 prints.

A striking growth in interlibrary loans, both incoming and outgoing, is shown by the increase of our borrowings from 463 to 655, and of our loans to other libraries from 902 to 974.

Photostat prints were supplied in response to 73 requests, of which 20 were from within the Institute and 53 from outside.

The growth of the Library is indicated by the following table of volumes accessioned:

Acquired by purchase	1,967
Acquired by binding	1,243
Acquired by gift	1,808
Total	5,018
Less volumes discarded	106
Net growth	4,912

Of these accessions, 2,938 were added to the Central Library and 1,974 to the branch libraries. In addition, 1 map was added to the Central Library and 25 to the Geology branch. As usual, several hundred pamphlets were also added, of which the above figures take no account.

The year's expenditures for books, periodicals and binding were as follows:

	Books	*Periodicals*	*Binding*	*Total*
From Library budget	$5,890.93	$5,044.14	$3,274.23	$14,209.30
From endowment funds	2,653.95	92.08	28.57	2,774.60
From special approp. 774 (Physics)	.....	155.07	.....	155.07
From income from sale of duplicates	68.52	11.00	.....	79.52
From departmental appropriations	650.55	402.30	2.84	1,055.69
Total	$9,263.95	$5,704.59	$3,305.64	$18,274.18

The Institute Library and branches now contain 267,478 volumes. Those in the branches are distributed as shown in the following table. In some cases the figures are less than reported last year because of the return of volumes to the Central Library.

Aeronautics	2,978
Architecture	5,934
Civil Engineering	2,931
Economics	3,315
Geology	3,660
Mathematics	3,495
Mining and Metallurgy	5,334
Modern Languages	1,404
Naval Architecture	3,718
Walker Memorial	8,609
Others	3,386
Total	44,764

At the beginning of the fiscal year systematic changes in our cataloging procedure were put into operation. The principal features of the new arrangement are the almost complete use of Library of Congress cards, which permits a more effective distribution of duties among the staff.

The next step must be the long-deferred reconstructive work upon the catalog, which should include not only the revision of inadequate cataloging, but the revision and systematization of subject headings upon a scientific basis. This need is not purely academic nor visionary. It arises out of our daily experience with the requirements of scientific men and engineers and their students for prompt and exact service. In a library of our type the catalog must be an instrument of precision. This work will require additional staff over a period of two or more years. Considerable progress along this line has been made with respect to the electrical material, through use of part of the income from the Vail Fund towards the services of

a special cataloger; the revision of electrical subject headings has in this way been practically completed and an authority list established. This is, however, but a portion of the work to be done.

Similarly, because of this additional assistance, the Vail Librarian was able to undertake the overhauling of a great quantity of electrical periodicals left over, uncataloged, from the original Vail Collection. One hundred sixty-six volumes from this lot were added to the Library and others were successfully offered for sale to other university and college libraries having electrical collections. The income received from these sales was set up as a special account, to be used for the binding of the volumes added and for the purchase of special items in electrical literature.

This procedure will be followed with the general mass of duplicate material belonging to the Library whenever sufficient assistance is available.

By special appropriation an additional assistant (part-time) was provided for Walker Memorial Library. Arrangements were made to have this branch open afternoons throughout the summer.

The Faculty Committee on the Library consisted this year of Professors Jackson (chairman), Keyes, Pearson, S. C. Prescott, and Babcock. The Librarian acted as secretary at its meetings. During the spring of 1931 the committee undertook the second task originally assigned to it, namely, the working out of a program for the closer coördination of the Central and departmental libraries. In the absence of such a program the relationship between the Central Library and these branches has varied greatly and the service rendered through the latter has, with some exceptions, not been satisfactory either to the Librarian and staff or to the departments. In response to requests of the committee the Librarian submitted on March 20 a Report upon the Status of the Branch Libraries, with recommendations, and on May 18 a Digest of Department-Library Policy in twenty-three college and university libraries. After giving the matter careful consideration the committee submitted on June 8 a unanimous report containing a definite program, the essential feature of which is the consolidation of the smaller libraries into a few larger libraries, each serving a group

of related departments (as for example, Physics, Chemistry and Mathematics), or a regional group (as the departments in Buildings 1, 3 and 5); each branch to have professional library supervision under the direction of the Institute Librarian. Such a step would be in line with the growing practice in universities having science and engineering departments.

From October 20 to November 12 an experiment in the instruction of freshmen in the use of the Library was tried in coöperation with the Department of English and History. Sections averaging 27 students visited the Library for one period each and listened to a talk upon the principal reference books and the card catalog, and their use; and in most cases were given practice work immediately following. These talks were given principally by members of the Department of English and History with occasional substitution by the Librarian or the Reference Librarian. As the Library possesses no room where such talks can be given, it was necessary to hold them in a corner of the stack corridor, with some of the students sitting on the stairs. Nevertheless, the results were noticeable and gratifying.

The Librarian on May 1 talked to the sophomore class in Electrical Engineering on the function of the Library in an engineering education. This was one of a series of orientation lectures conducted by the Department of Electrical Engineering. The Vail Librarian, as usual, gave two talks, one to graduate students and one to seniors, on bibliography and the use of the Library. The Branch Librarian of the combined Economics and Civil Engineering libraries gave similar talks to the seniors and graduate students of Course XV.

The Library coöperated with the Department of Business and Engineering Administration in building up and administering its new film library.

The Assistant Librarian served as member of the Committee on Education of the Special Libraries Association of Boston, and under the auspices of this committee an evening course of instruction in library methods was given in our Cataloging Room during the winter by Miss Loraine Sullivan of the Boston Public Library.

The Vail Librarian, as chairman of the Electrical Engineering Committee of the Commercial-Technical Group of the

Special Libraries Association, edited "A Bibliography of Bibliographies in Electrical Engineering, 1918–1929," which was published as Information Bulletin No. 11 of the association.

The Librarian attended the Conference of Eastern College Librarians at Columbia University in November. The Librarian, Vail Librarian, and Miss Hazen of the staff, attended the conference of the American Library Association at New Haven in June.

A notable gift to the Library this year was a new bookplate, designed by Elisha Brown Bird of the Class of 1891. Upon this bookplate appear the Institute seal, a portrait of the founder, William B. Rogers, and, surmounting all, the central building in which the Library is at present located. The bookplate has received much favorable comment from those who have seen it.

Noteworthy gifts of books were received during the year from the following donors:

Joseph D. Sawyer '71: Four of his own works, *History of the Pilgrims and Puritans*, *Milestones*, *The Pilgrim Spirit*, and *Washington*.

Mrs. John D. White: 28 volumes on architectural subjects from the library of Laura R. White, of the Class of 1880.

Mrs. John C. Clapp: 27 volumes in architecture from the library of John C. Clapp, of the Class of 1893.

The Earl of Camperdown: The publications of the Institution of Civil Engineers, Institution of Naval Architects, Iron and Steel Institute, and Junior Institution of Engineers.

Mrs. Fred C. Moore: 45 volumes on business and finance.

Dr. H. W. Tyler: 377 books and pamphlets.

Edison Electric Illuminating Co.: 38 volumes.

Mr. Elof Benson: 20 volumes on electrical and physical subjects.

The University of Pennsylvania Library: 13 volumes.

The Department of Military Science and Tactics: 50 volumes on mechanical engineering subjects.

Various periodicals and society publications were presented regularly, as in previous years, by Dr. Stratton and by Professors Bigelow, Dewey, Gill, H. W. Hayward, Hutchinson, Kennelly, Locke, S. C. Prescott, Richards, Schell, and Waterhouse.

The following members of the Instructing Staff presented the Library with copies of their own works:

Professor W. T. Hall: Treadwell and Hall's Analytical Chemistry. Vol. 1: Qualitative Analysis. Seventh edition. 1930.

Professor C. F. Park: A History of the Lowell Institute School. 1931.

Dr. J. L. Tyron: M. I. T. Secondary School Publicity Committee: Bulletin. Vol. 1–4. 1926–30.
Professor C. E. Turner: Health. Revised edition. 1930. (In collaboration with G. B. Collins.)
Professor A. G. Woodman: Food Analysis. 3d edition. 1931.

Other gifts were received from members of the Instructing Staff and Alumni, as follows:

Dr. S. W. Stratton
Professor R. P. Bigelow
Professor A. H. Gill
Professor M. P. Horwood
Professor E. H. Huntress
Professor W. S. Hutchinson
Professor W. H. James
Professor W. Lindgren
Dean H. E. Lobdell
Professor C. E. Locke
Professor L. F. Marek
Professor J. T. Norton
Professor C. F. Park
Professor S. C. Prescott
Professor A. T. Robinson
Professor E. H. Schell
Dr. J. A. Serrallach
Professor C. M. Spofford
Professor D. J. Struik
Mr. H. D. Swift
Professor C. E. Turner
Professor G. B. Waterhouse
Mr. John C. Chase '74
Mr. Edward R. Warren '81
Mr. Robert S. Allyn '98
Mr. M. G. Magnuson '04
Mr. Charles H. Burns '14
Mr. G. Y. Zara '26
Mr. G. G. Morrill '27

The student and alumni activities presented the Library as usual with current issues of their own publications.

W. N. SEAVER.

Medical Director. The Department of Hygiene is the guardian of the health of over 4,000 people at the Institute.

From July 1, 1930 to June 30, 1931 there were 28,119 calls made as compared with 24,175 during the last fiscal year. The increased numbers are not an indication of poor physical condition but rather a greater appreciation of the facilities available. The student is anxious to lose as little time as possible because of illness and also to know that he is well physically and mentally.

The following figures will better illustrate the work covered during the year just passed. There were 2,817 men examined and of this number 930 were found to have some defect. It was felt that men having heart trouble, kidney disturbances, recurring respiratory trouble, etc., would be benefited by some

special instruction about their particular condition. Short talks were given to this group with a simple description of their own particular trouble and they were advised about what to do in regard to it. These talks were supplemented by personal conferences and special examinations in many cases. The results were most satisfactory and far-reaching. This coming year all men are required to make their appointment for physical examination before November 1. The doctors will have a better opportunity to examine these men and get them into good physical condition wherever possible early in the school year.

There were 355 patients treated in the Infirmary during the year, or a total of 2,005 bed days — an average of approximately 6 days per man.

There were 8 contagious cases in a population of 3,200, which is an unusually small number. We like to believe this is due to the fact that all quarantine rules were carefully carried out.

Owing to the increasing popularity of the clinic it is deemed advisable this year to hold clinics in the morning from 8.30 to 9.30, and from 10 to 12; and in the afternoon from 2 to 3 and from 4 to 5.

GEORGE W. MORSE

Industrial Coöperation and Research. During the year the Personnel work carried on by the Division of Industrial Coöperation and Research has been greatly increased because of the unusual number of graduates of the Institute who have consulted us concerning new positions.

There has been a further increase in the proportion of the industrial activities of the staff which have been carried on through the Division rather than by personal contact, but the total amount of such work has not been increased. The work in Ceramics has been transferred to the Industrial Division until such time as it may be sufficiently developed to stand on its own feet.

Typical researches being carried on under the care of the Division are: the Study of the Flow of Steel at High Pressures and Temperatures, the Development of Refractory Materials,

the Study and Development of Internal Combustion Engines of a Special Type, an Investigation of the Use of Aluminum Foil as a Heat Insulating Material in Cold Storage and Building Construction, and a Comparison of Daylight and Artificial Illumination with Especial Reference to Schoolhouse Lighting.

C. L. NORTON, *Director.*

Municipal and Industrial Research. The year 1930–31, of the Division of Municipal and Industrial Research, both began and closed in a period of profound economic depression. In spite of the obvious fact that such a period offers an ideal opportunity to make an appraisal of economic assets and liabilities, the general absence of available funds on the part of chambers of commerce, industrial firms interested in community promotion, and municipal governments, has prevented the securing of any new survey contracts.

Our activities have, as a consequence of this situation, been limited to promotional activities of various sorts — especially publicity — the accumulation of data in anticipation of possible field surveys and emphasis upon the municipal aspects of our work. These are briefly outlined in the following sections.

Completion of the El Paso survey and report in January 1931 is the only self-supporting field activity that can be reported for the year. Industrial bureau managers of public utilities, for example, although familiar with our work and favorably disposed towards it, have not felt able to push the matter with their respective organizations. A considerable number of communities were visited during the year by our representatives — notably Camden and Elizabeth, New Jersey; Burlington, Vermont; Reno, Nevada; Petersburg, Virginia; Galveston, Texas; Holyoke, Massachusetts; Coatesville, Pennsylvania; to say nothing of our home city of Cambridge. All have expressed themselves as being favorably attracted to our service but have for various reasons felt unable to go ahead at present.

In spite of this we have been assured in several instances that at the first favorable opportunity the matter of engaging the Division's assistance will be taken up. An industrial survey

in Coatesville, Pa., a municipal survey in Chelsea, Mass., and a research study for the National Association of Real Estate Boards on the assessment of industrial properties are among very definite promises that have been given us in this connection.

Two cities with which we were in contact — Waterbury and Worcester — can no longer be considered prospects. At Worcester, although we were not retained, it has been announced that the study would follow "the municipal finance plans laid down by the Massachusetts Institute of Technology."

Naturally we are continuously investigating possibilities for our service and a staff member has been specially detailed during the past year to this branch of our activities.

In the absence of field surveys more attention has naturally been given to research and other office activities. Opportunities for constructive work of this type have been afforded by the series of bulletins prepared for New England municipalities, several of these requiring careful and intensive study,* and by the supervision of students' theses for the Department of Engineering Administration.

A number of research investigations have been carried on in anticipation of possible field work. Of this description was an inquiry into methods of industrial appraisal for taxation purposes, an examination of industrial sites in the Boston metropolitan area and an investigation of governmental costs in Massachusetts cities. The last two investigations are still in progress.

Under the conditions which have prevailed during the year, increased stress has been placed upon publicity. Eight bulletins on various topics of community interest, both industrial and civic, have been issued, the demand for additional copies exceeding the supply in most cases. The list is as follows:

No. 6. Business and Government, October, 1930
A Report of Progress, November, 1930
7. Waste in Industrial Development, February, 1931
8. Municipal Expenses and the Budget, February, 1931
9. Municipal Assessment, March, 1931
10. Can General Property Taxation be Reduced? April, 1931
11. The Question of Municipal Organization, June, 1931
12. Principles of Sewage Disposal, August, 1931

* Notably those on municipal assessments and on supplementary revenues.

A second printing was necessary in the case of two of these bulletins: No. 7, "Waste in Industrial Research" and No. 11, "The Question of Municipal Organization." A large number of letters expressing appreciation of our pamphlets have been received and favorable references in New England newspapers and other mediums have been noticed.

Addresses have been made by staff members during the year before both public and private groups including the Pawtucket and Haverhill Chambers of Commerce, the Stone & Webster executives' conference, National Association of Real Estate Boards and the Massachusetts Chamber of Commerce. Our members have also been able to render informal coöperative service at various times throughout the year to the Cambridge Industrial Association, Boston Industrial Publicity Bureau, New England Brick Manufacturers' Association, New England Council, Federal Reserve Bank, New England Telephone & Telegraph Company, etc. A number of inquiries of a technical nature, made in the first instance to the Division, have been referred to other departments of the Institute with satisfactory results.

An important feature of the Division's work during the past year has been the preparation and distribution of a series of bulletins dealing with practical problems of New England cities. The subjects of these bulletins were suggested by the chief executives of New England cities in response to our invitation; subjects already covered by this series of bulletins include municipal assessment, budget making, municipal revenues, forms of government, principles of sewage disposal, etc. Municipal officials appear to be very appreciative of this service and the Division has received a large number of complimentary letters in this connection.

The desirability of a conference on municipal topics has frequently been considered. A general inquiry on this subject mailed to the fifty-nine New England mayors on our list early in August has brought seventeen replies so far. Of these, thirteen have been favorable.

There have been no changes in respect to personnel during the year. The same division of work into two major sections — industrial and municipal — has been retained, with two members of the organization assigned to each. One member is still

on leave of absence with the Federal Trade Commission. A staff member continued to serve as acting head of the Division.

THOMAS L. HINCKLEY, *Acting Director.*

Society of Arts. Under the auspices of the Society of Arts four Popular Science Lectures were offered by members of the Institute staff during the past year, each lecture being given on three consecutive days to accommodate the large number of persons applying for admission.

On Friday and Saturday afternoons admission was restricted to pupils of secondary schools and on Sunday afternoon the lectures were open to the general public. In some instances the lecture hall could have been filled a fourth time by those unable to obtain admission.

The subjects presented and the speakers are given below:

"Grand Adventure with the Mining Engineer," by W. Spencer Hutchinson, S.B., Professor of Mining. The lecture was fully illustrated by slides and specimens, many of them collected by Professor Hutchinson in his extensive travels as a mining engineer in Africa, South America and North America.

"Recent Developments in Communication by Radio," by Edward L. Bowles, S.M., Associate Professor of Electrical Communication. In this lecture was demonstrated before a popular audience for the first time, the consecutive transmission of intelligence by means of wires, light, radio and sound.

"Some Contributions of Organic Chemistry to Daily Life," by Ernest H. Huntress, Ph.D., Assistant Professor of Chemistry. Numerous experiments and exhibits showed how research in Organic Chemistry has contributed to the development of motor oils, refrigerants, lacquers, resins, textiles, explosives and other common chemicals.

"X-rays and the Structure of Crystals," by Bertram E. Warren, Sc.D., Assistant Professor of Physics. The novel and striking experiments shown in this lecture illustrated advances in modern physics which have thrown light on the structure of matter in the crystalline state.

H. M. GOODWIN, *Secretary.*

Aeronautical Engineering. The program of subjects was revised to conform with the recommendations of the committee on revision of freshman and sophomore years, and certain minor changes were made to improve the program, effective for the Class of 1933 and later. A meeting of the Advisory Committee was held in May, at which a number of useful suggestions were made as to courses and department policy. These will be incorporated as far as possible. The policy of having a number of outside lectures was continued.

A study of the application of the honors group plan resulted in postponement of its application in this course until more suitable text and reference material become available. A number of factors peculiar to the Course make it appear inadvisable to adopt a scheme closely similar to that established in the Department of Electrical Engineering, but a study is in progress to find ways of accomplishing a similar end by somewhat different means.

Work has been started on several pieces of equipment for illustrating fundamentals of aerodynamics, including a water flow tunnel, propeller drive for wind tunnel models, stability models, etc.

A copy of the fluid flow film shown by Professor Prandtl during his lectures at the Institute some time ago has recently been obtained by the Department and is expected to prove a valuable aid in the instruction in aerodynamics.

Six research projects by the staff are now in process in the field of aerodynamics: (1) The effect of artificial turbulence of varying frequency and intensity on the total resistance of airship models and on the nature of the flow in the boundary layer. (2) A large scale study, on an airfoil segment, of the boundary layer formation and behavior under the influence of pressure gradient and Reynolds Number variations. (3) The air forces on bodies when moved through still air, with especial reference to spheres, whose resistance characteristics in such air are much needed for their use as turbulence indicators. The inclined wire method is being used for these tests, pending the building of the new towing basin which will provide an almost ideal equipment for such investigations. (4) The direct laboratory measurement of the local skin friction on an air-washed surface, leading possibly to the design of a practical apparatus for the

measurement of skin friction on a full scale airship in flight. (5) Investigation of airflow in the propeller stream and of downwash and tail efficiency of airplane models. (6) In the field of airplane structures investigations have been made for the purpose of obtaining basic data on the allowable strengths of stiffened sheets of aluminum alloy subjected to compression or shear. Funds were contributed by several aircraft manufacturers to assist in defraying the expense of the tests, and every effort has been made to coöperate with manufacturers and with the various government testing agencies to avoid duplication of test programs and to procure data that would be helpful in the design of all metal aircraft. The program completed during the past year has furnished a considerable quantity of data of this sort and has also demonstrated the need of research on full scale structures to provide designers with such coefficients as may be necessary where data obtained from specimens representing portions of a structure are to be used in the design of complete structures.

A tentative program for continuing this research has been drawn up and will be entered upon during the coming year, the phases to be investigated depending on the Army, the Navy and the National Advisory Committee for Aeronautics testing programs with which our work is coördinated.

Studies have been, and are being, prosecuted by members of the staff and graduate students to determine methods for rationalizing load factor requirements and design procedures for use in airplanes. This work is being coördinated with investigations made by the Bureau of Aeronautics of the Navy and the Aeronautics Branch of the Department of Commerce and will, it is believed, be of value to these agencies in revising their design specifications and procedures in the light of the latest data available.

In the field of power plant research the most important staff projects now in progress are (1) Continuation of the fundamental investigation of heat transfer from metal surfaces to air at high velocity, under the auspices of the National Advisory Committee for Aeronautics. (2) The development of a simple apparatus for photographing ultra-high speed phenomena, such as fuel sprays and valve gear parts. (3) The development of several types of high-speed-engine indicators. (4) Continuation

of the investigation of fuel injection with electric ignition. (5) Coöperation with the Society of Automotive Engineers in the development of precision methods for evaluating the knocking tendency of fuels. (6) Design and construction of a single cylinder engine for studying the effect of fuel spray variations on the high speed Diesel cycle and for coöperation with the Society of Automotive Engineers in the study of Diesel fuels. Investigations completed during the year included a study of the effect of variations in valve timing on supercharged engine performance and a study of bearing loads in radial engine crankshafts.

In the field of airplane design one interesting coöperative study yielded new data for the comparison of single surface controls with the conventional two-surface type. In the field of power plants one full time assistant was engaged in cylinder development under a contract between the Division of Industrial Coöperation and Research and a large manufacturing concern.

One of the Visiting Committee's most emphatic suggestions was that every student should be given at least two or three hours of practical instruction in full flight and general performance testing of aircraft. The need of such instruction has been felt by the Department for many years, and its inclusion in the curriculum now depends on obtaining the necessary funds for this purpose. It is believed that a fund of $2,000 per year would provide adequately for this phase of the work.

During the past summer the new required courses between the sophomore and junior years were given for the first time.

One course, Airplane Shop Work, was designed to replace the former courses of foundry, forging, machine tool work, pattern making, and airplane rigging with a consistent course more nearly approaching actual airplane factory processes. Another course, Airplane Production Methods, was rather a new departure in the Institute curriculum and consisted of visits to sixteen factories which were actually engaged in aeronautical work or in work closely allied to the industry.

Of especial value was a week's visit to Hartford in which the students studied in considerable detail the complete operations of airplane and engine buildings in the Vought and Pratt and Whitney factories.

C. F. TAYLOR.

Architecture. During the past year, owing to the leave of absence of Professor Emerson, there have been no radical changes in our curriculum. Such as have been made have been mostly in rearranging the subjects to conform to the new five-year Course and the introduction of a new subject, Mechanical Equipment of Buildings. The latter is given by the Department of Mechanical Engineering and rounds out very completely our school training in the so-called practical side of Architecture.

In reference to the increase in the time now required in our five-year course to obtain the degree in Architecture, it is interesting to note that this increase in time and its consequent expense has apparently not reduced the number of students. We have now completed our fourth year on the new basis with registration in all years equal to or greater than the year before. Incidentally as a matter of record, the course in Architecture will have no class of 1931.

Interested friends of the Department, Mrs. Henry Bigelow, Messrs. Edwin S. Webster, Otto Kahn, J. Lawrence Mauran and A. Farwell Bemis, have again enabled us, through their financial aid, to offer the two Fontainebleau Scholarships. A Special Prize of one hundred dollars was given anonymously to be awarded to the Design problem in Grade IV which best fitted the practical requirements of the program. The Department received from the Salada Tea Company a gift of full-sized casts of the sculptured details of the entrance of its building. These will be valuable additions to the equipment of the Free-hand Drawing studio. The Department has also benefitted through the generosity of the sisters of the late John S. Sargent, who have given eight framed charcoal studies made in connection with Sargent's mural decorations in the Boston Museum of Fine Arts.

It is a satisfaction to report again that former and present students have been successful in this year's competitions for scholarships and prizes. The 1931 Rotch Travelling Scholarship was won by Mr. Carney Goldberg of the Class of 1928. Mr. Frederick A. Pawley, an advanced class student, won the annual prize of the Boston Society of Architects in a competition open to the students of Harvard University, Boston Architectural Club and Technology.

To provide a training in Design which will better meet the

present trend in modern architecture, we have been carrying on for the past two years experiments in the first year class by giving the students exercises in abstract design as the proper basis of the beginning of this important subject. While the results have not yet justified our changing entirely the present scheme of instruction in Design they do seem to indicate that we are working in the right direction.

H. W. GARDNER, *Acting Head.*

Architectural Engineering. In order to conform to the recommendations of the Committee in charge of the revision and standardization of the second-year courses and at the same time to furnish the students with the requisite preparation to begin, in the first term of the third year, work in Structural Analysis, it was found necessary to require a summer course in Applied Mechanics between the second and third years. It was also found expedient to associate with this, as a summer requisite, a course in Office Practice. The new arrangement will become effective in 1932–33 and will be the first time that required summer work has been included in the curriculum of Architectural Engineering. It has allowed certain adjustments in the third and fourth years. These have received very careful study with the result that the complete course as now adopted by the Faculty offers, in our opinion, a better balanced curriculum than ever before.

During the absence of Professor Emerson the work in Principles of Planning has been conducted by Mr. James Ford Clapp assisted by Mr. Isidor Richmond. The students have shown an exceptional interest in the work and the results indicate clearly the value of carefully supervised classroom study in offering, to engineering students, a course so closely allied to architectural design. It is quite essential that the engineering student expecting to associate himself with the architectural profession should have some acquaintance with the point of view which inspires the architect, and the course in Planning Principles goes far towards the accomplishment of this result and towards creating a live interest in architectural composition.

The theses being taken by the seniors are becoming more and more of an experimental nature and through the kind and

interested coöperation of the Departments of Physics, Civil Engineering, and especially the Department of Mechanical Engineering, have resulted in some interesting and worthwhile research. These theses together with those of the graduate students have brought a severe strain upon the very limited resources for this work.

W. H. LAWRENCE.

Biology and Public Health. The Department has maintained its healthy growth in numbers, and the distribution in the different divisions of the work, both graduate and undergraduate, has been in general highly gratifying.

The general revision of curriculum of the first two years has made necessary a few changes in the course schedules. These have been satisfactorily adjusted, and have made possible a better coördination of our work with that of other departments. Under the new arrangement the required summer work has been shifted from the summer following the first year to that following the second year, organic chemistry and organic laboratory replacing qualitative and quantitative analysis as the subjects to be taken. The effect of this will be to give the student the advantage of taking this important subject in a more intensive and extensive manner than hitherto, and at a time immediately preceding its direct application to the subjects of bacteriology, sanitary and food chemistry and the technology of food supplies. The new sequence of studies is therefore more logical and advantageous. This arrangement also makes it possible for students who desire to do so to proceed directly with the more advanced courses in organic chemistry as presented in the chemical department.

While revision by the Faculty Committee was confined only to the first two years, some desirable modifications of the program of the two upper years have also been made.

The fourth-year program for the new option in Public Health Engineering has been arranged and has been approved not only by the Faculty, but by many men engaged professionally in this field. The revisions of graduate courses which were mentioned in last year's report have proved highly satisfactory. With the rapid extension of knowledge, especially in

bacteriology, biochemistry and biophysics the modifications and extensions of the work in these fields are inevitable.

The service of our lecturers from outside the Department has continued to be of great value, and is acknowledged with deep appreciation.

There has never been a time when the research program of the Department has been so extensive or so promising of real contributions to fundamental science, and this work will be continued and further extended throughout the coming year. While practically every member of the staff is carrying out research in some field, special mention should be made of the work of Professor Bunker and Mr. Harris in the field of biophysics, of Professor Turner and his assistants in health education and of the work in bacteriology and food technology, a part of which is made possible by coöperative arrangements between the Department and large industrial organizations in the food industry. Such arrangements are proving of great advantage to the Department not only because of the fundamental researches of special significance in the food industries, but also because a portion of the funds derived are devoted to the support of pure science researches for which no other funds have been available.

An interesting and important feature of the development of research is the coöperation with other departments. During the year formal coöperation has been established with the Research Laboratory of Organic Chemistry, and with the Research Divisions of Physics and Electrical Engineering, while coöperative relations of less fixed character have been set up with the divisions of Textile Engineering and refrigeration. Added impetus has been given to research through the allocation of a part of the Rockefeller grant which has made possible the purchase of expensive equipment hitherto impossible.

The constantly increasing volume of pure science research, together with the appointment of research associates, assistants and fellows whose time is devoted solely to investigation, compels the consideration of the possible advantages which might be derived from establishing a separate Research Division within the Department. The present crowded condition of the laboratories devoted to investigation emphasizes the desirabilty of greatly enlarging the space and facilities for such work

when the Department is enabled to remove to more commodious quarters in the proposed new Sedgwick Memorial Laboratory building.

The research work of the Department was well represented by a number of papers at the annual meeting of the Society of American Bacteriologists, to which the Institute was host at its annual meeting in December, 1930, and also at the Annual Conventions of the American Public Health Association at Fort Worth and Montreal. More than a dozen scientific papers by staff members were presented at these meetings.

S. C. PRESCOTT.

Building Construction. The course in Building Construction, which is now in its fifth year, continues to show its normal registration of about 90 men. Three classes have been graduated, of which two have been in the industry long enough to supply a slight indication of the value of the Course to our graduates. All seem to be making satisfactory progress and in spite of the depression, few have been dropped, while several have reached the grade of superintendent which is generally a position of considerable responsibility. One is the director of the testing laboratory of a large nationally known industry manufacturing building material products of many kinds.

Since the inauguration of the Course, changes have been made each year in the schedule, as experience indicated the necessity. Plans are being made to curtail the hours assigned to building construction and to transfer surveying, quantity surveying and estimating to the summer camp, thus giving opportunity to add some engineering courses to the schedule, which with the changes already adopted for all courses in the second year, will greatly strengthen this course and will put it on a par with the other engineering courses. These changes will be submitted to the Faculty to be immediately effective for all classes in so far as practicable. It will also be suggested that the name of the course be changed to "Building Engineering and Construction."

The revised schedule will be adequate preparation for some projected graduate courses in City Planning, Building Management and Materials which subjects are closely allied to building construction and for which there is a real need.

Col. William A. Starrett, President of Starrett Bros. & Eken, is greatly interested in the course and is giving it the benefit of his counsel. He visited the Department in the spring and besides attending a staff conference, he gave an illustrated lecture on the construction of the Empire State Building which was largely attended by students of the whole school.

Arrangements are in progress with the Associated General Contractors Association, the largest organization of builders in the country, to establish a junior chapter at the Institute for the students of the Department in the near future.

R. F. TUCKER.

Business and Engineering Administration. Student registration in the undergraduate and graduate courses of study offered by this Department totalled 346, an increase of 16 per cent over the previous year.

As a result of Professor Fernstrom's previous experiments in the placing of junior students in supervised summer employment, a new industrial group has been added to the curriculum which features a somewhat heavier schedule of studies during the third year, the requirement of supervised summer work during the junior-senior vacation period and a considerable freedom in the selection of engineering subjects during the fourth year. Enrollment will be restricted to students of unusual executive promise. It is believed that this program incorporates desirable characteristics found in the honors group and the coöperative plans.

Due to the large number of subjects presented by other departments to Course XV students, an experiment was undertaken whereby departmental registration officers were informed at periodic intervals in each term of the standing and general attitude of sophomore and junior students in all extra-department subjects. This information has proven of sufficient value to warrant continuance for another year.

Through the generosity of Messrs. Lammot duPont, F. Wright Fabyan, Charles Hayden, John R. Macomber, Alfred P. Sloan, Jr., and Charles A. Stone, members of the Institute Corporation, the Department has been enabled to offer six honorary fellowships of $1,500 each to engineering graduates of unusual promise, permitting a period of summer school and

year of graduate work in this Department, leading to the degree of Master of Science in Business and Engineering Administration. Under the conditions of the grants, these students will live together in company with a member of the teaching staff and will undertake certain additional administrative studies of a special character.

In order to give undergraduates greater familiarity with the viewpoint of modern industrial leaders, a series of industrial addresses by distinguished administrators has been inaugurated. We are indebted to Mr. Victor M. Cutter, President of the United Fruit Company, Mr. Paul W. Litchfield, President of the Goodyear Tire and Rubber Company and the Goodyear Zeppelin Company, and Mr. Homer L. Ferguson, President of the Newport News Shipbuilding and Dry Dock Company, for the three addresses of the spring series.

A unique development of the year has been the installation of a motion picture film library in which students may, upon request, witness films dealing with manufacturing processes. An area permitting the simultaneous showing of four films has been equipped with suitable apparatus. A large number of films have been considered for possible inclusion in the Library and the collection which now totals seventy reels is being rapidly increased.

During the second term, members of the senior class were offered an optional consultation service in the preparation of inter-departmental reports and other memoranda of a business nature. About three-quarters of the students availed themselves of this service which was extended by members of the English Department in the form of personal consultations in relation to work submitted in business subjects.

As a result of a generous grant by The Thorne-Loomis Foundation, Inc., sponsored by Mr. Alfred L. Loomis, a member of the Institute Corporation, the Department obtained the use of a specially designed and equipped motor bus by means of which a group of ten undergraduate students undertook an industrial camping trip of six weeks' duration into Mid-Western, Southern and Atlantic states. Over 6,000 miles were travelled following an itinerary provided by the Foundation, which included introduction and access to over thirty representative industrial plants and to points of historical interest.

This extraordinary opportunity to become familiar with the manufacturing activities of these extensive areas was made possible by the Foundation at a cost of less than twenty dollars for each participant.

In addition to normal teaching responsibilities, members of the Department have been active in the acquisition and publication of new text material, the organization and presentation of additional graduate subjects and the conduct of original research and its publication.

Professor Porter, in collaboration with Professor Fiske, has published a special edition of "Notes on Accounting" for use by Technology students. He has also completed an extended investigation into "A Comparison of Public and Private Electric Utilities in Massachusetts" which is now in process of publication. Much credit is due Professor Porter for conceiving and developing the plan of the industrial group before described.

A new graduate course in Industrial Traffic Management was presented by Professor Fernstrom in collaboration with a group of traffic managers from representative industries. He has also continued the summaries of data relating to the pre-Technology, Technology and post-Technology records of 875 graduates of the course which were collected during the preceding year. During the past summer, in addition to work in the summer school, Professor Fernstrom has collected new case material for use in the undergraduate subject of Business Management.

Professor Raymond's researches into problems of economic production quantities have resulted in the publication of a book, "Quantity and Economy in Manufacture." His further investigations into measures of management have been compiled into two volumes of notes for use in the graduate course, Standards of Measurement in Industrial Management. Under his supervision two additional pieces of investigation have been completed. Mr. H. O. Vorlander has made an investigation of "Evolution of Formulae for the Selection and Replacement of Equipment" which is now in press and will be presented at an early meeting of The American Society of Mechanical Engineers. In collaboration with Bigelow, Kent, Willard, Inc., Mr. P. C. Brown has conducted an inquiry into "Relationship of Net Profits to the Financial Structure of Industry," for later publication.

Professor Elder has published a special edition of notes and cases on "Scientific Management in Marketing" for use at Technology. He has also completed a survey of the quantitative effects of radio advertising upon the sale of specific products, excerpts from which are now receiving circulation in the technical press. In addition, he has published in periodical form a series of articles relating to the coördination of production and distribution.

Professor Fiske has published a special edition of "Materials in Industrial Accounting" for use at Technology and has also assembled and distributed in neostyled form a new body of text material dealing with contracting cost methods.

Arrangements were made whereby Professor L. F. Woodruff, of the Electrical Engineering Department, presented a new subject open to seniors and graduate students dealing with business control equipment and methods, based upon the distinguished work which he has carried on in this field.

Mr. Richard F. Wilder, an assistant, conducted an investigation of current progress in the coördination of research, sales and production functions in American industries. His findings, which cover a survey of fifty industries in various parts of the country, are now being published and will be presented at an early meeting of The American Society of Mechanical Engineers.

The Department has been very fortunate in securing the services of Associate Professor R. C. Eddy, and Assistant Professors Johnson O'Connor and Albert A. Schaefer. Colonel Eddy, who was formerly in charge of the Department of Military Science, will devote his attention to the presentation of accounting, statistics and allied subjects. He has recently conducted a study of new developments in the use of mass-accounting and statistical methods in a number of establishments in the Middle West and Atlantic states. Professor O'Connor, who for several years has coöperated with the Department as a special lecturer, will extend vocational counsel to freshmen registering for work in this Department. During the second term he will present a graduate course in the technique of measuring human aptitudes. Professor Schaefer, formerly a special lecturer in business law, will conduct all courses in this subject offered at the Institute.

Grants of funds from Mr. F. Wright Fabyan and Mr. John

R. Macomber, members of the Institute Corporation, have been of greatest value in providing wider general publicity for the educational opportunities offered by the Department and in permitting attendance by members of the Department at national conventions of professional societies.

The Department expresses keen gratitude to the members of the Visiting and Advisory Committees and of the Corporation who have so generously given of time and effort in furthering the welfare of this new Department.

E. H. SCHELL.

Chemical Engineering. The year has been one of marked progress in several phases of the Department's work. The revision of the first and second year curricula enabled the Department to carry out a revision of the work of the third and fourth years which will better correlate the instruction in industrial chemistry, physical chemistry, thermodynamics, and the unit operations of chemical engineering. This study of the undergraduate course was helpful to representatives of the Department in two interesting conferences on chemical engineering education. The first, in March, was with a group of alumni at the Technology Club of New York, when the work of the Department was thoroughly discussed. The consensus of opinion was that the professional training offered was adequate and well organized but that a proper balance between cultural and technical subjects should be maintained. The second, in June, was at the University of Michigan where a two-week conference was held under the joint auspices of the Society for the Promotion of Engineering Education and the Committee on Chemical Engineering Education of the American Institute of Chemical Engineers. It is apparent that instruction in this field is being standardized along lines in which this Department had done much of the pioneer work.

