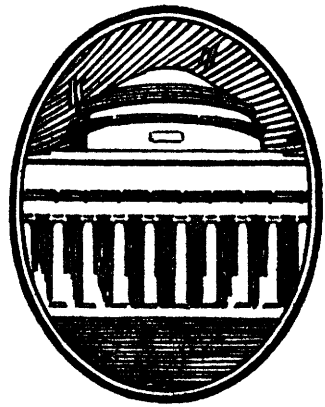
President's Report



October, 1940

Massachusetts Institute of Technology
Cambridge, Massachusetts

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REPORT OF THE PRESIDENT

To the Members of the Corporation:

In making my report to you at this time it is natural to turn first to the topic which is uppermost in all our minds today and to discuss the relation of this institution to our national program of defense. Protection of the Western Hemisphere, and especially of the North American Continent, against any possible invasion by force is the firm determination of all true Americans. Equally important, and more difficult, is defense of the freedom of spirit and action which our forefathers won for us by generations of struggle and which is stealthily threatened alike by subversive influences from without and vicious ambitions from within, both tending to undermine our strength by sowing doubt and discord. Sometimes these influences operate insidiously in the guise of high idealism, as in the cause of peace or of human rights; sometimes they operate openly to incite violence and class hatred.

We are fortunate to serve an institution whose objectives in respect to national needs are so clear-cut and constructive. Established at a time when technically trained men were needed to develop uses for our great national resources and to pioneer in the new industrial era, the Massachusetts Institute of Technology has had no reason to change its basic objectives, whether in times of prosperity or of depression, of peace or of war. Engineers are ever more needed to operate and improve the productive industries of the country; scientists are ever faced with opportunities to make discoveries which will create new industries and employment, or improve health and comfort, or add to the satisfactions of intellectual achievement; business men with technological training are increasingly able to cope with their problems as compared to those without it in this technological era. And in a time of military crisis, technological efficiency in production as well as in design of instruments of defense and offense is the basic element of national defense.

In my report last year, as the European war was just beginning, I submitted my opinion that the Massachusetts Institute of Technology's greatest service, in threat of war as

in time of peace, was to continue as efficiently and uninterruptedly as possible, its program of technological education and scientific research. That opinion still holds; but the progress of events has called for some new definitions of policy and modifications in procedure.

Where we possess facilities of personnel or equipment which can contribute in especially significant ways to the national defense program, we should direct them to this effort, always guided by our best evaluation of the national importance of this effort in comparison with other ways in which these same personnel and facilities might be used. We should make this possible by postponing less urgent research projects, by internal rearrangement of teaching schedules, and by carrying a more than normal per capita burden of work. We should not permit our facilities, many of which are unique, to be tied up in work of a type which can be well performed by many other agencies, and we should, in so far as possible, hold our staff together as a working unit. The teaching and research staff is certainly more effective intact than it would be dispersed, and as an integrated organization can exert a greater force for national defense.

Some fifty members of our staff hold reserve commissions in the Army or Navy and are subject to call to active duty. Our policy here has been to evaluate each officer's importance to our program in relation to the probable importance of his duties as an active officer. If this evaluation indicates that in our opinion he should remain here in the interest of the public welfare, we have so informed the armed forces and asked their coöperation in keeping the man here. By thus being selective, we hope to aid the Army and Navy in their own difficult problem of selection.

What are some of the specific activities we now have under way which illustrate and implement these defense policies?

While governmental agencies this summer have sponsored a vast program of technical, vocational and apprentice training at sub-collegiate levels, and while they were working to set up an intensive training program at the engineering school level, we took time by the forelock and carried through a ten weeks' intensive course to train junior aeronautical engineers. Fifty-

one graduates in civil, mechanical and other engineering fields from engineering schools in northeastern United States were accepted for this course, without tuition, and even before finishing the work practically all of them had been engaged for employment by aircraft manufacturing concerns. The success of this demonstration has led to repeated requests by these companies that the course be repeated and that similar courses be offered in other fields, such as airplane engines. Obviously we cannot continue to give such courses without some provision to defray our out-of-pocket costs of instruction, and arrangements for financing these important special courses are impending. Congress, for example, recently appropriated $9,000,000 for financing short intensive courses in engineering schools.

We are continuing to participate in the Civilian Pilot Training program. An intensive ground school program was offered for both primary and secondary groups this summer and we are planning to speed up our ground school program during the current year.

Weather forecasting is an essential feature of modern warfare. For a number of years we have been giving postgraduate training in meteorology to young men sent to us by the Army, Navy and Weather Bureau. This summer a special intensive course was given to recruits for the meteorological service of the Army Air Corps, and during the current year we will have another group of approximately sixty special postgraduate students in this subject, mostly from the Army Air Corps and the Weather Bureau. With these additions we have had a threefold increase in the number of graduate students studying meteorology.

Realizing fully that present conditions make it more important than ever that it keep abreast of advances in science and engineering and that its officers must have the best possible technical training, the Navy Department is sending us an increased number of officers for postgraduate study. At its request we have established a new course which combines the separate courses in Naval Construction and Naval Engineering into a single, coördinated program. Of the sixty officers detailed here, forty are taking this three-year program and the remainder

are distributed among meteorology, fire control, torpedo research, and aeronautical engineering.

As the need is arising, we are preparing to institute intensive new courses in naval construction and aircraft instruments for special groups of officers.

The Wright Brothers Memorial Wind Tunnel is being used overtime for the testing of design models of new types of airplanes. This is done on a contractual basis with several aircraft companies. With funds totaling $30,000 provided by two of these companies (Curtiss-Wright and United Aircraft Corporations) important new equipment is being added to this laboratory to enable us to test models with power applied to propellers, thus more closely simulating flight conditions.

Research work on national defense problems is being conducted in a majority of the departments of the Institute. Most of this is through contracts with the War and Navy Departments, the National Advisory Committee for Aeronautics, the National Defense Research Committee, the National Academy of Sciences, and with private companies engaged in development of equipment for military purposes.

Members of the Institute's staff are serving in a variety of national defense agencies, some having been granted leaves of absence and others having been relieved of a portion of their Institute duties to make this possible. Dean Robert G. Caldwell, for example, is serving as chairman of the Division of Cultural Relations Among the American Republics, a post he has taken at the request of President Roosevelt. Professor Ralph D. Bennett, Professor Francis Bitter, and Mr. Doyle Northrup are on leave of absence, working for the Navy on the protection of ships against magnetic mines, while Professor Chester M. Van Atta and Mr. Richard D. Campbell resigned from our staff also to work on this project. Professor Bennett, as Lieutenant-Commander, is in charge of one branch of this important service.

Professor Hunsaker, as a member of the National Advisory Committee for Aeronautics, is participating in the aeronautical research programs conducted for the Army and Navy by that committee and, through membership in many other boards and committees in Washington, is aiding the defense program.

Professor Edward S. Taylor has been the chief assistant to Mr. George J. Mead (M.I.T. '16) in charge of airplane engine production under Mr. Knudsen.

Professor John E. Burchard is in active charge, under Professor Richard C. Tolman (M.I.T. '03) of a group of scientists and engineers charged with the development of bomb-proof shelters.

Professor Douglass V. Brown is head of the Division of Economics and Statistics for the Stettinius Committee, and his colleague, Professor Douglas M. McGregor, has been called from time to time to undertake special assignments for the Bureau of Labor Statistics.

Carroll L. Wilson and Allen W. Horton, who have served as Assistants to the President here at Technology, have been lent by their present employers, the Research Corporation and the Standard Oil Company of California respectively. Mr. Wilson is serving the National Defense Research Committee and Mr. Horton is Specialist in Engineering Education for the United States Office of Education.

The National Defense Research Committee, under the chairmanship of our colleague, Dr. Vannevar Bush (formerly our Vice-President and Dean of Engineering), has presently available a large fund for research on devices and instruments of warfare. Members of the committee in charge of its four divisions are our colleagues Dr. Frank B. Jewett (M.I.T. '03), Dr. Richard C. Tolman (M.I.T. '03), James B. Conant, President of Harvard University, and myself. Among the committee's section chairmen are Dr. Alfred L. Loomis of our Corporation, Professor Warren K. Lewis and Professor George R. Harrison; and on the operating section committees are Professors Tenney L. Davis, Thomas K. Sherwood, Edward L. Bowles, and Samuel H. Caldwell. These are only some of the present national defense activities of our staff. Many others also will undoubtedly arise in the near future.

When a staff member or other employee of the Institute is called upon for important duties in the present national emergency and such service is undertaken on the advice of the Institute's administration, the Institute will make — at the direction of the President and in so far as is legally proper — whatever

salary adjustment is necessary for the academic year 1940–41 to enable the individual to enter service without undue sacrifice by dependents. In special cases similar adjustments, if necessary to prevent hardship, may be made for those called to service as Reserve Officers or under the Selective Training and Service Bill. Arrangements have also been made whereby staff members, on leave of absence for such duty, may retain their insurance and pension privileges in the Massachusetts Institute of Technology Pension Association.

On the financial side, it is believed that the Institute will approximately "break even" on these various extraordinary arrangements during the current year. On the credit side is the moderate "overhead" which is being charged for the defense research projects conducted at the Institute. This overhead has been arranged on a uniform basis for all educational institutions so as to carry most of the pro-rated administrative expense but so that the institution contributes the use of its facilities. On the credit side also is the saving when a staff member is taken onto the governmental pay roll and is not replaced, or is replaced by a substitute at lower salary. On the debit side are the supplementary allowances paid to permit staff members to undertake governmental work without personal financial sacrifice, and the large amount of service and expense of staff members who are receiving no governmental compensation. Frequently, also, the Institute is temporarily carrying salaries or expenses in connection with defense research projects, to enable them to be undertaken more promptly or to provide services which are important but apparently impossible to provide with government funds under existing (and sometimes crippling) regulations. We are keeping a special account of these credits and debits, and will later report to you the net result of these operations.

If the national emergency should become acute, the foregoing arrangements may have to be modified. It is conceivable that many of the Reserve Officers remaining on our staff may be called to active service, and that the number of regular students may be materially decreased. We may have to transform our activities very largely in the direction of emergency technical training courses and war research. If so, we are prepared to

carry on with as close adherence as may be possible to the basic policies and ultimate objectives which have guided us in the preceding arrangements.

Operations of the Past Year

And now let me turn from this discussion of our position in relation to defense and report to you on our normal operations during the past year. Details of these operations are described in the appended statements of other administrative officers; I seek here to chart and interpret trends, to tabulate the vital statistics of the year, to select a few of the noteworthy accomplishments, and to call attention to urgent needs.

Finances. In March 1939 when the budget for 1939–40 was approved we estimated a deficit for the year of $25,000. Largely as a result of a 10 per cent increase in investment income, we closed the year with a modest surplus, even without making planned appropriations of some $50,000 from the Income Equalization Fund and other funds.

Of the Institute's total budgeted expenditure of $3,333,000, 69.3 per cent was Academic Expense (*i.e.* teaching and research), 26.4 per cent Plant and Administration, and 4.3 per cent Miscellaneous Expense. Forty-five and one-half per cent of our operating income was derived from students, 37 per cent from investments, 10.2 per cent from loans and scholarships, and 7.3 per cent from other sources, compared with 46.5, 35.1, 11 and 7.4 per cent respectively for the preceding year.

The yield on all investments, based on market values as of June 30, was 4.32 per cent, compared with 3.89 per cent one year ago, and 4.45 two years ago. Investment income distributed to the pooled funds on the basis of book value was at the rate of 4.38 per cent, compared with 4.02 per cent in 1939 and 4.55 per cent in 1938. The market value of the Institute's investments as of June 30 was about 95 per cent of book value. In 1939 and in 1938 it was 100 per cent, and in 1937 109 per cent. The June 30 investment portfolio showed 43.7 per cent in bonds, 4.1 per cent in preferred stocks, 44 per cent in common stocks, and 8.2 per cent in mortgages and real estate. Comparable percentages for the preceding year were 40.3, 5.4, 47.6, and 6.7 respectively.

The table below shows the status and trend of operating income and gifts.:

FINANCIAL TRENDS

	Operating Income Budget	*Total Gifts*
1930–31	$2,880,131	$1,339,280
1931–32	3,029,881	1,781,473
1932–33	2,779,815	306,295
1933–34	2,646,648	208,635
1934–35	2,694,799	580,695
1935–36	2,714,301	429,533
1936–37	2,977,573	812,421
1937–38	3,008,530	2,347,693
1938–39	3,203,300	1,362,392
1939–40	3,334,271	790,559

The larger gifts of the past year included $98,261 from the Marcella B. Upham estate, $50,000 from the John Wells Morss estate, $50,000 from the Charles Hayden Foundation, $31,719 from the Charles A. Richards estate, $20,000 from Professor and Mrs. William Emerson, $15,985 from the Charles W. Eaton estate, $10,000 from Mr. Bartlett Arkell, $35,750 from the Alfred P. Sloan Foundation and $14,300 from Research Corporation. Of the total donations $464,953 were capital additions and $325,606 miscellaneous gifts.

ENROLLMENT AT M. I. T.
(As of November 1)

	Total Undergraduate	*Freshmen*	*Total Graduate*	*Total Enrollment*
1930–31	2,670	734	539	3,209
1931–32	2,610	628	578	3,188
1932–33	2,308	562	523	2,831
1933–34	2,106	485	500	2,606
1934–35	2,009	542	498	2,507
1935–36	2,018	561	522	2,540
1936–37	2,174	650	619	2,793
1937–38	2,305	605	661	2,966
1938–39	2,401	656	692	3,093
1939–40	2,379	605	721	3,100
1940–41	2,379	605	759	3,138

Enrollment. During the summer college administrators throughout the country voiced apprehension that demands of industry for men together with calls to military service would greatly reduce college enrollments. As shown in the table on the previous page our total registration shows very little change over last year.

As you know, the selective military service program will not affect regularly registered college students until next summer. After that time we are certain to feel the effects of the draft; with our large graduate school the proportion of our student body above 21 years of age is relatively high, perhaps over half. Offsetting this factor is the large number of students in the advanced R.O.T.C. who are not subject to the draft. Even though the draft may later reduce our regular registration, I believe that the reduction will be substantially offset by the special students whom we shall be asked to train for government and industry.

The 605 freshmen admitted for this new academic year were selected from among 1,700 applicants, a gain in applicants over last year of approximately 100. This class is the fifth to be admitted under the stabilized enrollment plan, and represents, we believe, the most carefully selected group yet to enter the Institute.

Student Aid. During the past decade the Institute's permanent scholarship and loan funds have been increased by three and a quarter million dollars. At the same time tuition increases and the growth of the graduate school have enlarged the need for student aid, and effective use could be made of additional scholarship funds both for graduates and undergraduates. The need, however, is particularly acute for graduate scholarships. To meet the heavy demands of the past few years we have used accumulated income of several large funds with the result that we face a reduction in monies available for graduate aid unless additional funds are secured.

The amounts received by students in the several categories of financial aid are shown in the table on the following page.

SUMMARY OF STUDENT AID AT M. I. T.

	1938–39		1939–40	
	Number	*Amount*	*Number*	*Amount*
Undergraduate Scholarships	539	$92,034	557	$93,830
Graduate Scholarships and Fellowships	300	108,517	334	111,618
Loans	368	167,173	373	162,843
Student Employment Service	560	62,970	550	66,675
Total Student Aid		$430,694		$434,966

Of the undergraduate scholarships, 235, or a total of $50,042 ($44,950 a year ago) went to freshmen, and of these, 26, totaling $8,850, were the first of the Charles Hayden Memorial Scholarships for "Boston boys" provided by an initial gift of $50,000 from the Hayden Foundation. The skill of the scholarship committee in selecting these students is shown by the fact that the 26 made an academic average of top quartile rank. As a result of this first year's experience, the Hayden Foundation has made a further gift of $30,000 to care for worthy and needy "Boston and New York boys" entering in 1940.

The Loan Fund continues as a major factor in student aid, even though the year showed a slight decrease in the amount loaned. The extent to which the Fund is revolving can best be indicated by the statement that the $110,044 received for interest exceeds the total matured principal in arrears by nearly $35,000.

Buildings and Facilities. Of the new facilities added during the year, the largest was announced last June — an addition to our internal combustion engine laboratory made possible by a gift of $100,000 from Mr. Alfred P. Sloan, Jr., whose earlier generosity had enabled the Institute to build the original laboratory. Mr. Sloan was prompted to make this gift by a desire to help the Institute increase at once its contribution to the nation's program of aircraft engine design and production. The new addition, which together with the present laboratory, will be known as the Sloan Laboratories for Aircraft and Automotive Engines, will add 10,000 square feet to the present laboratory and will be ready for occupancy by November 1.

Last June the Visiting Committee on the Department of

Aeronautical Engineering, which had earlier recommended the enlargement of the Sloan Laboratory, urged extensive alterations in the Guggenheim Laboratory in order that we might train increased numbers of aeronautical engineers. The Executive Committee promptly appropriated funds to dismantle the now obsolete 7½-foot wind tunnel and to install a second floor in the two-story space thus released. These alterations have provided 1,700 square feet of new drafting room space, two larger lecture rooms, an enlargement of the Aeronautical Engineering Library, a new instrumentation laboratory twice the size of the old one, a graduate student room, special research rooms and an airplane structures laboratory within which there is room for a new and more compact wind tunnel to replace the one dismantled. Together with the relief afforded by the Sloan addition, which frees the entire fourth floor for meteorology, we are now equipped to care for a 30 per cent increase in our registration in aeronautical engineering.

The timeliness of this expansion of our aeronautical engineering facilities has already been demonstrated by the large volume of new research we have been asked to undertake in the engine field, by threefold increase of our graduate registration in meteorology as a result of government requests to train meteorologists for the Army Air Corps and the Weather Bureau, and by the special training programs in aeronautical engineering which we expect to be asked to undertake in the immediate future.

To care, at least temporarily, for the expanded program in Biological Engineering made possible by the grant last Spring of $200,000 from the Rockefeller Foundation, we have made extensive space adjustments in our present buildings and intensified the utilization of existing biological laboratories. A half dozen research units for graduate students and office laboratories for the Biological Engineering staff have been provided, along with a new animal room and an adequate machine shop. The Food Technology Laboratories have been enlarged and centralized in Building 35 and the laboratories of Biological Engineering and Biophysics have been centered and extended. These changes required an always generous but not always easy reallocation of space on the part of several departments,

notably physics, and the intensive utilization of almost every square foot of spare space to be found in our educational plant. There remain many points of acute congestion particularly on the east side of the building group and we must look toward relieving pressure in this area.

Another alteration of importance to our academic program, in line with recommendations of the Visiting Committee, was the complete modernization of our mineral dressing laboratories. Under the direction of Professor Gaudin, who joined the Institute staff a year ago to direct our mineral dressing program, we have so rearranged and re-equipped the ore dressing laboratories that we now have an extraordinarily fine layout for both instruction and research. Thus equipped, the new program is ready to care for the new students and research workers it has already begun to attract in increased numbers.

In the Walker Memorial we have moved the library to the west side of the second floor and added to its space the room formerly used as a faculty dining room. This enlargement will care for the books that were overflowing the old quarters and will permit a concentration of volumes long desired by the Department of English and History. The former site of the Walker Memorial Library is now a music room and Faculty lounge. On the first floor of Walker the Grill Room has been equipped as a soda and sandwich bar, a feature well received by students.

In August the Alumni Swimming Pool was opened for use. This splendid recreational building, described in detail in my report a year ago, will evoke praise and gratitude from generation after generation of students and will stand as a fitting testament to alumni interest in student welfare.

Personnel. The Corporation suffered a great loss in the death on February 11 of Mr. Philip Stockton, a Life Member of the Corporation since 1936, and a member of its Executive Committee and Chairman of its Finance Committee since 1937. He brought wisdom and wide experience to our councils, and promoted skillfully the financial well-being of the Institute.

The Corporation lost through resignation Mr. John J. Pelley, a Life Member since 1931, and a friend of the Institute whose interest continues. In addition, the Alumni Term Mem-

berships of Messrs. Arthur C. Dorrance, Charles E. Smith, and Rufus E. Zimmerman expired in June after five years of notable activity on the part of each.