As was true last year, much effort has gone into the undergraduate instruction in thermodynamics and satisfactory progress has been made toward a text which will be suitable for undergraduate use. Two contributing factors in this program are the research program on the thermal properties of complex hydrocarbon vapors which is going ahead rapidly under the direction of Dr. Lewis and the special summer courses in petro-

leum refining. The first supplies data and the second provides an opportunity for the staff to work out numerous engineering applications under the stimulus of contact with a group of able experienced engineers sufficiently interested in this field to seek summer instruction.

Dr. Thomas K. Sherwood, formerly of Worcester Polytechnic Institute, joined the staff to broaden instruction in graduate work, a need which has been pressing because of the yearly increase in graduate students. He will teach, and carry on research in, drying, extraction and chemical engineering design.

Dr. P. K. Frolich, formerly Assistant Director of the Research Laboratory of Applied Chemistry, received the Grasselli Medal for his research in high pressure catalysis which he carried on as a staff member. Dr. Frolich developed the advantages of studying the reverse reaction at low pressure, a method which has proved extremely valuable not only in simplified technique, but in making possible the study of intermediate reactions, the speed of which was too great for study at high pressures.

Professor H. O. Forrest, Director of the Research Laboratory of Applied Chemistry, resigned to join the staff of the M. W. Kellogg Company, thereby ending a ten-year period of service to the Department in varied capacities. Professor L. F. Marek takes over his duties, and will be assisted by Professor E. W. Brugmann as assistant director.

The Research Laboratory of Applied Chemistry, dependent on industrial contracts for its finances, has suffered severely because of the depression, the cancellation and curtailment of research programs resulting in a large deficit. The staff has been reduced to skeleton proportions until such time as industrial conditions justify a resumption of former activities.

The School of Chemical Engineering Practice has had a satisfactory year, unmarked by any special developments and free from major changes in field station personnel.

W. P. RYAN.

Chemistry. The year saw the introduction of changes in the freshman course in Chemistry required of all first-year students. Hitherto the class has been separated into two groups

designated the Engineering Group and the Chemistry Group with a differentiation in the material presented. The attempted differentiation tended to lead away somewhat from the desirable objective of a basic scientific course in the principles of the subject. Under the present program of a single course for all students, irrespective of contemplated future specialization, the staff is able to concentrate more effectively in using the subject matter of Chemistry not only to fix the principles and facts of the science, but to prepare the student's mind to deal intelligently and resourcefully with the general phenomena of chemistry.

Another item of importance under the new first year schedule is the change from two laboratory periods of two hours each per week to one period of three hours. The loss of one hour per week has not been found to effectively diminish the student's accomplishment, due to the saving of time in starting and stopping of a single longer period. A difficulty does arise, however, in the case of laboratory preparations which deteriorate in standing for a week. Possibly a further improvement could be made by concentrating the entire laboratory work in chemistry and physics into alternate parts of the term, thereby providing a continuity which is unquestionably desirable.

The organization of the laboratory under any system has been trying during recent years due to the Institute's acceptance of a steadily increasing number of first-year students in excess of the laboratory space available. The undesirable elements of this situation have been stated in earlier reports. The remedy is clearly to accept only that number that can be fairly dealt with or to provide more laboratory space.

Analytical chemistry is a subject unexcelled in the possibilities offered for cultivating a generally valuable precision and facility not only in manipulative technique but in the application of scientific concepts in investigating the phenomena of nature. The attempt to use the subject for these purposes rather than for mere training in chemical analysis has been under consideration for several years and the results are distinctly encouraging. Last year the students were segregated into sections on the basis of their ratings in the freshman course, thereby enabling the staff to deal more efficiently in instructing both the more and the less apt students. A consolidation of all

subjects in analytical chemistry into units of 105 hours has also greatly facilitated instruction and permitted changes in course schedules without loss of the student's time.

A laboratory for electrometric procedures is needed and will be requested as soon as the adjustments attending the occupancy of the Eastman Laboratory by the Research Laboratory of Inorganic Chemistry are completed. Much of the equipment for such a laboratory is already available.

The overcrowded condition of the organic laboratories has been described in earlier reports. When the new Laboratory is available much desired relief will be forthcoming and a long delayed plan of reorganizing the organic chemistry laboratory work entered upon. It is earnestly recommended that in taking over space now in use for laboratory instruction in organic chemistry to provide enlarged quarters for metallography, full consideration be accorded the instructional problems that must be faced by the Department.

The course in physical chemistry has for years been the touchstone by which the better students have been unmistakably indicated. The fact that no earlier course in the student's career would serve the same purpose has long been the regret of the Department, but the introduction of the Registrar's cumulative index promises to go far in differentiating between students who, otherwise intelligent, are not sufficiently intellectual to become professional men of the highest type. The computation of the cumulative rating of students who failed in the course in physical chemistry indicated that the majority would not have been recommended to enter upon third-year work. This fact and others bearing on the Department's experience with the cumulative index warrant the expectation that a step has been taken which will go far in enabling the Institute to provide better environment for the more capable students.

Professor A. A. Noyes of the California Institute of Technology who, in collaboration with Professor Sherrill, originally devised and developed the course in physical chemistry, has during the past few years given unstintedly of his time and interest in revising and enlarging the material content of the course. The revised parts of the new text are already in use in mimeographed form.

The instructional work in food and proximate analysis has

proceeded satisfactorily with an extension of the attention given to microscopic methods.

The present study and reading room for students of Chemistry and Chemical Engineering should be enlarged as soon as practicable. It is believed possible to work out a satisfactory plan of space utilization which will satisfy the urgent need for larger and more suitable quarters.

The number and quality of graduate students again show an increase over the number reported a year ago. At the beginning of the first term 61 students were registered and 58 the second term. The classification of the students follows:

CANDIDATES FOR THE DEGREE OF DOCTOR OF PHILOSOPHY	
Inorganic Chemistry	5
Organic Chemistry	30
Physical Chemistry	15
CANDIDATES FOR THE DEGREE OF MASTER OF SCIENCE	
Inorganic Chemistry	3
Organic Chemistry	7
Physical Chemistry	1
Total	61

The number of entering students coming from other institutions is considerably greater (61.5 per cent) than the number of Institute students registering for graduate study. Thirteen graduate degrees were awarded in June, five of which were Master of Science.

Needless to say both space and equipment have been inadequate to care for the educational needs of such a large number of graduate students. The completion of the Eastman Laboratory is therefore looked forward to as marking a new period in the history of the Department since for the first time, except in the case of physical chemistry, will suitable space be definitely allocated for the carrying out of graduate instruction and research. The success of the graduate work under the trying conditions that prevail is convincing proof of the enduring good will and loyalty of both staff and students. Indeed no group could possibly deserve better the reward of increased facilities and space than that of the Chemistry Department.

Interest in research at present touches nearly every member of the Department staff. This interest, among other important effects, tending to produce a distinct change in the quality

of undergraduate teaching by shifting emphasis from the vocational type of instruction to the kind calculated to develop in the student powers of exact analysis, and intelligence in the use of knowledge. This is precisely the reaction which the general introduction of graduate work and research in the Department may be expected to produce and nothing but good can continue to follow from the more complete diffusion of an interest in research throughout the Department.

The year has been fruitful in results, judged from the standpoint of publications which may be summarized as follows:

PUBLICATIONS APPEARING FROM JULY 1, 1930 TO JUNE 30, 1931 FROM THE CHEMISTRY DEPARTMENT

Contributions to Inorganic Chemistry	7
Contributions to Organic Chemistry	10
Contributions to Physical Chemistry	26
Contributions to History of Chemistry	3
Contributions to Biography and work of chemists	3
Contributions to Semi-technical publications	2
Books	8
Total	59

The development of inorganic chemical research and a general interest in this somewhat neglected field of chemistry has been markedly satisfactory, largely due to the tireless effort of Professor Schumb and his co-workers. Twelve papers have been published and the new fields of interest are being opened for study. The American Academy of Arts and Sciences made a grant of $500 to assist in completing a new and powerful oscillator for the study of gaseous chemical combination in the electrodeless discharge.

The Research Laboratory of Organic Chemistry has been most unfortunately circumstanced with respect to space since the old quarters were taken over for Metallography. Conditions would have been no less than devastating but for the loyal and devoted coöperation of the staff and students. The new quarters are awaited with no small enthusiasm and the laboratory will be in a position to organize its work more effectively.

The Department expresses its deep appreciation for the sympathetic counsel and support given by its Visiting Committee.

F. G. KEYES.

Civil and Sanitary Engineering. No changes of importance have been made in the regular undergraduate curriculum during the year except those necessitated by the changes in the first- and second-year subjects adopted by the Faculty for all undergraduate courses. These changes necessitated some shifting of subjects, and as a result of the changes, it was found feasible to increase somewhat the time given to the important subject of Foundations. The number of advanced courses offered to graduate students has been increased by the addition of courses in the field of geodesy and seismology, river hydraulics, and harbor works engineering.

The Bureau of Public Roads of the United States Department of Agriculture renewed in 1930 for the fifth consecutive year its agreement with the Institute for the undertaking of investigations and research. As stated in the agreement, the purposes of the investigation for the year consist of the accumulating and digesting of the data required for a broader and more accurate interpretation of the results of simplified soil tests, the carrying out of systematic investigations concerning the effect of frost on roads, and the study of the factors which influence soil movements. The general arrangements under this agreement are the same as in previous years, with the Bureau maintaining Arthur Casagrande, Dipl. Ing., as its active representative at the Institute.

By an arrangement with the Committee on Earths and Foundations of the American Society of Civil Engineers, an investigation has been conducted on the settlement of buildings resting on compressible sub-strata, and the Society has maintained a research assistant, S. J. Buchanan, S.M., M. I. T. '31, at the Institute throughout the year; Professor Gilboy of the Institute staff as a member of the Committee has been in charge of these investigations. In carrying out this work, methods of obtaining large cores of undisturbed materials have been developed in coöperation with the Charles R. Gow Company and the B. F. Smith Company, both of Boston, who specialize in underground exploration. The Department wishes to express its appreciation for the courtesies shown by these companies.

Research has also been conducted during the year upon plumbing fixtures in coöperation with the Massachusetts State Association of Master Plumbers, the latter furnishing the

equipment and the Institute furnishing space and supplies and directing the investigations. This work is being conducted in the new Sanitary Engineering Laboratory which was made available during the past year in the basement of Building 1. The particular problem now under way may require a year or two before its completion, and, in the meantime, it is expected that the Association will submit further problems for investigation.

Considerable experimental research has been conducted in the fields of soil mechanics, river hydraulics and seismology. Theoretical research work not involving experimental work has also been conducted in structural engineering upon the determination of stresses in complicated structures.

The work in the field of soil mechanics has included the development and construction of a new testing machine for determining the coefficient of internal friction in soils and considerable valuable information upon this important property of soils has been obtained through its use. Other problems which have been investigated in this field consist of the development of a hydrometer method for the mechanical analysis of fine-grained sediment, the development of apparatus for determining the compressive strength of soil cylinders subjected to lateral pressure and the determination of the coefficient of permeability of soil from observation on the rate of horizontal capillary saturation.

In the field of seismology much progress has been made in the design of a seismometer capable of recording strong earthquake motion, such an instrument being needed in order to furnish information upon the effect of earthquakes for use in the design of engineering structures. The details of this design have been carried out by Mr. M. W. Braunlich, Research Associate, under the general direction of Professor Hosmer. The experimental instrument has virtually been completed, and tests upon a shaking table indicate that its performance will be satisfactory. One of the important features of the instrument is a device for starting the recorder whenever a shock occurs and stopping it when there is no further action, and this part of the apparatus seems to be particularly efficient. Officers of the United States Coast and Geodetic Survey have coöperated closely with us in this development work.

During the past year the equipment of the River Hydraulics Laboratory has been supplemented by the construction of a glass-walled channel, 50 cm. in width, and certain fundamental researches upon the effect of roughness on the flow of water over a dam have already been conducted in this channel. Further investigations have been made with the model of the section of the Connecticut River near Northampton, Massachusetts, for the purpose of finding a method of reducing erosion. Another problem which was completed during the year was the determination of a satisfactory method of decreasing the silting beneath a floating drydock located in New York Harbor. A considerable amount of instruction to graduate students was offered during the regular year and also during the summer of 1931.

Tentative plans for a definite research program for water and sewage treatment were proposed by Professor Camp at a department conference which was also attended by the President of the Institute, and these plans were discussed in detail at a conference attended by Chairman Stratton, President Compton, leading Boston sanitary engineers, and Professors Camp and Spofford. As a result of this conference, the Department has recommended the equipment of space now available in the Sanitary Engineering Laboratory and the appointment of a competent sanitary chemist to conduct such work. In order to consider further the need of such research work and the best methods of conducting it, Professor Camp made a tour of inspection during the summer to a number of different treatment plants and laboratories in this country and Canada. A detailed report of this trip, together with his conclusions, will be submitted later.

C. H. MacDougall, who was Research Assistant during the year in the River Hydraulics Laboratory, was granted leave of absence at the end of the year in order to pursue studies in the field of river hydraulics in Germany.

The fifth annual two-day conference of the Massachusetts State Association of Master Plumbers and the Massachusetts Sanitary Club was held at the Institute under the auspices of the Department on February 25 and 26. Papers were presented at this conference by members of the Institute Faculty, and others, upon topics of interest to the Associations represented,

and the proceedings of the conference, together with the papers presented, were printed in a 200-page pamphlet.

The attendance at the twentieth session of the Surveying Camp at East Machias during the summer of 1931 consisted of 44 students as compared with 48 in 1930. The charge per student for meals and miscellaneous expenses necessary for the operation of the camp was $1.90 per day as compared with $1.96 in 1930. The total charge per student for these items was $100.00 per man.

This year for the first time two students registered in the Public Health Engineering Option of Course VII attended the camp and were given instruction in limnological fieldwork by Professor Bunker and Mr. Jennison of the Biology Department. A fully equipped limnological laboratory was provided in the Cunningham Barracks Building for the use of students in this option. These students also took the courses in surveying and hydrographic surveying given by the Civil Engineering Department staff.

The Civil Engineering instructing staff consisted of Professors Hosmer, Babcock, Howard, Fife, Liddell, Messrs. Mitsch and Rolin, and in addition the following student assistants: Messrs. E. F. Childs and N. B. Haskell. Dr. Harland F. Lancaster, who was Resident Physician in 1927, 1929 and 1930, acted in the same capacity during the session.

The class in Mining Surveying, held at the Mining Camp at Dover, N. J., was attended by 8 students. The instruction was under the general direction of Mr. W. C. Eberhard, Instructor in the Division of Drawing, assisted by Mr. F. Leroy Foster, Instructor in the Mining Department.

C. M. SPOFFORD.

Drawing. The careful study and entire reconstruction of the course in descriptive geometry that has occupied the attention of the staff during the last three years is producing most satisfactory results.

During the year just passed much study has been given to the work in drawing. This has been wholly revised, with much stress placed upon teaching the students to read drawings, to visualize the objects which they represent through the construction of isometrics, to construct dimensioned free-hand

sketches from isometrics and from models, and finally to produce from the sketches, finished drawings. Fundamental principles of dimensioning have been developed which are of much use in laying out drawings of complex forms. More emphasis is constantly being placed upon the ability to do simple single stroke lettering well and rapidly.

In accordance with the recommendations of the committee on freshman courses, the work in descriptive geometry and in drawing has been brought into much closer connection than formerly so that it now forms a logical unit with the two branches of theory and practice closely interrelated. The texts used in the classroom have again been revised to meet the new conditions.

The college course in descriptive geometry alone, is still offered to transfer students coming from schools where drawing and descriptive geometry are taught as separate subjects and where such students may have received credit in drawing and not in descriptive geometry.

An interesting experiment is being arranged for trial during the coming year through coöperation with Lehigh University where it has been decided to adopt our course in descriptive geometry. We are looking forward to still further improvement in the course through mutual study, suggestion and interchange of ideas.

W. H. LAWRENCE.

Economics and Statistics. The principal item of interest affecting the Department of Economics has been the separation of this Department from that of Engineering Administration which has been given an independent status under the name of Business and Engineering Administration. Under this new arrangement the Department of Economics is responsible for instruction in political economy and also in the special subjects of banking, industrial relations, corporate organization and finance, building finance, statistics, and four graduate courses covering the subjects of statistical methods, business cycles, investment analysis, and public utility organization and finance.

A little more than half of the total number of teaching hours for the foregoing subjects is required for elementary economics. As the classes are large, they are divided into nearly 20

sections requiring the coöperation of each member of the staff. In view of the rapid changes which are taking place in our economic life, it is becoming more and more difficult to find a single text which accurately describes the current economic structure and the significance of the problems which arise. During the past year, therefore, a special effort has been made to remedy this deficiency through the use of a volume of selected readings dealing with current problems.

During the past year the Department has been handicapped by the absence of Professor Doten on account of illness. As a substitute Mr. Harold F. Williamson of the Harvard staff of Economics was engaged for instruction in elementary economics.

DAVIS R. DEWEY.

Electrical Engineering. Selecting students for the various sections of our undergraduate classes according to the students' interests and mental speeds, and the formation of an honors group in each junior and senior class, have continued to give satisfactory results. The Registrar now furnishes scholastic records of each student in a more definite form than heretofore, which is an aid in making the selections appropriately. We now accord the students greater freedom of choice of their work in the electrical engineering laboratories, and assign a single instructor to conduct both class exercises and laboratory supervision for each section or group. This raises the level of importance of the laboratory work and improves the interest of the students and the vitality of the instruction. As there are several sections each in the junior and senior classes, several staff members are thus assigned to the teaching of each one of the principal undergraduate subjects of the Department, which requires some attention to coördination. This is accomplished by weekly subject conferences of the teachers assigned to the subject.

With these conditions laboratory administration is becoming a service function for providing proper space and apparatus ready for use by students who are working under the advice and supervision of the instructors of the sections. The recent addition of an Associate Professor to the electrical measurements staff will enable us to more effectually generalize in this impor-

tant laboratory subject and deal with the phenomena of electric currents and electric charges, whether in solids (metallic and dielectric), liquids or gases of various pressures. Our new provision of more equipment relating to low pressure tubes is an important step to the same end. This equipment will contribute to both instruction and research.

The close association with the dynamo laboratory of the equipment for studying transient electromagnetic phenomena in electrical machinery enables senior students to participate in this important and enlightening advanced work along with graduate students who are prosecuting research into the phenomena. Our senior students prosecute a good deal of independent study and investigation of a high level and such correlation in the laboratories may be made a means of inspiration without disturbing the more advanced graduate work.

The desirability of placing each branch of electrical engineering in the hands of a particular member of the staff, who is provided with a laboratory and made responsible for expert treatment of the science and applications pertaining to his branch, is demonstrated anew by the success of the instruction and investigations in the field of acoustics relating to electrical communications and in the field of illumination. Some very interesting accomplishments have been made in each of these and the work promises to continue on a parity with work in our other branches which have been similarly treated heretofore.

With the assent of the Faculty we placed more emphasis on the comprehensive examination of the honors group of seniors, at the end of their course, relieving these students from the usual examinations in separate subjects at the end of the year and assigning two weeks for a combined examination covering the subjects of the four-year course. The examination was outlined by a committee consisting of Mr. O. B. Blackwell ('06) of the American Telephone and Telegraph Co., Mr. F. M. Carhart ('05) of Jackson and Moreland, Professor F. C. Stockwell ('07) of Stevens Institute of Technology and Professors Dahl and Fay of this Department. We are in debt to these examiners for the time and constructive effort which they contributed. Not the least of the contribution arose from an all-day sitting at the Institute to canvass with students and staff the excellences and defects of the results.

At request of the Department and with the wish of the student, the Faculty relieved one honors group student of the class of 1932 from all succeeding term examinations, thereby placing a greater weight on the comprehensive examination which will be held prior to his graduation. This is a new precedent in our honors group procedure. The outcome next June will give us additional information regarding the limit to which we may soundly extend more independence to students who have a defined purpose and also a will to pursue their own education. Such a degree of freedom as has been accorded this student is a severe test, and probably only one with originality of mind coupled with steadfast purpose can carry through. A competent honors group counsellor is available to give guidance and advice to all students of an honors group, and special advisors are available in our own branches and in other departments. Therefore, a student enjoying this wide degree of freedom in his study need have no personal loss of intimate contact with members of the Faculty who are likely to aid his intellectual development.

We continue to utilize full staff conferences (two a term) to maintain the excellent coöperation among the numerous members of the staff which follows from an acquaintance throughout the staff of the field of work and ideals of each.

The scientific work of the staff continued actively. The Vail Librarian, who is reference librarian for the Department, is a great help in connection with such work by both staff and students.

The new mechanical integraph is in use and apparently will fully satisfy our expectations of its serviceability in providing solutions for difficult equations. The precision bridge for measuring power factor is getting into its stride for investigating cable insulating oils for the Cable Research Subcommittee of the National Electric Light Association. An adaptation of an oscillograph and amplifier to electro-cardiography which was tested during the year gives such promise of serviceability that investigation of it and by it will be continued. The Department of Biology will coöperate in this. Interesting results have come out of the machine transients laboratory. The work on sound-wave measuring instruments is slow but it is progressing. An effort to apply quantitative measurements by a new method to

what is known as the Thomson effect called for more accurate data of the thermal conductivity of metals. An original method was devised for this investigation which is proceeding. Some interesting data relating to the characteristics of light sources and illumination have been secured. A further step has been made in the investigation of the process of puncture of a dielectric under electrostatic stress.

The network analyzer was applied during the year to the solution of six commercial power circuit problems, besides being used for the study of various thesis problems.

The Round Hill Laboratory made a fine contribution to knowledge regarding the penetration of light through fogs. The radio antenna study has been substantially completed, to which the new integraph has been an aid. Colonel Green has contributed money to continue these and associated investigations during the ensuing year.

The department staff produced twenty-eight publications in the field of electrical engineering.

Numbers of students and space are two closely associated matters calling for active consideration. The work space allotted to the Department is now occupied by a staff and students much beyond the maximum numbers for which the area was originally planned. It is badly overcrowded, which militates against effectiveness. Either the numbers of graduate students and seniors admitted to the study of electrical engineering should be placed at a limit lower than our present numbers, or more space should be provided. This is needed in order that the creditable repute of our work may not suffer because of difficulties of carrying on, however great may be the ability and devotion of the individuals composing the staff.

Our advisory committee canvassed the situation and took the position that it is not desirable to curtail our higher work, *i.e.*, work of graduate and senior students. The present industrial situation may automatically provide the needed relief temporarily. This, however, will not avert the difficulty, which will again arise for solution as industry and earnings become more normal.

DUGALD C. JACKSON.

Electrochemical Engineering. The curriculum of the course in Electrochemical Engineering has not been changed except in minor detail for a number of years. The original plan upon which the Course was laid out of basing the specialized work in electrochemistry upon a thorough foundation of electrical engineering and chemistry, has proved a sound one judged from the testimony of successful graduates in electrochemical and related industries. In the recent revision of the curriculum, however, it was found necessary to eliminate certain subjects in the interests of simplification; and rather than reduce the time devoted to electrical and chemical subjects it was decided to replace mechanical engineering studies by additional work in electronic physics. The endeavor has been to concentrate upon fewer subjects and to treat them with greater thoroughness. The policy of allowing fourth-year students a wide option in the choice of electives has been adhered to, as it has worked well in the past. The increasing importance of a knowledge of physical metallurgy to electrochemists has been recognized by giving somewhat greater prominence to subjects in this field.

It has been fortunate that the number of graduate students in electrochemistry during the past year has been smaller than usual, as the electrochemical research laboratory has had to be temporarily turned over to glass blowing, pending the completion of the new Physics research laboratory. The other two research rooms in Building 8 originally equipped for electrochemical work have likewise been temporarily assigned to research in physics.

It has been a rather unexpected development of the graduate work in Course XIV, that some of the ablest graduates returning for further study have found their training inclined them to research work in the field of physics rather than electrochemistry. Thus Dr. Stockbarger's work is now almost exclusively in the field of radiation. Mr. Johnson, who is working for his Doctor's degree in electrochemistry, has chosen his research in the field of ionization potentials.

The research work carried on the past year in the laboratory has been mostly in connection with thesis work, except for that conducted by Professor Thompson on the relation between hydrogen over-voltage and the composition of brass.

Other subjects which have been under investigation include: Hydrogen and Oxygen Over-Voltage of Nickel-Iron Alloys; The Variation of Over-Voltage on Polarized Electrodes; The Electrical Conductivity of Sulphur Dioxide-Water Solutions at Low Temperatures; Corrosion Tests on Nickel-Silver; The Effect of Mercury on Zinc Cyanide Plating Solutions; and the Simultaneous Deposition of Copper and Zinc from Sulphate Solutions. The results obtained in a number of these theses will be published.

The chief addition to the equipment of the laboratory during the past year has been the installation of a large rectangular vacuum furnace from the General Electric Company. This is now being used by Professor Thompson in connection with a research upon the formation of certain nickel alloys.

Dr. Knobel, who for a number of years has assisted in the instruction in electrochemistry by offering a graduate course in advanced electrochemistry, asked to be relieved from giving this course because of the pressure of other duties. The course is now given by Professor Thompson. Dr. Knobel has continued to assist, however, in the supervision of some of the electrochemical thesis work.

H. M. GOODWIN.

English and History. In the regular first-year course given by the Department, a decrease in the size of sections, an increase in the number of conferences between instructor and student, and a greater amount of theme writing, have made it possible to give a more thorough and effective training in the fundamentals of composition. Further, as a result of grouping the men in sections in accordance with their proficiency in writing, the students whose high school training in English was inadequate have received special attention.

In the upper years an interesting innovation has been the trial of a consultation service for the fourth-year students in the Course in Business and Engineering Administration. At the beginning of the second term, 61 men, about three-fourths of the class, voluntarily enrolled for this work as an extra, with a view to improving their form in the written work which constituted a regular part of their courses. In the five conferences scheduled with each man, their memoranda, reports, abstracts,

and theses were gone over carefully by the instructor, the purpose being to show the student what constitutes a high standard of excellence in such forms of writing. The spirit in which the men undertook the work, and the improvement which they made amply justify the experiment, and it is to be hoped that the arrangement may become permanent. It has a further value as an example of successful coöperation between two departments.

Another instance of the recognition by a professional department of the need of giving its students of the upper years training in practical English is the proposal of the Department of Mechanical Engineering to put into its program as a required general study the course in Committee Work. This course, which gives men practice in presenting reports before a group organized as a committee, is already required for students in Architecture and Chemical Engineering; its inclusion in the Course in Mechanical Engineering is further recognition of its value as a means of giving engineering students a kind of training in English that is especially adapted to their professional needs.

HENRY G. PEARSON.

Fuel and Gas Engineering. The course in automotive fuels, given for the first time in this Department, was modified to include less of refinery practice and more of the thermodynamics and mechanism of combustion in the engine.

The outside educational activities of the Department during the year included a lecture on radiant heat transmission given to the summer session of the Society for the Promotion of Engineering Education, the annual Fuels Progress Report to the American Society of Mechanical Engineers, and a short series of lectures to the employees of a gas company.

To assist in keeping in close contact with fuels research throughout the country, nine of the chief laboratories and schools which are carrying on work in fuels were visited by staff members during the year.

Progress on two industrial gas metering projects sponsored by public utilities groups has been entirely satisfactory, one of the projects having been completed during the year. The results on the important project of mechanism of combustion

of solid carbon are extremely encouraging. Other researches on which progress has been made include luminous flame and non-luminous gas radiation studies, the replacement of petroleum wax sweating by a continuous countercurrent crystallization process, the solvent refining of petroleum oils, industrial furnace design studies, and the cracking of heavy hydrocarbons under high pressure.

H. C. HOTTEL.

Geology. Professor W. Lindgren, in charge of the Department, was granted a leave of absence from March 1 to the end of the term. He spent several months in southern Europe studying geology and ore deposits of the Mediterranean region. During his absence Professor Shimer acted as Head of the Department, and the instruction in economic geology was in charge of Professor Newhouse.

For many years the Department has desired to give adequate instruction in Geophysics, both theoretical and practical. Many shorter courses have been given in the past by visiting men prominent in this branch. This did not prove entirely satisfactory and it was, therefore, with great pleasure that the Department received notification that Dr. Louis B. Slichter had been appointed associate professor of Geophysics.

In considering the work of the Department it must be remembered that a large number of students in other courses are given instruction in geology. The total number of these students from outside departments amounted to about 170. Three general studies relating to geology were given.

A new course in physical crystallography will be given to students in Metallurgy. For this course the Department will be obliged to obtain additional equipment for crystal models, etc., and it imposes an additional burden on the mineralogical section.

The collections of the Department of Geology, already large, are being continuously added to. The two-circle goniometer mentioned in last year's report, has been received.

From a special appropriation of $1,000 new and adequate polishing machines were purchased for the preparation of polished ore sections, and also three new metallographic microscopes at $150 each. From the income of the Peters Fund a

universal stage for microscopic work was purchased at $250. Through the generosity of Miss Katherine W. Carman the paleontological section was presented with a new binocular microscope of excellent quality.

A morphological set of ammonites prepared by the eminent authority Professor James P. Smith was acquired for $250, the money being taken from the interest of the Crosby Fund.

For a long time the Department has desired to possess an X-ray laboratory in which the crystal structure of minerals could be examined. By means of a special appropriation of $2,980 from the Rockefeller Research Fund this wish has now been realized, and the new laboratory under the direction of Professor Buerger will shortly be installed.

In order to find room for these changes, it was necessary to cut off a part of the Graduates Room for an office for Dr. Slichter, and to transfer the Map Room to a store-room without daylight in the Paleontological Section. This naturally has produced a considerable congestion in the Department and explains the demand later made for more space.

Professor Lindgren has continued the editing of his Annotated Bibliography of Economic Geology issued under the auspices of the National Research Council. Of this work three volumes have now appeared, 1928, 1929, and 1930. He spent part of his vacation investigating some iron and sulphur deposits in northern Africa and Italy, and also in preparation for a new edition of his book on "Mineral Deposits."

Professor H. W. Shimer has devoted practically the whole summer vacation to the revision of his volumes on Index Fossils, which are expected to be in the publishers' hands by February.

Professor F. K. Morris spent two and one-half months in field work in Arizona and New Mexico during the summer. The essential part of this work, which was supported by a grant from the Whitney Fund, comprised a study of the origin and physiographic history of the Recent and Quarternary deposits resting in front of southwestern mountain ranges.

Professor W. H. Newhouse continued during the winter and summer his research work on the areal and structural relations of ore deposits, as well as a study of the Appalachian ore deposits in particular.

Professor M. J. Buerger spent much time in the first term in writing a textbook on optical crystallography, which will soon be published; the second term, and most of the summer, were occupied in crystal structure research.

Owing to several special appropriations received during the year, the Department is now in fairly good condition as far as equipment and laboratories are concerned. However, with the addition of Dr. Slichter to the Department, and the constant expansion of laboratory work, the question of space is now becoming more pressing. The floor space as originally allotted in 1916 to the Department was less than the original estimate by the department officers. An expansion will be necessary in the near future if overcrowding is to be avoided.

The new laboratory erected in front of Building 4 has diminished the light in some of the laboratories, especially in the Mineralogical Laboratory, where good light is an urgent necessity, and where artificial light will not suffice. It is, therefore, urgently recommended that a special office and laboratory be provided for Dr. Slichter.

It is also recommended that a new large room, with north light, be provided for the purpose of the Mineralogical Laboratory, in which a large number of students receive instruction.

It has been suggested by the President that the Mining and the Geological libraries be consolidated. The Department is wholly in favor of this, but respectfully urges that the combined libraries should be placed on the same floor as the main Geological Library. This will be equally convenient for the Department of Mining and Metallurgy.

The collection of maps is now housed temporarily in a dark room in the Paleontological section. It is recommended that provisions be made as soon as possible for up-to-date cases and drawers in which this important collection may be stored with saving of space and increased efficiency in handling.

WALDEMAR LINDGREN.

Mathematics. The regular work of undergraduate instruction has been carried on without any essential change from the programs of the last few years. The list of graduate electives has been increased by two new courses — Algebra of

Quantum Theory, given by Professor Hitchcock, and Calculus of Variations, by Professor J. Douglas.

The growth of the Graduate Department in the last few years has been very gratifying. Last year we had enrolled in "A" subjects, primarily for graduate students, 159 students in the first term and 134 in the second term. This, of course, is not the number of individual students, since some take more than one subject. There has also been large attendance in "B" subjects, required in one or two of the professional courses and elected by many other students.

We have had enrolled in the Department of Mathematics, seven students as candidates for the Doctor's degree; six candidates for the Master of Science degree, and one student under the Guggenheim Foundation, not a candidate for any degree. One degree of Doctor of Philosophy in mathematics was conferred in June and four degrees of Master of Science in mathematics.

The Department has been fortunate in the presence of a number of foreign lecturers this year. Professor J. A. Schouten of the Delft Technical School spent nearly the whole first term here as visiting professor under the Rockefeller Foundation, dividing his time between the Institute and Harvard University, giving two lectures a week in each place on Linear Displacements. The lectures were well attended and greatly enjoyed. Professor Blaschke, of the University of Hamburg, gave three lectures on Selected Topics in Differential Geometry, and Professor E. Bompiani, of the University of Rome, one lecture on Projective Construction in the Theory of Connection.

A few changes in the personnel of the Department have taken place. The retirement of Professor Tyler as Head of the Department was appropriately noted in the last President's Report. Professor Phillips was on leave of absence for the year and his place was temporarily filled by Professor Jesse Douglas, whose appointment has been continued for the ensuing three years. Messrs. Estes, Giddings and Pease have served satisfactorily as half-time instructors in mathematics, while pursuing work for the Doctor's degree.

The Department has been active in productive work. Professors Moore, Hitchcock, Rutledge, Wiener, Franklin,

Struik and J. Douglas have published articles containing results of research.

There have been added to the equipment of the Department an Amsler's Integrator and a set of models for Skew Curve Projection.

FREDERICK S. WOODS.

Mechanical Engineering. For a number of years the Department has given instruction in air conditioning and dehumidification of factories and of office buildings but has had little laboratory equipment suitable for experimental work along these lines. Realizing that in the future the better class of residences will be supplied throughout the year with air nearly uniform in temperature and with a relative humidity of 50 to 60 per cent, a laboratory has been equipped with apparatus suitable for experimental work and for research along these lines. Much of the equipment has either been given outright or sold to us at shop cost.

There has been installed in the steam laboratory an Edwards dry vacuum pump, also a sewage ejector, and a self-priming centrifugal pump presented by the Nash Engineering Company, also a small air compressor presented by the Kellogg Manufacturing Company. A Froude Dynamometer has been added to the equipment in the Gasoline Engine Laboratory. An Emery-Tatnall machine of sixty thousand pounds capacity installed a year ago in the Testing Materials Laboratory has been exchanged without cost for a similar machine embodying certain improvements.

The three hundred thousand pound Emery Testing machine after thirty years of use is now being replaced by a vertical machine of the same capacity made by the Baldwin-Southwark Corporation, Philadelphia, Pennsylvania, manufacturers of the Emery-Tatnall machine. This new machine occupies a floor space about six by eight feet, while the Emery required a space thirty-three by seven, thus making available some one hundred eighty-three square feet of floor area which is of much value. Space in the basement under the Emery machine has been converted into a room to be used for facing specimens of concrete in preparation for compression tests.

Again this year a group of mill men was given an intensive

course in Textile Technical Analysis and Textile Microscopy by Professors Haven and Schwarz. The work covered the entire day and evening of Friday and all day Saturday for six weeks, occupying approximately one hundred hours, and included lectures, laboratory work, and discussions giving a fairly complete picture of the important portions of this type of work. A new course in textile microscopy has been added and was given during the regular term and again in the summer session by Professor Schwarz. Courses in textile laboratory and in textile technical analysis were also given in the summer session. These courses have proved to be of considerable interest and value and each year members of the staff of other colleges have taken the work.

Through the courtesy of the Draper Company, a latest model, fully automatic, Draper-Northrop loom has been installed in the Textile Laboratory to replace an old machine. The Whitin Machine Works has installed the newest of their long draft systems on one side of our present spinning frame.

In the Textile Testing Laboratory a new autographic single strand tester with electric recording device and a new cord and yarn tester have been added, the former as new equipment and the latter to replace an old machine. There also has been designed and built a preliminary model of an electrically operated constant load rate, autographic single filament and fibre testing machine. This equipment will make possible important researches which have been only imperfectly attempted in this country. In the Microscopical Laboratory a new polarising photometer has been added to form the basis of an instrument for the measurement of lustre and reflecting power of textile surfaces.

The issuing of a hundred-page catalogue devoted entirely to optical instruments for the textile industry by Bausch & Lomb Optical Company, following that issued last year by the Spencer Lens Company, is the direct result of the development of new apparatus and technique in the Textile Microscopical Laboratory.

With the formation of the United States Institute for Textile Research, the M. I. T. Textile Laboratory has been designated a coöperating laboratory. Professors Haven and Schwarz are both members of the research committee and the

latter is the Chairman of the Sub-Committee on Contact with Industry now engaged in making a national survey of textile research facilities for the Textile Alliance Foundation.