Mr. Ralph E. Flanders, a Special Term Member from 1937 to 1940, and Mr. James M. Barker, an Alumni Term Member for the five-year term ending June 1939, were elected to Life Membership, Mr. Edward R. Stettinius, Jr. to Special Term Membership, and Messrs. Egbert C. Hadley, Page Golsan, and Alfred H. Schoellkopf to Alumni Term Membership.

Mr. John R. Macomber succeeded Mr. Stockton as a member of the Executive Committee and as Chairman of the Finance Committee, and during the year Mr. Mayo, Mr. Flanders, and Dr. Cabot served as temporary members of the Executive Committee.

By death the Faculty lost from its active membership Professor James F. Norris, Professor George Rutledge and Assistant Professor Olin Ingraham, and from its Members Emeriti Professors Waldemar Lindgren and Henry G. Pearson. Professor Norris, who died on August 3, had been a member of the Department of Chemistry since 1916, and Director of the Laboratory of Organic Chemistry since 1925. Professor Rutledge joined the Department of Mathematics in 1915. Professor Ingraham was a member of the Department of Economics, where he had taught since 1922. Professor Lindgren, from 1912 to 1933 head of the Department of Geology, and Professor Pearson, for twenty-three years head of the Department of English and History, retired in 1933 and 1938 respectively.

The close of the last academic year brought the retirements of Professors Harold K. Barrows, Charles W. Berry, Harry M. Goodwin, and William T. Hall, all with the title Professor Emeritus. Dean Goodwin has been appointed Honorary Dean of the Graduate School, and in this capacity and on a part-time basis he will add still another year to his fifty years of association with the Institute.

Losses by resignation were as follows: Colonel Charles Thomas-Stahle, Professor of Military Science and head of the Department; Associate Professors Archibald D. Fisken, Elroy S. J. Irvine, Harold R. Jackson, Kirke B. Lawton and Harold

A. Nisley; Assistant Professors Joergen Holmboe, Lawrence A. Monroe, James E. Seebold, Chester M. Van Atta, Stanley T. Wray and Archibald Williams; and Dr. Louis W. Croke, Assistant Medical Director.

Leaves of absence were granted to Edward E. Bugbee, Associate Professor of Metallurgy, on exchange with Professor Orson C. Shepard of Stanford University; Associate Professors John L. Reid and Penfield Roberts, and Assistant Professor William T. Martin.

John W. M. Bunker, Professor of Biochemistry and Physiology in the Department of Biology and Public Health, was appointed Dean of the Graduate School to replace Dean Goodwin. Dean Bunker has long been an influential member of the Graduate Committee and he has played a major part in the development of the Institute's new program in Biological Engineering.

Other promotions were as follows: Howard R. Bartlett to head of the Department and Professor of English and History; Nathaniel McL. Sage to Director of the Division of Industrial Coöperation; and Professor Lawrence B. Chapman to take charge of the Course in Marine Transportation. Raymond D. Douglass, Avery A. Morton, Sverre Petterssen, Albert A. Schaefer, and Dirk J. Struik were promoted to the grade of Professor. Promotions to the grade of Associate Professor were as follows: William P. Allis, Avery A. Ashdown, Charles H. Blake, Douglass V. Brown, Samuel H. Caldwell, Arthur R. von Hippel, W. Rupert Maclaurin, John R. Markham, John D. Mitsch, Flavel Shurtleff, Stephen G. Simpson and Ralph C. Young. Promotions to the grade of Assistant Professor were as follows: Isadore Amdur, Allan T. Gifford, Lawrence J. Heidt, Charles Kingsley, Jr., Richard F. Koch, Malcolm S. McIlroy, Herman P. Meissner, William MacG. Murray, Augustus R. Rogowski, Reinhardt Schuhmann, Jr., Gerald B. Tallman, and John D. Trimmer.

New appointments included the following: Colonel Clarence T. Marsh, head of the Department and Professor of Military Science and Tactics; Alvar Aalto, Research Professor of Architecture; Associate Professors John R. Loofbourow, Major Albert M. Pigg, and Orson C. Shepard; Assistant Professors

Arthur D. Caswell, Joseph F. Cook, Jr., Justin R. Hartzog, Edward C. Harwood, Roland D. Parks, Paul A. Samuelson and Jerome L. Spurr; Lecturers Frederick P. Clarke, E. Newton Harvey, Richard von Mises, and Honorary Lecturer Harold K. Barrows. Professor Avery A. Ashdown was appointed Secretary of the Society of Arts, replacing Dean Goodwin, and Dr. John W. Chamberlain was appointed Assistant Medical Director.

New Policies and New Programs

Appointment of Instructors. Adopted during the year was a general policy, already in force at several colleges, of limiting the number of years an instructor may remain on the staff as an instructor.

In summary the policy requires that each new appointee to the rank of instructor shall be engaged with the definite understanding that his service as an instructor is to extend over not more than three consecutive periods, as follows:

(*a*) A one-year appointment, which provides an opportunity to appraise the man's effectiveness.

(*b*) A one-year appointment, during which his possible continuance shall be seriously considered by his department head.

(*c*) A two-year appointment.

There shall be no further appointment with the rank of instructor. In other words, men appointed under this policy will either be promoted or will leave the Institute at the conclusion of four years. Together with necessary exceptions to the above, the policy as adopted includes a provision under which the Institute gives notification of promotion or conclusion of service not later than one term before the end of the final year.

Recommendations that this policy be adopted came from the staff representatives on the Staff-Administration Conference Committee, a body organized in 1938 to promote the free exchange of ideas between staff and administration. Under the leadership of Professor Julius A. Stratton, this staff group has ably and diligently examined questions relating to the welfare of the staff. The statesmanship with which they have presented the conclusions and point of view of the staff have contributed

importantly toward the excellent personnel relationships which exist throughout the Institute.

Industrial Coöperation. The Faculty, the Visiting Committee of the Division of Industrial Coöperation, and the Administration joined in formulating during the year a codification and restatement of the policies governing the handling of industrial research at the Institute. This new statement reiterates that

(1) The primary purpose of all research projects conducted by the Division is the furtherance of the educational program of the Institute:

(2) Where the Institute has unique facilities of personnel and equipment, we have an obligation to make such facilities available to industry;

(3) The Institute has a special obligation to render service to the Commonwealth, to the cities of Cambridge and Boston, and to the several agencies of the Federal Government;

(4) It is unwise for the Institute to perform extensive routine testing services. While to a limited extent it is sometimes necessary and proper to do such testing merely on the grounds of courtesy or convenience, it must be recognized that competition by the Institute with existing equipped laboratories is improper.

With these principles in effect and with systematized and clarified procedures regarding contracts, relationships with the staff and disposition of funds, the Division experienced an exceptionally successful year, widening its contacts with industry and perfecting an organization that is already participating effectively in our developing defense research program. Along with a marked increase in the number of industrial projects handled by the Division has come a desirable new emphasis on fundamental research.

Related to this formulation of policy and important to the wise financial administration of our research activities was a study of the costs of conducting research at the Institute for outside agencies. This study showed clearly that intangible indirect costs loom large in educational institutions no less than in industry. In general if the Institute is to cover all of its costs in undertaking research, the overhead charge must equal the labor costs. There are types of research, of course, which the Institute is justified in accepting at less than total cost, espe-

cially if the research is in the nature of public service or contributes importantly to our educational program.

The Placement Bureau, which is administered by the Division, is in an exceptionally strong position to meet the mounting demand for technically trained men. In anticipation of this demand a comprehensive questionnaire was sent to all Technology alumni a year ago, and to date over 10,000 new records have been received and coded on punch cards. If the national defense effort should require the mass induction of engineering and scientific talent, the Institute is prepared to meet the situation with benefit to our alumni and to the nation. Already the Bureau is actively coöperating with the Civil Service, the Army, the Navy, and other Federal departments in the search for personnel.

Industry is likewise increasing its demands upon the Bureau. During the past year the Bureau handled a thousand calls from industry for men, and it is significant that an increasing proportion of the opportunities presented to our alumni were for responsible executive positions.

In addition to this alumni placement, the Bureau assists in the placement of the graduating class. The records show that the Class of 1940 is more than 90 per cent placed, as of September 1, and that the number of their employers totals 218. The students who went into industry were placed in 30 states, a clear indication of the national demand for Technology graduates. The unplaced residue of the class includes some who are seeking to establish private consulting or architectural practices and also includes those who, because of their views and activities in communistic or other radical directions, are practically unemployable.

Expansion of Medical Services. Upon recommendation of the Corporation Visiting Committee on the Department of Hygiene, the medical service available to students and staff has been extended. The reorganized staff set up by Dr. Morse, the Director, provides a doctor in attendance from 8.30 a.m. to 5 p.m. and includes an Assistant Medical Director who is the full-time executive officer of the department under Dr. Morse. Appointee to this new post is Dr. John W. Chamberlain, who has been Assistant to the Director since 1937. The two new

physicians appointed to the staff, Doctors Robert T. Monroe and Edward Harding, have exceptionally fine medical training. Dr. Monroe is on the staff of the Peter Bent Brigham Hospital and is qualified to handle psychiatric cases, a type of service which has been strongly recommended by the Visiting Committee. Dr. Harding has been associated with the Department of Hygiene, Stillman Infirmary, and Harvard Athletic Association, and thus has had a wide experience in dealing with student health.

Under the Directorship of Dr. Morse, the Department of Hygiene has grown from the stage when it cared for two or three hundred visits a year to its present activity of handling 25,000 visits a year. These new appointments constitute the next logical step in extending the Department's services. Other extensions are now under consideration, notably a dental clinic. The chief deterrent in installing this clinic, which has been advocated by successive Visiting Committees, is lack of funds.

Biological Engineering. In at least four of these annual reports I have discussed the concept and program of Biological Engineering and expressed the conviction that the concept was a seminal one, promising new achievements for the welfare of man and worthy, therefore, of large support. I am happy to record that the Rockefeller Foundation has come to our assistance with a grant of $200,000 to be used, over a period of not less than five nor more than seven years, to help us get this program started and given a period of trial development.

The first move in utilizing this new grant has been the selection of new members to be added to the staff of the Department of Biology and Public Health, complementing from the point of view of Biological Engineering the proficiency already established in bacteriology, food technology, biochemistry, biophysics and public health.

While the new staff is still incomplete, several important appointments have been made. John R. Loofbourow, formerly of the staff of the basic science research laboratory of the University of Cincinnati and professor of biophysics at the Institutum Divi Thomae, has been appointed associate professor in biophysics. He has a distinguished record as teacher, administrator, and investigator. Ernest E. Lockhart, who is a

graduate of Technology and in 1939–1940 holder of a Scandinavian-American postdoctorate fellowship, recently physiologist and biochemist at West Base, Antarctica, returns as research associate. E. Newton Harvey, Henry Fairfield Osborn professor of physiology at Princeton since 1933, has accepted appointment as lecturer in electro-physiology for the next academic year. In periodic visits to Cambridge he will direct several research projects and serve as consultant in developing the program.

With the help of the Rockefeller grant we are confident of demonstrating that this new field of Biological Engineering justifies support to the extent of at least $80,000 a year and that with associated fields in Biology and Public Health it needs an ample building to give it working space.

Some Urgent Needs

Several of the needs to which I called attention last year at this time have been fulfilled, notably through the Rockefeller grant for Biological Engineering and the gift of our colleague, Mr. Alfred P. Sloan, Jr., for enlarging our engine laboratory. The immediate benefits resulting from both of these gifts, the new energies released and the new public services undertaken, emboldened me to press with steady aggressiveness toward some old and new objectives still unattained. If this summer had not brought us greatly improved facilities in aeronautical engineering, we could not now be meeting with anything approaching comparable effectiveness the instructional and research jobs which have been handed to us by industry and government. Other demands and opportunities which we face as a result of the national defense program can similarly be cared for more effectively through further additions to our plant and resources. Thus some of our needs carry a new and special urgency.

Chemical Engineering Laboratories. New quarters for the Department of Chemical Engineering, our largest department, is probably our most pressing need. Again this last Spring the Corporation Visiting Committee emphasized the overcrowded and ill-adapted space now available to the Department and pointed out how its rapid growth and its record of notable

contributions of men and methods to industry make adequate quarters imperative.

The Department has drawn plans for a building which will care for the Department's present needs and a reasonable growth in the future. If we can secure the necessary funds, we not only can care for the Department of Chemical Engineering, we can relieve a congestion throughout the east half of our plant that is throttling many potential developments and that will become a critical bottleneck if our defense program grows.

Biology Laboratories. The temporary space arrangements made this summer for Biological Engineering will very quickly become inadequate as the program develops. Here is a strategic opportunity for improvement in a field where progress has great human import.

Fluid Research Funds. I have frequently stated and I still believe that the greatest need of the Institute, in the sense of permitting the most valuable extension of its work, would come from a research fund yielding $200,000 a year or more.

Funds for Salaries. For the past twenty years our faculty salary scale has been recognized as inadequate, based upon any reasonable standard. Twice during the past ten years tuition was raised by substantial amounts and practically the entire gain in income was put into Faculty salaries. These gains, however, have been largely offset by the general decrease in rate of income from invested funds and by some enlargement of our staff.

In order to preserve even our present salary scale in the face of a stabilized or possibly diminished income we are paying special attention to the distribution of our staff among the various ranks and to the "flow chart" of the men through these ranks. We have sought further to insure our salaries by means of such reserves as the Income Equalization Fund. These procedures, however, have to do with maintaining our present standards, whereas what we ought to do is to improve them.

In this connection it is pertinent to note the remarkable and unfortunate fact that our Institution has not a single fully endowed professorship.

Dormitories. Last year I indicated the desirability of adding another dormitory unit to our student housing. Such a

unit, preferably operated on an appropriate self-contained house plan could immediately be filled with students now on the waiting lists for accommodations in our present dormitories. Professor Boyce has made an intensive study of house plans in other institutions and the staff and students of the School of Architecture have coöperated in developing plans suitable to our situation.

Alumni Fund. Through the mechanism of the Alumni Fund, which is now in operation, funds for other needs, such as endowed professorships and recreational facilities, are being solicited, and monies obtained for additions to our unrestricted funds. With this alumni assistance, we are in a stronger position to solicit funds from other sources.

We cannot be satisfied while such needs and opportunities are not met and our value as a national asset remains thus circumscribed.

In Conclusion. In this, my tenth report as President of the Institute, I speak with special pleasure and gratitude of the support and encouragement which my colleagues and I have steadily received from the Corporation. Individually and collectively you have in diverse and skillful ways implemented and aided the work of the Administration. Few institutions, I am sure, operate under an ægis of official responsibility and public spirit comparable to the hall-mark of this body.

Respectfully submitted,

KARL T. COMPTON,
President.

REPORTS OF ADMINISTRATIVE OFFICERS

Dean of Students

A higher proportion of students from a distance entering the first-year class (a trend continued for a fourth consecutive year); an increase in the number of undergraduates receiving financial awards compared with 1938–39 but a decline in the number of applications for loans and the amount borrowed; the transfer of track and field athletics, and the activities of certain other sports, to the new Frank Harrison Briggs Field House, and the dedication of the Alumni Swimming Pool — these are the principal happenings to be recorded for the period under review. They relate, respectively, to the three general sections of this Report which are: stabilization of enrollment and selective admission, student aid, and student welfare.

The gross number of applicants seeking admission to the Class of 1943 was 1,621 compared with 1,353 for the Class of 1942. For 1939–40 the year opened with a registration of 605 first-year students, or a total nearer to the desired 600 matriculants than that of the 1938–39 total of 656. Percentage geographical distribution of first-year students since 1936–37, the year in which the selective admission plan began, has been:

	Percentage of First-Year Class			
	1939–40	*1938–39*	*1937–38*	*1936–37*
From outside New England..	62.0	58.1	60.0	51.8
From outside Massachusetts .	69.3	67.1	66.0	59.2

Distribution of student aid to undergraduates during 1939–40 compared with 1938–39 was:

	1939–40		*1938–39*	
	Number	*Amount*	*Number*	*Amount*
Freshman Scholarships.....	229	$50,042	235	$44,590
Other Undergraduate Scholarships	328	43,788	304	47,444
Total Scholarships.....	557	$93,830	539	$92,034
Undergraduate Loans.....	275	123,618	282	132,756
Total Aid to Undergraduates	724*	$217,448	694*	$224,790
Percentage of Undergraduate Registration Receiving Aid	30.4		28.9	

* Allowing for individuals receiving both scholarship and loan.

Of the 235 Freshman Scholarships noted above, 26, totalling $8,850, were the first of the Charles Hayden Memorial Scholarships for "Boston boys," provided by an initial gift of $50,000 from the Hayden Foundation. This group of 26 made an academic average for the year of *top quartile* rank, and it is gratifying to be able to report that the Hayden Foundation has made a further gift of $30,000 to care for worthy "New York boys" as well as for "Boston boys" entering as first-year students during the coming year.

The above tabulation, however, does not include grants totalling $6,900 to 23 undergraduates of the three upper classes "born in Massachusetts" made possible by the continued generosity of the trustees of the James Melvin Trust, which aided 13 men to the extent of $3,250 during 1938–39. Nor does it include William Barton Rogers Awards of $300 made, as in 1938–39, to six members of the Class of 1940 who had in the opinion of the Faculty Committee on Undergraduate Scholarships demonstrated "outstanding qualities," judged on the dual basis of their academic records and extra-curricular accomplishments.

Including both graduate and undergraduate students, the Loan Fund Board received 483 applications during 1939–40 and acted favorably upon 373, or 77.2 per cent, $162,843 being loaned. For 1938–39 the corresponding figures were 498, 368, 73.9 per cent, and $167,173.

Repayments to the fund during 1939–40 were: $101,401 on principal account and $17,006 for interest, or a total of $118,407 which came within $44,436 of providing the $162,843 loaned.

The cumulative record of the fund from its establishment in 1930 up to June 29, 1940 (with comparative figures up to June 30, 1939, given in parenthesis), shows: that 2,143 (1,974) individuals had borrowed $1,485,411 ($1,322,568), the average amount loaned per capita being $693 ($670); and that $597,354 ($495,953) had been repaid on principal account, representing 89.0 per cent (87.3 per cent) of the amount due, and $110,044 ($93,038) had been paid on interest account.

Of the unpaid $73,584 due on principal account as of June 29, 1940, interest had been received and extension of principal

repayment permitted on all but $25,526. It is of interest to note that the $110,044 received for interest exceeded the total matured principal in arrears, $73,584.

The Student Employment Bureau of the Technology Christian Association placed a total of 550 individuals compared with 560 in 1938–39, but the earnings this year were $66,675 compared with $62,970 last year. Of the 550 placed this year, 219 were under the National Youth Administration program of the Federal Government and 331 in private employment, earnings of the two groups being $18,968 and $47,707, respectively.

The average scholastic record of 670 men in 20 activity groups was 3.59 in June, 1940, compared with 3.42 for 614 men in 20 groups in June, 1939. Fraternity averages showed improvement, for 693 men averaged 3.30 in June, 1940, compared with 712 who averaged 3.23 a year ago.

Dormitory facilities operated as in 1938–39 at full occupancy during the greater portion of 1939–40, and the continued existence of autumn "waiting lists" for the Graduate House and undergraduate halls suggest that the provision of some additional housing space would not be unwelcome.

The Briggs Field House, together with the new running track and playing fields adjacent thereto, and the competence demonstrated by the new coaching personnel in crew and fencing, met with an enthusiastic response on behalf of many students who had been previously indifferent to the advantages of athletic exercise. No single factor could be expected to lend more momentum to this movement, especially to the stimulation of recreational sport as well as competitive, than the provision of a unit such as the Alumni Swimming Pool dedicated this June.