For the benefit of the Institute files, as well as for the United States Institute for Textile Research, considerable effort has been devoted to abstracting past and current literature concerned with textile research. This is a much needed service which is not being performed with any degree of completeness in any other one place.

For nearly two years Professor Haven has spent a great deal of his time on the subject of textiles in an effort to assist this industry in some of its problems and in training special groups of men selected by the mills in the field of research. One of the younger instructors has been loaned by the Institute during a part of the year to a mill which was starting a research laboratory.

Professor Hencky, who came to the Institute a year ago, has spent the greater part of his time on an investigation of the plastic flow of material under stress and on lectures in Rheology to a class of graduate students.

Professor Buckingham has continued his research work on Gears, his results having appeared in the Transactions of the A. S. M. E.

Mr. Maeser, an instructor in the Testing Materials Laboratory, has, in connection with his work for a higher degree, done an excellent piece of work on the determination of the stress brought into the steel reinforcing rods in concrete due to the shrinkage of the concrete.

Professor Zimmerman and Mr. Maeser are to be relieved of part of their teaching load during the coming year in order that they may carry on certain lines of investigation, the results of which it is felt will be of value to the engineering profession.

Mr. H. F. King, Research Associate, has been working for two or more years on the development of a Piezo electric pressure indicator for gasoline engines; in addition he has carried on the following investigations: (1) Research of lubricating oils; (2) Investigation of the components of exhaust gases of gasoline engines.

The change made recently in the curriculum of the second year whereby all students in the different engineering courses

now take the same course in Applied Kinematics, has increased the teaching load of the men giving instruction in this branch.

A General Study called "Preparation for Manufacture" given last year through the courtesy of the Western Electric Company by some of its leading engineers, is to be taken over by Professor Buckingham. This subject together with "Production Methods" given by Professor Robert H. Smith, covering specifically the types, number and sequence of machine tools needed for multiple production of a given article, should give a student an excellent preparation for work in a field in which many of our large industries find it difficult to obtain suitably trained men.

The Department is now offering a colloquium in Applied Mechanics open to graduate students who have had the requisite preliminary training.

The Department is now planning to require all its seniors to take in the second term a general study called "Committee Reports." The senior class in groups of fifteen will meet for a two-hour period once a week. At such a meeting twelve of these men constitute a board of directors, with Chairman and Secretary; the board meeting being called to listen to an engineering report from the three men who come as engineers to explain the proposition they desire to sell to the board. The projects to be submitted to the board will, in many instances, be taken from actual cases where members of the staff have been called in for consultation by industrial concerns. A member of the English Department and a member of the Mechanical Engineering staff will attend each meeting in order to criticize the presentation as to English and as to the technical side. It is planned to coöperate with the Chemical Engineering Department and with the Architectural Department, groups of our engineers appearing before boards of men made up from one department or the other. The Department intends to mimeograph the technical papers which the different groups of engineers present at these board meetings so that every student in the course may have a copy, it being felt that these will contain material of much value.

The Machine Tool Laboratory has received gifts of tools and instruments amounting to a value of ten thousand dollars. This laboratory is continuing its coöperation with industry.

Engineers from the different industries continue to give supplementary lectures to the students in the shop courses. The subjects cover the many phases of Production and Manufacturing Methods and Welding including Oxy-Acetylene, Electric Arc, Resistance and Thermit Welding. These lectures bring to the students the latest information and methods.

Again it should be noted that some of the tools, particularly the lathes, are forty years old and should be replaced with modern equipment when funds are available.

EDWARD F. MILLER.

Meteorology. During the year graduate studies in Meteorology were pursued by four Navy officers and four civilian students.

The Corporation voted to establish the degree of Master of Science with specification in Meteorology. At the end of the academic year this degree was conferred upon four students.

No radical changes in the course schedule were introduced. In coöperation with the Museum of Comparative Zoölogy at Harvard an informal weekly colloquium on theoretical oceanographical subjects was conducted by Professor Rossby at the Institute for four months.

One of our graduate students participated in oceanographic research work at Harvard during the winter under the direction of Dr. H. B. Bigelow and worked at the Scripps Institution for Oceanography at La Jolla during the summer of 1931. One of Dr. Bigelow's assistants followed our courses in descriptive Meteorology. Thus the coöperation with other Geophysical Institutions referred to in the last report is more and more being put into practice.

We continued to prepare, twice a day, well analyzed weather charts for the North American continent. These charts were reproduced and copies were mailed daily to a few American and foreign meteorological institutions in return for their weather charts and other publications.

The study of air masses mentioned in the report for 1929–1930 has progressed greatly during the year. Tables for the calculation of the entropy of moist air from specific humidity and potential temperature were prepared and used in the study

of examples selected from about 1,300 upper air soundings of temperature, humidity and pressure made in the United States during the winter of 1929–1930 and the summer of 1930. These observations, which were placed at our disposal by the United States Weather Bureau, are now being subjected to a systematic analysis. A final report on the theoretical and practical results of this investigation may be expected during the spring of 1932.

Dr. H. C. Willett completed a chapter on Dynamic Meteorology for a volume on meteorology published by the National Research Council.

The investigation of the meteorology of California referred to in last year's report was completed and published in the spring of 1931. A preliminary study of weather maps for the Pacific Ocean is now being undertaken with a view to extending the application of the Polar Front theory to this region.

The work at Round Hill was abandoned for an indefinite period of time. Both Professor Rossby and Professor Willett attended the meetings of the meteorological section of the International Geophysical Union in Stockholm, August, 1930.

C. G. A. ROSSBY.

Military Science and Tactics. The requirement, introduced last year, that all students registered for Advanced Military Science should devote at least one hour per week to practical instruction in Drill and Command has already resulted in improved leadership and greater ease in positions of command among the advanced students. The requirement meets with general approval and will be continued.

As has been the regular practice, special attention was devoted during the year to instruction in rifle and pistol marksmanship, both in the regular instruction periods and as a student activity. Interest in marksmanship continued to increase and the R. O. T. C., Varsity and Freshman rifle teams made excellent showings in intercollegiate and N. R. A. matches during the year. Demands upon the small range available have increased to such a point that it is no longer adequate, despite the fact that it is in almost continuous use during the indoor season. A gallery range of twenty firing points is urgently needed.

A new uniform, issued for the first time last year, has greatly improved the appearance of the regiment.

Because of the increased enrollment at the Institute, the student battalion of four companies has been expanded to a student regiment of a band and two battalions of three companies each. The band, under the direction of Warrant Officer Eric Svennson, United States Army, retired, made an excellent showing during the year.

The division of the freshman class into two battalions has made instruction by the half class most convenient. Consequently it has been possible to shift much of the instruction from late afternoon to earlier hours, with a marked saving in time to many of the students.

ROBERT ARTHUR, *Acting Head.*

Mining and Metallurgy. Registration in the Department, September, 1931, shows a substantial increase in the number of students electing courses in Metallurgy; the number in Mining Engineering is unchanged. This is as should be in view of the increasing demands of industry for men trained in metallurgy.

The demand is apparent to members of the Staff through the urgent requests for men, a demand which persists even in these times of depression. A recent paper read by William H. Bassett '91, Metallurgical Manager of the American Brass Company, asserts the existence of a shortage of metallurgical graduates for some years past. He cites an organization, employing fifty men on its metallurgical staff, able to find men trained in metallurgy and chemistry only sufficient in numbers to fill one-half their requirements. The other half had been trained in various ways, as follows: chemical engineering, mechanical engineering, electrical engineering, electrochemical engineering, biology and geology.

Respecting students studying metallurgy, the division of numbers between the two options is very nearly equal in the undergraduate years; of the graduate students, the majority is interested in the field of physical metallurgy as indicated by the choice of problems for research.

The policy continues of encouraging graduate study and

research on the part of junior members of the staff, and a number are registered for graduate work. The need of space for graduate research in metallurgy is pressing.

John T. Norton, Associate Professor of the Physics of Metals, is on leave of absence in Stockholm studying under Professor Arne Westgren in the field of radiology, with particular consideration of alloys. He will return in February.

New equipment acquired during the past year includes the following:

Laboratories of Physical Metallurgy

(1) Leeds and Northrup nitriding furnace; (2) Oscillograph; (3) Ajax induction melting furnace. Other equipment includes additional microscopes and polishing tables for the metallographic laboratory for graduate students. Also, there was acquired replacement of a crystal tube for the X-ray spectrometer.

We are indebted to the Leitz Company of New York for replacing with improved equipment the microscope and illuminating appliances of the metallographic camera.

Laboratory of Fire Metallurgy

(1) A new gas-fired kettle with motor operated stirrer for the desilverization of lead; (2) Electric-fired muffle furnace; (3) Republic pyrometer with automatic control.

Laboratory of Ore Dressing

We are indebted to the Minerals Separation North American Corporation for the generous gift of two Callow flotation cells, one with glass sides, the other with metal sides; also accessory apparatus. Mr. H. B. Johnson of the Technical Sales Corporation was the donor of a complete laboratory-type Huff electrostatic separator with generator. There were purchased also polishing equipment and briquette press for use in preparation of ore dressing products for microscopic study.

Laboratory of Applied Geophysics

A sand box has been built for small scale studies of equipotential prospecting and, by means of miniature ore bodies, data essential to the interpretation of field work are being developed. It has been used successfully both in undergraduate and graduate research.

The program of research activities is represented in part by titles of 1931 Master's theses, as follows:

Mining Engineering

Mineral Fuel Supplies and Markets in the United States.

The Use of Models for the Study of Equipotential Prospecting.

Metallurgy

Origins of Magnetite in Copper Reverberatory Slags.

Effects of Stress and Corrosive Gas at Elevated Temperatures on 18 Per Cent Chromium 8 Per Cent Nickel Steel.

Simultaneous Nitriding and Carburizing of Special Alloy Steels.

X-ray Investigation of Cold Worked Low Carbon Steel.

Professor Homerberg and Professor Walsted, collaborating, have just finished a two years' exhaustive research to determine the behavior of various alloying elements on nitriding (the ammonia case hardening process). They will present the results within a year in a comprehensive report before one of the technical societies.

The usual sessions of the Summer Mining Camp were held at Dover, New Jersey, and the school of metallurgy visited smelting and refining plants in Pennsylvania and New Jersey.

Professor Bugbee spent two weeks in June of this year in the bituminous coal fields of western Pennsylvania and northern West Virginia. In addition to visits made to a number of mines and coal washeries, he saw the experimental mine of the United States Bureau of Mines at Brewster and their experimental station at Pittsburgh. Other visits were made to the plant of the Mine Safety Appliance Company and the Mining Department of the University of West Virginia.

Professor Locke made a motor trip in September through the bituminous coal regions of western Pennsylvania and the anthracite regions of the northeastern part of the state, visiting coal washing plants and inspecting recent applications of the Chance and the Rheolaveur processes.

Professor Homerberg, during the past summer, visited no less than thirty manufacturing plants of automotive and allied industries, mainly in the Middle West, studying the applications of nitriding in the automotive field and determining the measure of success already attained.

Professor Hutchinson spent the greater part of the months of July and August engaged professionally in an intensive study of operating practices and mining economics in the anthracite fields of Pennsylvania.

Professor Waterhouse lectured before the meeting of the Springfield Chapter of the American Society for Steel Treating on May 11. His subject was "The Relation of Metallurgical

Education to Industry." He attended the metallurgical conferences of the Bureau of Standards in Washington, May 19 and 20, 1931 and acted as chairman of the iron and steel division.

Professor Homerberg's lectures on nitriding continue to be in demand, and he presented the subject of recent developments at a meeting in Hartford in April of the combined New England Chapters of the American Society for Steel Treating.

The Thirteenth Annual National Metals Congress and Metals Exposition was held in Boston, September 21 to 25, under the auspices of the American Society for Steel Treating and the American Institute of Mining and Metallurgical Engineers. Members of the staff took an active part in the various activities of the week; Professor Waterhouse presided at a number of the technical sessions. Professor Homerberg's services were also enlisted as chairman. Professor Walsted and Mr. Bannon were representatives of the Nitralloy Corporation at their exhibit at the Exposition. The Metals Congress and Exposition was an event of great interest and importance to all concerned with the production, selection, fabrication, treatment, welding, inspection, testing and applications of metals.

Professor Hutchinson delivered the Society of Arts lecture on December 16, 1930, "Grand Adventure with the Mining Engineer." He introduced something of the history of early-day mining in the United States and the story told was of adventures in Mexico, South Africa, Chile and Peru. Specimens of characteristic ores were exhibited.

A number of lectures in various fields were given to our students by specialists in their several fields of work, as follows:

Professor Arne Westgren, eminent Swedish chemist and X-ray metallurgist, on February 26, 1931, lectured on "Structures and Analogies of Alloys." This lecture attracted much interest and the large audience comprised guests from Harvard University, Tufts College and a group of metallurgists from the Watertown Arsenal, as well as students and members of the staff. This was the second of two talks in Cambridge by Dr. Westgren, the first having been at Harvard, in which he dealt with recent developments in the technique of X-ray metallography. In the lecture at Technology several sets of X-ray spectrographs were shown, representative of important alloy systems, spectrographs which reveal relations between chemi-

cal composition and the atomic arrangement of the alloying elements.

Mr. P. P. Alexander, Research Engineer of the Thomson Laboratory of the General Electric Company, gave a series of twelve lectures on the "Metallurgy of Welding and Its Applications." The lectures were well attended not only by members of the staff and students of the Department of Mining and Metallurgy, but by a considerable number of men from other departments and guests from the outside, notably a group of Army officers from the Watertown Arsenal; also several Naval officers from the Fore River Ship Building Corporation.

Mr. Hans F. T. Lundberg, Vice-President and Field Manager of the Swedish American Prospecting Corporation, delivered three lectures in February and conducted an evening seminar in addition. These talks dealt with the theory and practice of electrical prospecting, an important application of the science of geophysics. The attendance was good and interest was well revealed by questions and discussions.

The subjects treated included: (1) A brief history of the development of the electrical prospecting methods and consideration of the electrical susceptibility of underground waters contained in rocks; (2) A presentation of the several electric potential methods of prospecting with special emphasis on resistivity applications; (3) Electro-magnetic prospecting was discussed during the final hour in much the same order as the potential methods had been.

Mr. Charles S. Hurter, '98, Technical Representative, E. I. du Pont de Nemours and Company, Explosives Department, spent three days at the Institute in March and delivered lectures as follows: (1) High Explosives and Their Action; (2) Characteristics of Explosives; (3) Use of Explosives in Underground Mining.

Mr. R. S. Dean, Metallurgist of the Bureau of Mines, stationed in Washington, D. C., visited the Department in April and spoke before a group comprising members of the staff and students. He explained the various activities of the Bureau of Mines and discussed the opportunities afforded technical graduates for employment in the Bureau.

Mr. George H. Gilman, in charge of the Rock Drill Department of the Worthington Pump and Machinery Company at

Harrison, New Jersey, lectured at the Institute on January 12, 1931. He told of the history of the rock drill from its beginning, and pointed out how the essential features of modern powerful rock drills were developed step by step to produce the perfected hammer drill in use today. There was a good attendance of third-year students in Mining Engineering, and a considerable voluntary attendance of students from other departments.

W. SPENCER HUTCHINSON.

Modern Languages. The Departments of German and Romance Languages have been combined into the one Department of Modern Languages with satisfactory results, particularly in respect to greater consistency in administration and educational policy. Regular secretarial service has been installed, and during the summer the Department's headquarters have been advantageously remodelled. A course in Italian was given for the first time since the war, and in addition to the regularly enrolled undergraduates was followed by some of the instructing staff wishing to use it as a tool in scientific research. Two new General Studies in German were offered.

In the Summer Session an unusually large number of students took courses in Elementary and Intermediate French and German. The short six-week courses have proved to be a reasonably successful experiment, except in the cases, all too many, of students who have attempted to carry other work at the same time contrary to the recommendation of the Department.

It is with pleasure that we mention the excellent coöperation of other departments and the increasing appreciation on the part of the students of the advantage of foreign language study.

A number of candidates for higher degrees were given special examinations in French and German in coöperation with the professional departments concerned. All doubtful cases were decided by conferences between our Department and the head of the professional department.

The Department is making a great effort to encourage summer visits to Europe by members of its staff, as a means of keeping in the closest touch with European affairs, and partic-

ularly in selecting the newest and best material for its classes. This year Mr. Currier spent the first half of the vacation in Germany, and Mr. Koch the whole summer in France.

Attention is called to the pitiably small fund allotted to the central library for the purchase of recreational books in foreign languages. Such a fund ($15) would barely suffice to purchase one volume in each of the languages taught. The instructing staff must have the best reference books and secures them for its own working library through the general department fund; and occasional small, special funds are appropriated to the central library for foreign language books, but a generous, regular appropriation is urgently recommended if our students are to be encouraged to read foreign writers in the original.

It is with deep regret that we have to report the very serious illness of Professor Vogel early in the first term, necessitating the suspension of his work for the remainder of the academic year and his retirement in July. In his absence his work was taken in part by Mr. Barnason. The Department takes this opportunity to express its appreciation of the long services of Professor Vogel, and to wish him complete recovery of health.

E. F. LANGLEY.

Naval Architecture and Marine Engineering. The improvement in the number of students mentioned last year has been maintained. All of the seniors in Ship Operation were employed before the day of graduation, and most of those in Naval Architecture had jobs.

Towards the end of the year negotiations were opened with the Navy regarding an assistant to Professor Hovgaard, and Commander H. E. Rossell was detailed for this duty.

The following papers were contributed by Professor William Hovgaard: "A New Theory of the Distribution of Shearing Stresses in Riveted and Welded Connections and Its Application to Discontinuities in the Structure of a Ship," London, March 26, 1931, Institution of Naval Architects. "The Distribution of Stresses in Welded and Riveted Connections," read at the Meetings of the National Academy, April 27, 1931. "The Stress Distribution in Welded Overlapped Joints," published in the Proceedings of the National Academy, November, 1930.

The Head of the Department attended the joint meetings in Paris between the Institution of Naval Architects and the Association Technique Maritime et Aeronautique, and took part in discussions. During these meetings a visit was paid to the Saint Nazaire shipyard, where a very large Atlantic liner is under construction, rivalling indeed the giant Cunarder. The ground here is sandy and a considerable amount of work was involved in building an arched foundation on which the great weight of the hull was being erected. It is understood that the cost is being defrayed by the French government, as the slip can be used for building larger sized battleships.

A visit was also paid to "La Societe des Ateliers et Chantiers de la Loire" (Shipbuilding and Aircraft) where various types of machines were under construction. The Flying Field at Le Bourget was visited and a number of interesting demonstrations given, particularly the autogiro, the behavior of which is quite unique.

Professor Burtner visited a number of shipyards in Europe.

The Nautical Museum continues to attract a considerable number of visitors. The principal addition to the collection has been a model of the English ship *Sarah Constant*, which brought the first English settlers to America in 1606. The model is only a loan, but we hope to keep it for some time. A model of the clipper ship *Staghound*, and one of a Swedish 28-gun frigate have also been lent to us.

The books in Captain Arthur Clark's library, bequeathed to the Museum, are now being rebound and put in good condition.

The director of the Museum visited the Science and Arts Museum in South Kensington, London, where a new model is on exhibition representing the Elizabethan *Great Ship*. The data have been obtained by careful study of the material which Samuel Pepys bequeathed to Magdalene College, Cambridge, and it is probably pretty correct historically. It is proposed to acquire copies of the drawings and photographs for the records in our own Museum.

A visit was also paid to the Royal Naval College, Greenwich, in the hope of inspecting the celebrated Macpherson Collection, but the building in which it is to be housed will not be

available for some time, so that the Collection has not been unpacked.

J. R. JACK.

Physics. The year has been one of transition in the Department of Physics, and much energy has been expended in making plans for future development. The design of the new research laboratory has been completed, and construction has been started. The research program has been developed and expanded, and a number of new appointments to the staff have been made, so that by the time the new laboratory is completed the research of the Department will be amply sufficient to fill it.

The schedule of courses, both the required subjects of Course VIII and the graduate subjects, has also been entirely revised during the year. The junior work will be similar to the present schedule, but with some changes in the parts dealing with theoretical and modern physics. The senior and graduate work will be largely elective, and a very complete list of electives, both in experimental and modern physics, has been prepared.

In the work of the freshman and sophomore years, the development of the elementary work mentioned in last year's report has continued. The freshman laboratory has been improved by the addition of new apparatus, and plans call for improvement of the equipment for the sophomore course next year.

The principal new development in research during the year has been in the field of spectroscopy. Professor G. R. Harrison, of Stanford University, joined the staff at the beginning of the year, and not only directs spectroscopic research but also acts as general director of the experimental laboratory. Although there has not been room in the present building for all the spectroscopic activities which are contemplated, still space has been found for a thriving laboratory, including the twenty-one-foot vacuum spectrograph, and densitometers for photographic photometry. A number of graduate students and assistants have been at work in this field.

The other fields of research have continued in a satisfactory way. The X-ray laboratory has gone ahead with the study of crystal structure of compounds of the asbestos family. In

the radiation measurements laboratory, studies regarding the spectra of various gas discharges have been in progress, and also investigations concerning the effect of slit illumination on a spectroscopic image. The principal activity in the optical laboratory has been the writing of a textbook on Applied Optics by Professor Hardy and Mr. Perrin, now practically completed. Professor Müller has studied the Raman effect, with particular reference to the polarization of the scattered light, and the Kerr effect. Dr. Killian, transferred this year from the Electrical Engineering Department, has commenced research on the properties of electric arcs. Among the activities of the ceramics laboratory has been a study of the properties of various glazes. In theoretical physics, there have been a number of researches in quantum theory, dealing among other things with the penetration of electrons through potential barriers; various problems in atomic spectra, including the theory to go with some of the experimental results obtained by Professor Harrison; hyperfine structure and the nucleus; and problems in molecular structure, valence forces, and intermolecular forces, the last in collaboration with the Chemistry Department. Professor Stratton, transferred from the Electrical Engineering Department, is continuing for the present his work at Round Hill.

The Department was fortunate in having Professor P. Scherrer, of the Technische Hochschule in Zurich, as a visiting lecturer during ten weeks of the first term. Professor Scherrer's demonstration lectures on modern physics proved to be most popular with the Institute in general as well as with the Department, and even standing room was at a premium at all of his lectures. His presence furnished at the same time a useful stimulus toward improving the standard of experimental demonstrations in the Institute, and many changes have been made in the lecture equipment as a result.

JOHN C. SLATER.

The Treasurer

To the Corporation of the
Massachusetts Institute of Technology:

The statements submitted herewith show the financial condition of the Massachusetts Institute of Technology as of June 30, 1931, 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:		
Frances and William Emerson, for Student Aid (add)	$1,200.00	
Horace Herbert Watson Fund, for Endowment	20,371.75	
J. A. Grimmons, Perpetual Loan Scholarship	3,229.14	
Horace T. Smith Fund, for Scholarships	32,988.76	
Emma B. Moore, for Tech Matrons Tea Fund (add)	2,500.00	
Albert G. Boyden Fund, for Scholarships	40,000.00	
Treasurer's Fund, (additional)	181.25	
Class of 1896 Fund, additional subscriptions	345.00	
Esther A. Hilton Fund, for general purposes	1,626.67	
Educational Endowment Fund, Payments	156.00	
Contributions to Industrial Fund	12,500.00	
Alumni Dormitory Payments	2,195.50	
F. G. Webster Fund, for Endowment	25,000.00	
Francis E. Weston Fund, for Scholarships	10,000.00	
Frick Fund, for Endowment (additional)	200,000.00	
Emma B. Moore, for F. J. Moore Fund (additional)	7,000.00	
George Blackburn Memorial Fund, for Endowment	830,046.28	$1,189,340.35
Miscellaneous Gifts:		
Charles Hayden, for Poughkeepsie Crew Race.	$2,000.00	
Lammot du Pont, for general purposes.	50,000.00	
American Tel. & Tel. Co., for Course VI-A	5,000.00	
Redfield Proctor, for Graduate Scholarship	1,000.00	
J. E. Aldred, for Hydraulics	6,900.00	
Lammot du Pont, for Boat House.	2,000.00	
Contributions for Tuition	450.00	
Boston and Maine Railroad, for Course I-A	3,000.00	
Contributions for Course XV Fund	115.00	
E. I. du Pont de Nemours Co., for Fellowship	1,500.00	
Albert Fund, for Student House	7,500.00	
General Electric Co., for Courses VI and VIII	20,000.00	
H. M. Crane, for Diesel Engine Research	2,000.00	
F. W. Fabyan, for Course XV Publicity	1,579.75	
J. R. Macomber, for Course XV	500.00	
W. D. Binger, for Civil Engineering Department	200.00	
Godfrey L. Cabot, for Fog Research at Round Hill	1,000.00	
L. J. and Mary E. Horowitz, for course in Building Construction	11,000.00	
Gerard Swope, for Fellowship.	2,500.00	
Eastman Kodak Co., for Biocinema Research.	1,494.74	
J. R. Freeman, for Traveling Fellowship in Hydraulics	200.00	
*Col. E. H. R. Green, for Research at Round Hill	20,000.00	
Rockefeller Foundation, for Research	10,000.00	149,939.49
Total Capital and Miscellaneous Gifts		$1,339,279.84

* In addition to $67,700 contributed in 1929 and 1930.

Buildings for physical and chemical research and for a spectroscopic laboratory are now under construction. These buildings will cost at least $1,000,000, which will be met by appropriations from the George Eastman Building Fund, from which we have derived income for current purposes since 1916. An early start on these buildings was made possible by the generous action of Mr. Lammot du Pont in making up two years' loss of income due to these expenditures.

The new dormitories were opened in October, 1930, and we now have accommodations for 630 men, which just about equals the present demand.

The larger appropriations from special funds during the year have been:

For New Buildings — George Eastman Building Fund	$225,000.00
For Dormitories — Edmund Dana Barbour Fund	258,279.93
Frederick S. Hodges Fund	57,316.26
Russell Robb Fund	28,750.00
S. H. Thorndike Fund	15,000.00
Kenneth F. Wood Fund	28,750.00

Current operating income this year increased $130,000, of which $54,000 was additional income from students and most of the balance from special contributions. Expenses increased $167,500 so that the operating deficit for the year was $36,500.

In June, 1930, thirteen specific securities in our General Investment Account were marked up $1,740,000 as mentioned in the last report. Due to the depression the market value of these securities is now $246,000 less than the new book value.

Taking the General Investment Account as a whole, the present market value is $576,000 less than the book value. This is covered by the Endowment Reserve Account which now amounts to $606,000.

This year for the first time we are giving a detailed list with a short description of all our endowment funds — see pages 71 to 80.

The following is the first report of the Technology Loan Fund Committee.

July 20, 1931

Executive Committee,
Massachusetts Institute of Technology,
Cambridge, Mass.

Report of Technology Loan Fund Committee

Dear Sirs:

Referring to the resolution which was duly passed at the annual meeting of Massachusetts Institute of Technology on October 8, 1930, creating Technology Loan Fund and appointing a committee of five consisting of Charles Hayden (Chairman), Gerard Swope, Edwin S. Webster, Pierre S. Dupont, John E. Aldred, together with Dr. Stratton and Dr. Compton (the last two ex-officiis as Chairman and President of the Institute, respectively) for the purpose of raising ultimately a fund of five million dollars, the income from which, and if needs be the principal, to be devoted to making loans to meritorious students toward paying their tuition, said advances to students to be made under supervision of the Institute's Dean and Treasurer, the undersigned Chairman of the Committee makes the following report for the period ended June 30, 1931:

In 1930 twenty-three gentlemen made contributions, some of whom agreed to renew their subscriptions annually for a period of ten years, others reserving the right of cancellation, and still others stating that their contributions were only for the year 1930, but that they would be glad to consider making future contributions and would advise the Committee in respect thereto.

During the fiscal year ended June 30, 1931, the sum of $439,386 was received in cash and securities. In June 1931, your committee advised the various subscribers that it would be pleased to receive their subscriptions for the fiscal year beginning July 1, 1931, if they felt inclined to make them, and up to the date of this report $288,-500 on account of the second year's subscriptions have been received in cash and securities, a number of the subscribers having advised the Committee that they would make their subscriptions later in the year. The total amount of contributions received to date is therefore $727,886 in cash and securities. During the first year, income from securities and interest received on cash held amounted to $17,966.01, making a total received by the Fund of $745,852.01. During the initial year there was paid to the Institute the sum of $53,848 to reimburse it for loans made to students, leaving a balance in the Fund of $692,004.01.

The following is a statement showing how the fund of $692,-004.01 is now constituted:

Securities received from Contributors in lieu of cash and included herein at the value when received		*Present Value*
195 Cons. Gas Elec. Lt. & Pr. of Baltimore	$25,000.00	$16,965.00
53 9/200 Electric Bond & Share	5,000.00	2,332.00
213 4/40 North American Co.	18,375.00	15,336.00
250 Stone & Webster	24,718.75	8,750.00
	$73,093.75	$43,383.00
Securities Purchased		
$27,000 Atl. Gulf & W. I. S/S 5s 1959	$14,580.00	$15,660.00
$50,000 B. & O. RR. Conv. 4½s 1960	50,625.00	50,500.00
$100,000 Bklyn. Man. Transit 6s 1968	97,250.00	101,000.00
$75,000 Chic. N. W. Ry. Conv. 4¾s 1949	74,625.00	60,750.00
$75,000 Chic. R. I. & Pac. Ry. Conv. 4½s 1960	74,812.50	60,000.00
$4,000 Intl. Cement 5s 1948	3,230.00	3,440.00
	$315,122.50	$291,350.00
Cash on Hand	$303,787.76	$303,787.00
TOTAL FUND	$692,004.01	$638,520.00

Respectfully submitted,

(Signed) CHARLES HAYDEN, *Chairman.*

A financial statement of the Trustees of the Massachusetts Institute of Technology Pension Association follows herewith:

BALANCE SHEET, JUNE 30, 1931

Assets

Investments (as listed below)	$453,787.00
Cash	10,369.93
Total	$464,156.93

Liabilities

Teachers' Annuity Fund (5% salary deduction, plus interest)	$260,288.72
M. I. T. Pension Fund (3% of salary deducted, plus interest)	169,084.08
Reserve Fund (and interest)	25,872.76
Special Reserves for Annuity Payments	8,911.37
Total	$464,156.93

Par	*Investments* (as above)			*Book Value*
$10,000	Dominion of Canada	4½%	1936	$9,825.00
10,000	City of Montreal	5%	1936	10,000.00
30,000	City of Montreal	5%	1942	29,750.00
35,000	Gov't. of U. K., G. B. & Ireland	5½%	1937	36,217.00
35,000	Allis Chalmers Mfg. Co.	5%	1937	35,005.00
4,000	American Sugar Refining Co.	6%	1937	4,082.00
15,000	Chicago P. O. Service Bldg.	5½%	1936	15,000.00
10,000	Chile Copper Co.	5%	1947	9,587.50
35,000	Standard Oil Co. of N. Y.	4½%	1951	33,720.00
25,000	Texas Corp. Conv. Deb.	5%	1944	25,510.00
25,000	Am. Tel. & Tel. Co.	5%	1946	25,810.00
10,000	Cedars Rapids Mfg. & Power Co.	5%	1953	10,000.00
15,000	Mississippi River Power Co.	5%	1951	15,000.00
30,000	New York Power & Light Corp.	4½%	1967	29,400.00
10,000	Tenn. Elec. Power Co.	5%	1956	10,300.00
10,000	Canadian National Railways	4½%	1957	9,775.00
25,000	Canadian Pacific Ry., Eq. Tr.	5%	1944	25,562.00
5,000	Chicago & N. W. Ry. Co., Eq. Tr.	5%	1933	5,000.00
5,000	Chicago & N. W. Ry. Co., Eq. Tr.	5%	1937	5,000.00
21,000	Cleveland Union Term. Co.	4½%	1977	21,411.00
16,000	Kans. City, Memphis & Birm. R. R.	5%	1934	16,000.00
22,000	Southern Ry. Dev. & Gen. Mtge.	4%	1956	19,580.00
25,000	Pere Marquette Rwy Co.	4½%	1980	24,812.50
15,000	Union Pacific R. R.	4½%	1967	14,940.00
7,000	Central Mfg. District 1st Mtge. "B"	5½%	1937	7,000.00
5,000	General Electric Special Stock (500 shares)			5,500.00
				$453,787.00

Respectfully submitted,

EVERETT MORSS,
Treasurer

September 15, 1931.

SCHEDULE A

FINANCIAL RESULT OF OPERATION FOR YEAR ENDED JUNE 30, 1931 COMPARED WITH THE PREVIOUS YEAR

	1929-30	*1930-31*
Current Operating Expense (Schedule C) . . .	$3,905,327.07	$3,739,360.29
Current Operating Income (Schedule B) . . .	3,515,220.00	3,554,410.73
Excess Expense	$390,107.07	$184,949.56
PROFIT AND LOSS		
Net Profit (Schedule S)	743.62	1,386.48
Net Loss	$389,363.45	$183,563.08
Excess Expense of Funds, charged to Funds .	366,303.73	147,042.79
Decrease of Current Surplus, Schedule S . .	$23,059.72	$36,520.29

SCHEDULE B

OPERATING INCOME FOR YEAR 1930-1931

	Regular Courses	*Research and Funds*	*Total*
INCOME FROM STUDENTS:			
(a) Tuition Fees	$1,249,473.13	.....	.....
Locker Fees	1,664.73	.....	.....
Entrance Examination Fees	4,860.00	.....	.....
Condition Examination Fees	10,580.00	.....	.....
Late Registration Fees	2,246.00	.....	.....
Net Dormitory Income (Schedule C-19)	53,003.13	.....	.....
	$1,321,826.99		$1,321,826.99
INCOME FROM INVESTMENTS:			
Endowments, General Purposes, (Schedule P)	$1,118,476.65	$302,164.35	$1,420,641.00
(b) Endowments for Scholarships, applied	68,160.00	.....	68,160.00
Endowments, Designated Purposes (Schedule Q)	111,194.55	129,057.94	240,252.49
(c) Net (Schedule Q)	$1,297,831.20	431,222.29	$1,729,053.49
INCOME FROM OTHER SOURCES:			
Federal Aid from Acts, 1862–90	$21,963.34	.....	.....
Lammot du Pont	50,000.00	.....	.....
American Telephone and Telegraph Co., Course VI-A	5,000.00	.....	.....
General Electric Co., Courses VI, VI-A and VIII	48,417.70	.....	.....
Boston & Maine R. R. Course I-A	3,000.00	.....	.....
Daniel Guggenheim Fund	5,878.10	.....	.....
Horowitz Foundation	11,000.00	.....	.....
W. E. Nickerson Fund	4,322.22	.....	.....
Division of Laboratory Supplies	6,481.49	.....	.....
Trustees H. C. Frick Estate	59,102.58	.....	.....
E. A. Wyeth Fund	20,548.22	.....	.....
Bank Interest	9,435.30	.....	.....
Huntington Hall Rentals	3,500.00	.....	.....
Walker Building, Boston	10,000.00	.....	.....
U. S. N. Torpedo Research	1,824.26	.....	.....
	$260,473.21		$260,473.21
MINOR FUND EARNINGS:			
Total (Schedule R)	.....	$243,057.04	$243,057.04
TOTAL OPERATING INCOME (Schedule A)	$2,880,131.40	$674,279.33	$3,554,410.73

(a) STATEMENT OF TUITION FEES AND SCHOLARSHIPS:

Received in Cash for year 1930–1931	$1,059,799.00
Appropriated for Scholarships from Current Income	23,645.00
Received in Cash for Summer Session 1930	166,029.13
	$1,249,473.13
(b) Add Appropriation for Scholarships from Funds	68,160.00
Total Tuitions and Scholarships	$1,317,633.13

(c) Additional Income offset by Accrued Interest, Expenses, etc. $34,748.48

SCHEDULE C

OPERATING EXPENSE FOR YEAR 1930–1931

	Regular Courses	*Research and Funds*	*Total*
ACADEMIC EXPENSES:			
Salaries of Teachers (C-1)	$1,459,548.15	.....	.....
Wages Accessory to Teaching (C-1)	48,962.85	.....	.....
Wages, Laboratory Service (C-1)	64,708.79	.....	.....
Department Expenses (C-2)	150,827.83	.....	.....
General Library (C-3)	52,121.68	.....	.....
	$1,776,169.30		$1,776,169.30
ADMINISTRATION EXPENSES:			
Salaries, Officers	$92,500.00	.....	.....
Wages, Clerical Staff (C-4)	80,260.31	.....	.....
Printing and Advertising (C-5)	42,273.00	.....	.....
General Expense (C-6)	134,714.63	.....	.....
	$349,747.94		$349,747.94
PLANT OPERATION AND MAINTENANCE:			
Wages, Building Service (C-7)	$125,668.06	.....	.....
Power Plant Operation (C-8)	108,901.66	.....	.....
Fire Insurance (Net)	1,370.77	.....	.....
Repairs and Alterations (C-9)	180,561.84	.....	.....
	$416,502.33		$416,502.33
MISCELLANEOUS EXPENSES:			
Department of Hygiene (C-10)	$63,949.61	.....	.....
Summer Camps 1930 (C-11 and C-12)	11,388.34	.....	.....
Athletic Field, Boat House and Launches (C-13)	21,001.96	.....	.....
*Walker Memorial (C-16)	17,236.54	.....	.....
Special Appropriations (C-15)	262,042.15	.....	.....
	$375,618.60		$375,618.60
EXPENSES OF MINOR FUNDS:			
Total, including Salaries (Schedule R)	.....	$444,576.05	$444,576.05
AWARDS (other than Und. Schol.):			
Total (Schedule C-17)	.....	$55,425.59	$55,425.59
PAYMENTS FROM SPECIAL FUNDS:			
Total (Schedule C-18)	.....	321,320.48	321,320.48
TOTAL OPERATING EXPENSE (Schedule A)	$2,918,038.17	$821,322.12	$3,739,360.29

* Not including Dining Service (see Schedule C-14).

SCHEDULE C-1

SALARIES OF TEACHERS, WAGES ACCESSORY TO TEACHING AND LABORATORY SERVICE

Department	*Teachers Salaries (Net)*	*Wages Accessory to Teaching (Net)*	*Wages Laboratory Service (Net)*
Summer Session	$101,118.88	.....	.....
Aeronautics	64,240.00	$2,550.93	.....
Architecture	65,075.00	3,693.37	$2,383.19
Biology and Public Health	38,835.00	1,392.46	2,114.63
Building Construction	16,539.25	1,248.00	.....
Business and Eng. Administration	34,455.00	2,298.00	.....
Chemistry	135,379.35	4,141.62	4,869.66
Chemistry, Res. Lab. of Physical	30,980.00	1,377.00	*.....
Chemical Engineering	42,790.00	1,560.00	1,855.00
Chemical Engineering Prac. School	17,750.00	*.....	*.....
Civil Engineering	80,820.68	2,883.65	.....
Division of Laboratory Supplies	.....	.....	17,985.02
Drawing	27,100.00	312.00	.....
Economics	35,955.00	3,157.00	.....
Electrical Engineering	134,425.00	5,380.07	9,693.12
Electrical Engineering Research	4,020.00	*.....	1,872.00
English and History	62,050.00	$1,226.16	.....
Fuel and Gas Engineering	20,350.00	1,399.67	1,437.00
General Eng. and General Science	1,000.00	.....	.....
General Studies	2,250.00	.....	.....
Geology	29,369.30	1,568.00	.....
Humanics	4,000.00	.....	.....
Lantern Operation	.....	.....	437.15
Mathematics	65,800.00	950.00	.....
Mechanical Engineering	164,921.54	5,868.45	13,631.86
Meteorology	13,612.50	*.....	.....
Military Science	6,930.00	1,035.33	.....
Mining and Metallurgy	61,578.53	3,157.53	4,781.06
Modern Languages	23,025.00	348.00	.....
Naval Architecture	36,000.00	1,327.95	1,829.10
Physics	139,178.12	2,087.66	1,820.00
Totals (Schedule C)	$1,459,548.15	$48,962.85	$64,708.79

* Included in appropriation for Department Expenses (Schedule C-2).

SCHEDULE C-2
*DEPARTMENT EXPENSES (Net)

Department	*Expense (Net)*	*Overdrafts*
Aeronautics	$6,000.00	$92.24
Architecture	3,700.00	954.74
Biology	3,500.00	.....
Building Construction	2,000.00	100.77
Business and Eng. Administration	1,596.13	.....
Chemistry	16,250.00	.....
Chemistry, Research Laboratory of Physical	2,500.00	197.73
Chemical Engineering	6,100.00	174.59
Chemical Engineering Practice School	15,500.00	65.60
Civil Engineering	2,250.00	.....
Drawing	800.00	.....
Economics	1,554.85	.....
Electrical Engineering	13,500.00	486.21
Electrical Engineering, Research and Theses	8,000.00	.....
English and History	655.38	.....
Fuel and Gas Engineering (inc. Field Stations)	5,600.00	31.43
General Engineering and General Science	874.02	.....
General Studies	126.55	.....
Geology	1,979.83	.....
Humanics	322.22	.....
Lectures — Honoraria and Expenses	2,335.22	.....
Mathematics	1,300.00	.....
Mechanical Engineering	20,750.00	153.62
Meteorology	3,850.00	443.83
Military Science	1,832.62	.....
Mining and Metallurgy	7,500.00	.....
Modern Languages	325.23	.....
Naval Architecture	1,256.20	.....
Physics	18,700.00	1,137.77
United States Army and Navy Officers	169·58	.....
Totals	$150,827.83	$3,838.53

(Schedule C) (Schedule D-2)

SCHEDULE C-3
*GENERAL LIBRARY

Salaries of Officers	$6,700.00
Wages, Clerical Staff	29,396.68
Expenses	†16,025.00
Total (Schedule C)	$52,121.68

* Certain special appropriations not included (see Schedule C-15).
† Overdraft $91.80 (Schedule D-2)

SCHEDULE C-4
WAGES, CLERICAL STAFF, ADMINISTRATION OFFICES

Offices of the Chairman, President and Dean	$12,192.47
Registrar's Office	28,100.39
Secretary's Office	9,052.59
Bursar's Office	22,912.44
Superintendent's Office	8,002.42
Total (Schedule C)	$80,260.31

SCHEDULE C-5
PRINTING AND ADVERTISING

Printing, Bursar's Office	$1,551.97
Printing, Registrar's Office	7,962.22
Printing, Offices of Chairman, President, Dean, Secretary and Superintendent	2,033.49
Advertising in M. I. T. Publications	2,567.62
Bulletins: President's and Treasurer's Reports	1,023.00
Directory	1,331.50
Summer Session 1931	2,470.00
Course Pamphlets, etc.	1,803.50
Graduate Study and Research	960.00
General Catalogue	11,193.00
Examinations and Class Schedules	1,931.17
Maintenance of Catalogue of Former Students	2,654.59
Summer Session Advertising	1,696.09
Reprints and Binding, Abstracts of Staff Papers, etc.	3,094.85
Total (Schedule C)	$42,273.00

SCHEDULE C-6
GENERAL EXPENSE (Net)

Bursar's Office	$3,865.75
Registrar's Office	4,407.83
Superintendent's Office	2,779.94
Fees, Dues, Commissions, etc.	59,960.23
Secretary's Office, Admissions Office, New Student Publicity	3,139.53
Inauguration, Graduation, Receptions, etc.	14,506.94
Chairman's and President's Office	3,751.46
Ice and Ice Water	1,228.51
Dean's Office, Undergraduate Scholarship Committee	3,181.81
Trucking of Mail	1,627.76
News Service	6,736.49
370 Beacon Street	9,658.38
Travel	6,139.61
Telephone Service	18,838.52
Miscellaneous	34.65
Total	$139,857.41
Less Credits	5,142.78
Total (Schedule C)	$134,714.63

SCHEDULE C-7
WAGES, BUILDING SERVICE

Shop Foremen (net)	$3,739.95
Janitors: Supervisory and Staff	56,560.78
Night Cleaners	20,492.42
Watchmen (including Cambridge Police)	17,081.05
Window Cleaning	7,815.47
Heating and Ventilation	9,868.47
Messengers, Mail, Elevator, Shipper, Stock Room, Matron	10,109.92
Total (Schedule C)	$125,668.06

SCHEDULE C-8
POWER PLANT OPERATION (Net)

Coal	$78,267.60
Water	5,566.10
Supplies	3,389.22
Repairs	11,068.28
Trucking, etc.	988.88
Salaries	30,306.66
Electricity, Rogers Building	3,065.22
Expense, Rogers Building	1,529.30
Total	$134,181.26
Less Transfers and Credits	25,279.60
Total (Schedule C)	$108,901.66

SCHEDULE C-9
REPAIRS, ALTERATIONS AND MAINTENANCE

	Supplies and Repairs	*Alterations*	*Total*
Buildings 1, 2, 3, 4, 5, 8, 10, 11	$54,700.47	19,464.79	$74,165.26
Rogers Building, Boston	7,706.92	.....	7,706.92
Buildings No. 30, 31, 33, 35, 36, 38, 46	5,109.45	721.42	5,830.87
Miscellaneous Wooden Buildings	994.18	.....	994.18
President's House	13,870.04	.....	13,870.04
Furniture	3,885.26	.....	3,885.26
Elevators	1,770.81	.....	1,770.81
Water	9,745.39	.....	9,745.39
Gas	2,795.52	.....	2,795.52
Grounds, Roads, Tennis Courts, etc.	53,911.78	.....	53,911.78
Building Protection	1,216.89	.....	1,216.89
Rubbish	3,676.54	.....	3,676.54
Undistributed (net)	992.38	.....	992.38
Total (Schedule C)	$160,375.63	$20,186.21	$180,561.84

SCHEDULE C-10
DEPARTMENT OF HYGIENE

Salaries, Medical Director, Assistants and Infirmary Staff		$30,715.14
Additional Medical Services		1,035.15
Physical Training and Coaching		20,988.50
Medical and Other Supplies		2,072.94
Physical Examinations		4,139.23
Nutrition Class		1,000.00
Equipment		1,019.42
Food Account, Cost	$3,831.35	
Less Income	3,258.81	
		572.54
Laundry		1,281.16
Miscellaneous		1,125.53
Total (Schedule C)		$63,949.61

SCHEDULE C-11
CIVIL ENGINEERING SUMMER CAMP (1930)
TECHNOLOGY, MAINE

Income:		
From Students and Staff	$5,593.35	
Miscellaneous	96.68	
Total Income		$5,690.03
Expenses:		
Travelling Expenses	$329.19	
Construction and Repairs	4,300.77	
Caretaker	1,440.00	
Taxes and Insurance	1,490.11	
Administration, Telephone, etc.	835.47	
Wages — Operating	1,985.99	
Provisions and Supplies	3,382.44	
Coal, Wood, Gas and Ice	839.90	
Express and Freight, Laundry	471.13	
Total Expense		15,075.00
Net Expense		$9,384.97

SCHEDULE C-12
MINING ENGINEERING SUMMER CAMP (1930) DOVER, N. J.

Income:		
From Students and Staff	$930.82	
Miscellaneous	18.85	
Total Income		$949.67
Expenses:		
Travelling Expenses	$115.56	
Repairs and Equipment	721.39	
Caretaker, Insurance, Tel., Adm., Light	1,214.70	
Wages — Operating	500.00	
Provisions and Supplies	401.39	
Total Expense		2,953.04
Net Expense		$2,003.37
Total Expense of Camps (Schedule C)		$11,388.34

SCHEDULE C-13
ATHLETIC FIELD, BOATHOUSE, LAUNCHES

Athletic Field, Maintenance	$12,667.15
Boat House, Maintenance	5,273.28
Launches, Maintenance	3,061.53
Total (Schedule C)	$21,001.96

SCHEDULE C-14
DINING SERVICE (Net)

Inventory, July 1, 1930:		
Utensils	$8,529.08	
Stock	2,884.47	
		$11,413.55
Expenditures:		
Food	$70,558.49	
Salaries	48,284.83	
Light, Heat and Water	6,323.07	
Ice, Refrigeration	188.51	
Laundry	3,327.56	
Dining Room and Kitchen Equipment	3,171.27	
Repairs	2,977.06	
Printing and Advertising	1,344.82	
Administration Expense	1,421.44	
Insurance	612.68	
Occupancy (Schedule C-16)	5,000.00	
Dining Service, Reserve Fund (Schedule R)	6,524.40	149,734.13
Total		$161,147.68
Income:		
Coupon Books	$75,032.10	
Less Outstanding Coupons (Schedule D)	174.80	
	$74,857.30	
Cash	74,917.22	
		$149,774.52
Inventory, June 30, 1931		
Utensils	$8,144.76	
Stock	3,228.40	
		11,373.16
Total		$161,147.68

SCHEDULE C-15
SPECIAL APPROPRIATIONS

Graduate Scholarships				$22,059.75
Undergraduate Scholarships				23,645.00
Undergraduate Dues				21,876.00
Pension and Insurance Plan — Staff				61,018.50
Insurance Plan — Employees				5,127.25
Chemicals and Apparatus furnished to Students				14,189.04
New Equipment				22,437.04
Improvements to grounds near Dormitories				6,979.78
Research Laboratory of Applied Chemistry				8,500.00
Contribution to City of Cambridge, account of Vassar Street				5,000.00
Journal of Mathematics and Physics				3,000.00
Society of Arts				2,092.44
To DEPARTMENTS:				
Aeronautical Engineering			Total	8,550.00
No. 776	$3,000.00	No. 815	$3,500.00	
No. 780	550.00	No. 831	500.00	
No. 793	250.00	No. 837	750.00	
Architecture			Total	1,200.00
No. 779	$600.00	No. 817	$100.00	
No. 797	500.00			
Biology and Public Health			Total	2,000.00
Health Education, $500		Food and Fisheries, $1,500		
Business and Engineering Administration			Total	11,394.67
No. 783	$360.00	No. 789	$1,562.00	
No. 784	1,075.00	No. 790	1,500.00	
No. 785	916.00	No. 791	1,500.00	
No. 786	1,000.00	No. 809	1,000.00	
No. 787	181.17	No. 810	250.00	
No. 788	1,163.00	No. 811	287.50	
Spec.	300.00	No. 840	300.00	
Civil Engineering			Total	1,200.00
Soil Mech. Lab.	300.00	No. 813	$200.00	
No. 806	400.00	No. 833	300.00	
Economics			Total	800.00
No. 763	$800.00			
Electrical Engineering			Total	13,700.00
No. 792	$1,800.00	No. 822	$100.00	
No. 795	5,500.00	No. 830	500.00	
No. 798	5,800.00			
Geology			Total	1,200.00
No. 775	$1,000.00	No. 794	$200.00	
Mathematics			Total	500.00
No. 760	$500.00			
Mechanical Engineering			Total	713.42
No. 781	$200.00	No. 782	$513.42	
Mining Engineering			Total	1,050.00
No. 812	$1,050.00			
Naval Architecture			Total	750.00
No. 777	$150.00	No. 814	$600.00	
Physics			Total	21,885.33
No. 767	$1,500.00	No. 774	$1,000.00	
No. 768	3,637.00	No. 796	3,600.00	
No. 769	5,000.00	No. 821	208.25	
No. 770	1,810.08	No. 823	280.00	
No. 771	4,850.00			
Miscellaneous				1,173.93
Total (Schedule C)				$262,042.15

SCHEDULE C-16
WALKER MEMORIAL (Net)

Income:		
Games	$2,430.33	
Occupancy — Dining Service	5,000.00	
		$7,430.33
Expenses:		
Salaries	$10,308.35	
Light, Heat, Power	5,398.76	
Water	715.64	
Repairs, Alterations, Maintenance	6,019.98	
Trucking and Administration	700.78	
Supplies and Equipment	1,340.58	
Magazines and Papers	182.78	
Total		24,666.87
Net Expense (Schedule C)		$17,236.54

SCHEDULE C-17
AWARDS FROM FUNDS (Other than Undergraduate Scholarships)

Edward Austin Fund for Graduate Scholarships	$25,000.00
Teachers' Fund, Retiring Allowances	2,769.00
Robert A. Boit Fund, Prizes	300.00
Class of 1904 Prize Fund in Architecture	15.00
Arthur Rotch Prize Fund, Prizes	200.00
William Barton Rogers Fund for Student Loans	1,680.00
Bursar's Fund, for Student Loans	5,686.59
Dean's Fund, for Student Loans	550.00
Summer Surveying Camp Fund, for Loans	500.00
Misc. Funds, for Graduate Scholarships and Fellowships	15,225.00
Jonathan Whitney Fund:	
Graduate Scholarships	2,000.00
Technology Christian Association	1,500.00
Total (Schedule C)	$55,425.59

SCHEDULE C-18
PAYMENTS FROM INCOME OF SPECIAL FUNDS

Undergraduate Dues Fund for Class Dues	$300.00
Sedgwick Memorial Lecture Fund for Lectures	42.35
Walter S. Barker, for Books	463.32
Frank Harvey Cilley, for Books, etc.	1,980.75
Charles Lewis Flint, for Books	228.67
William Hall Kerr, for Books	20.25
George A. Osborne, for Books	358.34
Technology Matrons' Fund, for Teas	334.80
John Hume Tod, for Books	117.44
Theodore N. Vail for Vail Library	1,486.67
Ednah Dow Cheney, for Margaret Cheney Room	2,091.83
Crosby Honorary for Geology	85.00
F. Jewett Moore, for Chemical Department	934.78
F. W. Boles Memorial, for Architecture Department	1,619.73
Edmund K. Turner, for Annuity and Tax	2,039.69
Pratt Naval Architectural, for Nautical Museum	3,000.00
Textile Research Fund for printing	542.86
Edward D. Peters, for Mineralogy	39.40
Samuel Cabot, for Applied Chemistry Research	3,300.00
C. B. Richardson, for Applied Chemistry Research	1,600.00
Ellen H. Richards, for Research	734.60
Eastman Contract, to George Eastman	300,000.00
Total (Schedule C)	$321,320.48

SCHEDULE C-19
DORMITORY OPERATION (Net)

Income:			
From Rentals		$152,587.68	
Less Refunds		9,908.18	
Total			$142,679.50
Expenses:			
Salaries		$36,128.49	
Laundry		5,029.67	
Heat, Light, Power		16,121.05	
Water		2,272.55	
Repairs		10,948.79	
Supplies	$13,656.04		
Less Inventory (June 30, 1931) (Schedule D-2)	5,688.40	7,967.64	
Printing, Administration, Telephone		3,071.08	
New Equipment		637.10	
Interest on Mortgage Loan (Whitney Fund)		7,500.00	
Total			89,676.37
Net Income (Schedule B)			$53,003.13

SCHEDULE D
TREASURER'S BALANCE SHEET

1

ENDOWMENT ASSETS

Securities and Real Estate (Schedule H)	$33,389,244.26
Borrowed for Current Purposes (Contra)	20,338.62
Cash: For Investment (Schedule D-3)	412,004.90
Total June 30, 1931	$33,821,587.78

2

CURRENT ASSETS

Cash: For General Purposes (Schedule D-3)	$13,288.94
Accounts Receivable (Schedule D-1)	26,499.37
Students' Fees, Receivable	1,992.24
Students' Deposits, Receivable	506.37
Deposit on Fire Insurance Account	46,150.00
Inventories and Advances for 1931–32 (Schedule D-2)	107,720.27
Current Deficit (Schedule S)	14,124.33
Total June 30, 1931	$210,281.52

3

EDUCATIONAL PLANT ASSETS

Land, Buildings, and Equipment, June 30, 1930	$14,009,998.98
Additions during year	672,737.57
Cash (Schedule D-3)	20,103.95
Total June 30, 1931 (Schedule J)	$14,702,840.50
Total Assets June 30, 1931	$48,733,902.30

SCHEDULE D

JUNE 30, 1931

1

ENDOWMENT FUNDS

Funds (Schedule Q)	$33,821,587.78
Total June 30, 1931	$33,821,587.78

2

CURRENT LIABILITIES

Minor Funds (Schedule R)	$77,577.26
Accounts Payable	8,969.24
Students' Fees and Deposits Payable (Schedule D-4)	102,663.87
*Undergraduate Dues, Balance	557.73
Dining Room Coupons, Outstanding	174.80
Borrowed from Investment Assets (Contra)	20,388.62
Total June 30, 1931	$210,281.52

3

EDUCATIONAL PLANT CAPITAL

Endowment for Educational Plant, June 30, 1930	$14,083,044.19
Appropriated during year	619,796.31
Total June 30, 1931 (Schedule K)	$14,702,840.50
Total Liabilities June 30, 1931	$48,733,902.30

*See also Undergraduate Dues Reserve (Schedule Q, p. 192).

SCHEDULE D-1
DETAIL OF ACCOUNTS RECEIVABLE

Division of Industrial Coöperation and Research	$645.83
Division of Municipal and Industrial Research	3,946.51
Investment Income (June, 1931)	3,353.66
R. L. A. C. Contracts	6,040.89
U. S. Navy, Torpedo Research	2,500.00
Harvard Coöperative Society, Inc. (Notes)	1,830.10
Miscellaneous Accounts	8,182.38
Total (Schedule D)	$26,499.37

SCHEDULE D-2
DETAIL OF INVENTORIES AND ADVANCES FOR 1930–1931

Department Overdrafts (Schedule C-2)	$3,838.53
Summer Session Salaries, Advanced	2,855.00
Overdraft, General Library	91.80
Civil Engineering Summer Camp 1931, Advanced	726.78
Mining Engineering Summer Camp 1931, Advanced	801.04
Premiums Paid on Unexpired Insurance	2,737.13
Inventories — Notes held by Coöperative Society and M.I.T.	4,568.76
Dormitory Supplies (including Rugs)	6,018.40
Dining Service, Food, Utensils, etc.	11,373.16
Walker Memorial Games, Candy, Cigars, etc.	599.11
Letter Shop Supplies	687.51
Stamps	472.92
Office Supplies	1,427.69
Building and Janitors' Supplies	2,620.64
Architectural Students' Supply Room, Stock	1,231.94
Stock Room: Pipe, Fittings, Lumber, Hardware, Paint, Oil, Glass and Miscellaneous Supplies	12,534.82
Photostat Service, Supplies, etc.	1,823.63
Photographic Service, Supplies and Equipment	7,000.00
Division of Laboratory Supplies: Chemicals, Glassware, Platinum, etc.	46,231.89
Liquid Soap	79.52
Total (Schedule D)	$107,720.27

SCHEDULE D-3
TOTAL CASH RECEIPTS AND DISBURSEMENTS FOR THE YEAR

Total Cash Receipts	$7,573,720.62
Total Cash Disbursements	7,570,179.25
Excess of Receipts	$3,541.37
Cash, June 30, 1930	441,856.42
Cash, June 30, 1931	$445,397.79

CASH BALANCE

Cash for Investment — on Deposit (Schedule D)		$412,004.90
Cash for Buildings — on Deposit (Schedule D)		20,103.95
Cash for Current Purposes (Schedule D)		
On Deposit	$11,435.51	
In Office	1,853.43	
		13,288.94
Total Cash (Schedule D)		$445,397.79

SCHEDULE D-4
STUDENTS' FEES AND DEPOSITS, PAYABLE AND IN ADVANCE

Tuition Fees, 1931–1932	$295.00
Tuition Fees, Summer Session 1931	86,280.47
Students' Deposits Payable	3,853.88
Students' Deposits, Summer Session 1931	3,921.94
Dormitory Deposits in Advance	2,235.00
Dormitory Rentals, Summer Session 1931	5,759.00
Dormitory Rentals 1931–1932	212.50
Deposits, Civil Engineering Summer Camp 1931	96.08
Entrance Examination Fee 1931–1932	10.00
Total (Schedule D)	$102,663.87

SCHEDULE H

INVESTMENTS, BONDS, STOCKS,

Par Value	*Description of Securities*	*Rate*	*Maturity*	*Balance June 30, 1930*
	GOVERNMENT AND MUNICIPAL BONDS			
$1,000	Cincinnati, City of, Street Imp.. . .	4½%	1933	$1,003.00
500	Cincinnati, City of, Street Imp.. . .	4½%	1935	507.00
1,000	Cincinnati, City of, Street Imp.. . .	4½%	1935	1,023.00
6,500	Cincinnati, City of, Condemnation .	4½%	1945	6,920.00
100,000	Columbus, City of, Water Ext. No. 2	4½%	1944	104,436.00
25,000	German Govt. International Loan. .	5½%	1965	22,437.50
18,000	Kansas City, Sewer, 2d Issue . . .	4½%	1935	18,339.00
5,000	Kansas City, 23d St. Trafficway . .	4½%	1935	5,093.00
50,000	Los Angeles, City of, Water Works .	4½%	1942	51,405.00
10,000	Los Angeles, City of, Water Works .	4½%	1943	10,220.00
15,000	Los Angeles, City of, Water Works .	4½%	1943	15,334.00
50,000	Maisonneuve, City of (Montreal) . .	5%	1954	49,000.00
5,000	Mass., Comlth. of, Met. Park Loan .	3½%	1936	4,900.00
15,000	Montreal, City of	5%	1936	15,000.00
70,000	Montreal, City of	5%	1942	68,250.00
10,000	New York, City of, Corporate Stock.	4¼%	1964	10,311.00
5,000	New York, City of, Corporate Stock.	4½%	1967	4,625.00
33,000	Norfolk, City of, Va., Appropriation.	4%	1954	33,000.00
50,000	Omaha, City of, Nebraska	4½%	1934	50,705.00
50,000	Omaha, City of, Water Works . . .	4½%	1941	51,979.00
149,000	Ontario, Province of, Debenture . .	4%	1932	146,394.03
50,000	Ontario, Province of, Debenture . .	5½%	1937	50,295.00
50,000	Ontario, Province of, Debenture . .	6%	1943	52,923.00
50,000	Ontario, Province of, Debenture . .	5%	1952	49,250.00
14,000	Ontario, Province of, Debenture . .	5%	1959	13,930.00
1,000	Ottawa, City of, Ontario	4½%	1935	945.00
10,000	Ottawa, City of, Ontario	5%	1945	9,975.00
5,000	Ottawa, City of, Ontario	5%	1947	5,048.00
7,000	Ottawa, City of, Ontario	5½%	1931	7,009.00
42,000	Ottawa, City of, Ontario	5½%	1932	42,105.00
60,000	Ottawa, City of, Ontario	5½%	1939	61,160.00
1,000	Ottawa, City of, Ontario	6%	1931	1,003.00
5,000	Ottawa, City of, Ontario	6%	1936	5,150.00
1,000	Ottawa, City of, Ontario	6%	1938	1,043.00
8,000	Ottawa, City of, Ontario	6%	1939	8,356.00
8,000	Ottawa, City of, Ontario	6%	1940	8,390.00
1,000	Ottawa, City of, Ontario	6%	1948	1,068.00
10,000	Ottawa, City of, Ontario	6%	1951	10,712.00
50,000	Toronto, City of, Ontario, Gen. Loan	5%	1932	50,000.00

SCHEDULE H

REAL ESTATE AND MORTGAGES

Purchases and Charges during the year	*Sales and Credits during the year*	*Balance June 30, 1931*	*Accrued Interest, etc.*	*Income Received*
.....	$1.00	$1,002.00	.....	$45.00
.....	2.00	505.00	.....	22.50
.....	5.00	1,018.00	.....	45.00
.....	30.00	6,890.00	.....	292.50
.....	342.00	104,094.00	.....	4,500.00
.....	.....	22,437.50	.....	1,375.00
.....	68.00	18,271.00	.....	810.00
.....	19.00	5,074.00	.....	225.00
.....	117.00	51,288.00	.....	2,250.00
.....	17.00	10,203.00	.....	450.00
.....	26.00	15,308.00	.....	675.00
.....	.....	49,000.00	.....	2,500.00
.....	.....	4,900.00	.....	175.00
.....	.....	15,000.00	.....	750.00
.....	.....	68,250.00	.....	3,500.00
.....	10.00	10,301.00	.....	425.00
.....	.....	4,625.00	.....	225.00
.....	.....	33,000.00	.....	1,320.00
.....	235.00	50,470.00	.....	2,250.00
.....	180.00	51,799.00	.....	2,250.00
.....	.....	146,394.03	.....	5,960.00
.....	49.00	50,246.00	.....	2,750.00
.....	225.00	52,698.00	.....	3,000.00
.....	.....	49,250.00	.....	2,500.00
.....	.....	13,930.00	.....	700.00
.....	.....	945.00	.....	45.00
.....	.....	9,975.00	.....	500.00
.....	3.00	5,045.00	.....	250.00
.....	9.00	7,000.00	.....	385.00
.....	53.00	42,052.00	.....	2,310.00
.....	129.00	61,031.00	.....	3,300.00
.....	3.00	1,000.00	.....	60.00
.....	25.00	5,125.00	.....	300.00
.....	6.00	1,037.00	.....	60.00
.....	40.00	8,316.00	.....	480.00
.....	39.00	8,351.00	.....	480.00
.....	4.00	1,064.00	.....	60.00
.....	34.00	10,678.00	.....	600.00
.....	.....	50,000.00	.....	2,500.00

Schedule H (*Continued*)

Par Value	*Description of Securities*	*Rate*	*Maturity*	*Balance June 30, 1930*
	GOVERNMENT AND MUNICIPAL BONDS (*Continued*)			
$10,000	Toronto, City of, Ontario.	5%	1935	$9,845.00
35,000	Toronto, City of, Ontario.	5%	1936	34,475.00
18,000	Toronto, City of, Ontario.	5%	1937	17,721.00
23,000	Toronto, City of, Ontario.	5%	1939	22,655.00
9,000	Toronto, City of, Ontario.	5%	1942	8,830.80
5,000	Toronto, City of, Ontario.	6%	1934	5,072.00
23,000	Toronto, City of, Consolidated Loan	6%	1944	23,866.00
18,000	Toronto, City of, Consolidated Loan	6%	1945	18,716.00
9,000	Toronto, City of, Consolidated Loan	6%	1946	9,374.00
50,000	Winnipeg, City of, Debenture . . .	5%	1943	48,750.00
7,000	Winnipeg, City of, Gr. Water Dist. .	5%	1952	6,790.00
25,000	Winnipeg, City of	6%	1946	26,304.00
	Sold or matured during year			72,403.00
$1,274,000	*Total Government and Municipal Bonds*			$1,354,045.33
	INDUSTRIAL BONDS			
$15,000	Allis-Chalmers Mfg. Co., Gold Deb.	5%	1937	$14,812.50
18,000	Am. Agri. Chem. Co., 1st Ref. S. F.	7½%	1941	29,100.00
26,000	American Sugar Ref. Co..	6%	1937	34,421.00
25,000	Armour & Co. of Del., 1st Mtge. "A"	5½%	1943	24,000.00
40,000	Chile Copper Co. Gold	5%	1947	38,580.00
25,000	Fruit Growers Ex. Co., Equip. Tr. "G"	4½%	1934	24,607.25
25,000	Fruit Growers Ex. Co., Equip. Tr. "G"	4½%	1935	24,573.75
100,000	Glidden Co. Gold	5½%	1935	99,750.00
1,000	Inter. Paper Co., 1st & Ref. Gold "B"	5%	1947	1,000.00
50,000	Philadelphia Elec. Co., 1st & Ref. . .	4%	1971	.....
50,000	Prudence Co., Inc., Mtg..	5½%	1933	49,875.00
2,700	Reading Co., Gen. & Ref. Mtge. "A"	4½%	1997	2,646.00
100,000	Shell Union Oil Corp. S. F. Deb. . .	5%	1949	98,885.00
17,000	Smith & Wesson, Inc., 1st Mtge. S. F.	5½%	1938	46,530.00
100,000	Solvay Am.Inv.Corp.,Sec.Gold Notes	5%	1942	99,500.00
15,000	Standard Oil Co. of N. J.	5%	1946	15,059.00
65,000	Standard Oil Co. of N. Y.	4½%	1951	62,156.25
74,000	Swift & Co., 1st S. F.	5%	1944	69,883.13
50,000	Swift & Co., 10-Yr. Gold	5%	1940	.....
75,000	Texas Corp. Conv. Deb.	5%	1944	100,987.00
50,000	Waltham Watch & Clock Co..	6%	1943	49,000.00
	Sold or matured during year			300,153.00
$923,700	*Total Industrial Bonds*			$1,185,518.88

Schedule H (*Continued*)

Purchases and Charges during the year	*Sales and Credits during the year*	*Balance June 30, 1931*	*Accrued Interest, etc.*	*Income Received*
.....	.....	$9,845.00	.....	$500.00
.....	.....	34,475.00	.....	1,750.00
.....	.....	17,721.00	.....	900.00
.....	.....	22,655.00	.....	1,150.00
.....	.....	8,830.80	.....	450.00
.....	$18.00	5,054.00	.....	300.00
.....	62.00	23,804.00	.....	1,380.00
.....	48.00	18,668.00	.....	1,080.00
.....	25.00	9,349.00	.....	540.00
.....	.....	48,750.00	.....	2,500.00
.....	.....	6,790.00	.....	350.00
.....	81.00	26,223.00	.....	1,500.00
.....	72,403.00	.....	.....	4,246.81
.....	$74,308.00	$1,279,737.33	.....	$66,971.81
.....	.....	$14,812.50	.....	$750.00
$670.00	$12,310.00	17,460.00	.....	2,212.50
140.96	8,294.96	26,267.00	.....	2,040.00
.....	.....	24,000.00	.....	1,375.00
.....	.....	38,580.00	.....	2,000.00
.....	.....	24,607.25	.....	1,125.00
.....	.....	24,573.75	.....	1,125.00
.....	.....	99,750.00	.....	5,500.00
.....	.....	1,000.00	.....	50.00
46,750.00	.....	46,750.00	$105.56	.....
.....	.....	49,875.00	.....	2,750.00
.....	.....	2,646.00	.....	121.50
.....	.....	98,885.00	.....	5,000.00
600.00	30,300.00	16,830.00	.....	3,002.08
.....	.....	99,500.00	.....	5,000.00
.....	4.00	15,055.00	.....	750.00
.....	.....	62,156.25	.....	2,925.00
.....	.....	69,883.13	.....	3,700.00
51,025.00	11.00	51,014.00	231.94	.....
303.25	25,603.25	75,687.00	.....	4,270.83
.....	.....	49,000.00	.....	3,000.00
.....	300,153.00	.....	.....	7,341.70
$99,489.21	$376,676.21	$908,331.88	$337.50	$54,038.61

Schedule H (*Continued*)

Par Value	*Description of Securities*	*Div.*	*Shares*	*Balance June 30, 1930*
	INDUSTRIAL STOCKS			
$12,500	American Can Co., Com.	4%	500	$71,312.50
*50,000	American Car & Foundry Co., Com.	3%	500	25,875.00
13,750	American Pneumatic Serv. Co., 1st Pf.	7%	275	13,750.00
50,000	Amoskeag Mfg. Co., Pref.	4½%	500	41,395.00
50,000	Anaconda Copper Mining Co., Cap.	$1.50	1,000	28,254.00
11,500	Charlton Mills, Capital		115	6,886.04
*50,000	Curtis Publishing Co., Pref.	7%	500	59,375.00
10,000	Devoe & Raynolds Co., Inc., 1st Pref.	7%	100	9,800.00
*	Eastern Mfg. Co., New Common		1,000	
25,000	Eastern Mfg. Co., Pref.	7%	500	15,000.00
*1,250,000	Eastman Kodak Co., Common	8%	12,500	1,875,000.00
*400,000	General Electric Company, Common.	$1.60	4,000	160,000.00
14,710	General Electric Co., Special	60c	1,471	14,850.00
13,500	General Motors Corp., Common	$3.00	1,350	
*110,000	Gillette Safety Razor Co.		1,102	78,914.45
49,000	Int. Match Corp., Part. Pref.	4%	1,400	111,042.50
*12,500	Lackawanna Securities Co., Common	4%	125	8,250.00
50,000	Nashua Mfg. Company, Common		500	15,000.00
*49,200	Pullman Incorporated, Capital	4%	492	36,751.83
*	Quebradas Company		2,249	
6,500	Queen City Cotton Co., Capital	4%	65	1,300.00
*7,500	Samson Cordage Company	8%	75	5,000.00
100,000	Shell Union Oil Co., Conv. Pfd.	5½	1,000	97,750.00
*2,800	Shell Union Oil Co., Common		28	
*67,600	Standard Oil Co. of California, Capital	$2.50	676	29,981.25
16,000	Union Cotton Mfg. Co., Capital	6%	160	3,840.00
*530,500	United Fruit Company, Capital.	4%	5,305	397,875.00
50,000	U. S. Steel Corp., Cum. Pref.	7%	500	70,000.00
32,100	Wamsutta Mills, Capital		321	3,638.00
5,000	Westinghouse Elec. & Mfg. Co., Pref.	4%	100	6,393.90
51,100	Westinghouse Elec. & Mfg. Co., Com.	4%	1,022	102,200.00
	Sold during year			2,655.93
$3,090,760	*Total Industrial Stocks*			$3,292,090.40

Par Value	*Description of Securities*	*Rate*	*Maturity*	*Balance June 30, 1930*
	PUBLIC UTILITY BONDS			
$62,000	Am. Tel. & Tel. Co., Col. Trust.	5%	1946	$60,902.09
100,000	Appalachian Elec.P'r Co.,1st&Ref.Mt.	5%	1956	48,375.00
50,000	Blackstone Valley Gas & El. Co., Mt.	5%	1939	50,085.00

*No par value.