H. E. LOBDELL.

DEAN OF THE GRADUATE SCHOOL

The year has been one of progress for the Graduate School from the standpoint of registration, degrees conferred, graduate instruction, research and social life of the students. Although the success of a Graduate School is measured not by numbers but by its Faculty and quality of its instruction, by its facilities for research, and contributions of its students and staff, never-

theless enrollment and geographical distribution of students is indicative of its standing in the academic world. The enrollment of students working for higher degrees was 678, the largest to date, while the total registration, including college graduates pursuing special work, was 720. With applications for admission far exceeding the quotas indicated in last year's report, admission is becoming more competitive and selective each year thus raising the standard of entrance. The following comparative figures indicate recent trends:

	Registration during Past Five Years				
Candidates for Degree of	*1935*	*1936*	*1937*	*1938*	*1939*
Doctor of Philosophy....	90	109	133	138	136
Doctor of Science.....	106	115	128	118	137
Doctor of Public Health .	1	4	4	4	6
Master in Architecture ..	7	13	11	9	12
Master in City Planning.	6	9	8	8	8
Master of Science.....	295	345	320	348	379
Special Graduate Students	31	24	42	67	42
Total.....	536	619	646	692	720

Registration by Departments 1939–40

School of Architecture		
Architecture.....	M. Arch.....	12
City Planning.....	M. C. P.....	8
Total.....		20

School of Science	*S.M.*	*Sc.D.*	*Ph.D.*	*Dr. P.H.*	*Total*
Biology and Public Health.....		3	12	6	21
Chemistry.....	6	4	71		81
Geology.....	4	2	7		13
Mathematics.....	6		9		15
Physics.....	7	15	37		59
	23	24	136	6	189

School of Engineering	*S.M.*	*Sc.D.*
Aeronautical Engineering.....	25	4
Meteorology.....	17	4
Business and Engineering Administration ..	20	
Chemical Engineering.....	31	47
Chemical Engineering Practice.....	48	

School of Engineering—continued	*S.M.*	*Sc.D.*
Civil Engineering	31	3
Sanitary Engineering	5	2
Electrical Engineering	40	17
Electrical Engineering (Coöperative)	35	
Mechanical Engineering	58	16
Mechanical Engineering (Coöperative)	7	
Metallurgy	7	16
Ceramics	2	2
Mining Engineering	2	2
Naval Architecture	4	
Naval Construction	10	
Naval Engineering	13	
Economics and Engineering	1	
Total	356	113

Seventy-five per cent of all graduate students received their Bachelor's degree at other institutions than the Institute. One hundred and forty-four colleges were represented in 40 states, the District of Columbia, Puerto Rico, and Philippine Islands; 74 foreign students were also enrolled, coming from 43 colleges and institutions in the following 22 countries:

Argentina	New Zealand
Belgium	Netherlands
Brazil	Poland
Canada	Scotland
China	Sweden
England	Switzerland
France	Syria
Holland	Turkey
India	Union of Socialistic Soviet Republics
Italy	Venezuela
Mexico	Wales

In view of the conditions existing in Europe the registration of foreign students was larger than anticipated, being only four fewer than in the previous year.

The budget for fellowships and scholarships was $108,440, of which $38,000 was specifically appropriated to meet the tuition of members of the staff working towards higher degrees. These figures do not include funds provided by the Alfred P. Sloan Foundation for 10 fellowships in Business Administration and Economics. All funds were awarded except $3,800, for which there were no applicants who met the requirements

of certain bequests. Seven hundred and twenty-six applications for financial assistance were received and 307 awards covering full or part-time tuition, together with 15 fellowship awards carrying stipends in excess of tuition, were made. Graduate Scholarships were allocated as follows: To members of the staff 160, of which 109 were to students working for the Doctor's degree and 51 for the Master's degree; to full-time students 127, of which 64 were to students working for the Doctor's degree, and 83 for the Master's degree. Fellowships were awarded only to students pursuing courses leading towards the doctorate.

A study of the June records of graduate students showed the department committees had exercised excellent judgment in recommending scholarship awards. In addition to fellowships provided by the Institute, the following were available through special gifts, grateful acknowledgment for which is made: 10 Alfred P. Sloan Foundation Fellowships for advanced study in Business Administration and Economics, the Polymerization Process Corporation Fellowship for chemical research, the duPont Company Fellowship for research in Chemistry, the Dow Chemical Company Flotation Fellowship, the Haskins Laboratory Fellowship in Electronics, and the Alfred P. Sloan Automotive Engineering Fellowship. Twenty-eight students pursued graduate work under fellowships awarded them by other institutions or foundations. The large number of awards which were relinquished prior to June 1, after having been definitely accepted on or before April 15, noted in last year's report, were materially less this year, falling in amount from $18,000 a year ago to less than $10,000. It is hoped that this trend will continue.

The number of students at Harvard and the Institute who availed themselves of the privilege of taking courses in the other institution was somewhat less than a year ago, namely, 51 as compared with 66. Whereas last year more Harvard students registered at the Institute than Institute students at Harvard, the reverse was the case the past year. Courses elected by our students were in the Graduate School of Engineering, the Business School, School of Arts and Science, Medical School, and School of Public Administration, while Harvard students regis-

tered about equally for courses in the School of Science and the School of Engineering. One Radcliffe student registered in the Department of Chemistry.

The number of higher degrees conferred during the past year was 365, the largest number ever awarded in one year. These were Doctor of Philosophy 40, Doctor of Science 24, Master of Science 277, Master in Architecture 18, and Master in City Planning 6. Although at this time it is not possible to report complete figures on the placement of these graduates, it may be stated that all those holding Doctors' degrees have positions, except four, and of those holding Masters' degrees, 89 per cent were placed last June. The Department of Chemistry reports that the demand for men who have met requirements for the Doctor's degree is such that all candidates for this degree in February 1941 already have positions awaiting them.

During the year the Committee on the Graduate School adopted the following changes in its rules and regulations; whereas previously all students admitted to the School were expected to elect programs of work leading to a higher degree, admission to the School has been extended to college graduates with high credentials who desire to take advanced studies without reference to meeting the technical requirements for a degree. Thus students like those working under the Alfred P. Sloan Foundation Fellowships are now admitted to the Graduate School with all its privileges. Foreign language requirements for the Doctor's degree have also been modified so that the present requirement is a good reading knowledge of German, and a second modern language in which the scientific or technical literature of the student's major field is published, in addition to English. In the case of students working for the degree of Doctor of Science in the engineering departments, this second language may be waived if in the opinion of a department committee it is not essential for the student's mastery of his major field. Proficiency in reading foreign languages must, as at present, be certified by the Department of Modern Languages.

The Committee on the Graduate School recommended to the Faculty that the degree of Master in Public Health be

offered by the Institute to candidates in the Department of Biology and Public Health who meet the usual requirements for the Master's degree but with concentration on problems relating to Public Health. The recommendation has been approved by the Faculty and Corporation. This degree will be open to applicants holding degrees from approved medical schools as well as Bachelor degrees.

The new Graduate House continues to meet very satisfactorily the various functions for which it was planned. It is now possible to accommodate 420 students and even so at times there has been a waiting list. Although more single rooms would undoubtedly be provided in designing a new dormitory, the present arrangement of suites accommodating several students works well and finds favor with many students. The usual social activities were continued during the year, under the direction of Dr. Ashdown, affording much pleasure to all participating.

In conclusion the writer wishes to express his very deep appreciation of the friendly and hearty coöperation of the members of the Committee on the Graduate School in the administration of the School. To work with this Committee has been a privilege and a pleasure. As Secretary and subsequently as Chairman of the Faculty Committee charged with the administration of graduate work for the past 33 years, it has been his good fortune to see postgraduate work at the Institute develop from very modest beginnings into a Graduate School nationally and internationally recognized. That the School will continue to grow in strength and reputation under the administration of Dean Bunker, is assured.

H. M. Goodwin.

The Registrar

The enrollment statistics for the year 1939–40 show very little change from those of the preceding year. The registration of 721 in the Graduate School established a new high, but the increase was only 29 or about four per cent over last year. The undergraduate registration (2,379) was again about equally distributed among the four classes. There was a slight decrease in the number of foreign students from 231 to 217.

It is interesting to note that under these stabilized conditions over half of the total enrollment of 3,100 is in the three general fields of Chemical Engineering (497), Electrical Engineering (432), and Mechanical Engineering (673). Aeronautical Engineering, with 218 students, has been included as part of the general field of Mechanical Engineering.

The statistics for the year 1939–40 follow.

J. C. MacKinnon.

All statistics on registration are as of November 1, 1939
All statistics on degrees are through June, 1940

TABLE 1

Registration Since the Foundation of the Institute

Year	Number of Students	Year	Number of Students	Year	Number of Students
1865–66	72	1890–91	937	1915–16	1,900
1866–67	137	1891–92	1,011	1916–17	1,957
1867–68	167	1892–93	1,060	1917–18	1,698
1868–69	172	1893–94	1,157	1918–19	1,819
1869–70	206	1894–95	1,183	1919–20	3,078
1870–71	224	1895–96	1,187	1920–21	3,436
1871–72	261	1896–97	1,198	1921–22	3,505
1872–73	348	1897–98	1,198	1922–23	3,180
1873–74	276	1898–99	1,171	1923–24	2,949
1874–75	248	1899–00	1,178	1924–25	2,938
1875–76	255	1900–01	1,277	1925–26	2,813
1876–77	215	1901–02	1,415	1926–27	2,671
1877–78	194	1902–03	1,608	1927–28	2,712
1878–79	188	1903–04	1,528	1928–29	2,868
1879–80	203	1904–05	1,561	1929–30	3,066
1880–81	253	1905–06	1,466	1930–31	3,209
1881–82	302	1906–07	1,397	1931–32	3,188
1882–83	368	1907–08	1,415	1932–33	2,831
1883–84	443	1908–09	1,461	1933–34	2,606
1884–85	579	1909–10	1,479	1934–35	2,507
1885–86	609	1910–11	1,506	1935–36	2,540
1886–87	637	1911–12	1,559	1936–37	2,793
1887–88	720	1912–13	1,611	1937–38	2,966
1888–89	827	1913–14	1,685	1938–39	3,093
1889–90	909	1914–15	1,816	1939–40	3,100

TABLE 2

The Corps of Instructors

	'27	'28	'29	'30	'31	'32	'33	'34	'35	'36	'37	'38	'39
Faculty Members of the Staff	199	215	220	240	253	242	235	245	245	244	267	273	282
Professors	73	82	81	86	98	93	88	83	87	78	87	90	98
Associate Professors	58	61	59	63	68	60	57	69	81	87	89	98	89
Assistant Professors	58	64	71	80	79	81	80	82	68	70	76	72	83
Ex-Officio	—	—	2	4	3	3	5	6	6	6	5	6	7
Instructors	10	8	7	7	5	5	5	5	3	3	3	3	3
Research Associates	—	—	—	—	—	—	—	—	—	—	7	4	2
Other Members of the Staff	268	272	295	323	335	283	263	272	284	291	331	368	401
Instructors	115	119	116	123	133	105	90	86	90	97	101	97	99
Teaching Fellows	—	—	—	—	—	21	22	20	24	51	52	52	52
Assistants	55	53	68	70	96	45	43	70	76	64	69	79	78
Technical Assistants	—	—	—	—	—	28	31	28	—	—	—	—	—
Lecturers	30	29	32	32	34	28	25	25	24	19	29	28	31
Research Associates	29	22	21	31	31	32	25	22	27	31	22	25	36
Research Assistants	39	49	58	65	36	20	21	18	30	24	42	72	90
Research Fellows (D. I. C.)	—	—	—	2	5	3	3	2	1	—	—	—	—
Research Fellows	—	—	—	—	—	—	3	1	12	5	16	15	15
Special Investigator	—	—	—	—	—	1	—	—	—	—	—	—	—
Total	467	487	515	563	588	525	498	517	529	535	598	641	683
Other Members of the Faculty	13	11	14	15	15	17	25	26	27	31	28	28	28
Professors: Emeriti	6	4	4	6	7	13	21	23	24	29	27	27	27
Retired	4	3	4	3	3	—	—	—	—	—	—	—	—
Non-Resident	3	4	6	6	5	4	4	3	3	2	1	1	1

TABLE 3

Classification of Students by Courses and Years

COURSE NAME AND NUMBER	1937–38 YEAR						1938–39 YEAR						1939–40 YEAR					
	1	2	3	4	G	Total	1	2	3	4	G	Total	1	2	3	4	G	Total
Aeronautical Engineering XVI	71	28	32	28	32	191	95	30	30	34	25	214	96	28	31	34	29	218
Meteorology (in Aero. Eng. Department)	—	—	—	—	19	19	—	—	—	—	16	16	—	—	—	—	27	27
Architectural Engineering IV-A	—	—	1	4	—	5	—	—	—	2	—	2	—	—	—	—	—	—
Architecture IV, IV-B, IV-C	17	16	19	17	21	90	9	21	19	16	18	83	18	12	24	17	22	93
Architecture (IV, IV-B, IV-C) Fifth Year	—	—	—	21	—	21	—	—	—	17	—	17	—	—	—	15	—	15
Biology and Public Health VII	6	19	22	19	22	88	6	9	15	15	30	75	6	6	3	11	35	61
Biophysics and Biological Engineering VII-A	2	1	1	2	—	6	4	2	1	1	3	11	5	6	1	1	1	14
Building Engineering and Construction XVII	6	4	12	5	—	27	8	7	6	8	—	29	3	6	8	9	—	26
Business and Engineering Administration XV	56	79	57	53	24	269	52	70	58	57	28	265	44	62	56	68	21	251
Chemical Engineering X	124	94	66	62	87	433	153	89	73	69	84	468	124	102	66	75	83	450
Chemical Engineering Practice X-A, X-B	—	—	—	3	37	40	—	—	—	—	56	56	—	—	—	—	47	47
Chemistry V	32	32	25	21	76	186	34	27	25	30	87	203	26	31	31	26	80	194
Civil Engineering I	25	12	25	25	36	123	21	21	20	22	30	114	22	19	21	18	24	104
Army Engineer (in Civil Eng. Department)	—	—	—	—	15	15	—	—	—	—	17	17	—	—	—	—	13	13
Economics and Engineering or Science	—	—	—	—	3	3	—	—	—	—	4	4	—	—	—	—	1	1
Electrical Engineering VI, VI-B, VI-C	73	39	55	41	68	276	64	48	53	60	73	298	68	49	59	59	63	298
Electrical Engineering (Coöperative) VI-A	28	50	38	28	32	176	35	34	22	35	24	150	26	36	15	22	35	134
Electrochemical Engineering XIV	7	4	6	4	1	22	—	—	2	7	—	9	—	—	—	2	—	2
Food Technology and Indust. Biology VII-B	—	—	—	—	—	—	—	—	—	—	—	—	1	4	7	4	—	16
General Engineering IX-B	4	16	17	27	—	64	7	12	34	20	—	73	9	8	12	39	—	68
General Science IX-A	—	9	8	8	—	25	3	2	12	16	—	33	4	2	5	19	—	30
Geology XII	1	4	3	2	22	32	6	8	6	6	19	45	3	5	8	7	13	36
Marine Transportation XIII-C	6	8	6	5	—	25	6	7	6	7	—	26	6	6	9	4	—	25
Marine Transportation (XIII-C) Fifth Year	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	8	—	8
Mathematics XVIII	3	6	2	3	13	27	6	2	4	3	13	28	5	6	5	7	17	40
Mechanical Engineering II	85	108	62	49	35	339	95	91	80	68	43	377	78	105	86	91	52	412
Army Ordnance (in Mech. Eng. Dept.)	—	—	—	—	12	12	—	—	—	—	10	10	—	—	—	—	22	22
Torpedo Engineering (in Mech. Eng. Dept.)	—	—	—	—	2	2	—	—	—	—	2	2	—	—	—	—	2	2
Mechanical Engineering (Coöperative) II-A	—	—	11	7	11	29	—	—	7	8	7	22	—	—	6	6	7	19
Metallurgy XIX	14	23	18	11	13	79	12	27	23	23	19	104	18	25	25	29	24	121
Ceramics (in Metallurgy Department)	—	—	—	—	5	5	—	—	—	—	4	4	—	—	—	—	3	3
Mining Engineering III	8	9	7	5	6	35	—	—	10	7	8	25	—	—	—	7	3	10
Naval Architecture and Marine Eng. XIII	19	22	15	19	—	75	21	9	21	11	1	63	29	21	18	19	5	92
Naval Engineering (in Naval Arch. Dept.)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	14	14
Naval Construction XIII-A	—	—	6	8	7	21	—	—	10	9	9	28	—	—	22	10	10	42
Physics VIII	18	23	17	20	59	137	19	35	26	21	59	160	13	24	27	27	61	152
Sanitary Engineering XI	—	1	—	2	3	6	—	—	4	—	3	7	1	1	—	1	7	10
Unclassified	—	13	46	4	—	63	—	8	45	2	—	55	—	4	25	1	—	30
Total	605	620	577	503*	661	2,966	656	559	612	574*	692	3,093	605	568	570	636*	721	3,100

*These totals include fifth year in Architecture, City Planning, IV-B, City Planning Practice, IV-C, and Marine Transportation

TABLE 4-A

Classification of Students by Courses, Options, and Years

COURSE No.	Name	Option	Opt.	1 Opt.	1 Tot.	2 Opt.	2 Tot.	3 Opt.	3 Tot.	4 Opt.	4 Tot.	Grad. Opt.	Grad. Tot.	Total	Course Number
I	Civil Engineering			22		19		21		18		24			
	Army Engineer			—	22	—	19	—	21	—	18	13	37	117	I
		1. General	1	—		—		—		43					
		2. Automotive	2	—		—		—		15		52			
II	Mechanical Engineering	3. Refrigeration and Air Condition.	3	—	78	—	105	—	86	3	91		76	436	II
		4. Materials and Design	4	—		—		—		30					
		Army Ordnance		—		—		—		—		22			
		Torpedo Engineering		—		—		—		—		2			
II-A	Mechanical Engineering — Coöperative			—	—	—	—	—	6	—	6	—	7	19	II-A
III	Mining Engineering	1. Mining	1	—		—		—		4		2			
		2. Petroleum Production	2	—	—	—	—	—	—	3	7	1	3	10	III
IV	Architecture			—	18	—	12	—	24	—	15	—	14		
	Fifth Year			—	—	—	—	—	—	—	13	—	—	96	IV
IV-B	City Planning			—	—	—	—	—	—	—	2	—	6		
	Fifth Year			—	—	—	—	—	—	—	2	—	—	10	IV-B
IV-C	City Planning Practice			—	—	—	—	—	—	—	—	—	2		
	Fifth Year			—	—	—	—	—	—	—	—	—	—	2	IV-C
V	Chemistry			—	26	—	31	—	31	—	26	—	80	194	V
VI	Electrical Engineering			—	68	—	47	—	22	—	17	—	63	217	VI
VI-A	Electrical Engineering — Coöperative			—	26	—	36	—	15	—	22	—	35	134	VI-A
VI-B	Electrical Engineering — Illuminating			—	—	—	2	—	2	—	7	—	—	11	VI-B
VI-C	Electrical Engineering — Communications			—	—	—	—	—	35	—	35	—	—	70	VI-C
VII	Biology and Public Health	1a. Biology and Public Health	1a	3		2		3		9		—			
		1b. Biology	1b	1	6	2	6	—	3	2	11	—	35	61	VII
		2. Public Health Engineering	2	2		2		—		—		—			
VII-A	Biophysics and Biological Engineering			—	5	—	6	—	1	—	1	—	1	14	VII-A
VII-B	Food Technology and Industrial Biology			—	1	—	4	—	7	—	4	—	—	16	VII-B
VIII	Physics	1. General	1	11	13	14	24	9	27	12	27	—	61	152	VIII
		2. Applied	2	2		10		18		15		—			
IX-A	General Science			—	4	—	2	—	5	—	19	—	—	30	IX-A
IX-B	General Engineering			—	9	—	8	—	12	—	39	—	—	68	IX-B
X	Chemical Engineering			—	124	—	102	—	66	—	75	—	83	450	X
X-A	Chemical Engineering Practice — Graduate			—	—	—	—	—	—	—	—	—	47	47	X-A
XI	Sanitary Engineering			—	1	—	1	—	—	—	1	—	7	10	XI
XII	Geology	1. Geology	1	2		4		6		7		—			
		2. Mineral Resources	2	1	3	1	5	2	8	—	7	—	13	36	XII

(*Continued on page 42*)

TABLE 4-A — (*Continued*)

Classification of Students by Courses, Options, and Years

COURSE No.	Name	Option	Opt.	YEAR 1 Opt.	1 Tot.	2 Opt.	2 Tot.	3 Opt.	3 Tot.	4 Opt.	4 Tot.	Grad. Opt.	Grad. Tot.	Total	Course Number
XIII	Naval Architecture and Marine Engineering			29	29	21	21	18	18	19	19	5	19	106	XIII
	Naval Engineering			—	—	—	—	—	22	—	10	14	10	42	XIII-A
XIII-A	Naval Construction			—	6	—	6	—	9	—	4	—	—	33	XIII-C
XIII-C	Marine Transportation			—	—	—	—	—	—	—	8	—	—		
	Fifth Year			—	—	—	—	—	—	—	2	—	—	2	XIV
XIV	Electrochemical Engineering			30	44	46	62	45	56	43	68	—	21	251	XV
XV	Business and Engineering Admin.	1. Physical Sciences	1	14		16		11		25		29			
		2. Chemical Sciences	2	96		28		31		34		27	56	245	XVI
XVI	Aeronautical Engineering			—	96	—	28	—	31	—	34	—	—	26	XVII
	Meteorology			—	3	—	6	—	8	—	9	—	—		
XVII	Building Engineering and Construction			—		6		1		2		—		40	XVIII
		1. Pure	1	—		—		—		1		—	17		
XVIII	Mathematics	2. Applied	2	—	5	—	6	—	5	1	7	—			
		3. Industrial Statistics	3	—		—		4		4		—			
XIX	Metallurgy			18		25		25		29		24		124	XIX
	Ceramics			—	18	—	25	—	25	—	29	3	27		
	Economics and Engineering or Science—Engineering			—		—		—		—		1		1	Ec.&Eng. or Sci.
	—Science			—	—	—	—	—	—	—	—	—	1		
	Unclassified			—		4		25		1		—		30	Unc.
Total					605		568		570		636*		721	3,100	Total

* This total includes fifth year in Architecture, City Planning, and Marine Transportation.

TABLE 4-B

Classification of Special Students by Courses and Years
(Included in Table 4-A)

COURSE	YEAR 1	2	3	4	G	TOTAL	COURSE
I Civil Engineering	—	—	—	—	4	4	I
II Mechanical Engineering	—	—	1	4	3	8	II
III Mining Engineering	—	—	—	1	—	1	III
IV Architecture	2	2	4	1	1	12	IV
Fifth Year	—	—	—	2	—		
V Chemistry	1	1	—	—	—	2	V
VI Electrical Engineering	—	—	—	1	7	8	VI
VI-A Electrical Engineering (Coöperative)	—	—	—	—	1	1	VI-A
VI-C Electrical Engineering (Communications)	—	—	—	2	—	2	VI-C
VII Biology and Public Health	—	—	2	4	2	8	VII
VIII Physics	—	—	—	1	2	3	VIII
X Chemical Engineering	—	—	—	1	2	3	X
XIII Naval Architecture and Marine Engineering	—	—	2	1	—	3	XIII
XIII-C Marine Transportation, Fifth Year	—	—	—	1	—	1	XIII-C
XV Business and Engineering Administration	—	—	3	5	2	10	XV
XVI Aeronautical Engineering	—	—	—	1	—	7	XVI
Meteorology	—	—	—	—	6		
XVIII Mathematics	—	1	—	—	2	3	XVIII
XIX Metallurgy	—	—	—	5	—	5	XIX
Unclassified	—	—	1	—	—	1	Unc.
Total	3	4	13	30*	32	82	

* This total includes Fifth Year in Architecture and Marine Transportation.

TABLE 4-C

Classification of Former Students Who Returned This Year*
(Included in Table 4-A)

COURSE	YEAR 1	2	3	4	G	TOTAL	COURSE
I Civil Engineering	1	1	—	—	1	3	I
Army Engineer (in Civil Engineering Dept.)	—	—	—	—	2	2	I (A.E.)
II Mechanical Engineering	—	3	1	2	3	9	II
IV Architecture	—	1	—	—	—	1	IV
IV-B City Planning	—	—	—	—	1	1	IV-B
V Chemistry	1	1	2	1	3	8	V
VI Electrical Engineering	1	—	—	—	4	5	VI
VI-A Electrical Engineering (Coöperative)	—	1	—	—	2	3	VI-A
VII Biology and Public Health	1	—	—	—	3	4	VII
VIII Physics	—	—	—	1	3	4	VIII
IX-B General Engineering	—	1	—	—	—	1	IX-B
X Chemical Engineering	2	—	1	3	2	8	X
XI Sanitary Engineering	—	—	—	—	1	1	XI
XII Geology	—	1	—	—	—	1	XII
XIII Naval Architecture and Marine Engineering	1	—	2	—	—	3	XIII
XIII-C Marine Transportation	—	—	1	—	—	1	XIII-C
XV Business and Engineering Administration	5	1	3	—	3	12	XV
XVI Aeronautical Engineering	4	—	1	1	3	11	XVI
Meteorology (in Aeronautical Eng. Dept.)	—	—	—	—	2		
XVII Building Engineering and Construction	—	1	1	2	—	4	XVII
XVIII Mathematics	—	—	—	—	2	2	XVIII
XIX Metallurgy	—	—	1	—	3	4	XIX
Unclassified	—	—	8	—	—	8	Unc.
Total	16	11	21	10	38	96	

* Excluding four special students.

TABLE 5

Classification of Students by Courses since 1932

	1932–33	1933–34	1934–35	1935–36	1936–37	1937–38	1938–39	1939–40
Engineering Courses . . . . . *Total*	2,197	2,008	1,961	2,028	2,187	2,288	2,379	2,418
Aeronautical Engineering XVI	193	162	183	200	221	210	230	245
Architectural Engineering IV-A	34	31	23	17	12	5	2	—
Building Engineering and Construction XVII	45	43	31	32	23	27	29	26
Business and Engineering Administration XV	371	343	305	280	274	269	265	251
Chemical Engineering X, X-A, X-B	315	323	356	414	452	473	524	497
Civil Engineering I, I-A	175	142	129	142	122	123	114	104
Army Engineer (in Civil Engineering Dept.)	—	—	—	—	11	15	17	13
Electrical Engineering VI, VI-A, VI-B, VI-C	443	395	380	381	444	452	448	432
Electrochemical Engineering XIV	42	35	38	27	23	22	9	2
General Engineering IX-B	32	35	52	61	47	64	73	68
Mechanical Engineering II, II-A	315	270	255	274	313	370	401	433
Army Ordnance (in Mechanical Engineering Dept.)	11	9	9	10	10	12	10	22
Metallurgy XIX	58	65	50	60	81	84	108	124
Mining Engineering III	36	35	32	28	32	35	25	10
Naval Architecture and Marine Eng. XIII, XIII-C	93	90	90	80	93	100	89	139
Naval Construction XIII-A	34	26	25	23	23	21	28	42
Sanitary Engineering XI	11	13	12	9	6	6	7	10
Science Courses . . . . . *Total*	439	439	405	382	467	501	555	543
Biology and Public Health VII, VII-A, VII-B	94	92	81	65	91	94	86	91
Chemistry V	146	145	137	140	176	186	203	194
General Science IX-A	10	12	10	12	20	25	33	30
Geology XII	20	21	16	15	26	32	45	36
Mathematics XVIII	31	28	35	26	20	27	28	40
Physics VIII	138	141	126	124	134	137	160	152
Architecture IV, IV-B, IV-C . . . . . *Total*	159	135	120	100	97	111	100	108
Economics and Engineering or Science . . . . . *Total*	—	—	—	2	7	3	4	1
Unclassified . . . . . *Total*	25	15	12	18	35	63	55	30
Grand Total	2,831	2,606	2,507	2,540	2,793	2,966	3,093	3,100

TABLE 6

GEOGRAPHICAL CLASSIFICATION OF STUDENTS SINCE 1935

UNITED STATES	1935	1936	1937	1938	1939
North Atlantic . . . . . Total	1,877	1,979	2,026	2,057	2,050
Connecticut	92	109	113	125	124
Maine	28	33	26	20	22
Massachusetts	1,088	1,092	1,077	1,032	979
New Hampshire	23	21	23	22	19
New Jersey	143	154	169	169	173
New York	361	400	432	492	522
Pennsylvania	104	127	142	146	152
Rhode Island	29	30	35	40	50
Vermont	9	13	9	11	9
South Atlantic . . . . . Total	106	139	139	170	185
Delaware	7	12	14	14	15
District of Columbia	36	34	32	40	59
Florida	7	10	13	18	21
Georgia	7	10	6	10	11
Maryland	20	23	29	30	27
North Carolina	7	11	8	8	6
South Carolina	3	3	2	7	5
Virginia	12	26	24	25	23
West Virginia	7	10	11	18	18
South Central . . . . . Total	51	70	94	105	106
Alabama	3	6	12	16	15
Arkansas	1	3	3	6	6
Kentucky	14	13	12	15	14
Louisiana	8	13	14	11	12
Mississippi	2	5	5	3	4
Tennessee	7	7	10	9	13
Texas	16	23	38	45	42
North Central . . . . . Total	262	293	350	365	375
Illinois	76	91	106	111	115
Indiana	16	12	14	15	12
Iowa	8	6	8	7	9
Kansas	6	7	10	10	8
Michigan	18	26	34	39	44
Minnesota	15	19	18	11	14
Missouri	39	35	41	40	50
Nebraska	4	3	5	8	9
North Dakota	5	4	4	2	2
Ohio	58	73	95	105	96
South Dakota	3	1	1	—	2
Wisconsin	14	16	14	17	14
Western . . . . . Total	101	119	129	155	153
Arizona	2	2	3	2	6
California	38	44	46	49	42
Colorado	23	25	26	28	28
Idaho	—	2	2	3	1
Montana	—	8	6	12	11
Nevada	—	1	2	3	2
New Mexico	6	4	5	4	7
Oklahoma	5	6	6	13	9
Oregon	6	5	7	11	12
Utah	4	4	6	6	11
Washington	16	16	19	21	22
Wyoming	1	2	1	3	2
Territories and Dependencies . . . . Total	4	12	12	10	14
Canal Zone	—	2	1	1	1
Hawaii	1	4	6	4	4
Puerto Rico	3	6	5	5	9
Total for United States	2,401	2,612	2,750	2,862	2,883

(*Continued on page 46*)

TABLE 6 — (*Continued*)

Foreign Countries	1935	1936	1937	1938	1939
Total	139	181	216	231	217
Argentina	5	7	2	5	5
Australia	2	2	2	—	1
Austria	2	1	1	1	—
Belgium	2	1	—	2	4
Brazil	1	2	1	1	11
British West Indies	—	—	1	3	3
Canada	29	30	37	52	47
Chile	—	—	—	—	1
China	35	50	57	37	29
Colombia	1	2	6	6	6
Cuba	12	11	14	10	11
Czechoslovakia	—	—	—	1	1
Denmark	1	—	1	1	2
Dominican Republic	—	—	1	1	1
Dutch West Indies	—	—	—	1	—
England	6	11	8	11	4
France	1	4	5	5	6
Germany	1	3	2	4	4
Guatemala	1	1	1	—	1
Haiti	—	—	2	1	1
Honduras	2	2	1	2	2
Hungary	—	1	—	—	—
India	6	11	8	10	4
Iraq	2	—	1	—	—
Ireland	1	1	—	1	—
Italy	—	—	2	4	4
Japan	5	4	2	1	1
Mexico	4	5	7	7	8
Netherland Indies	1	1	1	—	—
Netherlands	1	2	4	5	7
Newfoundland	—	—	1	1	—
New Zealand	—	1	2	—	1
Norway	1	2	2	3	7
Panama	1	1	—	1	—
Paraguay	—	—	—	1	—
Persia	1	—	—	—	—
Peru	—	1	1	2	1
Philippine Islands	—	8	13	14	10
Poland	1	—	—	2	1
Roumania	—	—	—	—	1
Salvador	—	—	—	2	—
Scotland	1	1	—	1	1
South Africa	—	—	—	1	—
Spain	—	—	1	1	1
Straits Settlements	—	—	—	—	1
Sweden	1	—	1	2	1
Switzerland	1	3	3	4	5
Syria	1	1	2	1	1
Thai	1	4	9	8	8
Turkey	2	4	6	8	9
Union of South Africa	4	3	5	3	1
Union of Socialistic Soviet Republics	1	—	—	3	2
Venezuela	2	—	3	1	2
Grand Total, United States and Foreign	2,540	2,793	2,966	3,093	3,100

TABLE 7

Women Students Classified by Courses and Years

COURSE	YEAR					Total
	1	2	3	4	G	
I Civil Engineering	—	—	1	—	—	1
IV Architecture	5	2	5	1	3	16
Fifth Year	—	—	—	3	—	3
IV-B City Planning	—	—	—	1	—	1
V Chemistry	2	1	1	1	4	9
VII Biology and Public Health	1	1	2	2	8	14
VIII Physics	—	—	1	—	4	5
XV Business and Engineering Administration	—	—	—	2	—	2
XVI Aeronautical Engineering	—	—	—	—	2	2
XVIII Mathematics	—	—	—	1	2	3
Total	8	4	10	11*	23	56

* This total includes Fifth Year in Architecture.

TABLE 8

Old and New Students

Year	1934–35	1935–36	1936–37	1937–38	1938–39	1939–40
Students registered at end of last academic year (including specials)	1,568	1,558	1,634	1,843	1,955	1,985
Students who have previously attended the Institute, but were not registered at end of last academic year (including specials)	124	91	110	124	96	100
New students who entered by examination	214	194	190	162	213	198
New students who entered without examination	253	287	371	377	399	338
New students who entered from other colleges as candidates for degrees	302	361	432	395	379	419
New students (specials, not candidates for degrees)	46	49	56	65	51	60
Total	2,507	2,540	2,793	2,966	3,093	3,100

TABLE 9

List of American Colleges and Universities, with Number of Graduates Attending the Institute

College		College		College	
Abilene Christian College	1	Mass. State College	5	University of City of Toledo	1
A. & M. Coll. of Texas	3	Miami University	1	University of Colorado	6
Alabama Polytechnic Inst.	2	Mich. State Coll. A.& A.S.	2	University of Dayton	1
Alfred University	1	Middlebury College	1	University of Denver	7
Amherst College	3	Mississippi State College	1	University of Florida	1
Antioch College	1	Montana School of Mines	3	University of Illinois	8
Armour Institute of Tech.	3	Montana State College	2	University of Kansas	2
Arnold College for Hyg. and Phys. Ed.	1	Montana State University	2	University of Kentucky	4
Bates College	3	Morris Harvey College	1	University of Louisville	1
Berea College	1	Newark Coll. of Eng.	1	University of Maine	5
Boston College	2	New York University	2	University of Maryland	1
Boston University	3	Northeastern University	2	University of Michigan	9
Bowdoin College	5	Oberlin College	5	University of Minnesota	6
Brown University	4	Ohio State University	4	University of Mississippi	1
California Inst. of Tech.	5	Ohio University	2	University of Missouri	1
Carleton College	1	Oregon State College	4	University of Nebraska	1
Carnegie Institute of Tech.	7	Parsons College	1	University of Nevada	1
Case School of App. Science	2	Pennsylvania State Coll.	7	Univ. of New Hampshire	2
Central College	1	Pomona College	1	University of New Mexico	2
Clemson Agric. College	1	Princeton University	9	Univ. of North Carolina	1
Coe College	1	Providence College	3	Univ. of North Dakota	1
Colgate University	1	Purdue University	6	University of Notre Dame	5
College of Charleston	1	Radcliffe College	1	University of Oklahoma	2
College of City of N. Y.	12	Rensselaer Poly. Inst.	2	University of Pennsylvania	8
Coll. of Holy Cross (Mass.)	1	Rhode Island State Coll.	6	University of Richmond	1
Coll. of William & Mary	2	Rice Institute	3	University of Rochester	4
College of Wooster	1	Roanoke College	1	University of Tennessee	2
Colorado College	2	Rutgers University	2	University of Texas	6
Columbia University(N.Y.)	12	St. Edward's University	1	University of Utah	4
Cooper Union	2	St. Lawrence University	1	University of Virginia	1
Cornell University	8	Simmons College	1	University of Washington	11
Dartmouth College	14	Smith College	4	Ursinus College	2
Denison University	2	Southwestern College	1	Utah State Agric. College	2
Dickinson College	1	Stanford University	11	Vanderbilt University	3
Drexel Institute	2	State Coll. of Washington	1	Vassar College	1
Emory University	2	State University of Iowa	2	Virginia Military Institute	1
Franklin & Marshall Coll.	1	Stevens Inst. of Tech.	2	Virginia Polytechnic Inst.	1
Georgetown University	1	Swarthmore College	6	Washington College	1
George Washington Univ.	1	Syracuse University	3	Washington & Jefferson Coll.	1
Georgia School of Tech.	3	Tarkio College	1	Washington Univ. (Mo.)	2
Hampden-Sydney College	3	Teachers Coll. of City of Boston	1	Webb Inst. of Naval Arch.	2
Hardin-Simmons University	1	Temple University	1	Wellesley College	3
Harvard University	35	Texas Technical College	1	Wesleyan University	5
Haverford College	3	The Citadel	2	Western Reserve Univ.	1
Hendrix College	1	Trinity Coll. (Washington, D. C.)	1	Westminster College (Pa.)	1
Huron College	1	Tufts College	7	West Virginia University	2
Indiana University	4	Tulane University of La.	5	W. Virginia Wesleyan Coll.	1
Iowa State Coll. of A.&M.A.	3	Union College (N. Y.)	2	Wheaton College (Mass.)	1
Johns Hopkins University	1	U. S. Coast Guard Acad.	1	Williams College	6
Johnson C. Smith Univ.	1	U. S. Military Academy	35	Wilson College	2
Juniata College	1	U. S. Naval Academy	50	Woodstock College	1
Kansas State Coll.of A.&A.S.	1	University of Akron	3	Worcester Polytechnic Inst.	5
Lafayette College	3	University of Alabama	2	Yale University	6
Lawrence College	1	University of Arizona	1		
Lehigh University	8	University of Arkansas	3	Total	767
Lowell Textile Institute	1	University of California	7	Number of American Colleges Represented	170
Loyola University	1	University of Chicago	3	Number of Foreign Colleges Represented (not listed)	61
Marshall College	1	University of Cincinnati	3	Total	231
Mass. Institute of Tech.	179				

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	31	13	1	4	49
Second year	9	24	6	11	50
Third year	—	8	11	40	59
Fourth year	—	1	1	4	6
Graduate year	—	—	5	250	255
Total	40	46	24	309	419