Schedule H (*Continued*)

Purchases and Charges during the year	*Sales and Credits during the year*	*Balance June 30, 1931*	*Accrued Interest, etc.*	*Income Received*
.....	.....	$71,312.50	.....	$2,500.00
.....	.....	25,875.00	.....	2,625.00
.....	.....	13,750.00	.....	962.48
.....	.....	41,395.00	.....	2,250.00
.....	.....	28,254.00	.....	2,500.00
.....	.....	6,886.04	.....	.....
.....	.....	59,375.00	.....	3,500.00
.....	.....	9,800.00	.....	700.00
.....	.....	.....	.....	.....
.....	.....	15,000.00	.....	1,750.00
.....	.....	1,875,000.00	.....	100,000.00
.....	.....	160,000.00	.....	6,400.00
.....	.....	14,850.00	.....	882.60
$49,958.75	.....	49,958.75	.....	2,025.00
.....	.....	78,914.45	.....	2,479.50
.....	.....	111,042.50	.....	5,600.00
.....	$478.75	7,771.25	.....	500.00
.....	.....	15,000.00	.....	.....
.....	.....	36,751.83	.....	1,968.00
.....	.....	.....	.....	2,000.00
.....	.....	1,300.00	.....	.....
.....	.....	5,000.00	.....	600.00
.....	.....	97,750.00	.....	5,500.00
140.00	.....	140.00	.....	.....
.....	832.00	29,149.25	.....	1,687.05
3,921.00	7,760.00	1.00	.....	240.00
.....	.....	397,875.00	.....	21,220.00
.....	.....	70,000.00	.....	3,500.00
.....	.....	3,638.00	.....	.....
.....	.....	6,393.90	.....	475.00
.....	.....	102,200.00	.....	4,854.50
.....	2,655.93	.....	.....	.....
$54,019.75	$11,726.68	$3,334,383.47	.....	$176,719.13
.....	.....	$60,902.09	.....	$3,100.00
$51,862.50	.....	100,237.50	$276.39	2,500.00
.....	$11.00	50,074.00	.....	2,500.00

Schedule H (*Continued*)

Par Value	*Description of Securities*	*Rate*	*Maturity*	*Balance June 30, 1930*
	PUBLIC UTILITY BONDS (*Continued*)			
$46,000	Boston Elevated Ry. Co.	6%	1933	$45,100.00
5,000	Boston Elevated Ry. Co.	4%	1935	4,600.00
100,000	Boston Elevated Ry. Co.	5%	1937	99,875.00
185,000	Cedars Rapids Mfg.&P.Co.,1stMt.S.F.	5%	1953	172,903.85
25,000	Chesa. & Potomac Tel. Co., S.F. "A"	5%	1943	24,500.00
45,000	Chicago City Railway Co., 1st Mtge.	5%	1927	49,750.00
4,250	Chicago Railways Co., 1st Mtge. . .	5%	1927	3,250.00
101,000	Cleveland Elec. Ill. Co., 1st Mtge. .	5%	1939	101,408.00
120,000	Commonwealth Edison Co., 1st Mtg.	5%	1943	119,400.00
46,000	Conn. Lt. & Pr. Co., 1st Mt. S.F. "A"	7%	1951	43,324.48
52,000	Conn. Lt. & Pr. Co., 1st Mtg. "C" .	4½%	1956	49,465.00
75,000	Consolidated Gas Co., N. Y., Gold .	4½%	1951	.....
150,000	Con. Gas, Elec. Lt. & Power Co., Mtg.	4½%	1935	141,475.00
50,000	Dallas Ry. & Terminal Co., 1st Mtge.	6%	1951	48,125.00
100,000	Detroit Edison Co.,Gen.&Ref.Mtge."D"	4½%	1961	.....
25,000	Detroit Edison Co., 1st Mtge. . . .	5%	1933	25,066.00
100,000	Duquesne Lt. & Pr. Co., 1st Mt., Gold	4½%	1967	94,750.00
131,000	Edison Elec. Ill. Co. of Boston, Gold.	3¾%	1931	.....
175,000	Edison Elec. Ill. Co. of Boston, Gold.	5%	1933	173,093.75
25,000	Em. Gas & El. Co. & Em. Coke Co., Jt.	5%	1941	18,250.00
41,000	Georgia Ry. & El. Co., 1st Cons. Mt..	5%	1932	41,021.00
50,000	Great Lakes Power Co., Ltd., 1st Mt.	6%	1943	43,187.50
50,000	Gulf States Util.Co., 1st&Ref.Mt."A"	5%	1956	46,875.00
163,000	HydraulicPr.Co.of Niag.F'lls,Ref.&Im.	5%	1951	155,095.00
59,000	Illinois Bell Tel. Co., 1st & Ref. "A"	5%	1956	56,712.50
25,000	Indianapolis Water Co., 1st Lien&Ref.	5½%	1953	24,000.00
100,000	Los Angeles Gas & El. Corp., Ref. "F"	5½%	1943	95,750.00
50,000	Los Angeles Gas & El. Corp., Gen'lMt.	5%	1961	49,125.00
200,000	Louisville Gas & El. Co., 1st & Ref. Mt.	5%	1952	184,546.25
200,000	Massachusetts Gas Co., Consolidated	4½%	1931	192,312.50
200,000	Massachusetts Gas Cos., S. F. Deb .	5%	1955	195,500.00
50,000	Milwaukee El. Ry. & Lt. Co., 1st Mt.	5%	1961	46,125.00
50,000	Minneapolis Gen. Elec. Co., Mtge. .	5%	1934	50,087.00
110,000	Mississippi River Power Co., 1st Mt.	5%	1951	101,039.40
100,000	Montreal Light, Heat & Power Co. .	4½%	1932	93,812.50
50,000	Nevada California Electric Co. . . .	5%	1956	47,750.00
55,000	New England Tel. & Tel. Co., Deb. .	5%	1932	55,070.00
150,000	NewOrleansPub.Serv.,Inc.,1stRef.Mt.	5%	1952	134,375.00
100,000	New York Telephone Co., 1st Mtge. .	4½%	1939	58,043.36

Schedule H (*Continued*)

Purchases and Charges during the year	*Sales and Credits during the year*	*Balance June 30, 1931*	*Accrued Interest, etc.*	*Income Received*
.....	.....	$45,100.00	.....	$2,760.00
.....	.....	4,600.00	.....	200.00
.....	.....	99,875.00	.....	5,000.00
.....	.....	172,903.85	.....	9,250.00
.....	.....	24,500.00	.....	1,250.00
.....	$5,000.00	44,750.00	.....	2,375.00
.....	250.00	3,000.00	.....	218.75
.....	51.00	101,357.00	.....	5,050.00
.....	.....	119,400.00	.....	6,000.00
.....	.....	43,324.48	.....	3,220.00
.....	.....	49,465.00	.....	2,340.00
$75,562.50	.....	75,562.50	$84.38	.....
.....	.....	141,475.00	.....	6,750.00
.....	.....	48,125.00	.....	3,000.00
100,000.00	.....	100,000.00	25.00	.....
.....	33.00	25,033.00	.....	1,250.00
.....	.....	94,750.00	.....	4,500.00
130,829.70	.....	130,829.70	.....	2,456.25
.....	.....	173,093.75	.....	8,750.00
.....	.....	18,250.00	.....	1,250.00
.....	21.00	41,000.00	.....	2,050.00
.....	.....	43,187.50	.....	3,000.00
.....	.....	46,875.00	.....	2,500.00
.....	.....	155,095.00	.....	8,150.00
.....	.....	56,712.50	.....	2,950.00
.....	.....	24,000.00	.....	1,375.00
.....	.....	95,750.00	.....	5,500.00
.....	.....	49,125.00	.....	2,500.00
.....	.....	184,546.25	.....	10,000.00
.....	.....	192,312.50	.....	9,000.00
.....	.....	195,500.00	.....	10,000.00
.....	.....	46,125.00	.....	2,500.00
.....	22.00	50,065.00	.....	2,500.00
.....	.....	101,039.40	.....	5,500.00
.....	.....	93,812.50	.....	4,500.00
.....	.....	47,750.00	.....	2,500.00
.....	35.00	55,035.00	.....	2,750.00
.....	.....	134,375.00	.....	7,500.00
41,300.00	.....	99,343.36	410.00	3,600.00

Schedule H (*Continued*)

Par Value	*Description of Securities*	*Rate*	*Maturity*	*Balance June 30, 1930*
	PUBLIC UTILITY BONDS (*Continued*)			
$82,000	New York Pow. & Lt. Corp., 1st Mtge.	4½%	1967	$12,247.50
5,000	New York & Queen Gas Co.,1st & G.M.	5%	1934	4,900.00
1,000	Nia., Lock. & Ont. P. Co., 1st&Ref. Mt.	5%	1955	1,000.00
100,000	North Boston Lighting Prop.Co.Notes	5%	1932	99,250.00
50,000	Northern States Pow. Co., Ref. Gold	4½%	1961	.....
50,000	North. States Pr. Co., 1st & Ref. Mt..	5%	1941	45,000.00
50,000	Ohio Power Co., 1st & Ref.Mtge.Gold	4½%	1956	.....
100,000	Oklahoma Gas & Electric Co., 1st Mtg.	5%	1950	94,750.00
50,000	Ontario Power Co., 1st Mtge. S. F. .	5%	1943	49,312.50
100,000	Pacific Gas&El.Co.,1st&Ref.Mt.Gold.	4½%	1960	.....
75,000	Pacific Gas & El. Co., 1st Ref. Mt. "B"	6%	1941	77,393.00
75,000	Pacific Tel.&Tel.Co.,1stMt.Col.Tr.S.F.	5%	1937	73,915.10
50,000	Penn.-Ohio Edison Co., Gold Deb. .	5½%	1959	.....
50,000	Penn. Power & Lt. Co., 1st Mtge. Gold	4½%	1981	.....
2,000	Philadelphia Co.	5%	1967	.....
25,000	Portland Gen. Electric Co., 1st Mtge.	5%	1935	25,108.00
95,000	Potomac Elec. Power Co., Mtge. "B"	6%	1953	99,644.00
90,000	Public Ser. Co. of No. Ill., 1st Mtge.	4½%	1980	.....
50,000	Salmon River Power Co., 1st Mtge. .	5%	1952	47,625.00
100,000	Shawinigan Water & Pow.Co.,1st Mtg.	5%	1970	101,389.00
100,000	Southern Bell Tel.&Tel.Co.,1stMt.S.F.	5%	1941	100,597.00
165,000	Southern Calif. Edison Co., Gen. Mtge.	5%	1939	163,218.75
40,000	Tennessee Elec.Pow.Co., 1st&Ref.Mtg.	5%	1956	.....
300,000	Texas Power & Light Co., 1st Mtge.	5%	1937	291,437.50
50,000	Virginia Ry. & Pr. Co., 1st Mtge. .	5%	1936	46,375.00
100,000	West Penn. Power Co., 1st Mtge. "E"	5%	1963	93,482.50
50,000	West Penn. Power Co., 1st Mtge. .	5½%	1953	51,013.00
75,000	Western Tel. & Tel. Co., Col. Tr. . .	5%	1932	75,070.00
100,000	Western Union Tel. Co.	5%	1951	75,220.00
	Sold or matured during year			829,717.68
$5,755,250	*Total Public Utility Bonds*			$5,501,790.71

	PUBLIC UTILITY STOCKS	*Div.*	*Shares*	
$337,400	American Tel. & Tel. Co., Capital. .	9%	3,374	$581,350.00
*21,600	Brooklyn Union Gas Co., Capital . .	5%	216	8,587.50
*50,000	Commonwealth & Southern Corp.,Pfd.	6%	500	51,625.00
*100,000	Consolidated Gas Co. of N. Y., Pfd..	5%	2,000	194,975.00
6,800	Eastern Gas & Fuel Asso., Com. . . .		68	.....
3,400	Eastern Gas & Fuel Asso., Cum. Pref.	6%	34	2,960.13

*No par value.

Schedule H (*Continued*)

Purchases and Charges during the year	*Sales and Credits during the year*	*Balance June 30, 1931*	*Accrued Interest, etc.*	*Income Received*
$106,133.85	$39,924.69	$78,456.66	$1,460.00	$4,657.50
.....	.....	4,900.00	.....	250.00
.....	.....	1,000.00	.....	50.00
.....	.....	99,250.00	.....	5,000.00
49,625.00	.....	49,625.00	434.38	.....
.....	.....	45,000.00	.....	2,500.00
49,812.50	.....	49,812.50	781.26	1,125.00
.....	.....	94,750.00	.....	5,000.00
.....	.....	49,312.50	.....	2,500.00
98,368.75	.....	98,368.75	1,243.76	2,250.00
.....	218.00	77,175.00	.....	4,500.00
.....	.....	73,915.10	.....	3,750.00
51,142.50	39.50	51,103.00	504.94	.....
48,125.00	.....	48,125.00	137.50	.....
2,025.00	.....	2,025.00	.....	50.00
.....	27.00	25,081.00	.....	1,250.00
95.48	2,268.48	97,471.00	.....	5,820.00
88,393.75	.....	88,393.75	1,901.25	.....
.....	.....	47,625.00	.....	2,500.00
.....	36.00	101,353.00	.....	5,000.00
.....	60.00	100,537.00	.....	5,000.00
.....	.....	163,218.75	.....	8,250.00
49,750.00	10,300.00	39,450.00	387.49	1,250.00
.....	.....	291,437.50	.....	15,000.00
.....	.....	46,375.00	.....	2,500.00
.....	.....	93,482.50	.....	5,000.00
.....	46.00	50,967.00	.....	2,750.00
.....	70.00	75,000.00	.....	3,750.00
25,880.00	55.00	101,045.00	185.41	4,375.00
.....	829,717.68	.....	1.11	45,646.62
$968,906.53	$888,185.35	$5,582,511.89	$7,832.87	$301,819.12
$10,851.75	.....	$592,201.75	.....	$30,249.00
3,300.00	.....	11,887.50	$42.17	997.50
.....	.....	51,625.00	.....	3,000.00
.....	.....	194,975.00	.....	10,000.00
.....	.....	.....	.....	.....
.....	.....	2,960.13	.....	204.00

Schedule H (*Continued*)

Par Value	*Description of Securities*	*Div.*	*Shares*	*Balance June 30, 1930*
	PUBLIC UTILITY STOCKS (*Continued*)			
$5,000	Eastern Gas & Fuel Asso., Pr. Pref. .	4½%	50	$4,100.00
65,000	Electric Bond & Share Co. $5 Pfd. .	5%	650	59,312.50
150,000	Public Service Corp. of N. J., Pref. .	5%	1500	49,350.00
50,000	Stone & Webster, Inc., Capital . . .	3%	500	27,680.74
35,000	Western Union Tel. Co.	8%	350	.....
$824,200	*Total Public Utility Stocks*			$979,940.87

	RAILROAD BONDS	*Rate*	*Maturity*	
$75,000	Atch. Top. & S. F., Cal. & Ariz. Lines	4½%	1962	$73,143.75
100,000	Atch. Top. & Santa Fe, Gen. Mtge. . .	4%	1995	96,470.00
13,000	Atch. Top. & Santa Fe, 20-Yr.	4½%	1948	13,000.00
50,000	Atlantic Coast Line R. R. Co., Gen. Un.	4½%	1964	48,875.00
10,000	Boston & Albany Railroad Improvement	4%	1934	9,450.00
1,000	Boston & Maine Railroad	4½%	1944	850.00
150,000	Boston & Maine R. R., 1st Mt.Gold No. 2	5%	1955	150,720.00
50,000	Boston & Maine R. R., 1st Mtge. "AC"	5%	1967	46,500.00
90,000	Canadian Nat'l Railways Co.	4½%	1957	88,425.00
100,000	Canadian Nat'l. Rwys. Co., 25-Yr.Gold	4½%	1956	.....
25,000	Canadian Nat'l Rys. Equip. Tr. "J" .	4½%	1938	24,575.00
11,000	Canadian Pacific Ry. Co., Equip. Tr. .	5%	1944	27,564.00
75,000	Central New England Railways,1st Mtge.	4%	1961	56,281.25
50,000	Cen. Pacific Ry. Co., Short Line Mtge.	4%	1954	40,918.75
100,000	Ches. & Ohio Ry. Co., Cons'd. 1st Mtge.	5%	1939	103,024.00
51,000	Chicago, Burlington & Quincy, Mtge. .	4%	1958	50,307.00
100,000	Chic., Burl. & Quincy, 1st Ref.Mtge."B"	4½%	1977	96,750.00
100,000	Chic.J.Rys.&Un.St.Yds.Mt.&Co.Tr. .	4%	1940	94,250.00
75,000	Chic.J.Rys.&Un.St.Yd.Ref.Mt.&Co.Tr.	5%	1940	74,143.75
17,000	C. M. St. P. & Pacific R. R. Co., Gold"A"	5%	1975	10,410.00
68,000	C. M. St. P. & Pac. R.R.Con.Gold "A"	5%	2000	41,640.00
65,000	Chicago Union Station, 1st Mtge. "A".	4½%	1963	65,339.00
100,000	Chicago Union Station, 1st Mtge. "C".	6½%	1963	112,353.00
100,000	Chic. & N. W. Ry. Co., 20-Yr. Gold . .	4¾%	1949	100,327.00
5,000	Chic. & N.W. Ry. Co., Equip. Tr. of 1922	5%	1932	4,916.10
5,000	Chic. & N.W. Ry. Co., Equip. Tr. of 1922	5%	1934	4,907.10
5,000	Chic. & N.W. Ry. Co., Equip. Tr. of 1922	5%	1935	4,902.90
5,000	Chic. & N.W. Ry. Co., Equip. Tr. of 1922	5%	1936	4,899.30
200,000	Chic. & N.W. Ry. Co., 1st & Ref. Mtge.	4½%	2037	189,500.00
100,000	Clev., Cinn., Chic. & St. Louis Ry. Co.	4½%	1977	.....
79,000	Cleveland Union Terminals Co., 1st Mtg.	4½%	1977	98,562.50
25,000	Cleveland & Pittsburg R. R. Co., Mtge.	4½%	1942	25,324.00
190,000	Delaware & Hudson Co., 1st & Ref. Mt.	4%	1943	172,785.00

Schedule H (*Continued*)

Purchases and Charges during the year	*Sales and Credits during the year*	*Balance June 30, 1931*	*Accrued Interest, etc.*	*Income Received*
.....	.....	$4,100.00	.....	$225.00
.....	.....	59,312.50	.....	3,250.00
$99,315.88	.....	148,665.88	.....	3,231.16
.....	.....	27,680.74	.....	1,875.00
49,400.00	.....	49,400.00	.....	700.00
$162,867.63	.....	$1,142,808.50	$42.17	$53,731.66
.....	.....	$73,143.75	.....	$3,375.00
.....	.....	96,470.00	.....	4,000.00
.....	.....	13,000.00	.....	585.00
.....	.....	48,875.00	.....	2,250.00
.....	.....	9,450.00	.....	400.00
.....	.....	850.00	.....	45.00
.....	$30.00	150,690.00	.....	7,500.00
.....	.....	46,500.00	.....	2,500.00
.....	.....	88,425.00	.....	4,050.00
$98,000.00	.....	98,000.00	$121.88	.....
.....	.....	24,575.00	.....	1,125.00
305.79	16,657.79	11,212.00	.....	1,550.00
.....	.....	56,281.25	.....	3,000.00
.....	.....	40,918.75	.....	2,000.00
.....	378.00	102,646.00	.....	5,000.00
.....	.....	50,307.00	.....	2,040.00
.....	.....	96,750.00	.....	4,500.00
.....	.....	94,250.00	.....	4,000.00
.....	.....	74,143.75	.....	3,750.00
.....	.....	10,410.00	.....	850.00
.....	.....	41,640.00	.....	1,020.00
.....	11.00	65,328.00	.....	2,925.00
.....	375.00	111,978.00	.....	6,500.00
.....	18.00	100,309.00	.....	4,750.00
.....	.....	4,916.10	.....	250.00
.....	.....	4,907.10	.....	250.00
.....	.....	4,902.90	.....	250.00
.....	.....	4,899.30	.....	250.00
.....	.....	189,500.00	.....	9,000.00
98,891.25	.....	98,891.25	2,106.38	.....
721.77	21,420.00	77,864.27	.....	4,260.00
.....	30.00	25,294.00	.....	1,125.00
.....	.....	172,785.00	.....	7,600.00

Schedule H (*Continued*)

Par Value	*Description of Securities*	*Rate*	*Maturity*	*Balance June 30, 1930*
	RAILROAD BONDS (*Continued*)			
$35,000	Fort St. Union Depot Co., 1st Mtge. .	4½%	1941	$34,825.00
100,000	Grand Trunk & West. Ry., Eq. Tr. . .	5%	1942	99,495.70
150,000	Great Northern Railway Co. Gen. Mtge.	4½%	1976	46,273.00
50,000	Hudson & Man.R.R.Co.,1st&Ref.Mtg.	5%	1957	.....
10,000	Illinois Central Equip. Trust "J" . . .	5%	1932	9,825.00
10,000	Illinois Central Equip. Trust "J" . . .	5%	1935	9,825.00
10,000	Illinois Central Equip. Trust "J" . . .	5%	1936	9,825.00
10,000	Illinois Central Equip. Trust "J" . . .	5%	1937	9,825.00
5,000	Illinois Central R. R. Co., Ref. Mtge. .	4%	1955	4,700.00
75,000	Illinois Central R. R. Co., Sec. Gold. .	4%	1952	67,875.00
59,000	Ill. Cen. R. R. Co., Wes. Lines Mtge. .	4%	1951	54,526.25
9,000	Ill.Cen.R.R.Co., West.Lines Mt.(Reg.)	4%	1951	8,291.25
50,000	Indianapolis Un. Ry. Co., Gen. Mtge. .	5%	1965	49,468.75
8,500	Kan. City, Mem. & Birm. R. R. Co., Mt.	4%	1934	8,287.50
37,000	Kan.City, Mem.&Birm.R.R.Co.,In.Mt.	5%	1934	34,225.00
75,000	Kansas City Terminal Co., 1st Mtge. .	4%	1960	65,437.50
50,000	Long Island R. R. Co., Unified Mtge. .	4%	1949	48,068.75
50,000	Long Island R. R. Co., Un. Mtge. (Reg.)	4%	1949	48,068.75
100,000	Minn., St. Paul & S. St. Marie Ry. Co.	4%	1938	93,425.00
10,000	Minn.,St.Paul & S.St.Marie Ry.Co.Gold	5½%	1949	7,438.10
21,000	Miss. & Ill. Bridge & Belt R. R. Co., Mt.	4%	1951	13,650.00
100,000	Morris & Essex Ry. Co., Constr. "B" .	4½%	1955	96,250.00
10,000	New London Northern R. R. Co., 1st Mt.	4%	1940	8,600.00
41,000	N. Y. C. & H. R. R. R.	4%	1934	39,825.00
15,000	New York Central Lines Equip. Trust .	4½%	1932	14,439.21
14,000	New York Central Lines Equip. Trust .	4½%	1933	13,434.36
9,000	New York Central Lines Equip. Trust .	4½%	1937	8,536.50
18,000	New York Central R. R., Equip. Trust.	7%	1932	18,259.00
6,000	New York Central R. R., Equip. Trust.	7%	1933	6,168.00
11,000	New York Central R. R., Equip. Trust.	7%	1934	11,450.00
25,000	New York Central R. R., Equip. Trust.	4½%	1936	24,702.50
52,000	New York Cen. R.R. Co., Cons. Mt. "A"	4%	1998	46,046.65
100,000	N. Y., Chic.& St. Louis R.R.Co.,Gold"C"	4½%	1978	97,000.00
100,000	New York Connect. R. R., 1st Mtge. .	4½%	1953	98,625.00
31,200	N.Y., N.H. & H. Co., Con. Deb. (Reg.)	6%	1948	33,219.00
8,000	N. Y., N. H. & H. R. R. Co., Deb. . .	4%	1955	6,320.00
50,000	N.Y., N.H. & H. R.R. Co., Deb. . . .	4%	1957	.....
75,000	No. Pacific R. R. Co., Prior Lien Ry. .	4%	1997	67,875.00
332,000	No. Pacific Ry. Co., Ref. & Imp. . . .	6%	2047	353,284.00
84,000	Oregon R. R. & Nav. Co., Cons. Mtge. .	4%	1946	82,668.25
14,500	Oregon Short Line R. R., Cons. Mtge. .	5%	1946	14,940.00
18,000	Pennsylvania R. R. Co., Cons. Mtge. .	4½%	1960	18,435.00

Schedule H (*Continued*)

Purchases and Charges during the year	*Sales and Credits during the year*	*Balance June 30, 1931*	*Accrued Interest, etc.*	*Income Received*
.....	.....	$34,825.00	.....	$1,575.00
.....	.....	99,495.70	.....	5,000.00
$98,071.25	.....	144,344.25	$2,030.65	2,250.00
50,062.50	$3.50	50,059.00	416.67	.....
.....	.....	9,825.00	.....	500.00
.....	.....	9,825.00	.....	500.00
.....	.....	9,825.00	.....	500.00
.....	.....	9,825.00	.....	500.00
.....	.....	4,700.00	.....	200.00
.....	.....	67,875.00	.....	3,000.00
.....	.....	54,526.25	.....	2,360.00
.....	.....	8,291.25	.....	360.00
.....	.....	49,468.75	.....	2,500.00
.....	.....	8,287.50	.....	340.00
.....	.....	34,225.00	.....	1,850.00
.....	.....	65,437.50	.....	3,000.00
.....	.....	48,068.75	.....	2,000.00
.....	.....	48,068.75	.....	2,000.00
.....	.....	93,425.00	.....	4,000.00
.....	.....	7,438.10	.....	550.00
.....	.....	13,650.00	.....	840.00
.....	.....	96,250.00	.....	4,500.00
.....	.....	8,600.00	.....	400.00
.....	.....	39,825.00	.....	1,640.00
.....	.....	14,439.21	.....	675.00
.....	.....	13,434.36	.....	630.00
.....	.....	8,536.50	.....	405.00
.....	259.00	18,000.00	.....	1,260.00
.....	84.00	6,084.00	.....	420.00
.....	150.00	11,300.00	.....	770.00
.....	.....	24,702.50	.....	1,125.00
.....	.....	46,046.65	.....	2,080.00
.....	.....	97,000.00	.....	4,500.00
.....	.....	98,625.00	.....	4,500.00
.....	115.00	33,104.00	.....	1,872.00
.....	.....	6,320.00	.....	320.00
36,865.00	.....	36,865.00	100.78	.....
.....	.....	67,875.00	.....	3,000.00
.....	182.00	353,102.00	.....	19,920.00
.....	.....	82,668.25	.....	3,360.00
.....	28.00	14,912.00	.....	725.00
.....	15.00	18,420.00	.....	810.00

Schedule H (*Continued*)

Par Value	*Description of Securities*	*Rate*	*Maturity*	*Balance June 30, 1930*
	RAILROAD BONDS (*Continued*)			
$100,000	Pennsylvania R. R. Co., Gen. Mtge.	4½%	1965	$100,792.00
125,000	Pere Marquette Ry., 1st Mtge. Gold	4½%	1980	145,185.00
117,900	Pere Marquette Ry., 1st Mtge. "A"	5%	1956	104,719.59
37,500	Pere Marquette Ry. Co., 1st Mtge. "B"	4%	1956	37,500.00
51,000	Rio Grande Western Ry. Co., Mtge.	4%	1939	49,935.00
1,000	Somerset Ry. Co., 1st & Ref. Mtge.	4%	1955	850.00
5,000	Southern Pacific Co. Gold	4%	1949	4,575.00
212,000	Southern Pacific Co.	4½%	1969	192,280.00
20,000	So. Ry. Co., Dev. & Gen. Mtge.	4%	1956	17,380.97
25,000	So.Ry.Co.,St.Louis Div.,1st Mt. (Reg.)	4%	1951	24,875.00
100,000	Southern Pac. Co. Oregon Lines 1st Mtg.	4½%	1977	97,250.00
100,000	Term. R. R. Asso. of St. Louis, Mtge.	4½%	1939	100,137.00
100,000	Un. Pac. R. R. Co., 1st Mtge. & L. Gr.	4%	1947	100,606.00
20,000	Union Pacific R. R. Co.	4½%	1967	19,400.00
10,000	Western Pacific R. R. Co., 1st Mtge. "A"	5%	1946	8,000.00
50,000	Winston Salem South. Ry. Co., Mtge.	4%	1960	43,875.00
	Sold or matured during year			344,379.89
$5,302,600	*Total Railroad Bonds*			$5,106,286.87

	RAILROAD STOCKS	*Div.*	*Shares*	
$33,600	Atchison, Topeka & Santa Fe Co., Pref.	5%	336	$25,200.00
150,000	Atchison, Topeka & Santa Fe Co., Com.	10%	1,500	270,000.00
50,000	Atlanta, Birmingham & Coast R. R., Pfd.	5%	500	50,000.00
40,500	Baltimore & Ohio R. R., Common	5%	405	32,400.00
50,200	Boston & Albany R. R. Co., Capital	8¾%	502	94,883.25
13,300	Chic. Jct. Rwys. & Union St. Yds. Co.	6%	133	12,718.13
20,000	Chicago & Northwestern Ry., Common	4%	200	16,975.00
103,200	Delaware & Hudson R. R., Cap.	9%	1,032	126,604.00
12,500	Del., Lack. & Western R. R.	4%	250	26,800.00
72,500	Great Northern Ry. Co., Preferred	5%	725	62,815.00
8,400	Illinois Central R. R. Pref. "A"	6%	84	8,400.00
44,000	Illinois Central R. R. Co., Capital	4%	440	47,400.00
115,000	Louisville & Nashville R. R.	7%	1,150	132,250.00
58,000	New York Central R. R. Co., Capital	6%	580	109,360.00
50,000	N. Y., N. H. & H. R. R. Co. Pref.	7%	500	61,461.00
3,000	N.Y., N.H. & H. R.R. Co., Com.	6%	30	.....
33,500	Norfolk & Western Ry. Co., Common	10%	335	60,300.00
33,000	Northern Pacific Ry., Capital	5%	330	26,523.75
33,800	Old Colony R. R. Co., Capital	7%	338	39,612.50
76,600	Pennsylvania R. R. Co.	4%	1,532	125,312.50
65,000	Southern Pacific Co., Capital	6%	650	58,500.00

Schedule H (*Continued*)

Purchases and Charges during the year	*Sales and Credits during the year*	*Balance June 30, 1931*	*Accrued Interest, etc.*	*Income Received*
.....	$24.00	$100,768.00	.....	$4,500.00
$615.00	24,812.50	120,987.50	.....	6,750.00
.....	.....	104,719.59	.....	5,895.00
.....	.....	37,500.00	.....	1,500.00
.....	.....	49,935.00	.....	2,040.00
.....	.....	850.00	.....	40.00
.....	.....	4,575.00	.....	200.00
.....	.....	192,280.00	.....	9,540.00
.....	.....	17,380.97	.....	800.00
.....	.....	24,875.00	.....	1,000.00
.....	.....	97,250.00	.....	4,500.00
.....	17.00	100,120.00	.....	4,500.00
.....	36.00	100,570.00	.....	4,000.00
.....	.....	19,400.00	.....	900.00
.....	.....	8,000.00	.....	500.00
.....	.....	43,875.00	.....	2,000.00
.....	344,379.89	.....	1,885.55	19,782.50
$383,532.56	$409,025.68	$5,080,793.75	$6,661.91	$245,884.50
.....	.....	$25,200.00	.....	$1,680.00
.....	.....	270,000.00	.....	15,000.00
.....	.....	50,000.00	.....	2,500.00
.....	.....	32,400.00	.....	2,632.50
.....	.....	94,883.25	.....	4,392.50
.....	.....	12,718.13	.....	798.00
.....	.....	16,975.00	.....	700.00
.....	.....	126,604.00	.....	9,288.00
.....	.....	26,800.00	.....	1,375.00
.....	.....	62,815.00	.....	3,625.00
.....	.....	8,400.00	.....	504.00
.....	.....	47,400.00	.....	2,750.00
.....	.....	132,250.00	.....	8,050.00
.....	.....	109,360.00	.....	4,350.00
.....	.....	61,461.00	.....	3,500.00
$2,190.00	.....	2,190.00	.....	45.00
.....	.....	60,300.00	.....	4,020.00
.....	.....	26,523.75	.....	1,650.00
.....	.....	39,612.50	.....	2,366.00
.....	.....	125,312.50	.....	6,128.00
.....	.....	58,500.00	.....	3,900.00

Schedule H (*Continued*)

Par Value	*Description of Securities*	*Div.*	*Shares*	*Balance June 30, 1930*
	RAILROAD STOCKS (*Continued*)			
$100,000	Union Pacific R. R., Common	10%	1,000	$180,000.00
30,000	Vicksburg, Shreveport & Pacific Rwy.Co.	5%	300	29,250.00
	Sold during year			9,680.00
$1,196,100	*Total Railroad Stocks*			$1,606,445.13
	REAL ESTATE BONDS	*Rate*	*Maturity*	
$4,000	Cent. Mfg. Dist., 1st Mtge. R. E. Imp.	5½%	1940	$3,970.00
9,000	Cent. Mfg. Dist., 1st Mtge. R. E. Imp.	5½%	1941	8,955.00
14,000	Ellicott Sq. Co. of Buffalo, 1st Mtge.	5%	1935	13,580.00
415,000	Equitable Office Bldg. Corp., 35-Yr. Deb.	5%	1952	427,000.00
20,000	Equitable Real Estate Co., Gold Notes.	6%	1932	20,021.00
50,000	43 Exchange Pl. Bldg., 1st Mtge. S. F.	6%	1938	49,625.00
13,000	Jersey Mtge. & Title Guaranty Co.	5½%	1933	12,967.50
200,000	Lawyers Mtg. Invest. Corp. of Boston	5½%	1940	199,500.00
50,000	Steiger Bldg., 1st Mtge. Gold	5½%	1952	49,875.00
88,500	Trinity Bldg. Corp. of N. Y., 1st Mtge.	5½%	1939	89,399.24
	Matured during year			14,325.00
$863,500	*Total Real Estate Bonds*			$889,217.74
	REAL ESTATE STOCKS	*Div.*	*Shares*	
$58,800	Alaska Building Trust	2%	588	$58,251.22
20,000	Boston Cham. of Com. Realty Tr., 1st pf.	3%	200	19,200.00
68,000	Boston Real Estate Trust Capital	5%	680	71,661.64
$146,800	*Total Real Estate Stocks*			$149,112.86
	BANK STOCKS			
$35,800	First Nat'l Bank of Boston	16%	1790	$143,200.00
21,200	Guaranty Trust Co. of New York	20%	212	106,000.00
$57,000	*Total Bank Stocks*			$249,200.00
	MORTGAGE NOTES	*Rate*	*Maturity*	
$9,500	Beta Nu House Corporation	5½%	1934	$12,500.00
4,500	E. V. and C. H. Bigelow	5%	....	4,500.00
38,000	F. J. Holderried (2 at $19,000 each)	6%	1930	40,000.00
7,000	N. & V. Lomusico	5%	....	7,000.00
75,000	Ella C. Martin	5%	1933	75,000.00
18,000	Theta Chi	5½%	1931	18,000.00
	Sold or matured during year			1,700.00
$152,000	*Total Mortgage Notes*			$158,700.00

Schedule H (*Continued*)

Purchases and Charges during the year	*Sales and Credits during the year*	*Balance June 30, 1931*	*Accrued Interest, etc.*	*Income Received*
.....	.....	$180,000.00	.....	$10,000.00
.....	.....	29,250.00	.....	1,500.00
.....	$9,680.00	.....	.....	.....
$2,190.00	$9,680.00	$1,598,955.13	.....	$90,754.00
.....	.....	$3,970.00	.....	$220.00
.....	.....	8,955.00	.....	495.00
.....	.....	13,580.00	.....	700.00
.....	$12,000.00	415,000.00	.....	21,300.00
.....	21.00	20,000.00	.....	1,200.00
.....	.....	49,625.00	.....	3,000.00
.....	.....	12,967.50	.....	715.00
.....	.....	199,500.00	.....	11,000.00
.....	.....	49,875.00	.....	2,750.00
$134.09	4,000.00	85,533.33	.....	4,867.50
.....	14,325.00	.....	.....	814.00
$134.09	$30,346.00	$859,005.83	.....	$47,061.50
.....	.....	$58,251.22	.....	$1,764.00
.....	.....	19,200.00	.....	800.00
.....	.....	71,661.64	.....	3,400.00
.....	.....	$149,112.86	.....	$5,964.00
.....	.....	$143,200.00	.....	$5,728.00
.....	.....	106,000.00	.....	4,240.00
.....	.....	$249,200.00	.....	$9,968.00
.....	$3,000.00	$9,500.00	.....	$646.25
.....	.....	4,500.00	.....	225.00
.....	2,000.00	38,000.00	.....	2,340.00
.....	.....	7,000.00	.....	350.00
.....	.....	75,000.00	.....	3,843.75
.....	.....	18,000.00	.....	990.00
.....	1,700.00	.....	.....	63.78
.....	$6,700.00	$152,000.00	.....	$8,458.78

Schedule H (*Continued*)

Par Value	*Description of Securities*	*Rate*	*Maturity*	*Balance June 30, 1930*
	REAL ESTATE			
$205,632.55	Avon St. Land and Building (11–13)			$205,632.55
385,364.53	Franklin St. Land and Building (64–70)			385,364.53
100.00	Dorchester Land			100.00
40,000.00	Memorial Drive, Cambridge			40,000.00
15,000.00	No. 7 Central St., Winchester, Land and Building			15,000.00
$646,097.08	*Total Real Estate*			$646,097.08
	MISCELLANEOUS			
$100,000	Aldred Investment Trust Deb.	4½%	1967	$111,013.00
*.....	Aldred Investment Trust Common		1000†	.....
*60,000	Old Colony Trust Associates		600†	30,000.00
	Sold during year		....	450,000.00
$160,000	*Total Miscellaneous*			$591,013.00

RECAPITULATION, GENERAL INVESTMENTS

		Per cent of total 1931	*Per cent of total 1930*	
$1,274,000.00	Government and Municipal Bonds	6.05	6.25	$1,354,045.33
923,700.00	Industrial Bonds	4.30	5.45	1,185,518.88
3,090,760.00	Industrial Stocks	15.80	15.15	3,292,090.40
5,755,250.00	Public Utility Bonds	26.40	25.35	5,501,790.71
824,200.00	Public Utility Stocks	5.40	4.50	979,940.87
5,302,600.00	Railroad Bonds	24.20	23.50	5,106,286.87
1,196,100.00	Railroad Stocks	7.60	7.40	1,606,445.13
863,500.00	Real Estate Bonds	4.10	4.10	889,217.74
146,800.00	Real Estate Stocks	0.70	0.70	149,112.86
57,000.00	Bank Stocks	1.15	1.15	249,200.00
152,000.00	Mortgage Notes	0.70	0.75	158,700.00
646,097.08	Real Estate	3.00	3.00	646,097.08
160,000.00	Miscellaneous	.60	2.70	591,013.00
$20,392,007.08	*Total General Investments*	100.00	100.00	$21,709,458.87

GOVERNMENT AND MUNICIPAL BONDS (EASTMAN CONTRACT)

		Rate	*Maturity*	
$260,000	Canada, Dominion of, 30-Yr. Gold	5%	1952	$258,511.88
30,000	Manitoba, Province of	4½%	1945	28,650.00
70,000	Manitoba, Province of	5%	1944	70,630.00
100,000	Montreal, City of	5%	1958	101,380.00
100,000	Montreal, City of	5%	1963	101,510.00
150,000	Ontario, Province of	5%	1942	151,545.00

*No par value.
†Shares.