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			Entered							
				September 1939		Previous Years					
	Sept. 1939	Previous Years	Total	Undergrad.	Grad.	Undergrad.	Grad.	Total	S.B. Degree June 1939	Other Graduates	Total
Aeronautical Engineering XVI	8	16	24	2	27	3	11	43	7	5	12
Architecture IV, IV-B, IV-C	3	15	18	1	11	3	6	21	2	2	4
Biology and Public Health VII, VII-A, VII-B	—	1	1	—	13	—	16	29	5	4	9
Building Engineering and Construction XVII	—	3	3	—	—	1	—	1	—	—	—
Business and Engineering Administration XV	8	23	31	2	13	—	3	18	—	3	3
Chemical Engineering X, X-A	16	27	43	5	43	2	60	110	18	7	25
Chemistry V	4	5	9	1	18	—	31	50	7	13	20
Civil Engineering I	12	14	26	—	9	1	4	14	5	2	7
Army Engineer (in Civil Eng. Department)	—	—	—	—	11	—	1	12	—	1	1
Economics and Engineering or Science	—	—	—	—	—	—	—	—	1	—	1
Electrical Engineering VI, VI-A, VI-B, VI-C	16	32	48	8	23	8	38	77	27	9	36
Electrochemical Engineering XIV	—	1	1	—	—	—	—	—	—	—	—
General Engineering IX-B	4	7	11	—	—	3	—	3	—	—	—
General Science IX-A	—	2	2	—	—	—	—	—	—	—	—
Geology XII	1	4	5	—	4	1	8	13	—	1	1
Mathematics XVIII	—	1	1	—	2	—	7	9	1	5	6
Mechanical Engineering II, II-A	20	41	61	4	13	4	19	40	12	14	26
Army Ordnance (in Mech. Eng. Department)	—	—	—	—	22	—	—	22	—	—	—
Metallurgy XIX	5	4	9	—	10	—	7	17	4	6	10
Mining Engineering III	—	1	1	—	—	—	2	2	1	—	1
Naval Architecture XIII, XIII-C	5	7	12	2	5	2	—	9	—	—	—
Naval Engineering (in Naval Arch. Department)	—	—	—	—	12	—	—	12	2	—	2
Naval Construction XIII-A	—	1	1	22	—	9	7	38	1	2	3
Physics VIII	5	7	12	1	16	—	31	48	3	9	12
Sanitary Engineering XI	1	—	1	—	3	—	3	6	—	1	1
Unclassified	3	4	7	5	—	—	—	5	—	—	—
Total	111	216	327	53	255	37	254	599	96	84	180

TABLE 12

Number of Degrees Awarded in December, 1939 and June, 1940

Name of Course	S.B.		B.Arch. and B.Arch.C.P.		S.M.		M.Arch. and M.C.P.		Ph.D.		Sc.D.		Totals	
	Dec. 1939	June 1940	Dec. 1939	June 1940	Dec. 1939	June 1940	Dec. 1939	June 1940	Dec. 1939	June 1940	Dec. 1939	June 1940	Dec. 1939	June 1940
Aeronautical Engineering	2	28	—	—	5	7	—	—	—	—	1	—	8	35
Architecture	—	—	1	9	—	—	5	13	—	—	—	—	6	22
Biology	—	3	—	—	—	—	—	—	—	—	—	—	—	3
Biology and Public Health	—	4	—	—	—	—	—	—	—	2	—	—	—	6
Biophysics and Biological Engineering	1	1	—	—	1	1	—	—	—	—	—	—	2	2
Building Engineering and Construction	—	8	—	—	—	—	—	—	—	—	—	—	—	8
Business and Engineering Administration	4	59	—	—	—	7	—	—	—	—	—	—	4	66
Ceramics	—	—	—	—	—	—	—	—	—	—	—	1	—	1
Chemical Engineering	3	52	—	—	12	13	—	—	—	—	3	5	18	70
Chemical Engineering Practice	2	12	—	—	18	28	—	—	—	—	—	—	20	40
Chemistry	1	19	—	—	—	2	—	—	14	13	—	—	15	34
City Planning	—	—	—	3	—	—	2	4	—	—	—	—	2	7
Civil Engineering	2	9	—	—	24	8	—	—	—	—	1	2	27	19
Economics and Engineering	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Electrical Engineering (Inc. VI-A)	11	53	—	—	16	19	—	—	—	—	1	—	28	72
Electrochemical Engineering	—	2	—	—	—	—	—	—	—	—	—	—	—	2
Food Technology and Industrial Biology	—	3	—	—	—	—	—	—	—	—	—	—	—	3
General Engineering	1	31	—	—	—	—	—	—	—	—	—	—	1	31
General Science	1	17	—	—	—	—	—	—	—	—	—	—	1	17
Geology	—	6	—	—	—	4	—	—	—	2	—	1	—	13
Marine Transportation	—	6	—	—	—	—	—	—	—	—	—	—	—	6
Mathematics	2	5	—	—	—	3	—	—	1	4	—	—	3	12
Mechanical Engineering (Inc. II-A)	2	73	—	—	5	17	—	—	—	—	—	2	7	92
Metallurgy	1	22	—	—	1	4	—	—	—	—	—	2	2	28
Meteorology	—	—	—	—	1	8	—	—	—	—	—	—	1	8
Mining Engineering	1	6	—	—	—	2	—	—	—	—	1	1	2	9
Naval Architecture and Marine Engineer.	2	16	—	—	—	18	—	—	—	—	—	—	2	34
Naval Construction	—	—	—	—	—	10	—	—	—	—	—	—	—	10
Physics	3	21	—	—	3	—	—	—	—	4	1	1	7	26
Public Health Engineering	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Sanitary Engineering	1	—	—	—	1	2	—	—	—	—	—	1	2	3
Textile Technology	—	—	—	—	—	1	—	—	—	—	—	—	—	1
Without Course Classification	—	—	—	—	6	30	—	—	—	—	—	—	6	30
Total	40	456	1	12	93	184	7	17	15	25	8	16	164	710

TABLE 13

Degrees of Bachelor of Science According to Class in Which They Were Awarded

Class	Aeronautical Eng.	Architectural Eng.†	Architecture	Biology or Natural Hist. (Inc. VII-A)	Bldg. Eng. & 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. (Inc. II-A)	Metallurgy**	Military Eng.	Mining Eng. and Metallurgy	Naval Arch.	Physics	Sanitary Eng.	Total	Total by Decades
1868	—	—	—	—	—	—	—	—	1	6	—	—	—	1	—	—	1	—	—	6	—	—	—	14	
1869	—	—	—	—	—	—	—	—	1	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

(*Continued on page 52*)

TABLE 13 — (*Continued*)

Degrees of Bachelor of Science According to Class in Which They Were Awarded

Class	Aeronautical Eng.	Architectural Eng.‡	Architecture	Biology or Natural Hist. (Inc. VII-A)	Bldg. Eng. & 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. (Inc. II-A)	Metallurgy**	Military Eng.	Mining Eng. and Metallurgy	Naval Arch.	Physics	Sanitary Eng.	Total	Total by Decades
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	—	13	49	45	10	—	5	2	—	63	—	—	14	9†	1	17	345	
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	2,963
1921	—	—	11	3	—	70	92	—	9	98	75	15	15	—	3	—	128	—	—	24	18	1	3	565	
1922	—	—	32	8	—	126	98	15	11	65	109	25	25	1	8	—	56	—	—	27	16	8	7	637	
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	—	82	57	8	13	69	125	17	36	4	2	1	82	—	—	19	11	3	1	557	
1925	—	6	18	2	—	94	53	8	18	57	110	9	37	2	3	2	98	—	—	23	10	5	—	555	
1926	—	9	24	5	—	95	45	13	19	76	108	14	33	2	4	1	76	—	—	20	14	1	2	561	
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	76	8	9	1	2	1	48	—	—	6	6	11	4	459	5,410
1931	39	10	18	16	15	68	32	10	12	49	83	6	22	5	3	4	70	—	—	12	13	7	2	496	
1932	27	16	5	15	18	70	45	7	15	38	74	4	29	3	2	3	68	—	4	21	16	21	4	505	
1933	27	9	—	13	9	56	38	3	18	47	86	8	16	3	2	7	86	—	—	14	13	14	2	471	
1934	26	10	—	16	13	78	48	6	15	35	82	7	8	9	1	8	50	—	—	26	25	28	5	496	
1935	27	8	—	18	8	74	43	5	15	18	57	8	19	4	1	3	45	—	—	14	14	19	1	401	
1936	27	3	—	13	12	63	31	20	16	23	68	5	25	6	2	8	47	—	—	10	18	11	2	410	
1937	30	3	—	9	4	61	34	9	13	15	67	5	20	4	—	4	46	—	—	19	19	17	1	380	
1938	25	3	—	11	4	56	51	6	14	22	62	4	28	6	1	2	50	10	—	5	23	14	2	399	
1939	30	2	—	6	7	56	53	12	25	23	67	7	19	13	4	2	72	20	—	9	8	17	1	453	
§1940	28	—	—	10	8	59	52	12	19	9	46	2	31	17	6	5	66	22	—	6	22	21	—	441	4,452
Total	354	172	865	299	130	1,655	1,584	189	828	2,281	2,916	301	449	212	75	65	3,043	52	5	879	516	293	260	17,423	

* Prior to 1909 this Course was designated as Option 3 (Electrochemistry) of Course VIII.
† Two received the degree in Naval Architecture, Course XIII-B, in 1916 and three in 1917.
‡ Prior to 1923 degrees were awarded in Architecture.
** Prior to 1938 included in Mining Engineering and Metallurgy.
§ Includes only June degrees awarded in Class 1940.

TABLE 14

Degrees of Master of Science Awarded

	Aeronautical Engineering	Architectural Engineering	Architecture	Arch. & E. H. (Inc. VII-A)	Business and Eng. Admin.	Ceramics	Chemical Engineering	Chem. Eng. Practice X-A	Chemistry	Civil Engineering	Economics and Engineering	Electrical Eng. (Inc. VI-A)	Electrochemical Eng.	Fuel and Gas Eng.	General Science	Geology	Mathematics	Mech. Eng. (Inc. II-A)	Metallurgy	Meteorology	Mining Engineering	Naval Architecture	Naval Construction	Naval Con., Foreign Stud.	Petroleum Engineering	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													3								9
1907			6				1		1													8								15
1908			1						1			3										7								12
1909			6				1		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	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			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	5			1		1		53	182
1931	4	3		2	5		15	34	5	12		57	2	4		2	5	10	4	4	2	8			2	3			20	203
1932	5			5	9		25	33	8	17		56	2	5		2	3	16	1	4	1	7			6	6			40	251
1933	10	2		1	5		14	26	7	12		46	2				1	18	2		1	13			4	3	2		20	190
1934	7			5	5		16	19	11	9		46				3	3	20	5	1	2	11			3	2	1		21	190
1935	3	2		1	2		16	14	4	13		55	1				3	16	6		1	10			7		2		21	177
1936	5	3			4	2	7	30	3	19		22				2	2	14		4	1	7		1	5				23	155
1937	12			1	5	1	12	29	8	17	7	35					1	15	4	4	1	8		1	2		1		23	187
1938	13				8		11	28	1	29	2	58	1				1	24	1	4	1	7		1	3				30	223
1939	8			3	8		20	34	1	31	3	45				2	1	21	6	6	4	8			5		2		28	236
*1940	7			1	7		13	28	2	8		19				4	3	18	4	8	2	10					2		30	184
Total	150	19	84	32	62	3	241	520	117	252	12	951	28	26	1	42	34	303	41	35	33	28	272	5	3	60	14	23	569	3,960

* Includes only June degrees.

TABLE 15

Degrees Awarded in Architecture and City Planning

Year	Bachelor in Architecture	Bachelor of Architecture in City Planning	Master in Architecture	Master in City Planning
1921	—	—	3	—
1922	—	—	2	—
1923	—	—	7	—
1924	—	—	8	—
1925	—	—	5	—
1926	—	—	9	—
1927	—	—	7	—
1928	—	—	6	—
1929	—	—	9	—
1930	—	—	7	—
1931	—	—	9	—
1932	11	—	5	—
1933	24	—	7	—
1934	27	—	—	—
1935	17	4	11	—
1936	14	4	4	2
1937	9	2	11	3
1938	19	1	3	3
1939	14	1	10	3
*1940	9	2	13	4
Total	144	14	136	15

* Includes only June degrees.

TABLE 16

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	—	9	—	1	—	10
1932	1	12	—	1	2	16
1933	2	10	3	3	—	18
1934	2	10	2	2	1	17
1935	4	15	2	3	7	31
1936	—	15	—	3	12	30
1937	2	11	4	1	10	28
1938	2	12	2	4	7	27
1939	1	33	4	3	4	45
*1940	2	13	2	4	4	25
Total	27	225	37	31	55	375

* Includes only June degrees.

TABLE 17
DEGREES OF DOCTOR OF SCIENCE AWARDED

Year	Aero. Eng.	Ceramics	Chem. Eng.	Chemistry	Civil Eng.	Elec. Eng.	Electrochem. Eng.	Geology	Mathematics	Mech. Eng.	Metallurgy	Meteorology	Min. Eng.	Naval Arch.	Petroleum Eng.	Physics	San. Eng.	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	—	3	—	—	—	—	1	—	—	—	—	—	—	9
1932	—	—	5	—	1	2	—	1	—	2	1	—	—	—	—	2	—	14
1933	—	—	10	1	2	3	—	—	1	—	6	—	1	—	—	—	—	24
1934	—	—	3	—	—	2	1	1	—	3	2	1	—	—	—	—	—	13
1935	—	1	2	1	—	4	—	—	2	—	1	1	—	—	—	1	1	14
1936	2	1	12	—	—	1	—	—	—	2	3	—	1	—	—	2	—	24
1937	1	1	9	1	1	6	—	—	—	2	—	—	—	—	1	1	—	23
1938	—	1	12	—	2	7	—	1	—	2	5	3	—	—	—	5	—	38
1939	2	1	10	—	3	1	—	—	—	—	4	1	1	—	—	3	—	26
*1940	—	1	5	—	2	—	—	1	—	2	2	—	1	—	—	1	1	16
Total	11	6	94	7	13	44	2	7	5	17	39	6	5	1	1	20	2	280

* Includes only June degrees.

TABLE 18

DEGREES OF DOCTOR OF PUBLIC HEALTH AWARDED

Year	Number
1924	1
1927	1
1928	1
1930	1
1939	1
Total	5

TABLE 19

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

TABLE 20

SUMMARY OF DEGREES AWARDED (1868–1940)

Bachelor of Science	17,423
Bachelor in Architecture	144
Bachelor of Architecture in City Planning	14
Master of Science	3,960
Master in Architecture	136
Master in City Planning	15
Doctor of Philosophy	375
Doctor of Science	280
Doctor of Public Health	5
Doctor of Engineering (Discontinued after 1918)	4
Grand Total	22,356

Director of Admissions

During the year, 1,705 applications were received for admission to the First-Year Class as compared with 1,621 in 1939. Notices of admission were sent to 764 of these applicants, of whom 605 actually registered on the third day of the term (October 2, 1940), as compared with 604 on the corresponding date in 1939.

This entering class is the fifth since the policy of selective admission was initiated. As in former years, the data on each candidate has been supplemented in almost every case by a personal conference, either in the Admissions Office or with one of the Honorary Secretaries. These men have devoted a great deal of valuable time to interviewing candidates, advising them, and reporting on their apparent promise.

Emphasis has been placed on closer contact with secondary schools, particularly the independent schools. These schools normally send the larger part of the graduating class to college, while in most of the public high schools only a small number go on to advanced study. The importance of personal contact is such as to warrant a fairly extensive schedule of visits. During the year, 30 public high schools and 46 independent schools have been visited, including those visited in connection with the presentation of the Technology Awards. Experience indicates that the primary value of school visits lies in closer acquaintance with the headmaster and staff, and incidentally in the opportunity afforded for conference with small groups of prospective students. Addresses to the student body as a whole are of limited value and are made only when specifically requested by the school. Particular care is taken to avoid forcing "selling," or "recruiting" activities of any kind upon the schools. Such activities on the part of college representatives have caused much unfavorable comment in recent years and it is desirable to avoid associating the name of the Institute in any way with them. In the long run, our settled policy of stabilized enrollment and careful selection of candidates is far more effective in attracting students of genuine promise.

The Admissions Office, in collaboration with the Dean of the Graduate School and the chairmen of the department committees on graduate students, has completed a thorough revi-

sion and simplification of the records and procedure connected with the selection and admission of graduate students, including records of graduate scholarship and fellowship applications and awards. In this revision, the necessary decentralization of the selective process has been retained, while establishing a centralized system of records in the Admissions Office to serve the several departments. This is particularly helpful to those departments which find it necessary to limit enrollment and hence require a method of statistical control to guide current selections for admission and for scholarship awards.

The Class entering in September 1940 is the last to be included in the so-called Eight-Year Plan of the Progressive Education Association. A total of 39 freshmen have entered under this plan from 1935 to 1940 inclusive. The results may be summarized by saying that the group has ranged scholastically from very high to very low, with the average almost exactly equal to that of the First-Year Class as a whole.

The Coöperative Plan with liberal arts colleges is now in its third year of operation; thirteen students were admitted from the group of coöperating colleges in 1940, only four of them coming under the exact terms of the three-year two-year plan. This is in accord with experience in the two preceding years. The plan has had an excellent effect in publicizing the Institute's opportunities in the colleges, and has encouraged students to plan their college programs properly. It has not, however, notably altered the tendency of college students either to complete their four years before transferring or else to transfer after one or two years if they grow restless in the liberal arts work and wish to get an early start in their professional field.

The Admissions Office has coöperated in the selection of students for the special ten-weeks Course in Aeronautical Engineering given in the summer of 1940, and for the special one-year Course in Meteorology given by the United States Army Air Corps during 1940–41.

B. A. THRESHER.

CHAIRMAN OF COMMITTEE ON SUMMER SESSION

The registration of students in the Summer Session of 1940 was 1,548, a decrease of 33 from that of last year. The number registered for entrance subjects was 75, which was 62 less than in 1939.

In addition to the regular Summer Session subjects and the summer surveying camp, the activities of the Summer Session included several special programs and conferences.

A Friction and Surface Finish Conference was held on June 5, 6, and 7 by the Department of Mechanical Engineering with the coöperation of the Department of Metallurgy. There was an attendance of 200 engineers, drawn largely from the automobile, aircraft engine, oil, electrical and machine tool industries. The discussions were far reaching, and the conference accomplished much by providing a medium for expression of ideas as to the importance of the very high degrees of surface finish.

A Conference on the Differential Analyser was held on July 8, 9, 10, 11, and 12 under the direction of Professor Samuel H. Caldwell. It seemed desirable to limit the registration to 25, but there was an attendance of 29. Of the group, 12 were from engineering schools and the remainder were from various industries. The conference was maintained at a vigorous pace throughout, and although the group participation, by the nature of the subject, did not involve much in the way of contributions, the question and discussion periods showed a lively interest. The program consisted of 18 hours of lecture and six hours of laboratory demonstration and discussion. In addition, a three-hour session was held on the Cinema Integraph.

The Eighth Spectroscopy Conference was held on July 15, 16, and 17, with an attendance varying from 200 to 240. Two hundred and twenty-seven advance registrations were received. A program of 31 papers was presented.

There were no representatives from foreign countries this year on account of the war conditions, but members registered from all over the United States. Metallurgical, biological, and mineralogical industries were represented, as well as all of the sciences in which spectrochemical analysis is of value.

The enthusiasm for the conference was as great as ever

and there was some agitation to form a national society of spectrochemical analysis as an outgrowth of these conferences. Many expressed the opinion, however, that a national organization, if brought about, should not be allowed to interfere with the custom of holding this conference at the Massachusetts Institute of Technology every summer, since many members felt that there is here an atmosphere which would be difficult to equal in the meetings of a formal society.

A Summer Conference on Powder Metallurgy was held on August 29, 30, and 31. The attendance was 189, with a wide distribution both industrially and geographically. Twenty-two papers were presented. In addition to the regular meetings, two dinner meetings were held. Plans are under way for the publication of the papers presented.

Courses in Practical Spectroscopy, Applied Spectroscopy, and Quantitative Spectroscopic Analysis were offered by the Physics Department, with a total registration of 28.

Courses in General Bacteriology and Public Health Bacteriology were again offered, with registrations of 7 and 19 respectively.

For the sixth time a course in Theoretical and Applied Chemistry and Physics of Matter in the Colloidal State was offered with a registration of 15. Although the number is less than last summer, it seems desirable in the future to limit the enrollment to 15 with not over 12 in the laboratory.

The course in Food Technology enrolled 22 students from 12 states and Canada. Three of those men were from the Food Division of the New York Health Department and a similar number from the District of Columbia Health Department. The United States Navy detailed a lieutenant who is in charge of all food purchases and inspection for the Navy. Two of the students were professors at other educational institutions and the remainder held responsible positions in industry and were sent by the companies with which they were connected.