Schedule H *(Continued)*

Purchases and Charges during the year	*Sales and Credits during the year*	*Balance June 30, 1931*	*Accrued Interest, etc.*	*Income Received*
.....	.....	$205,632.55	$4,533.04	$13,736.08
.....	.....	385,364.53	13,538.30	41,140.28
.....	.....	100.00	80.08	.....
.....	.....	40,000.00	975.08	.....
.....	.....	15,000.00	747.53	1,620.00
.....	.....	$646,097.08	$19,874.03	$56,496.36
.....	$306.00	$110,707.00	.....	$4,500.00
.....	.....	.....	.....	.....
.....	.....	30,000.00	.....	1,200.00
.....	450,000.00	.....	.....	10,775.33
.....	$450,306.00	$140,707.00	.....	$16,475.33
.....	$74,308.00	$1,279,737.33	.....	$66,971.81
$99,489.21	376,676.21	908,331.88	$337.50	54,038.61
54,019.75	11,726.68	3,334,383.47	.....	176,719.13
968,906.53	888,185.35	5,582,511.89	7,832.87	301,819.12
162,867.63	.....	1,142,808.50	42.17	53,731.66
383,532.56	409,025.68	5,080,793.75	6,661.91	245,884.50
2,190.00	9,680.00	1,598,955.13	.....	90,754.00
134.09	30,346.00	859,005.83	.....	47,061.50
.....	.....	149,112.86	.....	5,964.00
.....	.....	249,200.00	.....	9,968.00
.....	6,700.00	152,000.00	.....	8,458.78
.....	.....	646,097.08	19,874.03	56,496.36
.....	450,306.00	140,707.00	.....	16,475.33
$1,671,139.77	$2,256,953.92	$21,123,644.72	$34,748.48	$1,134,342.80
.....	.....	$258,511.88	.....	$13,000.00
.....	.....	28,650.00	.....	1,350.00
.....	$49.00	70,581.00	.....	3,500.00
.....	50.00	101,330.00	.....	5,000.00
.....	46.00	101,464.00	.....	5,000.00
.....	129.00	151,416.00	.....	7,500.00

Schedule H (*Continued*)

Par Value	*Description of Securities*	*Rate*	*Maturity*	*Balance June 30, 1930*
	GOVERNMENT AND MUNICIPAL BONDS (EASTMAN CONTRACT) *Cont.*			
$50,000	Ontario, Province of	5%	1952	$50,756.00
11,000	Ontario, Province of	5%	1959	10,945.00
40,000	Ottawa, City of	5½%	1932	40,246.00
5,000	Ottawa, City of	5%	1933	5,014.00
36,000	Ottawa, City of	5%	1934	36,136.00
35,000	Ottawa, City of	5%	1940	35,299.00
25,000	Ottawa, City of	5%	1945	25,235.00
25,000	Ottawa, City of	5%	1946	25,245.00
29,000	Ottawa, City of	5%	1954	29,553.00
100,000	Quebec, Province of	4½%	1950	97,000.00
200,000	Winnipeg, City of	4½%	1944	189,000.00
	Matured during year			142,896.00
$1,266,000	*Total Government and Municipal Bonds*			$1,399,551.88
	INDUSTRIAL BONDS (EASTMAN CONTRACT)			
$200,000	Armour & Co., Real Estate 1st Mtge.	4½%	1939	$175,116.25
50,000	Chile Copper Co., Gold Deb.	5%	1947	48,500.00
300,000	Consolidation Coal Co., 1st & Ref. S. F.	5%	1950	268,806.25
100,000	Gulf Oil Corp. of Penn., 15-Yr. Gold	5%	1937	96,750.00
100,000	International Cement Corp.	5%	1948	.....
110,000	Royal Dutch Co., Deb. "A"	4%	1945	.....
100,000	United Drug Co.	5%	1953	.....
190,000	Western Electric Co., Deb.	5%	1944	188,288.75
50,000	Woodward Iron Co., 1st & Cons. Mtge.	5%	1952	42,750.00
	Sold or matured during year			28,811.25
$1,200,000	*Total Industrial Bonds*			$849,022.50

		Div.	*Shares*	
	INDUSTRIAL STOCKS (EASTMAN CONTRACT)			
*$1,875,000	Eastman Kodak Common	.8%	18,750	$1,778,006.25
180,000	Eastman Kodak Preferred	.6%	1,800	198,000.00
21,000	International Match Co., Part. Pfd.	.4%	600	18,711.30
$2,076,000	*Total Industrial Stocks*			$1,994,717.55

		Rate	*Maturity*	
	PUBLIC UTILITY BONDS (EASTMAN CONTRACT)			
$200,000	Alabama Power Co., 1st Mtge. "A"	5%	1946	$191,501.25
200,000	Am. Tel. & Tel. 35-Yr. Deb.	5%	1960	190,000.00
100,000	Cedars Rapids Mfg. & P'r Co., S. F.	5%	1953	99,875.00

*No par value.

Schedule H (*Continued*)

Purchases and Charges during the year	*Sales and Credits during the year*	*Balance June 30, 1931*	*Accrued Interest, etc.*	*Income Received*
.....	$36.00	$50,720.00	.....	$2,500.00
.....	.....	10,945.00	.....	550.00
.....	123.00	40,123.00	.....	2,200.00
.....	5.00	5,009.00	.....	250.00
.....	34.00	36,102.00	.....	1,800.00
.....	30.00	35,269.00	.....	1,750.00
.....	17.00	25,218.00	.....	1,250.00
.....	16.00	25,229.00	.....	1,250.00
.....	23.00	29,530.00	.....	1,450.00
.....	.....	97,000.00	.....	4,500.00
.....	.....	189,000.00	.....	9,000.00
.....	142,896.00	.....	.....	8,315.70
	$143,454.00	$1,256,097.88	.....	$70,165.70
.....	.....	$175,116.25	.....	$9,000.00
.....	.....	48,500.00	.....	2,500.00
.....	.....	268,806.25	.....	15,000.00
.....	.....	96,750.00	.....	5,000.00
$99,500.00	.....	99,500.00	.....	2,500.00
102,675.00	.....	102,675.00	.....	2,200.00
100,000.00	.....	100,000.00	.....	2,500.00
.....	.....	188,288.75	.....	9,500.00
.....	.....	42,750.00	.....	2,500.00
.....	$28,811.25	.....	.....	737.50
$302,175.00	$28,811.25	$1,122,386.25	.....	$51,437.50
.....	.....	$1,778,006.25	.....	$150,000.00
.....	.....	198,000.00	.....	10,800.00
.....	.....	18,711.30	.....	2,400.00
.....	.....	$1,994,717.55	.....	$163,200.00
.....	.....	$191,501.25	.....	$10,000.00
.....	.....	190,000.00	.....	10,000.00
.....	.....	99,875.00	.....	5,000.00

Schedule H (*Continued*)

Par Value	*Description of Securities*	*Rate*	*Maturity*	*Balance June 30, 1930*
	PUBLIC UTILITY BONDS (EASTMAN CONTRACT) *Continued*			
$50,000	Ch.N.Sh.&Mil.R.R.Co.,1st&Ref.Mt."A"	6%	1955	$49,000.00
49,000	Cleveland Elec. Ill. Co., 1st Mtge. . .	5%	1939	49,263.00
200,000	Consolidated Gas Co. of N. Y.	5½%	1945	202,204.00
100,000	Consolidated Gas & El. Lt. & Pr. Co. .	4½%	1935	96,500.00
200,000	Consumers Power Co., 1st & Ref. . .	5%	1936	199,000.00
55,000	Cumberland County P'r&Lt.Co.,1st Mt.	4½%	1956	51,837.50
260,000	Edison Elec. Ill. Co., of Boston . . .	4%	1932	. . . . .
10,000	Hydraulic Pr. Co. of Niagara Falls . .	5%	1951	10,050.00
50,000	Illinois Pr.&Lt.Corp., 1st & Ref.Mt."B"	5½%	1954	48,500.00
100,000	Montreal Lt., Heat & Pr., 1st Mtge. .	4½%	1932	98,750.00
100,000	Nebraska Power Co., 1st Mtge. "A" . .	5%	1949	98,750.00
100,000	Pacific Gas & El. Co., 1st Ref. Mt. "B"	6%	1941	103,000.00
115,000	Penn-Ohio Edison Co., Gold Deb. . . .	5½%	1959	. . . . .
50,000	SanJoaquinLt.&Pr.Co.Un.&Ref.Gold"D"	5%	1957	49,125.00
50,000	Syracuse Lt. Co., Inc., 1st&Ref. Mtge.	5½%	1954	50,594.00
50,000	Tennessee Pr. Co., 1st Mtge.	5%	1962	46,625.00
100,000	Western Union Tel. Co.	5%	1951	100,000.00
	Sold or matured during the year . . .			499,375.00
$2,139,000	*Total Public Utility Bonds*			$2,233,949.75

Par Value	*Description of Securities*	*Div.*	*Shares*	*Balance June 30, 1930*
	PUBLIC UTILITY STOCKS (EASTMAN CONTRACT)			
*$50,000	Central Illinois Pub. Ser. Co., Pref. . .	6%	500	$42,937.50
28,600	Edison Electric Ill. Co., Capital . . .	13.60	286	57,802.50
*50,000	Memphis Pr. & Lt. Co., Pref..	7%	500	49,375.00
50,000	Public Service Elec. & Gas. Co., Pref. .	6%	500	47,250.00
	Sold during year			49,375.00
$178,600	*Total Public Utility Stocks*			$246,740.00

Par Value	*Description of Securities*	*Rate*	*Maturity*	*Balance June 30, 1930*
	RAILROAD BONDS (EASTMAN CONTRACT)			
$48,000	Canadian Pac. Ry. Co., Equip. Tr. . .	5%	1944	$49,003.00
100,000	Chicago & Northwestern R.R.Co.Gen'l	4%	1987	96,500.00
50,000	Chic., Rock Is. & Pacific, 1st & Ref.Mt.	4%	1934	42,406.25
100,000	Delaware & Hudson, 1st & Ref. Mtge..	4%	1943	89,500.00
50,000	East Penn. Ry. Co., 1st Mtge.	5%	1936	46,875.00
100,000	Florida East Coast Ry.Co.,1st&Ref.Mt.	5%	1974	95,633.75
11,000	Illinois Central R. R. Equip. Trust "K"	4½%	1931	10,876.51
4,000	Illinois Central R. R. Equip. Trust "K"	4½%	1932	3,948.40
4,000	Illinois Central R. R. Equip. Trust "K"	4½%	1933	3,943.20
5,000	Illinois Central R. R. Equip. Trust "K"	4½%	1934	4,922.50
11,000	Illinois Central R. R. Equip. Trust "K"	4½%	1935	10,818.05
27,000	Illinois Central R. R. Equip. Trust "K"	4½%	1936	26,524.02

*No par value.

Schedule H (*Continued*)

Purchases and Charges during the year	*Sales and Credits during the year*	*Balance June 30, 1931*	*Accrued Interest, etc.*	*Income Received*
.....	.....	$49,000.00	.....	$3,000.00
.....	$33.00	49,230.00	.....	2,450.00
.....	159.00	202,045.00	.....	11,000.00
.....	.....	96,500.00	.....	4,500.00
.....	.....	199,000.00	.....	10,000.00
.....	.....	51,837.50	.....	2,475.00
$260,187.50	.....	260,187.50	$566.67	5,200.00
.....	3.00	10,047.00	....	500.00
.....	.....	48,500.00	.....	2,750.00
.....	.....	98,750.00	.....	4,500.00
.....	.....	98,750.00	.....	5,000.00
.....	273.00	102,727.00	.....	6,000.00
118,201.25	9.50	118,191.75	1,678.26	.....
.....	.....	49,125.00	.....	2,500.00
.....	26.00	50,568.00	.....	2,750.00
.....	.....	46,625.00	.....	2,500.00
.....	.....	100,000.00	.....	5,000.00
.....	499,375.00	.....	.....	11,250.00
$378,388.75	$499,878.50	$2,112,460.00	$2,244.93	$106,375.00
.....	.....	$42,937.50	.....	$3,000.00
.....	.....	57,802.50	.....	3,889.60
.....	.....	49,375.00	.....	3,500.00
.....	.....	47,250.00	.....	3,000.00
.....	$49,375.00	.....	.....	1,750.00
.....	$49,375.00	$197,365.00	.....	$15,139.60
.....	$72.00	$48,931.00	.....	$2,400.00
.....	.....	96,500.00	.....	4,000.00
.....	.....	42,406.25	.....	2,000.00
.....	.....	89,500.00	.....	4,000.00
.....	.....	46,875.00	.....	2,500.00
.....	.....	95,633.75	.....	5,000.00
.....	.....	10,876.51	.....	495.00
.....	.....	3,948.40	.....	180.00
.....	.....	3,943.20	.....	180.00
.....	.....	4,922.50	.....	225.00
.....	.....	10,818.05	.....	495.00
.....	.....	26,524.02	.....	1,215.00

Schedule H (*Continued*)

Par Value	*Description of Securities*	*Rate*	*Maturity*	*Balance June 30, 1930*
	RAILROAD BONDS (EASTMAN CONTRACT) *Continued*			
$21,000	Illinois Central R. R. Equip. Trust "K"	4½%	1937	$20,606.71
12,000	Illinois Central R. R. Equip. Trust "K"	4½%	1938	11,762.28
5,000	Illinois Central R. R. Equip. Trust "K"	4½%	1939	4,895.79
25,000	Ill. Cent. & Chic. St. L. & N. O. R.R.	4½%	1963	24,375.00
50,000	Kansas City, Ft. Scott & Memphis Cons.	4%	1936	41,243.75
50,000	Kansas City Terminal Ry., 1st Mtge. .	4%	1960	42,750.00
75,000	Maine Central R.R., 1st & Ref. Mtge.	4½%	1935	.....
200,000	Minn., St. Paul & S. St. Marie Ry. Co..	4%	1938	175,710.00
100,000	Missouri, Pacific Ry. Co. 1st&Ref.Mt."F"	5%	1977	99,750.00
50,000	New York, Chicago & St. Louis Ry.. .	5½%	1974	47,350.00
200,000	Northern Pacific Ry. Co., Ref.&Imp."B"	6%	2047	215,191.00
5,000	Penn. R. R. Equip. Trust "A"	5%	1932	4,959.00
50,000	St. Louis Iron Mt. & Southern Ry. . .	4%	1933	42,290.00
50,000	South. Ry. Co., Dev. & Gen. Mtge. . .	4%	1956	37,492.50
100,000	Terminal R.R.Asso.of St.Louis Gen.Mt.	4%	1953	83,860.00
100,000	Union Term. Co. of Dallas, 1st Mt. S.F.	5%	1942	99,673.75
200,000	Virginian Ry. Co., 1st Mtge. "A" . .	5%	1962	191,737.50
$1,803,000	*Total Railroad Bonds*			$1,624,597.96

		Div.	*Shares*	
	RAILROAD STOCKS (EASTMAN CONTRACT)			
$8,800	Bangor & Aroostook R. R. Common .	3.50	176	$10,560.00
20,000	Bangor & Aroostook R. R., Pref. . . .	7%	200	19,000.00
143,500	New York Central R. R., Capital . .	6%	1,435	140,808.22
100,000	Pere Marquette Ry. Pr., Pref. Cum.. .	5%	1,000	80,024.40
$272,300	*Total Railroad Stocks*			$250,392.62
	MISCELLANEOUS (EASTMAN CONTRACT)			
$64,000	First National Bank of Boston	3.20	3,200	$191,878.76
4,000	First National Bank of New York. . .	100%	40	104,328.00
300,000	Gannett Co., Inc., Note	5%	..	300,000.00
$368,000	*Total Miscellaneous*			$596,206.76

RECAPITULATION, EASTMAN CONTRACT INVESTMENTS

		Per cent of total, 1931	*Per cent of total, 1930*	
$1,266,000	Government and Municipal Bonds	13.20	14.70	$1,399,551.88
1,200,000	Industrial Bonds	11.70	9.00	849,022.50
2,076,000	Industrial Stocks	21.00	21.00	1,994,717.55
2,139,000	Public Utility Bonds	22.00	23.40	2,233,949.75
178,600	Public Utility Stocks	2.30	2.60	246,740.00
1,803,000	Railroad Bonds	17.80	17.30	1,624,597.96
272,300	Railroad Stocks.	2.60	2.60	250,392.62
368,000	Miscellaneous.	6.30	6.25	596,206.76
300,000	Cash Reserve.	3.10	3.15	300,000.00
$9,602,900	*Total Investments (Eastman Contract)*	100.00	100.00	$9,495,179.02

Schedule H (*Continued*)

Purchases and Charges during the year	*Sales and Credits during the year*	*Balance June 30, 1931*	*Accrued Interest, etc.*	*Income Received*
.....	.....	$20,606.71	.....	$945.00
.....	.....	11,762.28	.....	540.00
.....	.....	4,895.79	.....	225.00
.....	.....	24,375.00	.....	1,125.00
.....	.....	41,243.75	.....	2,000.00
.....	.....	42,750.00	.....	2,000.00
$73,500.00	.....	73,500.00	.....	1,687.50
.....	.....	175,710.00	.....	8,000.00
.....	.....	99,750.00	.....	5,000.00
.....	.....	47,350.00	.....	2,750.00
.....	$83.40	215,107.60	.....	12,000.00
.....	.....	4,959.00	.....	250.00
.....	.....	42,290.00	.....	2,000.00
.....	.....	37,492.50	.....	2,000.00
.....	.....	83,860.00	.....	4,000.00
.....	.....	99,673.75	.....	5,000.00
.....	.....	191,737.50	.....	10,000.00
$73,500.00	$155.40	$1,697,942.56	.....	$82,212.50
.....	.....	$10,560.00	.....	$616.00
.....	.....	19,000.00	.....	1,400.00
.....	.....	140,808.22	.....	10,762.50
.....	.....	80,024.40	.....	5,000.00
.....	.....	$250,392.62	.....	$17,778.50
.....	.....	$191,878.76	.....	$10,240.00
.....	.....	104,328.00	.....	4,000.00
.....	.....	300,000.00	.....	15,000.00
.....	.....	$596,206.76	.....	$29,240.00
.....	$143,454.00	$1,256,097.88	.....	$70,165.70
$302,175.00	28,811.25	1,122,386.25	.....	51,437.50
.....	.....	1,994,717.55	.....	163,200.00
378,388.75	499,878.50	2,112,460.00	$2,244.93	106,375.00
.....	49,375.00	197,365.00	.....	15,139.60
73,500.00	155.40	1,697,942.56	.....	82,212.50
.....	.....	250,392.62	.....	17,778.50
.....	.....	596,206.76	.....	29,240.00
.....	.....	300,000.00	.....	9,000.00
$754,063.75	$721,674.15	$9,527,568.62	$2,244.93	$544,548.80

Schedule H (*Continued*)

Par Value	*Description of Securities*	*Rate*	*Maturity*	*Balance June 30, 1930*
	INVESTMENTS, GEORGE BLACKBURN MEMORIAL FUND			
$24,325	Toronto, City of, Consol. Loan Deb.	4%	1948	.....
25,000	Armour & Co., 1st Mtge. "A"	5½%	1943	.....
20,000	Brown Co., 1st Mtge. "A"	5½%	1946	.....
25,000	International Paper Co., Ref. Mtge."A"	6%	1955	.....
25,000	Sun Oil Co., Gold Deb.	5½%	1939	.....
105,300	American Manufacturing Co., Pref.	5%	1053†	.....
66,000	American Manufacturing Co., Com.	4%	660†	.....
10,000	Arlington Mills, Capital		100†	.....
2,500	Corn Products Ref. Co., Com.	3%	100†	.....
24,600	Harmony Mills, Com.		246†	.....
*	International Paper & Pow.Co.,"A"Com.		800†	.....
*	International Paper & Pow.Co.,"B"Com.		800†	.....
*	International Paper & Pow.Co.,"C"Com.		2000†	.....
10,000	Pan-American Pet.& Trans.Co.,Com.		200†	.....
5,000	Pan-American Pet.& Trans.Co.,"B"Com.		100†	.....
*12,500	Patchogue-Plymouth Mills Corp.		125†	.....
*500	Pullman, Inc.	4%	5†	.....
25,000	Rhode Island Malleable Iron Wks., Pref.	7%	250†	.....
3,960	Royal Dutch Co. (N. Y. Shares)	1.34	300†	.....
60,000	Stevens Linen Works		600†	.....
14,175	Texas Corp., Capital	2%	567†	.....
3,400	Tidewater Assoc.Oil Co.Cum.Conv.Pref.	6%	34†	.....
*10,000	Tidewater Assoc. Oil Co., Com.	60c	100†	.....
*5,200	United Fruit Co.	4%	52†	.....
25,000	American Tel. & Tel. Co., Gold Deb.	5%	1960	.....
25,000	Cities Service Co., Gold Deb.	5%	1958	.....
10,000	Dallas Pow. & Light Co., 1st Mtge."A"	6%	1949	.....
25,000	Des Moines City Ry.Co.,Gen.&Ref.Mtge.	5%	1936	.....
25,000	Illinois Pow.&Light Corp.,1st&Ref.Mtge.	6%	1953	.....
25,000	Iowa Falls Elec.Co. 1st Mtge. "A"	6%	1937	.....
50,000	Minnesota Pow. & Lt. Co., 1st Mtge.	4½%	1978	.....
25,000	Mississippi Pow.Co.,1st & Ref. Mtge.	5%	1955	.....
25,000	Narragansett Elec. Co., 1st Mtge. "A"	5%	1957	.....
20,000	Nebraska Pow. Co., 1st Mtge. "B"	6%	1949	.....
10,000	Public Ser. Co. of No. Ill., 1st Mtge.	4½%	1980	.....
50,000	Shawinigan Wat.&Pow.Co.,1st Mtge.	4½%	1967	.....

*No par value.
†Shares.

Schedule H (*Continued*)

Purchases and Sales during the year	*Sales and Credits during the year*	*Balance June 30, 1931*	*Accrued Interest, etc.*	*Income Received*
$22,622.25	.....	$22,622.25	.....	.....
17,125.00	.....	17,125.00	.....	.....
14,000.00	.....	14,000.00	.....	.....
15,125.00	.....	15,125.00	.....	.....
25,375.00	.....	25,375.00	.....	.....
46,332.00	.....	46,332.00	.....	$1,316.25
16,500.00	.....	16,500.00	.....	660.00
1,800.00	.....	1,800.00	.....	.....
6,950.00	.....	6,950.00	.....	75.00
246.00	.....	246.00	.....	.....
4,800.00	.....	4,800.00	.....	.....
3,200.00	.....	3,200.00	.....	.....
4,000.00	.....	4,000.00	.....	.....
6,000.00	.....	6,000.00	.....	.....
3,150.00	.....	3,150.00	.....	.....
1,250.00	.....	1,250.00	.....	.....
210.00	.....	210.00	.....	5.00
250.00	.....	250.00	.....	.....
9,000.00	.....	9,000.00	.....	.....
39,000.00	.....	39,000.00	.....	.....
14,175.00	.....	14,175.00	.....	.....
1,819.00	.....	1,819.00	.....	.....
555.00	.....	555.00	.....	.....
2,912.00	.....	2,912.00	.....	.....
27,000.00	.....	27,000.00	.....	.....
16,500.00	.....	16,500.00	.....	.....
10,500.00	.....	10,500.00	.....	.....
8,125.00	.....	8,125.00	.....	.....
26,125.00	.....	26,125.00	.....	.....
24,625.00	.....	24,625.00	.....	750.00
48,500.00	.....	48,500.00	$243.75	.....
23,250.00	.....	23,250.00	.....	.....
25,750.00	.....	25,750.00	.....	.....
20,800.00	.....	20,800.00	.....	600.00
9,812.50	.....	9,812.50	210.00	.....
49,000.00	.....	49,000.00	481.25	.....

Schedule H (*Continued*)

Par Value	*Description of Securities*	*Rate*	*Maturity*	*Balance June 30, 1930*
30,000	Sierra & San Fran.Pow.Co., 1st Mtge. .	5%	1949	.....
25,000	Utah Light&Trac.Co.,1st&Ref.Mtge."A"	5%	1944	.....
25,000	Wis.-Minn.Lgt.&Pow.,1st&Ref. . . .	5%	1944	.....
1,000	American Tel. & Tel. Co., Capital. . .	9%	10†	.....
*33,200	Eastern Gas & Fuel Assoc., Com. . . .		332†	.....
12,000	Eastern Gas & Fuel Assoc., Pr. Pref. .	4½%	120†	.....
16,600	Eastern Gas & Fuel Assoc., Cum. Pref.	6%	166†	.....
20,000	Great Northern Ry.Co.,Gen.Mtge."C"	5%	1973	.....
50,000	Hudson & Man. R.R. Co., 1st &Ref."A"	5%	1957	.....
10,000	Great Northern Ry. Co., Pref.	5%	100†	.....
5,500	Illinois Central R.R. Co., Pref. "A". .	6%	55†	.....
19,300	Illinois Central R.R. Co., Com. . . .	4%	193†	.....
12,100	New York Central R.R. Co., Capital .	6%	121†	.....
50,000	N. Y., N. H. & H. R.R. Co., Com. . .	6%	500†	.....
20,000	Northern Pacific Ry. Co., Capital . .	5%	200†	.....
20,000	Amer.Furn.Mart Bldg.Corp.,1st Mtge..	6%	1946	.....
$1,142,160	*Total*			.....

INVESTMENTS, MALCOLM COTTON BROWN FUND

$15,000	Metro. West Side Elev. Ry. Co., Mtge.	4%	1938	$6,750.00
10,000	Metro. West Side Elev. Ry. Co., Mtge.	4%	1938	4,100.00
2,000	Southern Ry. Co., Dev. & Gen. Mtge.	4%	1956	1,795.00
$27,000	*Total*			$12,645.00

INVESTMENTS, FRANK HARVEY CILLEY FUND

$10,000	New York, City of, Corp. Stock . . .	4¼%	1964	$10,320.00
5,000	St. Louis Iron Mt.&So.R.R.Mtg.(Reg.)	4%	1933	4,812.50
11,000	New York Power & Lgt.Corp., 1st Mtge.	4½%	1967	.....
9,000	Southern Ry. Co., Dev. & Gen. Mtge.	4%	1956	8,077.50
5,000	Chic. & Northwestern Ry. Co.,Equip. Tr.	5%	1938	5,000.00
2,500	Boston Elev. Ry. Co., 2d Pfd.	7%	25†	2,600.00
5,900	Edison Electric Ill. Co., Capital. . . .	13.60	59†	12,667.09
7,500	Eastern Gas & Fuel Assoc., Pr. Pr. . .	4½%	75†	6,825.00
1,250	Springfield Ry. Companies Pref. . . .	8%	25†	2,125.00
7,800	Boston & Albany R. R. Co., Capital. .	8¾%	78†	12,589.50
1,000	Boston & Providence R. R. Corp. . .	8½%	10†	1,700.00
2,400	Mortgage Note, E. and A. Orlogski . .	5%		2,400.00
	Sold or matured during year			6,000.00
$68,350	*Total*			$75,116.59

*No par value
†Shares

Schedule H (*Continued*)

Purchases and Charges during the year	*Sales and Credits during the year*	*Balance June 30, 1931*	*Accrued Interest, etc.*	*Income Received*
$31,200.00	.....	$31,200.00	.....	.....
24,750.00	.....	24,750.00	.....	.....
25,250.00	.....	25,250.00	.....	$625.00
1,850.00	.....	1,850.00	.....	.....
6,972.00	.....	6,972.00	.....	.....
9,840.00	.....	9,840.00	.....	135.00
15,272.00	.....	15,272.00	.....	249.00
20,400.00	.....	20,400.00	.....	.....
49,656.25	.....	49,656.25	$447.92	.....
5,800.00	.....	5,800.00	.....	.....
5,500.00	.....	5,500.00	.....	.....
11,001.00	.....	11,001.00	.....	193.00
12,100.00	.....	12,100.00	.....	.....
36,000.00	.....	36,000.00	.....	.....
9,100.00	.....	9,100.00	.....	.....
16,400.00	.....	16,400.00	.....	.....
$827,475.00	.....	$827,475.00	$1,382.92	$4,608.25
.....	.....	$6,750.00	.....	$600.00
.....	.....	4,100.00	.....	400.00
.....	.....	1,795.00	.....	80.00
.....	.....	$12,645.00	.....	$1,080.00
.....	$10.00	$10,310.00	.....	$425.00
.....	.....	4,812.50	.....	200.00
$10,450.00	.....	10,450.00	.....	247.50
.....	.....	8,077.50	.....	360.00
.....	.....	5,000.00	.....	250.00
.....	.....	2,600.00	.....	175.00
.....	.....	12,667.09	.....	802.40
.....	.....	6,825.00	.....	337.52
.....	.....	2,125.00	.....	137.50
.....	.....	12,589.50	.....	682.50
.....	.....	1,700.00	.....	85.00
.....	.....	2,400.00	.....	120.00
.....	6,000.00	.....	.....	135.00
$10,450.00	$6,010.00	$79,556.59	.....	$3,957.42

Schedule H (*Continued*)

Par Value	*Description of Securities*	*Rate*	*Maturity*	*Balance June 30, 1930*
	INVESTMENTS, COFFIN MEMORIAL FUND			
$35,000	Light & Power Securities Co., Pref. . .	6%	350†	$35,000.00
1,000	United Gas & Imp. Co., Pref.	5.00	10†	973.04
$36,000	*Total*			$35,973.04
	INVESTMENTS, EBEN S. DRAPER FUND			
$22,000	Province of Ontario Deb.	5%	1959	$21,890.00
16,000	Georgia Ry. & Elec. Co., 1st Mt. S. F..	5%	1932	16,018.00
20,000	New York Tel. Co., 1st & Gen. Mtge. .	4½%	1939	19,395.00
4,000	Chic.Mil.,St. Paul & Pac.R.R.Gold"A"	5%	1975	4,065.00
16,000	C. M., St. P. & Pac.RR..Conv.Gold"A"	5%	2000	16,267.00
24,000	Indianapolis Un. Ry. Co., Gen. Mtge. .	5%	1965	23,880.00
$102,000	*Total*			$101,515.00
	INVESTMENTS, FRANCES AND WILLIAM EMERSON FUND			
$86,000	Associated Gas & Elec. Co. (Reg.) . .	4½%	1949	$72,240.00
29,000	Southern Ry. Co. Dev. & Gen. Mtge. .	4%	1956	26,027.50
$115,000	*Total*			$98,267.50
	INVESTMENTS, HENRY C. FRICK FUND			
$50,000	Province of British Columbia	4½%	1939	$48,325.00
0,000	Province of Ontario Deb.	4½%	1934	48,314.30
50,000	Alabama Pow. Co., 1st & Ref. Mtge. .	4½%	1967	.....
50,000	Commonwealth Elec. Co., 1st Mtge.. .	5%	1943	47,937.50
51,000	Cumberland Tel. & Tel. Co., 1st Mtge.	5%	1937	50,305.75
50,000	Jersey Central Pow. & Lt.Co.,1st Mt."B"	5%	1947	.....
100,000	Northern States Pow.Co.,Ref.Mtge.Gold	4½%	1961	.....
25,000	Ohio Power Co., 1st & Ref.Mtge.Gold	4½%	1956	.....
50,000	Penn. Pow. & Lt. Co., 1st Mtge. Gold	4½%	1981	.....
50,000	Shaw.Wat.&Pow.Co.,1stMt.&Coll. Tr. .	4½%	1967	.....
50,000	American Radiator Co. Gold Deb. . .	4½%	1947	48,000.00
35,000	Chicago Post Office Ser.Bldg.1stMtg."A"	5½%	1936	34,562.50
25,000	U. S. Cold Storage Co., 1st Mtge. R. E.	6%	1945	25,435.00
25,000	Canadian Natl. Rys.Equip.Tr.Gold "J"	4½%	1937	24,605.00
68,000	Chicago & No. West. Ry. Co. Gold . .	4¾%	1949	68,000.00
25,000	Ill.Cent & Chic.,St.L.&New Orleans R.R.	4½%	1963	24,312.50
25,000	Mich.Cent.R.R.Co.,Ref.&Imp.Mtge."C"	4½%	1979	.....
25,000	Southern Ry. Co. Dev. & Gen. Mtge."A"	4%	1956	21,425.00
40,000	Union Pacific R. R. Co.	4½%	1967	38,800.00
*37,000	Cerro de Pasco Copper Corp.	1.50	370†	18,870.00
170,000	Chic. & Northwestern Ry. Co. Com. .	4%	1700†	93,500.00
	Sold or matured during year			149,362.50
$1,051,000	*Total*			$741,755.05

*No par value.
†Shares.

Schedule H (*Continued*)

Purchases and Charges during the year	*Sales and Credits during the year*	*Balance June 30, 1931*	*Accrued Interest, etc.*	*Income Received*
.....	.....	$35,000.00	.....	$2,100.00
.....	.....	973.04	.....	50.00
.....	.....	$35,973.04	.....	$2,150.00
.....	.....	$21,890.00	.....	$1,100.00
.....	$18.00	16,000.00	.....	800.00
.....	.....	19,395.00	.....	900.00
.....	2.00	4,063.00	.....	200.00
.....	4.00	16,263.00	.....	240.00
.....	.....	23,880.00	.....	1,200.00
.....	$24.00	$101,491.00	.....	$4,440.00
.....	.....	$72,240.00	.....	$3,870.00
.....	.....	26,027.50	.....	1,160.00
.....	.....	$98,267.50	.....	$5,030.00
.....	.....	$48,325.00	.....	$2,250.00
.....	.....	48,314.30	.....	2,250.00
$49,125.00	.....	49,125.00	$918.75	1,125.00
.....	.....	47,937.50	.....	2,500.00
.....	.....	50,305.75	.....	2,550.00
50,943.75	.....	50,943.75	618.07	.....
97,500.00	.....	97,500.00	192.50	.....
25,312.50	.....	25,312.50	28.13	.....
48,125.00	.....	48,125.00	168.75	.....
48,218.75	.....	48,218.75	175.00	.....
.....	.....	48,000.00	.....	2,250.00
.....	.....	34,562.50	.....	1,925.00
.....	$29.00	25,406.00	.....	1,500.00
.....	.....	24,605.00	.....	1,125.00
.....	.....	68,000.00	.....	3,230.00
.....	.....	24,312.50	.....	1,125.00
25,625.00	14.00	25,611.00	175.00	.....
.....	.....	21,425.00	.....	1,000.00
.....	.....	38,800.00	.....	1,800.00
.....	.....	18,870.00	.....	1,248.75
.....	.....	93,500.00	.....	5,950.00
.....	149,362.50	.....	.....	7,250.00
$344,850.00	$149,405.50	$937,199.55	$2,276.20	$39,078.75

Schedule H (*Continued*)

Par Value	*Description of Securities*	*Rate*	*Maturity*	*Balance June 30, 1930*
	INVESTMENTS, JOY SCHOLARSHIP FUND			
$5,000	Cedars Rapids Mfg.&Pr.Co.1st Mt.S.F.	5%	1953	$4,075.00
5,000	Mass. Hospital Life Insurance Co. . .	4¾%	..	5,000.00
8,000	Southern Ry. Co. Dev. & Gen. Mtge. .	4%	1956	7,180.00
1,000	Trinity Bldgs. Corp. of N.Y., 1st Mtge.	5½%	1939	.....
$19,000	*Total*			$16,255.00
	INVESTMENTS, RICHARD LEE RUSSEL FELLOWSHIP FUND			
$3,000	Trinity Bldgs. Corp. of N. Y., 1st Mtge.	5½%	1939	$2,000.00
	INVESTMENTS, SUSAN H. SWETT SCHOLARSHIP FUND			
$10,000	Mass. Hospital Life Insurance Co.	4¾%		$10,000.00
2,000	Trinity Bldgs. Corp. of N.Y., 1st Mtge.	5½%	1939	.....
$12,000	*Total*			$10,000.00
	INVESTMENTS, FRANCES E. WESTON FUND			
$10,000	Mortgage Note, Anna C. Bartlett . .	4%	1936	.....
	INVESTMENTS, JONATHAN WHITNEY FUND			
$25,000	Montreal, City of, Canada	5%	1936	$25,000.00
25,000	New York, City of, Corporate Stock.	4¼%	1964	25,854.00
54,000	Canada, Dominion of, 10-Yr. Gold . .	4½%	1936	53,257.50
21,000	Standard Oil Co. of New York	4½%	1935	21,058.00
24,000	Swift & Co., 1st Sinking Fund	5%	1944	21,720.00
28,000	Western Electric Co., Deb.	5%	1944	27,720.00
25,000	Detroit Edison Co., 1st Mtge.	5%	1933	25,060.00
25,000	Georgia Rail. & Elec. Co., 1st Mtge. .	5%	1932	25,042.00
25,000	N. Y. Tel. Co., 1st & Gen. Mtge. . . .	4½%	1939	24,150.39
25,000	Western Tel. & Tel. Co., Co. Tr. . . .	5%	1932	25,047.00
25,000	Atch.,Top.&S.F.,Cal.&Ar.Lines, 1st Mt.	4½%	1962	24,381.25
35,000	Chicago Union Station, 1st Mtge. . .	4½%	1963	35,183.00
25,000	Illinois Cen. R. R. Co., Sec. Gold . . .	4%	1952	22,625.00
50,000	Kansas City Terminal Ry. Co., 1st Mt.	4%	1960	42,750.00
25,000	Maine Cen. R. R. Co., 1st & Ref. Mt. .	4½%	1935	25,004.00
7,000	New York Central Equip. Tr.	4½%	1935	7,000.00
9,000	New York Central Lines, Eq. Tr. . . .	4½%	1936	8,558.10
5,000	Penn. R. R. Eq. Tr. "A"	5%	1936	4,950.00
10,000	Southern Ry. Co. Dev. & Gen. Mtge. .	4%	1956	8,975.00
150,000	Mortgage Note, M. I. T. Dormitory. .	5%	..	150,000.00
$618,000	*Total*			$603,335.24
$33,198,417.08	Grand Total, All Investments (*Schedule D*)			$32,901,500.31

Schedule H (*Continued*)

Purchases and Charges during the year	*Sales and Credits during the year*	*Balance June 30, 1931*	*Accrued Interest, etc.*	*Income Received*
.....	.....	$4,075.00	.....	$250.00
.....	.....	5,000.00	.....	237.50
.....	.....	7,180.00	.....	320.00
$1,000.00	.....	1,000.00	.....	55.00
$1,000.00	.....	$17,255.00	.....	$862.50
$1,000.00	.....	$3,000.00	.....	$165.00
.....	.....	$10,000.00	.....	$475.00
$2,000.00	.....	2,000.00	.....	110.00
$2,000.00	.....	$12,000.00	.....	$585.00
$10,000.00	.....	$10,000.00	.....	.....
.....	.....	$25,000.00	.....	$1,250.00
.....	$26.00	25,828.00	.....	1,062.50
.....	.....	53,257.50	.....	2,430.00
.....	15.00	21,043.00	.....	945.00
.....	.....	21,720.00	.....	1,200.00
.....	.....	27,720.00	.....	1,400.00
.....	30.00	25,030.00	.....	1,250.00
.....	42.00	25,000.00	.....	1,250.00
.....	.....	24,150.39	.....	1,125.00
.....	47.00	25,000.00	.....	1,250.00
.....	.....	24,381.25	.....	1,125.00
.....	6.00	35,177.00	.....	1,575.00
.....	.....	22,625.00	.....	1,000.00
.....	.....	42,750.00	.....	2,000.00
.....	1.00	25,003.00	.....	1,125.00
.....	.....	7,000.00	.....	315.00
.....	.....	8,558.10	.....	405.00
.....	.....	4,950.00	.....	250.00
.....	.....	8,975.00	.....	400.00
.....	.....	150,000.00	.....	7,500.00
.....	$167.00	$603,168.24	.....	$28,857.50
$3,621,978.52	$3,134,234.57	$33,389,244.26	$40,652.53	$1,769,706.02

Schedule H (*Continued*)

RECAPITULATION, ALL INVESTMENTS

	Per cent of total 1931	*Per cent of total 1930*	*Book Value June 30, 1931*
Government and Municipal Bonds	8.35	9.10	$2,791,382.26
Industrial Bonds	6.75	6.65	2,246,232.13
Industrial Stocks	16.50	16.15	5,510,120.02
Public Utility Bonds	26.10	24.55	8,715,818.03
Public Utility Stocks	4.30	3.90	1,434,297.63
Railroad Bonds	22.00	22.20	7,328,063.91
Railroad Stocks	6.10	6.00	2,036,638.25
Real Estate Bonds	2.65	2.80	915,968.33
Real Estate Stocks	.45	.45	149,112.86
Bank Stocks	1.65	1.70	545,406.76
Mortgage Notes	.95	1.85	314,400.00
Real Estate	1.95	1.95	646,097.08
Miscellaneous	1.35	1.80	455,707.00
Cash Reserve	.90	.90	300,000.00
	100.00	100.00	$33,389,244.26

SCHEDULE J
EDUCATIONAL PLANT

Land, Buildings and Equipment

Land, Boylston, Clarendon and Newbury Streets, Boston	$1,500,000.00
Rogers Building, Boylston Street, Boston	204,534.76
Walker Building, Boylston Street, Boston	150,000.00
Land, east of Massachusetts Avenue, Cambridge	1,125,766.67
Land, west of Massachusetts Avenue	854,014.82
Main Educational Building Group	4,071,492.13
Pratt School of Naval Architecture	674,971.70
Guggenheim Aeronautical Laboratory	293,637.46
Aeronautical Engine Testing Laboratory	121,101.92
Mechanic Arts Building	83,658.89
Power Plant (inc. Machinery and Equipment)	302,569.27
Homberg Memorial Infirmary	188,441.60
Educational Equipment, Cambridge	2,039.953.60
Steam and Electrical Distribution System, Cambridge	155,448.64
Gas Engine Laboratory	26,301.88
Automotive Laboratory	11,000.00
Compression Laboratory	31,000.00
Tractor Garage	6,400.00
Service Garage	5,981.54
Athletic Field	24,815.14
Walker Memorial Building	575,111.50
Walker Memorial Building, Equipment	139,475.52
Dormitories (1916) ($331,357.67 less mortgage $150,000)	181,357.67
Dormitories (1916) Equipment	26,967.85
Alumni Dormitories (1924)	185,718.91
Alumni Dormitories (1924) Equipment	9,518.04
Alumni Dormitories (1928)	291,274.49
Alumni Dormitories (1928) Equipment	18,971.05
Alumni Dormitories (1930)	562,485.62
Alumni Dormitories (1930) Equipment	32,630.16
Service Building	42,988.20
Boathouse	54,244.13
Squash Courts	29,042.54
Summer Camp, East Machias, Maine	120,558.00
Summer Camp, Dover, New Jersey	35,000.00
New Buildings under construction	204,576.58
Miscellaneous	301,726.27
Total, June 30, 1931 (Schedule D)	$14,682,736.55

SCHEDULE K

PRINCIPAL GIFTS AND APPROPRIATIONS FOR EDUCATIONAL PLANT

George Eastman, for New Buildings	$3,725,000.00
Maria A. Evans, for Dormitories	161,192.55
Class of 1893, for Dormitory	100,000.00
Appropriation, Maria A. Evans Fund	169,080.60
T. C. du Pont, Donation for Land	625,000.00
T. C. du Pont, Donation for Dormitories	100,000.00
T. C. and P. S. du Pont, Charles Hayden, for Mining Building	215,000.00
Pratt Fund, for School of Naval Architecture	675,150.00
Alumni Fund, Equipment, Dormitories and Walker Memorial	622,119.38
Alumni Dormitory Fund	516,945.66
Appropriation, E. D. Barbour Fund, for Dormitories	258,279.93
Appropriation, K. F. Wood Fund, for Dormitories	28,750.00
Appropriation, F. S. Hodges Fund, for Dormitories	57,316.26
Appropriation, Russell Robb Fund, for Dormitories	28,750.00
Appropriation, S. H. Thorndike Fund, for Dormitories	15,000.00
Walker Memorial Fund, for Walker Memorial	167,303.96
Appropriation of Emma Rogers Fund, for Equipment	528,077.06
Daniel Guggenheim Fund	230,000.00
Estate of F. W. Emery, for Equipment	126,423.80
Appropriation of Charles C. Drew Fund	305,171.52
Subscriptions to Homberg Memorial Infirmary	110,225.00
A. P. Sloan, Jr., for Aero Engine Laboratory	65,000.00
Appropriation of Frank E. Peabody Fund	52,238.89
Appropriation of French Fund for Equipment	100,843.34
Appropriation of George B. Dorr Fund for Equipment	49,573.47
Land in Boston, Grant of Commonwealth (estimated)	1,500,000.00
Appropriation of A. F. Estabrook Fund for Land	85,000.00
Appropriation of Ida F. Estabrook Fund for Land	20,000.00
Appropriation of Miscel. Unrestricted Funds for Land	151,697.89
Subscriptions for Land	125,525.00
Sale of Land and Buildings in Boston	656,919.45
Equipment from Buildings in Boston (estimated)	500,000.00
Other Funds, Donations, Appropriations, etc.	2,631,256.74
Total, June 30, 1931 (Schedule D)	$14,702,840.50

SCHEDULE P
[3]ENDOWMENT FUNDS FOR GENERAL PURPOSES

No.	Restricted Funds	Funds, June 30, 1930	Investment Income	Other Income	Expended or Transferred	Funds, June 30, 1931
101	George Robert Armstrong	$5,750.00	$287.50	.....	$287.50	$5,750.00
102	George Blackburn Mem. .	.....	3,225.33	830,046.28	3,225.33	830,046.28
103	Charles Choate	41,108.15	2,055.40	.....	2,055.40	41,108.15
104	Eben S. Draper	102,400.00	4,440.00	.....	4,440.00	102,400.00
107	[1]Eastman Contract . . .	6,646,053.90	542,303.87	45,026.56	261,689.47	6,971,694.86
108	George Eastman(Building)	2,875,000.00	143,750.00	.....	368,750.00	2,650,000.00
109	Charles W. Eaton	275,869.11	13,793.45	.....	13,793.45	275,869.11
112	Educational Endowment .	8,709,108.60	435,450.00	156.00	435,450.00	8,709,264.60
113	Martha Ann Edwards . .	34,500.00	1,725.00	.....	1,725.00	34,500.00
114	William Endicott	28,750.00	1,437.50	.....	1,437.50	28,750.00
117	Francis Appleton Foster .	1,150,000.00	57,500.00	.....	57,500.00	1,150,000.00
118	Alexis H. French	5,000.00	250.00	.....	250.00	5,000.00
119	Jonathan French	28,962.48	1,448.10	.....	1,448.10	28,962.48
121	Henry C. Frick	742,918.88	36,802.55	200,637.50	36,802.55	943,556.38
122	General Endowment . .	1,756,599.00	87,829.95	.....	87,829.95	1,756,599.00
123	James Fund	188,104.21	9,405.20	.....	9,405.20	188,104.21
125	Katherine B. Lowell . .	5,750.00	287.50	.....	287.50	5,750.00
126	Thomas McCammon. . .	15,000.00	750.00	.....	750.00	15,000.00
127	M. I. T.Alumni Fund(Bal.)	1,458.94	72.95	.....	.....	1,531.89
130	Kate M. Morse	28,750.00	1,437.50	.....	1,437.50	28,750.00
131	Richard Perkins	57,500.00	2,875.00	.....	2,875.00	57,500.00
132	J. W. and B. L. Randall .	95,902.36	4,795.10	.....	4,795.10	95,902.36
135	Wm. Barton Rogers Mem.	287,725.00	14,386.25	.....	14,386.25	287,725.00
136	[2]Saltonstall Fund	64,600.96	3,230.00	.....	2,422.50	65,408.46
137	Samuel E. Sawyer . . .	5,364.40	268.20	.....	268.20	5,364.40
139	Andrew Hastings Spring .	57,500.00	2,875.00	.....	2,875.00	57,500.00
140	Seth K. Sweetser	28,811.62	1,440.55	.....	1,440.55	28,811.62
141	William J. Walker . . .	27,113.59	1,355.65	.....	1,355.65	27,113.59
144	Horace Herbert Watson .	13,497.50	1,400.00	20,371.75	1,400.00	33,869.25
145	Albion K. P. Welch . . .	5,750.00	287.50	.....	287.50	5,750.00
		$23,284,848.70	$1,377,165.05	$1,096,238.09	$1,320,670.20	$24,437,581.64
	Unrestricted Funds					
151	Edmund D. Barbour. . .	$678,501.01	$33,925.05	.....	$292,204.98	$420,221.08
153	Henrietta G. Fitz	10,000.00	500.00	.....	500.00	10,000.00
155	Esther A. Hilton	.....	50.00	$1,626.67	50.00	1,626.67
	[4]Frederick S. Hodges . . .	57,316.26	.....	.....	57,316.26	.....
157	Industrial Fund	105,137.73	5,500.00	12,500.00	5,500.00	117,637.73
159	Hiram F. Mills	11,675.00	583.75	.....	583.75	11,675.00
162	Moses W. Oliver	12,870.49	643.50	.....	643.50	12,870.49

[1] Income added to Fund. See also Special Deposit Fund.
[2] One-fourth of net income added to fund.
[3] See alphabetical listing and description of Funds on pages 202-211.
[4] Appropriated.

Schedule P (*Continued*)

	Unrestricted Funds (Continued)	*Funds, June 30, 1930*	*Investment Income*	*Other Income*	*Expended or Transferred*	*Funds, June 30, 1931*
	[4]Russell Robb	$28,750.00	.....	.....	$28,750.00	.....
165	Robert E. Rogers	8,730.77	$436.50	.....	436.50	$8,730.77
168	Ellen V. Smith	25,000.00	1,250.00	.....	1,250.00	25,000.00
	[4]Sturgis H. Thorndike	15,000.00	.....	.....	15,000.00	.....
171	Horace W. Wadleigh	2,443.14	122.15	.....	122.15	2,443.14
173	Webster, Frank G.	.....	465.00	$25,000.00	465.00	25,000.00
	[4]Kenneth F. Wood	28,750.00	.....	.....	28,750.00	.....
		$984,174.40	$43,475.95	$39,126.67	$431,572.14	$635,204.88

SCHEDULE Q

[3]ENDOWMENT FUNDS FOR DESIGNATED PURPOSES

Special Deposit Funds

201	New Dormitory, General	$4,504.62	.....	$2,195.50	$6,700.12	.....
203	[2]Geo. Eastman (due under contract)	2,850,000.00	.....	.....	300,000.00	$2,550,000.00
205	Endowment Reserve	580,383.96	$37,903.32	84,616.89	96,178.97	606,725.20
207	Albert Fund	.....	232.00	7,500.00	2,500.00	5,232.00
209	[1]Anonymous (1924)	1,447.45	72.35	.....	.....	1,519.80
210	1923 Endowment	193.29	.....	54.92	.....	248.21
211	[1]1923 Endowment Reserve	5,042.62	255.00	597.84	395.23	5,500.23
212	[1]1924 Endowment	1,406.58	70.30	.....	.....	1,476.88
213	[1]1924 Endowment Reserve	3,865.07	195.00	1,448.29	467.09	5,041.27
214	[1]1925 Endowment	1,126.19	56.30	.....	.....	1,182.49
215	[1]1925 Endowment Reserve	1,962.46	102.50	1,157.54	399.76	2,822.74
216	1926 Endowment	258.56	.....	.....	.....	258.56
217	1926 Endowment Reserve	62.98	.....	1,820.05	1,405.51	477.52
218	1927 Endowment	1,679.32	105.00	1,570.85	.....	3,355.17
220	[1]1928 Endowment	3,169.30	160.00	1,711.38	13.63	5,027.05
221	1929 Endowment	568.50	40.00	1,280.81	.....	1,889.31
222	[1]1930 Endowment	375.00	.....	73.95	.....	448.95
225	M.I.T.Teachers' Insurance	2,260.55	.....	24,554.77	23,652.70	3,162.62
226	[1]M.I.T.Teachers' Insurance (Special)	22,386.03	1,590.00	14,160.62	.....	38,136.65
227	[1]M.I.T.Alumni Association Permanent Funds	25,569.97	1,655.00	15,622.12	.....	42,847.09
230	[1]Class of '98 Loan	6,225.90	311.25	.....	.....	6,537.15
	[4]Gen.Elec.Co.VI and VIII	27,064.50	1,353.20	.....	28,417.70	.....
233	[1]Richards Portrait	457.95	22.85	.....	.....	480.80
235	Rockefeller Found.Research	.....	80.00	10,000.00	.....	10,080.00
237	Sedgwick Memorial Lecture Fund	3,691.36	200.00	1,716.62	42.35	5,565.63
239	[1]Elihu Thomson	5,408.75	270.00	.....	.....	5,678.75
	[4]Treasurer's Fund	498.75	.....	181.25	680.00	.....
243	[1]Undergraduate Dues, Reserve	11,757.20	587.85	3,000.00	.....	15,345.05
		$3,561,366.86	$45,261.92	$173,263.40	$460,853.06	$3,319,039.12

[1] Income added to Fund.
[2] See also Funds for General Purposes (Eastman Contract)
[3] See alphabetical listing and description of Funds on pages 202–211.
[4] Appropriated.

[2]Schedule Q (*Continued*)

No.		Funds, June 30, 1930	Investment Income	Other Income	Expended or Transferred	Funds, June 30, 1931
	FUNDS FOR SALARIES					
251	Samuel C. Cobb For General Salaries	$41,951.31	$2,097.55	.....	$2,097.55	$41,951.31
253	Sarah H. Forbes For General Salaries	500.00	25.00	.....	25.00	500.00
255	George A. Gardner For General Salaries	23,000.00	1,150.00	.....	1,150.00	23,000.00
	*Daniel Guggenheim Professorship in Meteorology	2,382.00	119.10	.....	2,501.10	.....
259	James Hayward Professorship of Engineering	21,500.00	1,075.00	.....	1,075.00	21,500.00
261	William P. Mason Professorship of Geology	21,500.00	1,075.00	.....	1,075.00	21,500.00
263	Henry B. Rogers For General Salaries	28,750.00	1,437.50	.....	1,437.50	28,750.00
265	Nathaniel Thayer Professorship of Physics	28,750.00	1,437.50	.....	1,437.50	28,750.00
		$168,333.31	$8,416.65	.....	$10,798.65	$165,951.31
	FUNDS FOR LIBRARY, READING ROOMS AND GYMNASIUM					
271	Walter S. Barker	$11,858.31	$590.00	.....	$463.32	$11,984.99
273	Ednah Dow Cheney	18,236.57	825.00	.....	2,091.83	16,969.74
274	Frank Harvey Cilley	80,685.92	3,957.42	.....	1,980.75	82,662.59
277	Charles Lewis Flint	6,004.33	300.00	.....	228.67	6,075.66
280	William Hall Kerr	3,148.37	155.00	.....	20.25	3,283.12
283	George A. Osborne	11,920.58	595.00	.....	358.34	12,157.24
286	Arthur Rotch Arch	6,313.70	315.00	.....	.....	6,628.70
288	Technology Matrons' Teas	6,588.42	330.00	$2,500.00	334.80	9,083.62
289	John Hume Tod	3,089.49	150.00	.....	117.44	3,122.05
291	Theodore N. Vail	45,401.96	2,270.00	.....	1,486.67	46,185.29
		$193,247.65	$9,487.42	$2,500.00	$7,082.07	$198,153.00
	FUNDS FOR DEPARTMENTS					
301	William Parsons Atkinson	$15,032.20	$750.00	.....	$750.00	$15,032.20
303	Frank Walter Boles Memorial	28,859.36	1,440.00	.....	1,619.73	28,679.63
305	William E. Chamberlain	8,359.77	418.00	.....	418.00	8,359.77
307	Chemical Engineering Practice	296,322.97	14,815.00	.....	14,815.00	296,322.97
309	Crosby Honorary Fund	1,586.51	75.00	.....	85.00	1,576.51
311	Susan E. Dorr	110,205.67	5,510.00	.....	5,510.00	110,205.67
312	George Eastman	460,000.00	23,000.00	.....	23,000.00	460,000.00
	*Daniel Guggenheim	3,217.00	160.00	.....	3,377.00	.....
317	George Henry May	5,750.00	287.50	.....	287.50	5,750.00
319	Susan Minns	40,000.00	.....	.....	.....	40,000.00
320	Forris Jewett Moore	31,968.44	1,685.00	$7,000.00	934.78	39,718.66
322	William E. Nickerson	47,420.05	2,371.00	.....	4,322.22	45,468.83
324	Edward D. Peters	5,944.46	297.50	.....	39.40	6,202.56
325	Pratt Naval Architectural	451,035.81	22,550.00	.....	22,550.00	451,035.81
327	Arthur Rotch	28,750.00	1,437.50	.....	1,437.50	28,750.00
329	W. T. Sedgwick	81,479.55	4,075.00	8.14	.....	85,562.69
331	[1]Edmund K. Turner	274,940.85	13,745.00	.....	10,818.69	277,867.16
		$1,890,872.64	$92,616.50	$7,008.14	$89,964.82	$1,900,532.46

[1] One-fourth of net income added to fund.
[2] See alphabetical listing and description of Funds on pages 202–211.
[4] Appropriated.

[1]Schedule Q (*Continued*)

No.		Funds, June 30, 1930	Investment Income	Other Income	Expended or Transferred	Funds, June 30, 1931
	FUNDS FOR RESEARCH					
341	John E. Aldred	$63,776.39	$3,266.00	$2,500.00	$19,536.73	$50,005.66
343	Samuel Cabot	85,127.77	4,257.50	.....	3,300.00	86,085.27
344	Crane Automotive Research	7,913.90	340.00	.....	1,140.00	7,113.90
347	Daniel Guggenheim	5,549.00	277.50	.....	700.00	5,126.50
349	Ellen H. Richards	21,730.75	1,085.00	.....	734.60	22,081.15
351	Charlotte B. Richardson	47,403.29	2,370.00	.....	1,600.00	48,173.29
354	Technology Plan Research	2,382.12	85.00	.....	913.24	1,553.88
356	Textile Research Fund	42,694.10	2,135.00	.....	542.86	44,286.24
358	Edward Whitney	69,623.11	3,480.00	.....	.....	73,103.11
		$346,200.43	$17,296.00	$2,500.00	$28,467.43	$337,529.00
	FUNDS FOR FELLOWSHIPS					
361	Arkwright Club	$2,684.80	$134.00	.....	.....	$2,818.80
363	William Sumner Bolles	30,726.59	1,535.00	.....	$1,250.00	31,011.59
364	Malcolm Cotton Brown	13,561.59	1,080.00	.....	1,000.00	13,641.59
366	Collamore	16,292.11	815.00	.....	700.00	16,407.11
368	Dalton Graduate Chemical	7,661.00	380.00	.....	.....	8,041.00
369	du Pont	.....	.....	$1,500.00	1,500.00	.....
372	Daniel Guggenheim	4,049.00	100.00	.....	2,400.00	1,749.00
374	Rebecca R. Joslin	2,460.22	123.00	.....	.....	2,583.22
376	Wilfred Lewis	5,000.00	250.00	.....	.....	5,250.00
378	Moore	31,743.56	1,585.00	.....	1,500.00	31,828.56
380	Willard B. Perkins	7,467.24	372.50	.....	.....	7,839.74
382	Proctor	125.00	.....	1,000.00	1,125.00	.....
384	Proprietors Locks and Canals	3,711.75	185.00	.....	.....	3,896.75
386	Henry Bromfield Rogers	29,011.45	1,450.00	.....	1,100.00	29,361.45
388	Richard Lee Russell	2,859.07	165.00	.....	.....	3,024.07
390	Henry Saltonstall	12,380.79	615.00	.....	550.00	12,445.79
392	James Savage	13,964.36	698.00	.....	600.00	14,062.36
395	Susan H. Swett	12,345.45	585.00	.....	750.00	12,180.45
396	Gerard Swope	2,638.75	.....	2,500.00	2,500.00	2,638.75
398	Louis Francisco Verges	11,984.76	599.00	.....	500.00	12,083.76
		$210,667.49	$10,671.50	$5,000.00	$15,475.00	$210,863.99
	FUNDS FOR SCHOLARSHIPS					
401	Elisha Atkins	$6,054.27	$302.50	.....	$300.00	6,056.77
403	Billings Student	59,049.66	2,952.50	.....	2,800.00	59,202.16
404	Jonathan Bourne	12,318.93	615.00	.....	600.00	12,333.93
405	Albert G. Boyden	.....	.....	$40,000.00	.....	40,000.00
406	Harriet L. Brown	8,398.32	420.00	.....	400.00	8,418.32
408	Nino Tesher Catlin	1,209.00	60.00	.....	50.00	1,219.00
410	Chandler	3,671.97	182.50	.....	.....	3,854.47
411	Lucius Clapp	5,897.86	295.00	.....	300.00	5,892.86
413	Class of 1896	6,357.27	330.00	355.00	270.00	6,772.27
415	Lucretia Crocker	92,363.40	4,617.50	.....	4,400.00	92,580.90
417	Isaac W. Danforth	6,157.97	307.50	.....	300.00	6,165.47

[1]See alphabetical listing and description of Funds on pages 202–211.

[1]Schedule Q (*Continued*)

No.		*Funds, June 30, 1930*	*Investment Income*	*Other Income*	*Expended or Transferred*	*Funds, June 30, 1931*
420	Ann White Dickinson	$48,728.06	$2,435.00	.....	$2,300.00	$48,863.06
421	Thomas M. Drown	52,439.00	2,620.00	.....	2,800.00	52,259.00
424	Farnsworth	6,294.17	315.00	.....	300.00	6,309.17
426	Charles Lewis Flint	6,292.19	315.00	.....	300.00	6,307.19
427	Sarah S. Forbes	4,134.02	205.00	.....	200.00	4,139.02
429	Fuel and Gas Scholarship	350.00	.....	.....	.....	350.00
431	George Hollingsworth	5,943.62	295.00	.....	300.00	5,938.62
433	T. Sterry Hunt	3,723.61	185.00	.....	180.00	3,728.61
434	William F. Huntington	6,151.98	307.50	.....	300.00	6,159.48
436	Joy Scholarships	17,289.49	862.50	$250.00	900.00	17,501.99
438	William Litchfield	6,219.30	310.00	.....	300.00	6,229.30
439	Elisha T. Loring	6,229.09	310.00	.....	300.00	6,239.09
441	Lowell Inst. Scholarship	2,945.22	147.50	.....	125.00	2,967.72
443	George Henry May	8,152.73	415.00	300.00	350.00	8,517.73
445	James H. Mirrlees	2,943.37	147.50	.....	140.00	2,950.87
447	Nichols Scholarship	6,161.71	307.50	.....	300.00	6,169.21
448	Charles C. Nichols	6,219.59	310.00	.....	300.00	6,229.59
450	John Felt Osgood	6,132.71	305.00	.....	300.00	6,137.71
451	George L. Parmelee	21,455.08	1,072.50	.....	1,000.00	21,527.58
453	Richard Perkins	62,124.57	3,105.00	.....	3,000.00	62,229.57
455	John P. Schenkl	24,615.96	1,230.00	.....	1,100.00	24,745.96
456	Thomas Sherwin	6,197.25	310.00	.....	300.00	6,207.25
458	Horace T. Smith	.....	267.50	32,988.76	.....	33,256.26
460	Samuel E. Tinkham	2,705.78	135.00	.....	125.00	2,715.78
462	F. B. Tough	510.30	25.00	.....	.....	535.30
463	Susan Upham	1,341.95	67.50	.....	60.00	1,349.45
465	Vermont Scholarship	9,093.82	455.00	.....	400.00	9,148.82
467	Ann White Vose	71,615.21	3,580.00	.....	3,400.00	71,795.21
469	Arthur M. Waitt	11,909.48	595.00	.....	550.00	11,954.48
471	Louis Weissbein	4,994.13	250.00	.....	230.00	5,014.13
473	Frances Erving Weston	1,245.13	.....	5,338.89	.....	6,584.02
474	Samuel Martin Weston	64.91	.....	5,338.89	.....	5,403.80
476	Amasa J. Whiting	5,345.65	267.50	.....	250.00	5,363.15
		$621,047.73	$31,235.00	$84,571.54	$29,530.00	$707,324.27
	FUNDS FOR PRIZES					
481	Robert A. Boit	$5,896.76	$295.00	.....	$300.00	$5,891.76
483	Class of 1904	520.00	25.00	$15.00	30.00	530.00
485	Roger D. Hunneman	1,165.00	57.50	.....	.....	1,222.50
487	James Means	3,112.62	155.00	.....	49.40	3,218.22
489	Arthur Rotch	7,153.93	357.50	.....	200.00	7,311.43
491	Arthur Rotch, Special	9,237.81	460.00	.....	.....	9,697.81
		$27,086.12	$1,350.00	$15.00	$579.40	$27,871.72

[1]See alphabetical listing and description of Funds on pages 202–211.

[2]**Schedule Q** (*Continued*)

No.		*Funds, June 30, 1930*	*Investment Income*	*Other Income*	*Expended or Transferred*	*Funds, June 30, 1931*
	FUNDS FOR RELIEF					
501	Edward Austin	$504,664.73	$25,235.00	$20.00	$25,000.00	$504,919.73
503	Thomas Wendell Bailey	2,853.15	142.50	42.00	130.00	2,907.65
504	[1]Charles Tidd Baker	29,810.77	1,490.00	.....	650.00	30,650.77
506	Levi Boles	12,465.92	620.00	.....	600.00	12,485.92
508	Bursar's Fund	10,212.61	500.00	4,583.32	5,686.59	9,609.34
510	Mabel Blake Case	30,779.35	1,537.50	.....	1,500.00	30,816.85
514	Coffin Memorial	37,618.50	2,150.00	.....	.....	39,768.50
516	Dean's Fund	3,394.65	175.00	796.47	550.00	3,816.12
518	Carl P. Dennett	165.17	.....	162.51	.....	327.68
520	Dormitory Fund	4,310.71	215.00	.....	200.00	4,325.71
521	Frances and William Emerson	100,572.10	5,030.00	1,250.00	8,955.00	97,897.10
523	Norman H. George	107,828.39	5,390.00	.....	5,100.00	108,118.39
525	John A. Grimmons	215.76	75.00	3,229.14	.....	3,519.90
527	James H. Haste	141,845.63	7,090.00	.....	.....	148,935.63
529	David L. Jewell	25,797.75	1,290.00	.....	1,400.00	25,687.75
531	William B. Rogers	18,671.46	1,030.00	5,312.47	1,680.00	23,333.93
532	Summer Surveying Camp	670.80	25.00	360.52	500.00	556.32
534	Teachers' Fund	140,800.46	7,040.00	.....	2,769.00	145,071.46
536	Samson R. Urbino	1,226.00	60.00	.....	50.00	1,236.00
537	Jonathan Whitney	604,706.70	28,857.50	.....	28,667.00	604,897.20
539	Morrill Wyman	82,529.44	4,125.00	.....	4,000.00	82,654.44
		$1,861,140.05	$92,077.50	$15,756.43	$87,437.59	$1,881,536.39

RECAPITULATION OF FUNDS

FOR GENERAL PURPOSES					
Restricted	$23,284,848.70	$1,377,165.05	$1,096,238.09	$1,320,670.20	$24,437,581.64
Unrestricted	984,174.40	43,475.95	39,126.67	431,572.14	635,204.88
FOR DESIGNATED PURPOSES					
Special Deposit Funds	$3,561,366.86	$45,261.92	$173,263.40	$460,853.06	$3,319,039.12
Salaries	168,333.31	8,416.65	.....	10,798.65	165,951.31
Libraries, etc.	193,247.65	9,487.42	2,500.00	7,082.07	198,153.00
Departments	1,890,872.64	92,616.50	7,008.14	89,964.82	1,900,532.46
Research	346,200.43	17,296.00	2,500.00	28,467.43	337,529.00
Fellowships	210,667.49	10,671.50	5,000.00	15,475.00	210,863.99
Scholarships	621,047.73	31,235.00	84,571.54	29,530.00	707,324.27
Prizes	27,086.12	1,350.00	15.00	579.40	27,871.72
Relief	1,861,140.05	92,077.50	15,756.43	87,437.59	1,881,536.39
Total (Schedule D)	$33,148,985.38	$1,729,053.49	$1,425,979.27	$2,482,430.36	$33,821,587.78

[1] One-half of the income added to the principal.
[2] See alphabetical listing and description of Funds on pages 202–211.

SCHEDULE R

MINOR FUNDS

Name	Balance June 30, 1930	Income	Other Increases	Salaries and Expenses	Balance June 30, 1931
Additional Group Ins. Fund		$4,517.75	.....	$4,446.07	$71.68
Aeronautical Eng., Airplane Mat. Design	.....	1,958.00	[1]$550.00	2,060.25	447.75
Aeronautical Eng., No. 640	$4,104.49	.....	.....	700.91	3,403.58
No. 691	*230.48	.....	[2]342.83	112.35	.....
No. 700	500.00	.....	.....	500.00	.....
No. 715	2,204.48	.....	.....	1,590.50	613.98
Coasting Expts	1,848.88	.....	[1, 2]1,650.00	3,517.61	*18.73
No. 740	2,370.00	.....	.....	2,370.00	.....
Wind Tunnels	2,599.78	1,513.93	.....	2,393.28	1,720.43
N.A.C.A.Acct.	.....	30.60	[1]300.00	1,330.60	*1,000.00
Crane DieselAcct.	.....	2,000.00	.....	2,463.58	*463.58
No. 741	.....	60.00	[2]1,140.00	1,110.00	90.00
No. 776	.....	.....	[1]3,000.00	2,680.95	319.05
No. 793	.....	.....	[1]950.00	900.26	49.74
No. 832	.....	.....	[2]500.00	369.18	130.82
No. 837	.....	.....	[1]100.00	63.92	36.08
Aldred Lectures	1,509.28	.....	.....	1,404.87	104.41
Aldred Hydraulic Fund	*862.71	8,028.76	.....	6,226.55	939.50
Alumni Dormitory Committee	1,221.89	.....	.....	1,221.89	.....
Alumni Reunion, 1930	2,918.70	22.51	.....	2,941.21	.....
American Petroleum Institute	*1,063.46	2,624.32	.....	1,560.86	.....
American Academy Grant	.....	500.00	.....	448.09	51.91
Architecture:					
Special Scholarship	.....	650.00	.....	1,000.00	*350.00
Travel. Scholarships	2,500.00	.....	.....	2,200.00	300.00
Biology — Food and Fisheries	1,172.86	7,083.91	[1]1,500.00	2,250.55	7,506.22
No. 717	719.50	.....	.....	6.10	713.40
Biocinema Research	398.86	1,494.74	.....	49.62	1,843.98
Coffee Research	3,060.73	200.00	.....	2,632.58	628.15
Frigidaire Research	4,601.40	4,500.00	.....	7,891.02	1,210.38
Health Education	1,394.72	508.90	[1]500.00	1,551.14	852.48
General Sea Foods	7,196.57	7,522.00	.....	13,325.20	1,393.37
Public Health	802.52	.....	.....	802.52	.....
Simms Co. Research	1,108.99	5,704.79	.....	6,813.78	.....
Met. Life Insurance Co.	1,748.32	.....	.....	1,748.32	.....
Merck Research	.....	2,000.00	.....	757.55	1,242.45
Boat House Equipment No. 346	237.16	2,898.25	.....	1,126.30	2,009.11
Bus. and Eng. Administration					
XV Fund	304.40	115.00	.....	106.00	313.40
No. 736	250.00	.....	.....	247.00	3.00
No. 739	5,222.54	.10	.....	5,222.64	.....
Spec. Exp.	.....	500.00	.....	499.17	.83
No. 785	.....	30.00	[1]916.00	680.85	265.15
No. 786	.....	18.25	[1]1,000.00	965.85	52.40
No. 789	.....	.....	[1]1,562.00	1,488.15	73.85
No. 791	.....	.....	[1]1,500.00	677.93	822.07
No. 810	.....	.....	[1]250.00	92.63	157.37

* Overdraft.
[1] Appropriation from Current Funds.
[2] By Transfer.