The first part of a four-summer program leading to the Certificate of Public Health was offered by the Department of Biology and Public Health. Sixteen people actually took the course, although there was an early registration of 27.

The Department of Metallurgy offered a course in Ceramic

and Molding Processes, with an enrollment of 24 students in addition to our own students and staff. It is of interest to mention that many of those attending were high officials in their own companies.

The Department of Architecture offered a course in City and Regional Planning which attracted 14 students. Five of the students had been trained in the field of architecture, five in engineering, two in geography, one in law, and one in government.

For the second time the section of Graphics offered a course for teachers of mechanical drawing. Although the number enrolled was smaller than last year, there appears to be a need for such a course.

A six-weeks' course in Textile Analysis was again offered with registration limited by laboratory capacity.

A course in Photoelasticity was offered for the first time by the Department of Mechanical Engineering, with a registration of 12 students representing seven states and one foreign country.

A course in Statistical Analysis was given by the Departments of Mathematics and Economics and Social Science. The attendance was 15.

The registration at the summer surveying camp was slightly lower than last year, with an enrollment of 35. Of this number, 24 were regular Institute students.

In addition to the above programs, intensive courses relating to defense were offered in Civilian Pilot Training under the Civil Aeronautics Authority, Aeronautical Engineering, and Meteorology.

R. D. DOUGLASS.

THE LIBRARIAN

During the year 8,014 volumes were added to the Library, bringing its total contents up to an estimated 348,103 volumes. This is about the average yearly growth and represents, with slight exceptions, the acquisition of only necessary books. Some attempt to strengthen weak spots was made in mathematics, physics, and mechanical engineering, special funds being available, but systematic building up of the collections was still deferred, because of limitations of income.

As a means to remedy this situation the Library Committee obtained approval from the Executive Committee of the Corporation for the creation of a Library Growth Fund, to be used for the completion of sets or the strengthening of collections in special fields. This fund will be built up from book appropriation money not allotted to departments, balances of allotments unexpended on June 30 of each year, Barker Fund income, fine money, and unrestricted gifts. The fund was set up on January 25, 1940 with a nucleus of $1,310. As it grows it should prove of utmost value in careful planning of the Library's collections.

The year was the busiest in the Library's history. The circulation of books for one- or two-weeks' use reached 101,117, while overnight circulation increased 13 per cent, to 34,156, making a total home use of 135,273 volumes. Of all books borrowed for one- or two-weeks' use from the Central Library and branches excluding Walker, the Instructing Staff took 23 per cent, graduate students 21 per cent, undergraduates 43.6 per cent, alumni 5 per cent, Institute employees 3 per cent, the public .46 per cent, and other libraries 3 per cent. Registered alumni users of the Library totalled 596 (Central Library 351; branches 245).

An analysis of one- and two-week circulation at the Central Library showed the largest number of books to have been borrowed in the following subjects: Electrical Engineering 5,408 volumes, History 3,625, Physics 3,163, Literature 2,605, Chemical Engineering 2,457, Chemistry 2,379, Biology and Public Health 2,212, Mechanical Engineering 1,604; M.I.T. theses 929; current periodicals 6,782.

As this is the end of a decade it may be interesting to see the growth in use of the Library over that period, so far as can be shown by the loans of one- and two-week books:

	1929/30	*1934/35*	*1939/40*	*10-Year Increase*
Central Library	28,749	37,340	46,986	63%
Branch Libraries	16,164	39,066	54,131	234%
Total	44,913	76,406	101,117	127%
Walker Memorial circulation included in above	No record	12,885	20,026	(*5 years*) 55%

Overnight loans were not recorded 10 years ago, but in the six years since the first records were kept, in 1933–34, such loans at the Central Library have more than doubled, and those at the branch libraries have quadrupled. Last year reserves for 20 courses, totalling 665 books, were maintained at the Central Library upon professors' requests. Such collections can be a very real aid to the teaching staff; their setting-up, however, requires considerable time and labor. To assemble one history reserve (the largest) required 142 hours' labor from five people.

The Reference Department reports a decided increase in transactions with persons and firms outside the Institute. This is strikingly shown by the record of 1,597 interlibrary loans, of which 1,097 went to business libraries and 500 to other libraries. Volumes borrowed from other libraries totalled 260, for the service of 66 staff borrowers. The department handled 3,015 telephone calls for service and replied to 2,404 letters or cards. One hundred photostats and 40 microfilms were obtained for readers.

The Librarian's lecture to freshmen on the use of the Library and the classroom talks by members of the Library staff were again given with the coöperation of the Department of English and History.

The Cataloging Department, already inadequately manned, was obliged this year to lend to other departments the equivalent of 33 weeks' time of a full-time assistant. Work on coöperative interlibrary projects claimed about 12 weeks more. Comparatively little clerical assistance was received from the N. Y. A., since those students more and more prefer to work in the laboratories. These handicaps reduce the amount of professional work that can be turned out by the department and emphasize again the need of a larger cataloging staff.

The progress of microfilm developments has been followed closely. In order to arouse interest in the subject locally, an exhibit of microfilm cameras and reading-machines was held in the Central reading-room November 21–24, with the helpful coöperation of manufacturers. The exhibit was in charge of Professor Ralph D. Bennett, assisted by C. R. Mills, '38, Vail Assistant, a graduate of Course VI. Mr. Mills prepared a sample film to test the response of the projectors to different

types of material, and copies were tried out simultaneously in three machines. Attendance at the exhibit from within and without the Institute was gratifying.

At the request of Professor Bennett, Mr. Mills was granted half-time leave of absence for one year beginning June 10, 1940, to carry out a research and development program on sheet microfilm for the Committee on Scientific Aids to Learning, under Professor Bennett's direction.

The Library Committee held seven meetings. The establishment of the Library Growth Fund through its efforts has already been mentioned. At the request of the Librarian the Committee took up the unsatisfactory status of service to outside borrowers, especially industrial firms, some of whom paid the established fee, others having the advantage of interlibrary loans without fees. Careful study was given to this problem with the result that, at the suggestion of President Compton, the fee system set up by the Library Committee in 1933 was abolished. Also through the efforts of the Committee an appropriation was obtained for the enlargement of facilities at Walker Memorial Library, as outlined elsewhere in this report.

Vail Library activity continued to expand in volume and in type of service. Reference service increased by 40 per cent. A quarterly *Vail Library Bulletin* was started in January 1940. One interesting step was the formation of a Vail Library Student Advisory Committee, which will organize in October 1940. A welcome surprise was the discovery that certain securities in the Vail Fund, long carried on the Institute books as of no par value, had an actual accumulated income of $26,000. This windfall will be used in part to build the Vail Fund principal up to $50,000. It has already made possible the construction of an office for the Vail Librarian out of the Central stack.

The Arthur Rotch Library received during the year, on a rental basis, the library of the late John Nolen, city planning expert. Consisting of over 1,500 books and a large number of pamphlets, it becomes an important part of the city planning collection.

The Dewey Library had an exceedingly busy year, evidenced by increased student attendance and the largest circulation of any branch except Walker. The bibliographical service

rendered by the Economics Librarian to members of the staff in connection with courses and seminars included two lists on the Economics of the War. On the engineering side, special attention was given to the strengthening of the Mechanical Engineering collection.

At the Eastman Library a noticeable decrease in the circulation of overnight books was offset by an increase in the one- and two-week loans; also by an increase in registration, which showed use of the branch by every department of the Institute, the largest representations from outside departments coming from Courses VI, VII, X, XVI and XIX.

At the Lindgren Library the circulation of overnight books increased 23 per cent owing to the growing practice by the Faculty of placing books on reserve. This library is becoming seriously crowded, and unless additional space can be annexed, conditions of administration and service will soon become difficult.

Walker Memorial Library is to obtain more space by removal to the west side of the building. This plan, originating in the Library Committee and supported by Dean Caldwell, received the consent of the administration and an appropriation of $3,000 was made by the Corporation for the purpose. The plan contemplates increased service to the Department of English and History and General Studies as a temporary measure pending the establishment of a Humanities branch library, and the former faculty dining-room will be used mainly for this purpose. As this will result in a large amount of reserve book work being carried on here instead of at Central, an assistant to the Walker Librarian will be necessary.

While recognizing the opportunity of Walker Memorial Library to be of service to the humanities departments, we must not lose sight of the intent of the donor, Frank Cilley, that the Library should be a recreational library in a recreational center. We should indeed be blameworthy if the new departure should seriously alter the inviting character of the Library. It has been the aim of the Committee on the Cilley Fund, as stated by them to Dean Bush December 17, 1935, "to attract to Walker Memorial Library every student desiring a book, whether for recreation or for broadening his horizon, and to buy in each

field the best books that will be read." This aim was reaffirmed in a statement of policies submitted by them to the Library Committee November 23, 1939.

As an aid to users of Walker Memorial Library, the Walker Librarian began this year the issuance of a mimeographed monthly book list entitled *Books of the Month*, which seems to have been well received.

At the Central Library three book exhibits were displayed. The Kenneth Roberts "Arundel" exhibit was continued into the fall, after which D. O. Woodbury, '21, lent a similar collection connected with his writing of "The Glass Giant of Palomar," which describes the construction of the 200-inch telescope. A Vail Library exhibit of rare books concerning William Gilbert and his contemporaries was shown in connection with the Boston meetings of the A. I. E. E. and I. R. E. in June.

The publication activities of the Library are still modest in extent because of limited funds. The annual supplement to the *Technology Bookshelf*, listing all known publications of the year by M. I. T. alumni, was issued on Alumni Day. The tenth annual alumni reading-list, this year dealing with "News by Electric Waves," was the work of Mrs. Ruth McG. Lane, Vail Librarian. It was issued in preprint form on Alumni Day, to appear later in the *Technology Review* of July 1940. The addition of a mimeograph to our equipment made possible a wider circulation of our monthly book lists, the distribution of subject lists of periodicals to the Instructing Staff, and the starting of the Vail Library and Walker Library bulletins.

Mrs. Lane served as special representative of the Special Libraries Association on the American Standards Association committee on library standards, and Miss Hazen as editor of the *Bulletin* of the Special Libraries Association, Boston chapter. A large number of the staff attended as auditors the new course on the Arts of the Book, through the courtesy of Professor Henry L. Seaver, in charge of the course, and a by-product was the compilation of a card list of early printers represented by rare books in the Institute Library.

The Staff Association met regularly and had the privilege of listening to talks by Dean MacCornack, Dean Caldwell, Dr. Hunter, Professor Edgerton, and Miss Blanche McCrum,

Librarian of Wellesley College. The Library *Handbook*, long in preparation by a committee of the association, was issued in a second tentative edition.

Among interesting gifts received was a copy of Walter Charleton's *Physiologia*, London, 1654, sent us from England by G. A. Mower, '81. The Friends of the Library presented Blondel's *Cours d'architecture*, Paris, 1771–77, and Aviler's *Cours d'architecture*, Paris, 1720. Through the Friends the Lessing J. Rosenwald Foundation completed our set of *The Colophon*. Dr. Dard Hunter presented a copy of his *Paper-making by hand in India*. The William Lowell Putnam Memorial intercollegiate second prize in mathematics, $300, won by three M. I. T. undergraduates in 1939, was awarded to the Institute and turned over by the Department of Mathematics to the Library for the purchase of books in mathematics for undergraduates. Eighty-six books have been purchased thus far.

Several large gifts were received, notably 269 volumes and many periodicals from the bequest of Charles F. Hopewell, '93; 170 volumes in geology from the estate of Dr. Waldemar Lindgren; and 155 miscellaneous books from the library of former President Maclaurin, presented by Professor W. R. Maclaurin. In response to our appeal, several class secretaries sent us class histories, class newspapers, reunion material, etc., and the secretary of the Class of 1885, Mr. Arthur K. Hunt, deposited in the Library the class archives. Several volumes to complete periodical sets were received from the Fort Collins, Colorado, Public Library (*Century magazine*) and the Malden Public Library (*Scientific American*).

In addition to the normal work for its own clientele the Library was called upon as usual to contribute its part towards various philanthropic undertakings. Among these may be mentioned the collection and shipment of seventeen boxes of books and periodicals to China, which at the request of Professor Wildes were specially designated for the National Tsing-Hua University. A selective list of scientific and technical books for China was appraised in detail at the request of the Institute of Pacific Relations.

Although recent years show progress made towards better provision for the Library's needs, may I again point out that

the steady expansion and intensification of Institute activities produce a constantly increasing demand upon the Library's resources and service, ever wider in scope and more exacting in nature. To meet this demand the immediate need is the enlargement and strengthening of the Library staff, particularly in the Cataloging and Reference departments. The long-range need is a larger conception of the place of library service in engineering education and research of the standard maintained by the Institute. Better service and many additional kinds of service can be rendered both to our Institute clientele and to industry whenever the need is realized and the support provided.

W. N. SEAVER.

DIRECTOR OF DIVISION OF INDUSTRIAL COÖPERATION

During the year a Faculty Committee made a study of the operations of the Division, and submitted a report in the form of a statement of policy. This has been approved and incorporated in the *Policies and Procedures*, Edition of 1940.

The principal change in policy has been to modify the rights of sponsors to conform to Institute patent policy, and this eliminated the granting of exclusive rights to patentable structures and substituted the granting of non-exclusive rights.

There has been a marked increase in the number of projects handled by the Division and a very satisfactory tendency towards work that is fundamental in character, and which as far as staff is concerned demands the personnel of more than one department in its prosecution.

A good deal of the research has been of a character which would establish fundamentals upon which improvement of processes or products depends. A significant number of our annual contracts have been renewed. It is unfortunate that due to present world conditions, little can be said about the details of individual researches.

THE PLACEMENT BUREAU

Alumni Placement. During the year we have had 994 calls for men from industry. An increasing number of opportunities are for responsible executive positions. A part of this

is due to the preparedness program, which emphasizes the desirability of engineering or scientific training. There seems, however, to be an acceptance of the doctrine that scientific and engineering education provides an executive a better background from which to judge industrial matters than other types of training. This is particularly true in the chemical and mechanical industries.

The Bureau has spent a large proportion of the summer months coöperating with the Civil Service, the Army, the Navy, and other Federal Departments in an endeavor to supply personnel with a background of training useful in the present emergency. In September of 1939, it was decided to advance the collection of information for the 1940 Alumni Register, and special forms were mailed to all alumni. To date 10,540 records have been received and coded, so that if the country comes to the point where mass induction of engineering and scientific talent becomes a necessity, the Institute is in a position to meet the situation.

Undergraduate Placement. The Class of 1940 was launched under very auspicious circumstances. Placement figures on February and June candidates show: Bachelors, 70.7 per cent placed, Masters, 88.8 per cent placed, Doctors, 70.8 per cent placed — an overall placement of 76 per cent. Overall figures as of September 15 show 90 per cent placed.

Employment of men by fields of endeavor is shown in the following table: This is not a complete statement but covers the most significant fields.

Chemical industry	71
Federal employment	69
Further study	57
Teaching	37
Machinery, tools and instruments	35
Aeronautics	29
Electrical equipment	18
Utilities	14
Steel mills and products	13
Private shipyards	11
Paper and pulp	9
Automobiles, bodies, and internal combustion engines	8
Foundries	7
Rubber industry	7
Radio and television	6

Food	6
Printing and publishing	4
Insurance	3
Textiles and products	3
Mercantile	2
Guns, ammunition and explosives	1
Finance	1
Heating, ventilation and refrigeration	1

Distribution of graduates by companies indicates that 218 employers hired 527 men:

Army, Navy and Federal Government took	69
Further study	57
M. I. T	27
10 other universities	1 each
1 company took	17
1 company took	13
1 company took	10
1 company took	6
6 companies took	5 each
2 companies took	4 each
13 companies took	3 each
29 companies took	2 each
152 companies took	1 each

For the first time we have made a study of the geographical distribution of the graduating class, considering only men who went into industry. Three hundred fifty-four men were placed in 30 states, which is of interest as indicating the national rather than the local reputation of Technology's product.

New York	59	Rhode Island	4
New Jersey	50	Tennessee	4
Massachusetts	47	Missouri	3
Pennsylvania	36	Iowa	2
Ohio	25	Louisiana	2
Illinois	21	Maine	2
California	16	New Hampshire	2
Connecticut	15	West Virginia	2
Michigan	11	District of Columbia	1
Indiana	10	Kentucky	1
Maryland	9	Mississippi	1
Texas	8	Montana	1
Wisconsin	8	Oklahoma	1
Virginia	6	Vermont	1
Delaware	5	Washington	1
Total			354

NATHANIEL MCL. SAGE.

DIRECTOR OF ALBERT FARWELL BEMIS FOUNDATION

The year has witnessed substantial progress in the program of study outlined in the report of a year ago. An "objective study of the economies which result from various specific and actual changes in building techniques" has been commenced by dividing the shelter unit itself into a number of readily distinguishable categories. Of these, the window has been selected as the first for intensive study.

The study of such a category consists, first, of determining in as fundamental a way as possible what type of performance may reasonably be expected from it in the light of contemporary scientific knowledge; and then, by a comparison of the cost of actual devices available to the public and a comparison of the degree to which such devices meet the criteria set by the performance study, it should be possible to arrive at useful conclusions.

For obvious reasons, our study of the window is limited to a geographic area (our own) with definite climatic characteristics. Such matters as the amount of useful ultra-violet energy, the net heat energy, and the lighting effects which may be expected from the sun must be expressed as a function of latitude and other modifying factors. Extension of our studies should then be made for other geographic areas, and there is reason for encouragement in the interest which staff members at a number of other institutions have displayed in this future possibility.

Our own studies are for the moment complete in the ultra-violet range, well advanced in the field of net heat energy, and now beginning in the fields of illumination and ventilation. To make this work more effective the staff has been increased not only in numbers but in diversity of professional background so that in the forthcoming year we shall have the benefit of the knowledge of men trained in mechanical engineering and physics to add to that of men trained in architecture.

During the year we have coöperated with the School of Architecture in bringing to the Institute Mr. Alfred Rheinstein, Mr. and Mrs. Antonin Raymond and Mr. Alvar Aalto. The addition of the latter to the staff of the School of Architecture as Research Professor in Architecture has made it possible for

us to work in close harmony with him in preparation of a program of architectural research which will be initiated this coming year and in which we expect to coöperate.

To the American Society of Mechanical Engineers, Wood Industries Division, at its annual meeting in October 1939, the Director delivered a paper entitled "Economic Factors of the Housing Problem." The material of this paper, restudied and enlarged, has just been issued as a publication of the Foundation entitled "A Method for Analyzing the Economic Distribution of Housing." Other principal addresses were presented at Norwich University, at Dartmouth College, and at the Bicentennial of the University of Pennsylvania.

Through the temporary addition to our staff of Mr. Roy Kantorowich, traveling fellow from the University of the Witwatersrand in South Africa, we were able to engage in a coöperative study of housing in Haverhill, Massachusetts. The bulk of the impetus for this study came from the Division of City Planning.

As in the past, and with the assistance of colleagues throughout the Institute, we have been able to answer numerous questions relating to the art and practice of building, and on several occasions have been able to furnish rather comprehensive reports on specific proposals in this field.

On the pedagogical side the most important development was the success of the Graduate Housing Seminar. This seminar is directed by the members of the Interdepartmental Committee on Housing, stretching across many disciplines. The Director of the Foundation has merely been the administrative officer and the task was remarkably simple and pleasant. As a result of observations made this first year the seminar will be modified in the coming year, generally in the direction of making the work more professional and of concentrating the background lectures in one semester with laboratory, field and case-method work in the other.

The general coöperation with the School of Architecture remains close. The most direct relation this year was perhaps in the study of a housing project for one hundred families in a nearby suburb, wherein the graduate students in architecture made complete economic studies of the various possible solu-

tions. We have also had the good fortune to work with a number of graduate students on their theses; and have been happy to observe the increasing attention to and interest in the scientific aspects of architecture as witnessed by a number of recent graduate thesis subjects.