Schedule R (*Continued*)

Name	*Balance June 30, 1930*	*Income*	*Other Increases*	*Salaries and Expenses*	*Balance June 30, 1931*
Carnegie Music Fund	$105.93	.....	.....	$105.93	.....
Chemistry, Special	249.89	.....	.....	.....	$249.89
Rockefeller Research	.....	.....	.....	60.52	60.52
Res. Lab. App. Chemistry	380.27	$64,017.76	[1,2]$13,400.00	$99,438.01	*22,400.52
Res. Lab. Phys. Chem. Royalties;	1,343.00	276.03	.....	724.41	894.62
Special Research No. 13,101	1,370.92	.....	.....	.....	1,370.92
Steam Table Research	*1,095.59	4,825.32	.....	4,068.39	*338.66
Civil Engineering — No. 616	100.00	.....	.....	.....	100.00
Soil Mech.	110.63	11.70	[1]600.00	580.81	141.52
Spec. Fund	.....	200.00	.....	50.00	150.00
No. 734	1,000.00	30.13	.....	592.17	437.96
No. 635	2,000.00	.....	.....	.....	2,000.00
Trav. Schol. Hydraulics.	1,200.00	200.00	.....	1,400.00	.....
Trav. Schol. Struct. Eng.	1,000.00	.....	.....	1,000.00	.....
Corson Const. Acct.	*1,904.60	2,042.44	.....	137.84	.....
Hartford Flood Control	*$400.16	2,086.83	.....	1,686.67	.....
Master Plumbers Assoc.	*1,780.46	1,599.20	.....	552.97	*734.23
No. 757	1,200.00	.....	.....	1,200.00	.....
Dining Service Reserve	17,282.16	.....	[2]6,524.40	4,014.76	19,791.80
Div. of Mun. and Ind. Research	.....	4,468.19	[2]19,536.73	24,004.92	.....
Div. of Ind. Coöp. and Res. No. 2	24,484.60	5,456.61	[2]1,210.00	26,575.08	4,576.13
Dormitory Tax	393.45	1,842.50	.....	1,940.00	295.95
Laundry Account	.....	1,235.24	.....	1,235.24	.....
Rug Account	.....	298.50	[2]330.00	628.50	.....
Book Shelf	.....	.....	[1]314.50	.....	314.50
Electrical Engineering No. 710	4,766.06	8.69	.....	3,444.62	1,330.13
VI-A Fund	760.78	4.40	[1]1,800.00	2,356.08	209.10
Network Analyzer	1,296.60	1,073.80	[1]500.00	1,380.36	1,490.04
Integraph	776.09	40.99	[1]5,500.00	5,344.57	972.51
Industrial Lighting	86.49	.....	.....	86.49	.....
Paper Ins. Cable	24.53	.....	[2]456.98	481.51	.....
Round Hill	*7,472.13	21,045.50	[1]8,982.24	20,334.30	2,221.31
Nat. Elec. Light Assoc.	2,799.84	6,135.18	.....	8,611.34	323.68
No. 749	575.00	.....	.....	575.00	.....
No. 822	.....	.....	[1]100.00	34.70	65.30
Fuel and Gas, Contractors' Acct.	.....	12,556.49	.....	5,308.97	7,247.52
Geology, No. 727	1,000.00	147.49	.....	1,147.49	.....
Rockefeller Research	.....	.....	.....	78.99	*78.99
Historic Memorials	936.06	.....	.....	80.05	856.01
Historic Tablets No. 723	500.00	.....	.....	261.00	239.00
Hygiene Department Special	5,005.86	394.53	.....	459.50	4,940.89
Journal of Mathematics and Physics	2,829.21	260.23	[1]3,000.00	1,977.07	4,112.37
Letter Shop	1,702.06	26,947.36	.....	26,871.39	1,778.03
Library, Special No. 1	.....	323.53	.....	82.52	241.01
No. 774	.....	.....	[1]1,000.00	155.07	844.93
Mechanical Engineering—No. 482	1,779.00	.....	.....	.....	1,779.00
No. 568	188.91	.....	.....	.....	188.91
Shop Account	29.80	50.00	[2]500.00	494.81	84.99
No. 781	.....	.....	[1]200.00	62.25	137.75

* Overdraft.
[1] Appropriation from Current Funds
[2] By Transfer

Schedule R (*Continued*)

Name	*Balance June 30, 1930*	*Income*	*Other Increases*	*Salaries and Expenses*	*Balance June 30, 1931*
Mining Engineering:					
Ore Dressing	$1,262.48	$593.94	.....	$893.80	$962.62
No. 722	6,000.00	.....	.....	6,000.00	.....
No. 730	3,000.00	.....	[1]$611.93	3,611.93	.....
No. 731	5,000.00	.....	.....	4,727.62	272.38
No. 812	.....	.....	[1]1,050.00	850.92	199.08
Naval Architecture No. 760	.....	.....	[1]500.00	380.77	119.23
No. 777	.....	.....	[1]150.00	78.95	71.05
Photographic Service	*4,254.62	18,845.97	[2]9,000.00	23,033.43	557.92
Photostat Service	612.27	6,806.03	[2]1,823.63	7,798.11	1,443.82
Physics Dept. No. 726	*106.67	.....	[2]106.67	.....	.....
R. L. Ind. Phys.	3,780.92	.....	.....	.....	3,780.92
Roentgen Ray	1,883.42	.....	.....	.....	1,883.42
Hale Spect.	3,207.10	.....	.....	500.00	2,707.10
No. 756	2,000.00	.....	.....	2,000.00	.....
No. 753	350.00	.....	[2]1.86	351.86	.....
Nat. Res. Council	.....	1,000.00	.....	91.75	908.25
Rumford Grant, A. A. of A. & S.	.....	500.00	.....	221.38	278.62
No. 767	.....	31.05	[1]1,500.00	1,456.19	74.86
No. 769	.....	4.00	[1]5,000.00	4,727.15	276.85
No. 771	.....	.....	[1,2]4,863.18	4,393.16	470.02
No. 796	.....	.....	[1]3,600.00	3,234.66	365.34
Poughkeepsie Race Acct.	*1,828.98	2,248.42	.....	1,848.94	*1,429.50
President's Fund	157.50	.....	.....	.....	157.50
R. O. T. C. Uniform Accts.	504.68	547.96	.....	414.93	637.71
Special Tuition Fund	700.00	.....	.....	700.00	.....
Suspense Accounts	200.00	.....	[2]7,716.61	6,047.26	1,869.35
Tech Song Book	*538.49	61.95	.....	.12	*476.66
Tech Loan Fund — Interest	.....	352.27	.....	.....	352.27
Walker Memorial Library	180.96	5.00	[2]1,970.75	1,368.68	788.03
Buildings and Grounds Accounts					
No. 735	855.00	.....	.....	855.00	.....
No. 743	1,145.00	.....	[1]29.25	1,174.25	.....
No. 747	24,000.00	.....	[1]1,643.06	25,643.06	.....
Totals	$159,813.65	$243,057.04 (Schedule B)	$119,282.62	$444,576.05 (Schedule C)	$77,577.26 (Schedule D)

* Overdraft.
[1] Appropriation from Current Funds
[2] By Transfer

SCHEDULE S

Current Deficit

Balance, Surplus June 30, 1930	$22,395.96
Net Decrease (Schedule A)	36,520.29
Deficit, June 30, 1931 (Schedule D)	$14,124.33

Detail of Profit and Loss Account

Losses and Charges:	
Students' Accounts (previous years), charged off	$1,069.03
Miscellaneous Charges	6,486.11
Total Losses	$7,555.14
Gains and Credits:	
Premium Refund Account Employees' Insurance	$3,173.95
Miscellaneous Credits	5,767.67
Total Gains	$8,941.62
Profit and Loss. Net Profit (Schedule A)	$1,386.48

AUDITORS' CERTIFICATE

We have examined the books and accounts of the Treasurer and the Bursar of the Massachusetts Institute of Technology for the year ended June 30, 1931, and we report upon our verification of the accompanying financial statements of the Treasurer, as follows:

We agreed the investment accounts in detail with certified lists of securities obtained from the Old Colony Trust Company of Boston, Massachusetts, and from the Security Trust Company of Rochester, New York, and verified the several other assets and liabilities shown in the Treasurer's Balance Sheet, Schedule D.

We satisfied ourselves by extensive tests of the recorded transactions for the year that income receivable had been duly accounted for and expenditures properly controlled and authorized.

WE HEREBY CERTIFY that the accompanying Balance Sheet and Statements of Income and Expenditures correctly set forth, respectively, the financial condition of the Institute at June 30, 1931, and the financial results for the year ended at that date, and that the financial statements are in accordance with the books of the Institute.

We extended our examination to include the transactions relating to the accounts of the Wyeth and Hewett Funds of which the Massachusetts Institute of Technology acts as Trustee, and satisfied ourselves that the provisions of the Trust Agreements had been fulfilled.

Our examination embraced also the accounts of the Massachusetts Institute of Technology Pension Association which we found to be correctly stated.

Respectfully submitted,

PATTERSON, TEELE & DENNIS,
Accountants and Auditors.

1 Federal Street, Boston, August 25, 1931.

REPORT OF THE AUDITING COMMITTEE

We have the honor to report that the firm of Patterson, Teele & Dennis, Accountants and Auditors, have examined the books and accounts of the Treasurer and the Bursar of the Massachusetts Institute of Technology for the fiscal year ended June 30, 1931, and their certificate is attached to our report.

You will note that this covers not only the books and accounts of the Treasurer and the Bursar but has also been extended to the accounts of the Wyeth and Hewett Funds of which the Massachusetts Institute of Technology acts as Trustee. It also covers the accounts of the Massachusetts Institute of Technology Pension Fund.

Respectfully,

THE AUDITING COMMITTEE:
JOHN R. MACOMBER
FRANKLIN W. HOBBS
JOSEPH W. POWELL.

September 1, 1931.

*THE ENDOWMENT FUNDS OF THE INSTITUTE

207 ALBERT FUND, 1930, $7,500. Gift from anonymous donor to pay three years rental of M. I. T. Student House at 159 Bay State Road, Boston.

341 JOHN E. ALDRED FUND, 1926, $101,850. Gift of John E. Aldred. For establishment of Division of Municipal and Industrial Research.

209 ANONYMOUS, 1924, $1,052.50. Gift of member of Class of 1924 to accumulate until twenty-fifth reunion of Class in 1949.

361 ARKWRIGHT CLUB FELLOWSHIP, 1926–27, Gift. For graduate student in Industrial Chemistry or other textile activity.

101 GEORGE ROBERT ARMSTRONG FUND, 1902, $5,000. Bequest of George W. Armstrong in honor of son. Income available for general purposes of the Institute.

401 ELISHA ATKINS SCHOLARSHIP FUND, 1894, $5,000. Bequest of Mary E. Atkins.

301 WILLIAM PARSONS ATKINSON FUND, 1918, $13,000. Bequest of Charles F. Atkinson as a memorial to father — for English Department of the Institute.

501 EDWARD AUSTIN FUND, 1899, $400,000. Bequest. Interest paid to needy, meritorious students and teachers to assist in payment of studies.

503 THOMAS WENDELL BAILEY FUND, 1914, $2,200. Bequest. Income used for rendering assistance to needy students in Department of Architecture.

504 CHARLES TIDD BAKER FUND, 1922, $20,000. Bequest. One-half of net income for assistance of poor and worthy students and one-half to principal.

151 EDMUND DANA BARBOUR FUND, 1926, $847,000. Bequest. Principal and income for general purposes of Institute.

271 WALTER S. BARKER FUND, 1927, $10,000. Bequest. Income only available for purposes of the Library.

403 BILLINGS STUDENT FUND, 1900, $50,000. Bequest of Robert C. Billings. Students receiving benefit are expected to abstain from use of alcohol or tobacco in any form.

102 GEORGE BLACKBURN MEMORIAL FUND, 1931, $830,000. Bequest of Harriette A. Nevins. Income for general purposes.

481 ROBERT A. BOIT FUND, 1921, $5,000. Bequest. Income to stimulate students' interest in best use of English Language through annual prizes or scholarships.

303 FRANK WALTER BOLES MEMORIAL FUND, 1915, $25,200. Under agreement between Harriet A. Henshaw and M. I. T. Income paid to committee of Department of Architecture, to purchase fine arts material and to supplement and strengthen instruction in architectural design.

506 LEVI BOLES FUND, 1915, $10,000. Bequest of Frank W. Boles in memory of father. Income for assistance of needy and deserving students.

363 WILLIAM SUMNER BOLLES FUND, 1924, $9,400. Bequest of William P. Bolles in memory of son, to maintain either fellowship, traveling scholarship or resident scholarship. Recipient to have character, ability or promise.

404 JOANTHAN BOURNE FUND, 1915, $10,000. Bequest of Hannah B. Abbe. Income to aid deserving students.

* Alphabetically listed — see pages 191–196 for corresponding reference numbers.

405 ALBERT G. BOYDEN FUND, 1931, $40,000. Bequest. Estate of Elizabeth R. Stevens. Income for scholarships. Preference to students from Fall River and Swansea, Mass.

406 HARRIET L. BROWN FUND, 1922, $6,000. Bequest. Income to needy and deserving young women students, as would otherwise be unable to attend. In case two or more applicants of equal merit, preference given to native of either Massachusetts or New Hampshire.

364 MALCOLM COTTON BROWN FUND, 1919, $11,000. Under agreement between Caroline Cotton Brown, Charles A. Brown and M. I. T., to establish memorial to son, Lieutenant Brown, R. A. F., killed in service 1918, for advanced study and research in Physics. Income to Senior in high standing for graduate study — not a condition but other things being equal, the fellowship to be awarded to member of Phi Gamma Delta.

508 BURSAR'S FUND, 1907, $6,000. Bequest of Lyman S. Rhoads. Income and repayments used for loans to students in discretion of Bursar, subject to approval of President and Treasurer.

343 SAMUEL CABOT FUND, 1912, $50,000. Gift of Helen N. Cabot in honor of husband. Income for purchase of apparatus and supplies required in conduct of research in Industrial Chemistry.

510 MABEL BLAKE CASE FUND, 1920, $25,000. Bequest of Caroline S. Freeman. Income to aid deserving students (preferably women) who are in need of assistance.

408 NINO TESHER CATLIN FUND, 1926, $1,000. Gift of Maria T. Catlin in memory of son. Income for needy and deserving students — not a condition but if possible award to be made to member of Lambda Phi Fraternity.

305 WILLIAM E. CHAMBERLAIN FUND, 1917–19, $6,000. Bequest. Income used for Department of Architecture.

410 CHANDLER FUND, 1927, $2,700. Gift from Architectural Society. A loan fund to be administered by Head of Architectural Department.

307 CHEMICAL ENGINEERING PRACTICE FUND, 1915–16, $300,000. Gift of George Eastman for Chemical Engineering Stations provided Institute will carry forward this plan of education for a reasonable period.

273 EDNAH DOW CHENEY FUND, 1905–06, $13,900. Bequest. Income for maintenance and care of Margaret Cheney Room for women students.

103 CHARLES CHOATE FUND, 1906, $25,000. Bequest. Income for general purposes.

274 FRANK HARVEY CILLEY FUND, 1913, $57,700. Bequest. Income and such part of principal as necessary for purchase of suitable books, photographs, statuary, etc., for library and gymnasium of Walker Memorial.

411 LUCIUS CLAPP FUND, 1905, $4,900. Bequest. Income to worthy students who may not be able to complete their studies without help.

413 CLASS OF '96 FUND, 1923, $2,272. Gift. Award subject to approval of Class Secretaries. Preference to descendants of members of Class. Scholarships to be considered a loan to be repaid when and if able.

483 CLASS OF 1904 FUND, 1925, $392. Contributions received by Professor Gardner for Architectural Department prizes.

210, 211, 212, 213, 214, 215, 216, 217, 218, 219, 220, 221, 222. CLASS ENDOWMENT AND ENDOWMENT RESERVE FUNDS

Note: These funds are being accumulated for the several classes whose members took out life insurance toward a gift to the Institute on their Twenty-Fifth Reunions.

The Class Endowments are of funds permanently held toward the final sum.

The Class Endowment Reserves may be applied in accordance with the terms of the several plans toward keeping alive policies that might lapse on account of non-payment or as otherwise designated.

230 CLASS OF 1898 LOAN FUND, $5,535. By subscription of certain members of class from 1927–1931. Income only for scholarship loans, as authorized by committee of class.

251 SAMUEL C. COBB FUND, 1916, $30,000. Bequest. Income for salaries of President and professors.

514 COFFIN MEMORIAL FUND, 1929, $35,000. Gift of the Estate of Charles A Coffin. For loans or other aid to students as determined by Executive Committee.

366 COLLAMORE FUND, 1916, $10,000. Bequest of Helen Collamore. Income primarily to aid women students in post-graduate courses, secondarily, for purchase of instruments for Chemical Laboratory.

344 CRANE AUTOMOTIVE FUND, 1928, $5,000. Gift of Henry M. Crane. Reserved for purchase of further equipment for Aeronautical Laboratory when necessary.

415 LUCRETIA CROCKER FUND, 1916, $50,000. Bequest of Matilda H. Crocker. Income for establishment of scholarships for women in memory of sister.

309 CROSBY HONORARY FUND, 1916, $1,633. Contributions in honor of William Otis Crosby (Professor Emeritus). Income for upbuilding of the Geological Department, especially its collections.

368 DALTON GRADUATE CHEMICAL FUND, 1896, $5,000. Gift of Charles H. Dalton. Income for scholarships for American male graduates of M. I. T., for advanced chemical study and research — preference given to chemical research especially applicable to textile industries.

417 ISAAC W. DANFORTH FUND, 1903, $5,000. Bequest of James H. Danforth. Income for scholarship purposes as a memorial to brother.

516 DEAN'S FUND, 1924, $3,350. Contributions — to be loaned by Dean to needy students.

518 CARL P. DENNETT FUND, 1926, $500. Gift. To be loaned to students, preferably Freshmen, at discretion of President.

420 ANN WHITE DICKINSON FUND, 1898, $40,000. Bequest. Income used to establish free scholarships. Such persons enjoying benefit shall be worthy young men of American origin.

520 DORMITORY FUND, 1903, $2,700. Contributions. Income for scholarship purposes.

311 SUSAN E. DORR FUND, 1914, $95,000. Bequest. Income for use and benefit of Rogers Physical Laboratory.

104 EBEN S. DRAPER FUND, 1915, $100,000. Bequest. Income used for general purposes of the Institute.

421 THOMAS MESSINGER DROWN FUND, 1928, $50,000. Bequest of Mary Frances Drown. Income to establish scholarships for deserving undergraduate students.

369 DU PONT FUND, 1922, $750. Annual gift of Chemical Department of E. I. Du Pont de Nemours & Company to be granted to graduate student whose major subject is chemistry or chemical engineering. Company to be advised of name of appointee and a report of progress made semi-annually.

107 and 203 EASTMAN CONTRACT FUND, 1924, $9,000,000. Gift of George Eastman. M. I. T. to purchase this amount of securities from him in installments of $150,000, semi-annually, over a period of fifteen years for $4,500,000.

108 GEORGE EASTMAN BUILDING FUND, 1916–17, $2,500,000. Gift of George Eastman on condition that $1,500,000 be raised by alumni and others. To be used eventually for new educational buildings.

312 GEORGE EASTMAN FUND, 1918, $400,000. Gift of George Eastman. Income for Chemistry and Physics.

109 CHARLES W. EATON FUND, 1929, $243,000. Bequest. Income for advancement of general purposes of Institute.

112 EDUCATIONAL ENDOWMENT FUND, 1920–21, $8,000,000. $4,000,000 gift from George Eastman and $4,000,000 from alumni and others. Income for current educational expenses.

113 MARTHA ANN EDWARDS FUND, 1890, $30,000. Gift. Income for general purposes.

521 FRANCES AND WILLIAM EMERSON FUND, 1930, $100,000. Gift. Income for aid of regular and special students in Department of Architecture.

114 WILLIAM ENDICOTT FUND, 1916, $25,000. Bequest. Income for general purposes.

205 ENDOWMENT RESERVE FUND, 1924, $600,000. Created by application annually of a small percentage of income of the General Investments to insure the annual income of the funds sharing. Increased otherwise by gains account of sales or maturities of investments and decreased by premium amortization of bonds and losses and charges from sales or maturities.

424 FARNSWORTH FUND, 1889, $5,000. Bequest of Mary E. Atkins. Income for scholarships

153 HENRIETTA G. FITZ FUND, 1930, $10,000. Bequest. Income for general purposes.

426 CHARLES LEWIS FLINT FUND, 1889, $5,000. Bequest. Income for support of worthy student, preference given graduate of English High School, Boston.

277 CHARLES LEWIS FLINT FUND, 1889, $5,000. Bequest. Income for purchase of books and scientific publications for library.

253 SARAH H. FORBES FUND, 1901, $500. Gift of Malcolm Forbes as memorial to mother. Income for salaries.

427 SARAH S. FORBES FUND, 1913, $3,400. Gift of Sarah S. Forbes, William B. Rogers and Henry S. Russell. Income for maintenance and education of scholar in M. I. T.

117 FRANCIS APPLETON FOSTER FUND, 1922, $1,000,000. Bequest. Income for purposes of Institute.

118 ALEXIS H. FRENCH FUND, 1930, $5,000. Bequest. Income for general purposes of Institute.

119 JONATHAN FRENCH FUND, 1915–16, $25,000. Bequest of Caroline L. W. French. Income for purposes of the Institute.

121 HENRY CLAY FRICK FUND, 1925–31, $940,000. Bequest. Institute received ten shares of a total of one hundred shares of his residuary estate. Income for general purposes.

429 FUEL AND GAS SCHOLARSHIP FUND, 1925–26, $700. Gift Boston Consolidated Gas Company and Massachusetts Gas Companies for scholarship in Gas Engineering.

255 GEORGE A. GARDNER FUND, 1898, $20,000. Gift. Income for salaries of instructors.

122 GENERAL ENDOWMENT FUND, 1921, $1,527,000. Contributions by alumni and others to meet George Eastman's condition relative to gift of $2,500,000, his building fund (No. 108).

523 NORMAN H. GEORGE FUND, 1919, $70,000. Bequest. Income for assistance of worthy and needy students.

525 JOHN A. GRIMMONS FUND, 1930–31, $1,644.90. Bequest of Lillian C. Moore of Malden. Principal held by Atlantic National Bank, Boston. Income for loans to undergraduates in Electrical Engineering not to exceed $600 to any one student in any one year with interest at 5 per cent and to be repaid within ten years. Loans to be awarded to male, white, native-born citizens of United States and to be protected by life insurance.

347 DANIEL GUGGENHEIM FUND, 1928. Gift for Meteorology Department. Balance remaining from $34,000 of which $10,000 was available for equipment, $12,000 for salaries, $6,000 for three fellowships and $6,000 for research for three years.

527 JAMES H. HASTE FUND, 1930, $141,000. Bequest. Income for aid of deserving students of insufficient means.

259 JAMES HAYWARD FUND, 1866, $18,000. Bequest. Income for salaries.

155 ESTHER A. HILTON FUND, 1930, $1,600. Bequest. Income used for general purposes.

431 GEORGE HOLLINGSWORTH FUND, 1916, $5,000. Bequest of Rose Hollingsworth. Income used for scholarship.

485 ROGER D. HUNNEMAN FUND, 1927, $1,060. Gift of W. C. Hunneman in memory of Roger Defriez Hunneman, '23. Income paid as annual award to most meritorious student in Chemical Engineering who has shown most outstanding originality in his work as determined by that Department.

433 T. STERRY HUNT FUND, 1894, $3,000. Bequest. Income to a student in Chemistry.

434 WILLIAM F. HUNTINGTON FUND, 1892, $5,000. Gift of Susan E. Covell. Income to deserving students. Preference to be given to students in Civil Engineering.

157 INDUSTRIAL FUND, 1924–31. This fund succeeded "Tech Plan" Contracts, payments under which went to the Educational Endowment Fund. Payments on contracts which were renewed or new contracts are now turned over to this Fund.

123 JAMES FUND, 1898–99, $163,000. Bequest of Julia B. H. James. Income for development of M. I. T

529 DAVID L. JEWELL FUND, 1928, $25,000. Bequest. Income for tuition of five young men who are worthy of assistance and who, were it not for such assistance, might be unable to pursue their studies at M. I. T.

374 REBECCA R. JOSLIN FUND, 1924, $1,540. Gift. Income awarded as a loan to advanced student in Chemical Engineering on recommendation of that Department — restricted to native and resident of Massachusetts. Beneficiary to abstain from using tobacco in any form.

436 JOY SCHOLARSHIPS, 1886, $7,500. Gift of Nabby Joy. Income for scholarships for one or more women studying natural science at M. I. T.

280 WILLIAM HALL KERR FUND, 1896, $2,000. Gift of Alice M. Kerr. Income for the annual purchase of books and drawings in machine design.

276 WILFRED LEWIS FUND, 1930, $5,000. Gift of Emily Sargent Lewis. Income for maintenance of graduate student in Mechanical Engineering.

438 WILLIAM LITCHFIELD FUND, 1910, $5,000. Bequest. Income for scholarship on competitive examination.

439 ELISHA T. LORING FUND, 1890, $5,000. Bequest. Income for assistance of needy and deserving pupils.

441 LOWELL INSTITUTE FUND, 1923, $2,300. Gift from alumni of Lowell Institute to establish scholarship for their graduates.

125 KATHARINE B. LOWELL FUND, 1895, $5,000. Gift of Augustus Lowell in honor of Mrs. Lowell. Income for purchase of books and apparatus for Department of Physics.

261 WILLIAM P. MASON FUND, 1868, $18,800. Bequest. Income to support a professorship in the Institute.

127 M. I. T. ALUMNI FUND, 1907. Total subscriptions of alumni to 1924, $632,500. $632,000 appropriated for New Equipment, Walker Memorial 1916 Reunion and Dormitories. Present small balance unappropriated.

227 M. I. T. ALUMNI ASSOCIATION PERMANENT FUND, 1929–31, $30,274.09. Deposited with M. I. T. for investment purposes only.

225 M. I. T. TEACHERS' INSURANCE FUND, 1926. Balance of 2 per cent salary deductions under M. I. T. Pension and Insurance Plan in excess of Group Insurance Premiums paid.

226 M. I. T. TEACHERS' INSURANCE FUND SPECIAL, 1928–29–30, $34,937.90. Refund of premiums paid on Group Insurance under M. I. T. Pension and Insurance Plan held at interest and accumulated. Payments to be at direction of Executive Committee.

317 GEORGE HENRY MAY FUND, 1914, $4,250. Gift. Income for benefit of Chemical Department.

443 GEORGE HENRY MAY FUND, 1914, $5,000. Gift. Income to assist graduates of Newton High School recommended as eligible by superintendent and head masters of Newton High Schools. Beneficiary to issue a note payable without interest.

126 THOMAS McCAMMON FUND, 1930, $15,000. Bequest in honor of father, James Elder McCammon. Income available for general purposes.

487 JAMES MEANS FUND, 1925, $2,700. Gift of Dr. James H. Means as a memorial to father. Income for annual prize for essay on an aeronautical subject.

159 HIRAM F. MILLS FUND, 1922, $5,000. Bequest. For general purposes.

319 SUSAN MINNS FUND, 1930. Gift of Miss Susan Minns — tract of land on Memorial Drive for use in any way deemed best for benefit of plan regarding construction and maintenance of an hydraulic laboratory.

445 JAMES H. MIRRLEES FUND, 1886, $2,500. Gift of James Buchanan Mirrlees. Income to such student in third or fourth year Mechanical Engineering most deserving pecuniary assistance.

320 FORRIS JEWETT MOORE FUND, 1927, $25,000. Gift of Mrs. F. Jewett Moore as a memorial to husband. Income or principal expended subject to approval of Executive Committee by a committee of three members of the Department of Chemistry — to make the study of Chemistry more interesting and surroundings of such study more attractive.

378 MOORE FUND, 1914, $5,000. Gift of Mrs. F. Jewett Moore. Income to help some Institute graduate to continue studies in Europe, especially organic chemistry. Preference to student who has distinguished himself in this subject while an undergraduate.

130 KATE M. MORSE FUND, 1925, $25,000. Bequest. Income for general purposes of M. I. T.

201 NEW DORMITORY, GENERAL FUND, 1926–30. Balance of subscriptions of alumni and others toward cost of new dormitories. Total appropriated $510,000.

447 NICHOLS FUND, 1895, $5,000. Bequest of Betsy F. W. Nichols. Income for scholarship to student in Chemistry.

448 CHARLES C. NICHOLS FUND, 1904, $5,000. Bequest. Income for scholarship.

322 WILLIAM E. NICKERSON FUND, 1928, $50,000. Gift. Principal and income used to finance chair in Humanics.

162 MOSES W. OLIVER FUND, 1921, $11,000. Bequest. Principal or income for general purposes.

283 GEORGE A. OSBORNE FUND, 1928, $10,000. Bequest. Income for benefit of mathematical library.

450 JOHN FELT OSGOOD FUND, 1909, $5,000. Bequest of Elizabeth P. Osgood in memory of husband. Income for scholarship in Electricity.

451 GEORGE L. PARMELEE FUND, 1921, $17,000. Bequest. Income for tuition of either special or regular worthy students.

131 RICHARD PERKINS FUND, 1887, $50,000. Bequest. Income for general purposes.

453 RICHARD PERKINS FUND, 1887, $50,000. Bequest Income for scholarships.

380 WILLARD B. PERKINS FUND, 1898, $6,000. Bequest. Income to be expended every fourth year for travelling scholarship in architecture.

324 EDWARD D. PETERS FUND, 1924, $5,000. Bequest of Elizabeth W. Peters. Income for the Department of Mineralogy.

325 PRATT NAVAL ARCHITECTURAL FUND, 1916, $1,071,000. Bequest of Charles H. Pratt to endow the Department of Naval Architecture and Marine Engineering to be called forever Pratt School of Naval Architecture and Marine Engineering — to erect a building — remainder held in trust. Income to support said school.

382 PROCTOR FUND, 1929–30. Gift of $1,000 per annum from Redfield Proctor for fellowship in Physics.

384 PROPRIETORS LOCKS AND CANALS FUND, 1927, $4,000. Gift to finance post-graduate scholarship in Textile Research, mechanical or chemical, to American-born graduate of Lowell Textile School, nominated by the Trustees of that School and approved by Executive Committee of Locks and Canals.

132 J. W. & B. L. RANDALL FUND, 1897, $83,000. Bequest of Belinda L. Randall as a permanent fund or in erecting a building with those names.

233 RICHARDS PORTRAIT FUND, 1929. Subscriptions from friends of Prof. R. H. Richards for portrait.

349 ELLEN H. RICHARDS FUND, 1912, $15,000. Income for promotion of research in Sanitary Chemistry, for fellowships to advanced students, for employment of research assistants and in such other ways as will best promote investigation in that field.

351 CHARLOTTE B. RICHARDSON FUND, 1891, $30,000. Bequest. Income to support of Industrial Chemical School.

263 HENRY B. ROGERS FUND, 1873, $25,000. Gift. Income for salaries of one or more professors or instructors.

386 HENRY BROMFIELD ROGERS FUND, 1921, $20,000. Bequest of Anna Perkins Rogers. Income to establish fellowship or scholarship for women graduates of M. I. T. or other colleges whose graduate work is carried on at M. I. T.

165 ROBERT E. ROGERS FUND, 1886, $7,600. Bequest in memory of brother, William B. Rogers. For general purposes.

531 WILLIAM BARTON ROGERS FUND. Present, $23,300. Established by subscriptions of members of Alumni Association through Prof. R. H. Richards for loans to students.

135 WILLIAM BARTON ROGERS MEMORIAL FUND, 1883–4–5, $250,000. Contributions from 91 persons. Income for support of Institute.

286 ARTHUR ROTCH ARCHITECTURAL FUND, 1895, $5,000. Bequest. Income for Library or collection of Department of Architecture.

327 ARTHUR ROTCH FUND, 1895, $25,000. Bequest. Income for general purposes of Department of Architecture.

489 ARTHUR ROTCH FUND, 1895, $5,000. Bequest. Income for annual prize to student in regular course in Architecture graduating highest in class.

491 ARTHUR ROTCH SPECIAL FUND, 1895, $5,000. Bequest. Income for annual prize to student who shall be ranked highest at end of two years special course in Architecture.

388 RICHARD LEE RUSSEL FUND, 1904, $2,000. Gift of Theodore E. Russel. Income to assist worthy student of high standing in Department of Civil Engineering either undergraduate or post-graduate.

136 SALTONSTALL FUND, 1901, $40,000. Bequest of Henry Saltonstall. One-fourth income each year added to principal and remaining three-fourths expended for benefit of Institute.

390 HENRY SALTONSTALL FUND, 1901, $10,000. Bequest. Income to aid one or more needy students.

392 JAMES SAVAGE FUND, 1873, $10,000. Bequest. Income for scholarships in institution "where my son-in-law, William B. Rogers, is President."

137 SAMUEL E. SAWYER FUND, 1895, $4,000. Bequest. Income to be used in such manner as will best promote interests of M. I. T.

455 JOHN P. SCHENKL FUND, 1922, $20,000. Bequest of Johanna Pauline Schenkl in memory of father. Income for scholarships in Department of Mechanical Engineering.

237 SEDGWICK MEMORIAL LECTURE FUND, 1930, $3,900. Bequest of Mary Katrine Sedgwick in memory of husband. All copyrights and interest in copyrights and benefits from contracts with publishers for Department of Biology and Public Health.

329 W. T. SEDGWICK FUND, 1928, $69,500. Received from Trustees of the Estate of W. T. Sedgwick under Agreement and Declaration of Trust following decease of Mary Katrine Sedgwick, for Department of Biology and Public Health.

456 THOMAS SHERWIN FUND, 1871, $5,000. Gift of Committee on Sherwin Memorial Fund for free scholarship to graduate of English High School.

168 ELLEN VOSE SMITH FUND, 1930, $25,000. Bequest. For general purposes.

458 HORACE T. SMITH FUND, 1930, $32,988.76. Bequest. Income for scholarships. Preference to graduates of East Bridgewater (Mass.) and Bridgeport (Conn.) High Schools.

139 ANDREW HASTINGS SPRING FUND, 1921, $50,000. Bequest of Charlotte A. Spring in memory of nephew as a permanent fund. Income for general purposes.

532 SUMMER SURVEYING CAMP LOAN FUND, 1927, $500. Gift of Lammot du Pont as a revolving loan fund to help students in Civil Engineering attend summer surveying camp.

140 SETH K. SWEETSER FUND, 1915, $25,000. Bequest as a permanent fund. Income for general purposes.

395 SUSAN H. SWETT FUND, 1888, $10,000. Bequest. Income to support a graduate scholarship.

396 GERARD SWOPE FUND, 1926, $2,500. Annual gift for fellowships in Electrical Engineering.

534 TEACHERS' FUND, 1899–1900. Gifts of $50,000 each from Augustus Lowell and A. Lawrence Lowell to establish fund for use in case of retirement, disability or death of members of instructing staff.

288 TECHNOLOGY MATRONS TEAS FUND, 1916–22–31. Gift of Mrs. F. Jewett Moore. Income for social activities of Technology Matrons.

354 TECHNOLOGY PLAN RESEARCH FUND. Funds received by Division of Industrial Co-operation and Research from Industrial Companies under contract covering a five-year period paid in annual installments.

356 TEXTILE RESEARCH FUND, 1930, $42,000. Gift of Textile Alliance, Inc., for scientific and economic research for benefit of development of textile industry, its allied branches, including production of raw materials.

265 NATHANIEL THAYER FUND, 1868, $25,000. Gift. Income for professorship of Physics.

239 ELIHU THOMSON FUND, 1929, $5,000. Gift.

460 SAMUEL E. TINKHAM FUND, 1924, $2,400. Gift of Boston Society of Civil Engineers. Income to assist worthy student in Civil Engineering.

289 JOHN HUME TOD FUND, 1913, $2,500. Gift of Mrs. F. Jewett Moore. Income for purchase of books of a humanistic character for General Library.

462 F. B. TOUGH FUND, 1924, $465. Gift to extend financial assistance to worthy students in mining or oil production.

331 EDMUND K. TURNER FUND, 1915, $178,000. Bequest. Income for a certain annuity during the life of sister — three-quarters of balance of income for Department of Civil Engineering and one-quarter to be added annually to principal.

243 UNDERGRADUATE DUES RESERVE FUND, 1924. Transferred from Undergraduate Dues Reserve and Contingent to secure investment income.

463 SUSAN UPHAM FUND, 1892, $1,000. Gift. Income to assist students deserving financial aid.

536 SAMSON R. URBINO FUND, 1927, $1,000. Bequest. Income for students who need assistance, Germans preferred.

291 THEODORE N. VAIL FUND, 1925, $24,000. Bequest. Income for benefit of Vail Library.

398 LUIS FRANCISCO VERGES FUND, 1924, $10,000. Gift from Caroline A. Verges. Income for graduate students doing research work in sugar industry or if no such candidate, undergraduate student in Civil Engineering.

465 VERMONT SCHOLARSHIP FUND, 1924, $8,000. Gift of Redfield Proctor, '02, in memory of Vermonters who, having received their education at the Institute, served as engineers in the armies of the Allies in the World War. Income to student preferably from Vermont. Mr. Proctor reserves right to designate recipient as long as he lives.

467 ANN WHITE VOSE FUND, 1896, $60,000. Bequest. Income for free scholarships for young men of American origin.

171 HORACE W. WADLEIGH FUND, 1920, $2,100. Bequest. For general purposes.

469 ARTHUR M. WAITT FUND, 1925, $9,700. Bequest. Income for deserving students in second, third and fourth year classes in Mechanical Engineering.

141 WILLIAM J. WALKER FUND, 1915–17, $23,000. Bequest. Income for general purposes.

144 HORACE HERBERT WATSON FUND, 1930, $31,000. Bequest of Elizabeth Watson Cutter as a permanent fund. Income for general purposes.

173 FRANK G. WEBSTER FUND, 1931, $25,000. Bequest. For general purposes.

471 LOUIS WEISBEIN FUND, 1915, $4,000. Bequest. Income for scholarship for student in Architectural Department, preference to be given to a Jewish boy.

145 ALBION B. K. WELCH FUND, 1871, $5,000. Bequest as a permanent fund. Income for general purposes.

473 FRANCES ERVING WESTON FUND, 1912, $200. Bequest. Received annually to aid a native-born American Protestant girl of Massachusetts. (Principal $5,000 turned over to M. I. T., 1931.)

474 SAMUEL MARTIN WESTON FUND, 1912. Bequest of Frances E. Weston in memory of husband. Two hundred dollars received annually to aid a native-born American Protestant boy; preference to be given one from Roxbury. (Principal $5,000 turned over to M. I. T. in 1931.)

476 AMASA J. WHITING FUND, 1927, $4,500. Bequest of Mary W. C. Whiting. Income as scholarship to deserving students; preference to students from the Town of Hingham, Massachusetts.

358 EDWARD WHITNEY FUND, 1910, $25,000. Bequest as a memorial to him and his wife, Caroline. Principal and interest for conduct of research or teaching in geophysics — to include investigations in seismology conducted with a view to the protection of human life and property.

537 JONATHAN WHITNEY FUND, 1912, $525,000. Bequest of Mrs. Francis B. Green. Income to assist poor and deserving young men and women in obtaining an education at M. I. T.

539 MORRILL WYMAN FUND, 1915–16, $66,000. Bequest. Income to aid deserving and promising students upon understanding that if in after life the person receiving aid shall find it possible, he shall reimburse said fund — not a legal obligation.