Perhaps the most important new public relations which have developed during the year are those by which the Director has become a member of several committees of the American Institute of Architects and the Boston Society of Architects, and Chairman of the Board of the Housing Association of Metropolitan Boston. Other activities in this direction have merely been continuations of or logical extensions of earlier relationships.

JOHN E. BURCHARD.

SECRETARY OF THE SOCIETY OF ARTS

The Popular Science Lectures, initiated by President Maclaurin in 1917 as an activity of the Society of Arts, were continued during the year and attended by the usual large and enthusiastic audiences. The subjects chosen were related to research activities in which the Institute is at present engaged and the lecturers were all authorities in their respective fields. These lectures serve not only to stimulate interest in science among secondary school pupils, many of whom are about to enter college, but they offer the public in and about Boston and Cambridge an opportunity of keeping informed on recent scientific developments. In this respect the Society of Arts continues to fulfill one of the objects for which it was established by President Rogers, as the early meetings of the Society were also devoted to lectures followed by discussions of current inventions and discoveries. Present day discussions take place after the lecture, when the speaker not infrequently remains an hour answering questions of those gathered around the lecture table.

The program of lectures given the past year was as follows:

Friday, December 15; Saturday, December 16; Sunday, December 17
Giant Molecules in the Service of Man by Robert C. Hockett, Ph.D., Assistant Professor of Chemistry.

The lecture was illustrated by many experiments on the prop-

erties of cellulose, rubber, proteins and plastics, together with a very fine exhibit of these products of the organic chemist.

Friday, January 12; Saturday, January 13; Sunday, January 14
Paper and How It Is Made by Dard Hunter, Litt.D., Curator of the Dard Hunter Paper Museum.

The lecturer and his son illustrated the art of making hand-made paper by actually carrying out the process on a practical scale before the audience. How such paper is still made in other countries was illustrated by beautiful colored slides taken by the lecturer in his travels through India, China and Japan. After the lecture the Dard Hunter Paper Museum was open and visited by a large number of the audience.

Friday, February 9; Saturday, February 10; Sunday, February 11
Atom Smashing and Radioactivity by Robley D. Evans, Ph.D., Associate Professor of Physics.

This beautifully illustrated lecture brought before the audience some of the most recent results of researches in the field of atomic transmutations. Various atom smashing machines were described, artificial radioactivity experimentally demonstrated, and numerous applications of radioactive matter to problems in chemistry, metallurgy, geophysics, botany and medicine explained. After the lecture the Atomic Disintegration Laboratories, containing the new Cyclotron and the Van de Graaff Generator, were open for inspection.

Friday, March 8; Saturday, March 9; Sunday, March 10
The Architecture of the Solid and Liquid States by Bertram E. Warren, Sc.D., Professor of Physics.

This lecture was devoted to recent advances in the application of X-ray analysis to the structure of matter. Striking experiments were shown illustrating the dependence of physical properties on the arrangement of atoms and molecules, a new and fascinating field of physics and chemistry.

H. M. Goodwin.

Chairman of Committee on the Museum

The Museum Committee, receiving much valuable advice from its Visiting Committee, is planning a detailed program for the expansion of the departmental exhibits. With the coöpera-

tion of the various departments, it is hoped to develop an adequate policy for the encouragement of displays from industry and other outside sources, and to increase the number of exhibits pertaining to the significant research of the Staff. Some headway has already been made in these respects, and an appeal for such exhibit material as may be found in our own research laboratories has brought gratifying results.

The Committee has adopted a policy of installing as many of the corridor exhibits as possible in recessed cases cut into the wall. This type of case seems to fit the requirements of attractiveness, convenience, and economy of space. During the year, five such cases have been built along the first floor corridor of Building 4, and these will eventually be used for Electrical Engineering displays; another in-set case has been built adjoining the main office of the Military Science Department.

The American Branch of the Newcomen Society of England presented a model of the Newcomen Atmospheric Engine of 1712. Presentation was made at a dinner meeting of the Society in Boston, held in honor of Dr. Compton. Other contributions of exhibit material through either gift or loan, have been received from the following: Professor Charles F. Park, Mr. Alexander G. Meacham, the General Radio Company, the Corning Glass Works, the Shur-on Optical Company, the General Electric Company, the Hamilton Watch Company, the International Telephone and Telegraph Corporation, the Automatic Electric Company, New England Telephone and Telegraph Company, Simplex Wire and Cable Company, Boston Insulated Wire and Cable Company, and Bell Telephone Laboratories Incorporated.

The Committee has been in charge of exhibits furnished by the Institute to the New York World's Fair. The Edgerton stroboscope display in the National Cash Register Building was continued from the previous season, and Professor Jack's model of the *Mayflower* was again on exhibit in the Massachusetts building. Also several exhibits were furnished to the Hall of Inventions, including principally the dioramas of the early New England pottery and of the Sandwich glass works made for the Ceramics Section.

The Hobby Shop has been prospering under increased stu-

dent responsibility, and the regular membership reached nearly a hundred. The most interesting project of the year was the construction of two stroboscopic flash lamps for high speed photography under the direction of Ralph B. De Lano, '41, shop foreman; the parts were furnished by Professor Harold E. Edgerton. A successful photography contest was held in which the use of these lamps was required. Several members of the staff gave talks in the Hobby Shop, and Professors George G. Marvin and Donald C. Stockbarger gave instruction in gem-grinding and glass-blowing respectively. The facilities of the Hobby Shop have been increased by the addition of space for a new darkroom, and by the acquisition of a printing press.

A. C. WATSON.

MEDICAL DIRECTOR

During the year the work of the Department of Hygiene has just about equaled that of the previous year, which was the busiest in its history and during which there was a moderately severe epidemic of influenza. Out-patient visits numbered 21,105 (20,003 visits in the clinic and 1,102 to the Infirmary).

In addition to this, 2,811 physical examinations were done, an increase of 269 over last year. These included the required examinations of students and prospective employees and special examinations for the R. O. T. C., C. A. A., and of students seeking employment with outside firms.

As a result of the routine physical examinations, 674 students were found to have defects requiring special consideration.

In the Infirmary, 424 bed patients were cared for during the year for a total of 1,822 days. The number of patients requiring hospitalization at any one time during the school year varies and, at times, is greater than our present bed capacity. This has necessitated discharging convalescent patients earlier than was desirable. It is hoped that an additional six or seven beds will be made available in a ward on the second floor for use during the coming year.

During the year, it was necessary to refer 193 patients to members of the consulting staff, the great majority for eye and nose and throat conditions. Twenty-four students were referred to outside hospitals, chiefly for major surgical conditions.

X-ray examinations, including routine chest plates of all new students, numbered 1,519. This is an increase of 162 over last year.

There were only six recognized instances of contagious diseases (chicken-pox 3, German measles 2, and mumps 1).

The only death was that of a visiting professor who expired suddenly of a heart attack.

The desirability of having a physician present at all times during the school day has been recognized, and arrangements have been made to make this possible during the coming year.

GEORGE W. MORSE, M.D.

DIRECTOR OF NEWS SERVICE

Although the European war has focused public attention on activities abroad, interest in news of scientific and engineering developments has been virtually unaffected by the constant readjustment of national and international news trends during the year. This country's preparation for national defense has stimulated new interest in the nation's research facilities, especially in those fields in which technical developments important to preparedness may be expected. Inquiries from science editors and editorial comment indicate firm public faith in the ability and resourcefulness of American scientists and engineers to contribute to the progress of national defense. This attitude may well become a new foundation for wider interpretation and greater public appreciation of the achievements of science.

Activities of officers of the Institute and members of the Faculty in national and regional projects of importance to the public have resulted in widespread press reports beneficial to the Institute. News of this type emphasizes the broad scope of the Institute's resources and their efficient application in the interests of national security. Furthermore, it has directed attention to the need for support of fundamental and industrial research with its consequent contribution to human welfare.

During the year the News Service distributed 1,697 news announcements covering subjects ranging from reports on scholarships and student scholastic achievements to important research developments in the Institute's laboratories. Coöperation with magazine writers, authors of industrial journals,

books on the popularization of science, and textbooks increased, resulting in numerous important articles, as well as many significant references to the Institute's prestige in science and engineering. An increase in favorable editorial comment on various aspects of Technology's work was also noted.

Institute news reports and articles appeared in more than two thousand newspapers and weekly news magazines in this country and Canada. The increase in publication of Institute news in middle western and Pacific Coast states, noted last year, has continued. South American newspapers, especially in Argentina, indicated a growing interest in Technology news. A comprehensive history of the Institute was presented in a special Spanish edition of an important industrial journal distributed to leaders of government and industry in every South American country. Members of the staff also coöperated in contributing to a series of radio programs presented by the World Wide Broadcasting Corporation to stimulate closer cultural relations between North and South America.

The News Service furnished the *Technology Review* with more than fifty thousand words of Institute news, as well as various photographs, for the Institute Gazette section of the magazine.

JOHN J. ROWLANDS.

SCHOOL OF ENGINEERING

AERONAUTICAL ENGINEERING

The pressure for space in Building 33 to permit larger enrollments in Aeronautical Engineering and in Meteorology has been intensified by the national defense program of the government. However, the building alterations recommended in last year's report, which are now being carried out, will relieve this situation. To meet an immediate demand, special intensive courses in Meteorology and in Aeronautical Engineering were given during the summer of 1940 for qualified college graduates, as well as ground school instruction for the Civil Aeronautics Board's flight training program.

The building alterations, which include the dismantling of the old 7½ foot wind tunnel, permit us to provide additional

drafting room space and gives room both for a more compact modern wind tunnel for student research work and an Airplane Structures Laboratory. This last has been badly needed for some time to make strain measurements on loaded full scale structures.

The addition being built on the Sloan Automotive Laboratory allows engine design work to be moved out of Building 33, and the allocation of the entire fourth floor to Meteorology.

Aerodynamics. Research on the mechanics of the frictional boundary layer on a flat plate has continued with support from the National Advisory Committee for Aeronautics. The Carnegie Corporation Research Project has been interrupted due to pressure for use of the Wright Brothers Wind Tunnel for investigations in connection with the national defense program. A new research project on the "flutter" of airplane wings at diving speeds has been undertaken for the Navy.

The Wright Brothers Wind Tunnel was calibrated and tested in the fall of 1939. Very satisfactory results are obtained for measurements at atmospheric pressure. The influx of industrial test work in connection with the government's airplane program has required postponement of work at higher pressures. Since January 1940, the tunnel has been operated full time in the aerodynamic analysis of airplane designs for the industry. It will soon be necessary to work two shifts.

During the second term, the 7½ foot, 5 foot, 4 foot and boundary layer tunnels were all in demand for student thesis work and for staff research problems.

Instrumentation. The courses in instrumentation now include a general lecture course dealing with fundamental principles, with examples of specific designs taken from several fields of engineering besides aeronautics. Two new courses have been added. These are designed especially for the needs of naval officers detailed to the Institute for aviation, fire control, or marine engineering work. The staff devoted to teaching and research will be doubled in the coming academic year in response to the need for speeding up certain instrument developments of importance to the national defense.

Structures. Professor Newell's investigation of "Shear Lag in Corrugated Sheet" for the National Advisory Committee for

Aeronautics resulted in a highly successful experimental check of a theory for predicting stress, proposed by Dr. E. Reissner of the Department of Mathematics, making use of a new type of fine wire strain gauge designed by Professor de Forest of the Department of Mechanical Engineering, following the original idea of Professor Ruge of the Department of Civil Engineering. The coöperation of experts in four departments to achieve a specific result is noteworthy. Further work in this field continues with a research sponsored by the Army Air Corps.

Airplane Engines. In the report of the Mechanical Engineering Department mention is made of changes in automotive engineering work. Since a substantial proportion of aeronautical engineering students take automotive courses, the staffs of the two departments are closely associated in their training.

Meteorology. Research has continued on long range weather forecasting in coöperation with the Department of Agriculture. Methods of forecasting predominant weather characteristics for a period of five days have been developed and tested. For the year 1940–41, such forecasts will be supplied weekly for distribution to all United States Weather Bureau offices in the United States.

The research program on condensation and precipitation processes in the atmosphere has been continued during the past year. Valuable data were obtained during the summer of 1939 on the summit of Mt. Washington; other aspects of the problem have been studied in the laboratory and several new pieces of apparatus have been constructed to facilitate field work.

During the past year a research program on methods of airplane de-icing has been carried out for the National Academy of Sciences at the instance of the United States Army Air Corps. This work has been carried out jointly in the Meteorological Division and in the Laboratory of Physical Chemistry. Results of definite promise have already been obtained and it is believed that this work may lead to practical solutions of some important phases of the de-icing problem.

Research projects have also been supported by the Forest Service and the Weather Bureau on meteorological methods for predicting forest fire hazards.

Placement. This June the demand for graduates in Aero-

nautical Engineering and in Meteorology again greatly exceeded the supply. Employment opportunities exist with the aircraft industry, with airlines and with government bureaus. Relatively fewer able students remain for graduate study and research. The plan of special Honors Courses for students of superior ability, inaugurated this year, could, if implemented by adequate scholarship aid, do much to correct what may become in the long run an unsound trend.

J. C. HUNSAKER.

BUILDING ENGINEERING AND CONSTRUCTION

During the past year several changes in the curriculum were approved by the Faculty. These changes now make it possible for seniors to broaden their choice of electives. The fundamental courses in mechanics, structures, materials, and building construction will now be completed by the end of the third year.

Coöperation on joint problems with the School of Architecture was continued and a study of dormitory facilities at the Institute was made under this plan. The School of Architecture has set up its program to include problems on third, second, and first class buildings, these studies by their students to be used in our courses in Building Construction during the coming year.

One of the important activities of the department is its participation on a Committee for the Coördination of the Building Industry, which was appointed by the administration during the year. This committee is composed of two groups, one from the Institute staff and the other from the industry. The Institute staff members are: Professor F. J. Adams, City Planning; Professor Douglass V. Brown, Economics and Social Science; Professor John E. Burchard, Bemis Foundation; Dean Walter R. MacCornack, Architecture; Professor Donald S. Tucker, Economics and Social Science; Professor Walter C. Voss, Chairman, Building Engineering and Construction; Mr. Albert Dietz, Secretary, Building Engineering and Construction.

The members from outside the Institute staff are: Mr. Arthur C. Holden, Architect; Mr. Thomas S. Holden, F. W. Dodge Co.; Mr. Alfred L. Loomis, Corporation; Mr. Redfield Proctor, Corporation; Mr. Alfred Rheinstein; General R. E.

Wood, Sears Roebuck & Co. The immediate effort of this committee has been centered around Building Codes and Zoning Ordinances.

The Building Materials Research Laboratory was again aided by a grant from the National Lime Association and a grant for the coming year has been approved. A second series of tests on the effects of lime on concrete has been started and will be continued over a period of two years. An extrusion-energy machine for the testing of the workability of concrete has been designed and built and is in use. A new graduate course in Building Materials Research has been approved and will enable graduate students to investigate selected fundamental properties of construction materials and will aid in the development of apparatus and procedures for study and measurement.

Professor Voss presented papers at the A. S. T. M. Lime Symposium on "Lime Characteristics and Their Effect on Construction;" to the National Lime Association Convention on "Further Tests on the Use of Lime in Concrete;" to the Building Officials Conference of America on "The Present Trend in Building Codes;" and to the engineers of the Department of Public Works of New York City on "Successful Masonry Work." Professor Staley gave a paper on "Structural Characteristics of Masonry" to the Designer's Section of the B. S. C. E. and one to the National Lime Association Convention on "Masonry and Mortar Characteristics." His paper on "Petrographic Study of Bond Between Brick and Mortar" has been reprinted in the *Journal* of the British Ceramic Society. Mr. Dietz has continued his researches on superpressed plywood, rapid bonding of wooden members and thermoplastic plastics and is completing his experimentation on the stress-strain relations in timber beams as a part of his work for the doctorate. Mr. Whiston has carried on the laboratory work under the National Lime Association grant and has developed some valuable relations between the surface area, plasticity, immobile water content, and bleeding of cementitious matrices.

WALTER C. VOSS.

Business and Engineering Administration

Constructive departmental activities have been largely centered in applying the recommendations made by the alumni the previous year at the convocation which celebrated the twenty-fifth anniversary of the founding of the Course.

As presented in the preceding President's Report, specific recommendations incorporated:

(*a*) Greater awareness of human relationships through the mediums of summer employment at bench and machine, early introduction of industrial subjects, widening of interest in the social sciences, and encouragement in extra-curricular campus activities.

(*b*) Greater understanding of distribution problems extending to the retail selling floor, and greater awareness of the problems of government.

(*c*) Training in the spoken word to the extent that a course in oral expression be required.

(*d*) Enhancement of the student-teacher relationships.

(*e*) Closer contact in the upper years with business executives.

Progress in each of these areas during the past twelve-month period has been as follows:

Summer Employment. For some years the undergraduate requirement of business experience during the Junior-Senior summer has been approved by the department as to amount and nature, such experiences to include employment in industry or commerce, reports on industrial plants or communities, or an advanced course of reading. As a result of the efforts of Professor Fernstrom, nearly one-half of the Junior class obtained summer employment in 1939 with remuneration averaging $22.50 per week. This attainment marks the highest ratio of summer employment thus far. During the past year Professor Fernstrom has corresponded with an increased number of concerns and it is anticipated that current summer figures will show a still higher ratio of industrial placement. Moreover, it appears that a larger number of Sophomore students than ever before in this department have been given summer employment.

Early Introduction of Business Subjects. While the trend

in the departmental curriculum has been toward earlier presentation of business subjects, a definite step was taken in the introduction of a new subject, Field of Business Management (15.01), to be given in the first term of the Sophomore year. This subject orients the entering student to the round of activities involved in managerial work and is designed to assist him in the choice of electives available in the organization of his three-year program.

Interest in the Social Sciences. The development of the new Division of Industrial Relations under the auspices of the Department of Economics and Social Science has opened steadily increasing opportunities for departmental students whose interests lie in humanistic areas. Following a conference with members of this Division, departmental registration officers and thesis advisors have encouraged students to consider elective studies and research investigations in the social sciences.

Extra-curricular Campus Activities. A study of extra-curricular student activities in the department during the past 10 years revealed a vigorous upward secular trend. In order further to encourage student participation in managerial activities of an extra-curricular nature, entering Sophomores were this year advised that final rankings for departmental stabilization of enrollment would be derived from equal weightings of standings on the basis of (1) scholastic achievements and (2) personal qualities giving promise of executive proficiency.

Training in Distribution. Progress here has consisted in a redesign of the method of marketing instruction to permit of greater application of the principle of learning by doing. A proposal for a marketing laboratory has been organized in detail and to become a reality awaits only the necessary funds for the provision of equipment and for space alterations.

Familiarity with Problems of Government. Within the last few years, several new undergraduate subjects relating to government have been made available — notably Professor Schaefer's presentations in Comparative Political Institutions (G79) and American Government (Ec72). Qualified Seniors have also been permitted to take Professor Thresher's graduate subject, Government Control of Industry (Ec78).

Facility in Oral Expression. As a result of a series of con-

ferences with Professor Bartlett, in charge of the English Department, a plan was approved whereby a group of Seniors were assigned to an experimental section of the general study, Biography in Science (G12) where, under the supervision of Professor Eaton, a series of conference presentations were undertaken in a manner similar to that which has proved successful with Course VI-A students, where three or four men report orally upon some phase of a central topic. The results have been found excellent and service to departmental students in this subject will be increased during the coming year. This development, coupled with opportunities for oral expression in practise and in prospect in currently required English subjects, will assure each departmental student ample opportunity for thorough training in the spoken word.

Enhancement of Student-Teacher Relationships. At the beginning of the year each class was invited to attend a dinner meeting with its registration officer and the head of the department. At this time, the students were informed of the great emphasis placed by alumni upon facility in human relationships and of the effectiveness of the principle of learning by doing. Thereafter, a series of afternoon gatherings was planned by a special departmental committee, whereby registration officers met informally with students at four-week intervals, professors held similar meetings after classes, departmental teas were regularly scheduled, and special conferences organized. By grant of funds from the Institute, together with gifts from alumni and others, a departmental Commons Room was decorated and equipped for these activities. Because of these necessary alterations, the program was not undertaken until the last of October. Yet during this foreshortened school year, 73 functions were held in this room, being sponsored equally by this department and the Department of Economics and Social Science.

Closer Contact with Business Executives. The committee further instituted a Junior dinner program by means of which small groups of third year students met for dinner and evening discussion with business executives. During the year a total of 19 meetings were held and served well their purpose of providing additional opportunities for informal contacts between our students and business men.

Fourth year students undertook, in the required Senior subject, Industrial Problems (15.92), a study of executive activities in which eight industrial presidents presented lectures and 83 departmental graduates in executive positions in Greater Boston collaborated. During the progress of the subject, in addition to classroom work, each Senior conducted, as one of a group of four students, five interviews with a selected executive and in addition, five individual interviews with a second executive. Tabulated results of the investigation provided the basis for a dinner meeting and ensuing presentation of findings at which executives and students were present. This is the most ambitious coöperative project of the sort yet attempted by the department.

Other Departmental Activities. The Alfred P. Sloan Foundation of New York made a fourth grant of funds for the continuation of the post-industrial fellowship program during the school year of 1940–41. Eleven men — the largest group thus far — have been selected from a national field of competitive applicants. The average age of successful candidates continues high (over 30 years) with correspondingly extensive industrial experience. Railroads and public utilities as well as manufacturing establishments are represented.

Counting these recipients, the sponsored fellowship program since its inception in 1930–31 will have been extended to a total of 70 men, the last 32 of whom have thus benefited through the generosity of the Alfred P. Sloan Foundation.

The selection of candidates for the annual competition for Sloan Fellowships is now being given consideration by the presidents of well over a thousand progressive American companies situated throughout the country.

An important responsibility undertaken during the year was that of re-aligning the technical curriculum in the Chemical Engineering option to incorporate in largest measure the new advances made by this progressive department. Largely through the introduction of a summer session in qualitative analysis in the interim preceding the second year, opportunity was afforded to enhance the range and depth of ensuing fundamental engineering subjects taught to Course XV students.

During the year the department requested of its Visiting

Committee that a study of departmental status and progress be made with especial reference to opportunities for further close coördination with the needs of industry. The Visiting Committee thereupon appointed a special committee for study and report consisting of Edmund C. Mayo, Chairman, Carl T. Keller and Raymond S. Stevens.

The recommendations of the special committee, all of which were approved by the Visiting Committee, included:

(1) The organization of systematic contacts between teaching staff and industry; (2) The establishment of a practise school for selected students; (3) The maintenance of organized relationships between the department and its alumni; (4) The further raising of standards of selectivity for entering students. To these recommendations, the department will give especial attention during the coming year.

ERWIN H. SCHELL.

CHEMICAL ENGINEERING

A high pitch of activity in both teaching and research characterized the year in Chemical Engineering. Student enrollment continued at the maximum set by undergraduate and graduate stabilization policies, and several new lines of research were inaugurated. In order to keep graduate registration within the quota limit it was necessary to refuse admission to more qualified applicants than in any previous year. It is increasingly evident that new quarters are needed by the department, particularly to consolidate staff quarters and to secure proper space and facilities for the extensive graduate research activities.

The policy of granting research assistantships to superior men who are engaged on extended Doctor's theses is producing gratifying results, as reported elsewhere by the President. The Honors Group, consisting of about eight selected Seniors, is continuing, with some modification in technique being tried out each year. The Honors Group system seems to demand a fresh approach for each new group of students, and the staff effort which it requires is therefore unusually high.

Two new graduate subjects were offered during the year: Applied Electrochemistry, and an informal seminar in Chemical Engineering Economics. Unfortunately the Electrochemis-

try and related research in this field will not be given next year because of budget restrictions, but it is hoped that the work can be resumed later. The seminar program, for men who had completed the work of the School of Chemical Engineering Practice, considered business problems encountered by the practicing engineer, and included discussion with men from industry.

The department's development work of recent years in the field of amorphous materials demonstrated its value in the success of a course on plastics, given by one of the staff under the auspices of the State Department of University Extension. Attended by over 300 men, recruited largely from the industries around Boston, the demand for the course made it necessary to repeat it later in the year in Springfield.

The engineer of the future will be vitally concerned with relations between labor and management. In coöperation with the Industrial Relations Section of the Economics Department, an informal option was organized for a selected group of undergraduates with the object of developing a better appreciation of the human problems of industry. Sophomores who elect this work will spend about 15 per cent of their time during the subsequent three years on a sequence of courses, starting with a basic course in Economics and involving work in psychology, sociology, and several courses on industrial relations. The program does not sacrifice the professional work of the curriculum and the experiment so far seems quite successful.

The Practice School was eminently successful in its program, and again handled the maximum number of students for which it is equipped. Its plant problems, which are assigned to the students for solution, are largely along lines which combine direct interest to the plant with their educational value to the students. Typical problems during the year were: the development and design of an absorption system for making a new bleaching liquor, tests on heat exchangers for cooling acid which led to recommendations for new equipment, and extensive research on open hearth regenerators which will shortly be published.

The investigation of heat transfer and pressure drop for mixtures of liquid and vapor flowing through tubes has been highly productive as a start on development of this important

operation. Experiments on converting water into steam and certain organic liquids into vapor show that the unvaporized liquid wets the tube wall until a condition is reached where perhaps 80 per cent has been vaporized. High coefficients are obtained during this period. Above 80 per cent the liquid is apparently carried as a fine spray and the heat transfer coefficients are greatly reduced. The phenomena are complex and subject to variations with several factors. This work should prove helpful to the design of industrial equipment such as boilers, pipe stills and heat exchangers.

Two important phases of the department's research program on gas absorption and mass transfer were brought to completion. The work of one research assistant on the mechanism of mass transfer between phases, continuing the previous work on eddy diffusion, was completed and published. The extensive experimental data of another research assistant on gas absorption were summarized and published. These results represent the only data generally available for the design of packed towers to absorb relatively insoluble gases. The work is being continued to obtain design data on a number of packings for the case of very soluble gases. The research program on gas absorption in bubble-type equipment was also completed and will be published soon. The results, which apply particularly to the absorption of natural gasoline and refinery gases, emphasize the importance of gas solubility and solvent viscosity on the plate efficiencies obtained in plate equipment.

Exploratory work on the behavior of powders suspended in flowing streams of gases has shown that important conclusions of earlier investigators are unjustified and that further study of this method of transporting solids is essential. Pumping efficiencies hitherto unheard of have already been attained in the laboratory.

Filtration is one of the most obdurate of the unit operations as regards satisfactory quantitative treatment. Employing a new experimental approach, research has been initiated to test the validity of present filtration theory.

The study of radiation from water vapor, started as a project related to industrial furnace design, was continued during the year in coöperation with the University of California

Agricultural Experiment Station as part of a program of studying fruit frosts. Work on those phases of the problem related to furnaces is being continued.

Further research on combustion of heavy fuel oils by photography of the burning of individual droplets has uncovered interesting phenomena associated with the burning process. For example, the photographs show evidences of soot, formed by cracking, which extends behind the burning drop like the tail of a comet.

Several years ago charts were developed by the department presenting the thermodynamic properties of air-fuel mixtures in the internal combustion engine. These charts have proven valuable to the automotive engineer, and a recent grant of funds for extending and improving them has been received from the National Advisory Committee for Aeronautics.

High pressure research has continued along three major lines. The thermodynamic properties of hydrocarbons at high pressures and high temperatures, a knowledge of which is needed for the design of systems for separating hydrocarbons, have been determined for several sets of components. Conditions for the synthesis of organic materials such as alcohols from hydrocarbon gases have been determined. Finally, a start has been made in studying reactions at extremely high pressures, such as 45,000 pounds per square inch, where unusual results may be encountered because of the changed properties of the system.

The general program on thermodynamic properties included an attempt at a basic correlation for many substances which would lead to the preparation of a universal Mollier chart.

Work initiated several years ago on recovery of metals by volatilizing them as chlorides was continued. This process would seem to be particularly interesting for handling low grade ores of the more unusual metals. Special attention has been directed this year to the recovery of beryllium and titanium.

Several investigations in the field of catalysis were initiated. With a view to learning something of a fundamental nature concerning the catalytic cracking of petroleum, an extensive research was completed on the decomposition of normal heptane

in the presence of a nickel catalyst. Under the conditions studied the primary reaction appears to be quite different from that found when the commercially important catalysts for the production of motor fuels are used.

A preliminary investigation was directed towards discovering possible relations between catalytic activity and electron emissivity for oxide type catalysts. If some such relationship could be found it would greatly simplify the commercial development of new catalysts.

In an attempt to evaluate the commercial possibilities of the Bredig arc method for producing colloidal solutions studies were made on the effect of frequency on colloid production. Currents of frequency up to thirty million cycles were used. More desirable results are obtained at higher frequencies.

The study of the equilibria between nitrogen oxides and mixed acids is laying the basis for more satisfactory methods of nitric acid recovery and concentration. A method of recovery of lithium from lepidolyte by treatment with dry hydrochloric acid has been developed which gives high yields with low consumption of reagent in a single treatment of the ore.

Studies in the colloid chemistry of clays in general, and of bentonite specifically, have been continued and extended. The work on Alsifilm, supported by a grant from the Research Corporation, has been attacked from the chemical as well as the mechanical aspect. The results have materially furthered our knowledge of the clay minerals, culminating in a better insight into the structure of clays and the reasons for their varying properties. Investigation of an interesting color reaction between clays and amines which was noticed several years ago has further contributed to this picture.

In the purification of clays by electrodialysis, the continuous introduction of small amounts of acid at the cathode has greatly increased reaction rate and energy efficiency and minimized fluctuations in operating conditions.

Extension of the research on gelation and coagulation of colloidal systems materially substantiates the theory on gelation which was postulated during the previous year.

Work on the vulcanization of rubber under stretch and in inert atmospheres was continued. During the year the Insti-

tute entered into an agreement with the Midwest Rubber Reclaiming Company, of East St. Louis, setting up a research program to study the actual mechanism of rubber reclaiming and to find methods which would permit the reclaiming of synthetic rubbers and the complete desulfurizing of vulcanized natural rubber. A new chemical laboratory has been equipped for this special purpose, a machine laboratory has been set up with the latest types of machinery needed in rubber processing and reclaiming, and a new Research Associate of the Division of Industrial Coöperation has been appointed for the work. Both laboratories are now in full swing. Although actual experimental work could be started only in the latter part of the summer, results so far obtained can be considered promising. Beside the importance of this project from a purely technical or industrial point of view it should offer valuable information on problems of polymerization and depolymerization of high molecular organic compounds exhibiting rubber-like properties. For the purpose of obtaining more insight into the reaction of sulfur with unsaturated hydrocarbons, work has been started to ascertain the mechanism of the formation of so-called rubber substitutes using tung oil and sulfur as basic materials.

An experimental study of the behavior of rubber-like materials toward various gaseous hydrocarbons, combined with a determination of the interrelation of certain of their physical properties as functions of temperature, is already throwing important light on the inner structure of this type of plastics.

Research on surface tension with the pendant drop method originally developed at the Institute a few years ago has been continued. Dr. Lloyd E. Swearingen, Professor of Chemistry at the University of Oklahoma and guest of the Institute for the academic year 1939–40, completed an elaborate study on the surface tension of amino acids and proteins under varying conditions. The results have contributed valuable information on a variety of surface phenomena which are of extreme importance to biological problems. Interesting results were also obtained on the surface tension of solutions of cationic compounds, demonstrating for the first time the importance of the water soluble radical in regard to the degree of surface tension depression obtainable. Unfortunately, no funds have so far

been available to build the improved pendant drop apparatus, but work in this field, which is creating increasing interest throughout the country, will be even more actively prosecuted as soon as a new instrument can be procured.

The study of flow of liquids under varying conditions of rate, etc., using as indicator the stream double refraction of bentonite suspensions of low concentrations, has been started after several preliminary experiments have proven the feasibility of using this phenomenon for the purpose. Informative work has been started on polymerization of various synthetic resins for the purpose of rounding out the picture. A systematic study of the creaming of rubber latex, a phenomenon of both industrial and scientific interest, was successfully completed.

A number of new instruments important to research and training of students in the field of applied colloid chemistry have been added to the inventory, further increasing the effectiveness of the laboratory course in colloid chemistry and of the lecture demonstrations.

Professor Weber's book on "Thermodynamics for Chemical Engineers" was published during the year and has been widely adopted throughout the country. This work meets a need which has long existed for an adequate text prepared from the standpoint of the chemical engineer. Books on amorphous materials and on colloid chemistry and important chapters on heat transmission, radiation, thermodynamics and drying for standard handbooks have engaged considerable staff effort and will appear next year.

Recent appointments from the staff for government work will involve the almost complete loss of one senior staff member and considerable time for two others during the coming year. Fortunately, a policy of flexibility in staff activities has been developed over the years, and it appears that only minor modifications in program will be required.

WALTER G. WHITMAN.

CIVIL AND SANITARY ENGINEERING

The department is continuing its policy of coördinating laboratory research with regular instruction. Much of this research is of such an advanced character as to be applicable

only to graduate courses, but the undergraduate student is made to realize the value of study in unsolved fields and the necessity for developing that technique or art necessary for success in such study. In our laboratories — concrete, soil mechanics, structures, sanitation and seismology — undergraduate and graduate classwork is carried on as well as original research by staff and by graduate students. We believe the effect of this policy is to develop, in the student, ability to tackle the solution of difficult problems and the initiative and courage to assume responsibility, both of which are essential in any engineering career.

The staff of the Soil Mechanics Laboratory has continued the study of consolidation of clay, the development of a strain meter to measure earth pressures, and the determination of the shearing strength of soils by the cylindrical compression method, this last using the apparatus developed by Harold A. Fidler. The United States Corps of Engineers has entered a coöperative research program and has assigned two army engineers to work in the Soil Mechanics Laboratory on a continuation of the study of shearing strength of soils under the direction of Professor Donald W. Taylor.

A year ago summer courses in soil mechanics were offered and were well attended. This year they were repeated and of the 11 students who attended, 9 were from soil mechanics laboratories of the Corps of Engineers.

During the present year two major projects of the Structural Laboratory were: The development of an electric contact lateral extensometer for measuring the changes in the thicknesses of bakelite models to be used in photoelastic stress determination, and the development of an instrument to locate points of zero moment in models of rigid frames, such as building frames. We have called this instrument the inflection indicator. A brochure describing the recent research of the Structural Laboratory for 1938–39 was published this year. Professor Wilbur has been acting as consultant on a power project of recent and unique development.

The Earthquake Analyzer has been studied experimentally and developed into final form during the year. Calibrations and initial tests have been made. A preliminary report pre-

sented at the June meeting of the Eastern Section of the Seismological Society of America in Cincinnati received wide press coverage through the agency of the Technology News Service. In coöperation with the United States Coast and Geodetic Survey an extensive study of strong motion earthquake records is planned. Professor Ruge has coöperated extensively in thesis and research work in the departments of Aeronautical Engineering, Naval Architecture, Mechanical Engineering, and Electrical Engineering in connection with the application of the Ruge-de Forest electrical strain gage.

The Cement and Concrete Laboratory facilities have been further extended. Considerable progress has been made on studies on volume changes in concrete. Professor Carlson has acted as consultant on concrete for the Tennessee Valley Authority, Bureau of Reclamation, and the War Department.

A new subject entitled Sanitary Engineering Laboratory was offered by the department for graduate students in Sanitary Engineering. The purpose of this subject is to train students in methods of development of processes for treating water and sewage. This subject, which was taught by Mr. Philip C. Stein in the Sanitary Engineering Laboratory, was received with interest by the students. It is being offered again the coming year with increased laboratory facilities.

The research program on the theory of filtration of water through sand was completed by Mr. Stein and submitted in June as a thesis for the degree of Doctor of Science. The results obtained in this study are noteworthy and will form the basis of important future research on filtration.

Experimental studies of the effect of temperature upon the time of formation of floc in water and sewage treatment have been completed. These studies indicate that temperature has no effect if flocculation takes place at the optimum pH value but that the optimum pH value does vary with temperature.

Further studies of short-circuiting through model mixing chambers have been made, by means of dyes, in order to compare shapes and types of mixing chambers. Comparative studies upon the types of floc formed in continuous flow and batch mixing chambers have also been made.

Experimental studies upon the effect of turbulence on

sedimentation of discrete particles in water are now in progress. The purpose of these studies is to check and extend the theory developed by Professors Camp and Wadsworth.

During the winter Professor Reynolds gave a series of 18 lectures, the John R. Freeman Lectures on Hydraulics, sponsored by the Boston Society of Civil Engineers. An experimental program was completed for the United States Corps of Engineers which involved a model investigation of a proposed spillway for a New England flood control project. The River Hydraulic Laboratory is continuing the long-time investigation of flow in open channels under varying conditions. We are indebted to the Boston Office of the Corps of Engineers and to the Watertown Arsenal for furnishing hydraulic thesis equipment.

Professor Russell continues on the Advisory Board of the United States Coast Guard Academy at New London, Connecticut. He delivered a series of lectures on hydraulics before the New England Water Works Association. Additions to the experimental apparatus of the Hydraulic Demonstration Room have been made, which have proved to be of great value in aiding students to visualize the effect of basic hydraulic laws.

In the transportation field Professor Breed has continued to act as consultant to the Attorney General of Massachusetts on the proposed abandonment of the Old Colony Railroad. Professor Bone has supervised research on the economic significance of traffic delays.

The policy of extending the facilities of the Summer Surveying camp at East Machias, Maine to outstanding students of other technical institutions has been continued. A number of students availed themselves of the opportunity this year.

For several years we have operated a continuous record seismograph station at our Summer Camp in coöperation with the United States Coast and Geodetic Survey. This year, at the request of and in coöperation with the Survey, arrangements were made to establish a station for magnetic observations.

Professor Peabody received the annual prize given by the Designers Section of the Boston Society of Civil Engineers for his paper on "Continuous Frame Analysis of Flat Slabs."

Members of the staff have given active service on many

committees of technical societies and have contributed several original papers and discussions on timely subjects.

The retirement of Professor Spofford and Professor Barrows takes from our department two distinguished educators and practicing engineers. Professor Barrows will continue through the coming year as an honorary lecturer.

Many of the older graduates of the department will be interested to learn that an excellent portrait of Professor George F. Swain, former head of the department, has been painted and will be hung this fall in the department headquarters. This portrait was made possible through gifts of his former students. His dynamic personality and superior ability contributed much to the reputation of the department.

CHARLES B. BREED.

ELECTRICAL ENGINEERING

Significant progress can be recorded for this department during the year in all phases of its activity ranging from undergraduate training through graduate training to research activities and their inter-relations.

In the undergraduate program a conspicuous milestone was reached in the Curriculum Revision Project when the first volume of a contemplated unified series of texts covering the Principles of Electrical Engineering appeared on June 10, 1940. This volume, entitled *Electric Circuits*, with the Electrical Engineering Staff as authors, was evolved through the extended coöperative effort of many individuals. As an undergraduate text its scientific tone is undoubtedly high, though in the words of Dr. Compton's Foreword "It should appeal to the student of ordinary preparation and also provide a depth and rigor challenging to the exceptional student and acceptable to the advanced scholar."

Four more subsequent volumes are evolving through the medium of planographed notes used in the Principles of Electrical Engineering sequence of undergraduate subjects. This combined curriculum revision and note-writing activity has made great demands on staff time and talent for several years and is not yet near completion, but the effort has already yielded

most valuable though partly intangible benefits to the staff from the enforced blending and coördination of many different ideas, points of view and professional interests. These benefits to staff are, of course, immediately felt by the students.

In the Coöperative Course, VI-A, the General Radio Company has joined the group of coöperating companies, and affords an unusually comprehensive experience to students in the development and manufacture of intensively engineered measuring apparatus and electronic appliances. Course VI-A students have this year again enjoyed ample works experience of high educational value.

As an important correlative to formal study the Student Branch of the A. I. E. E. has continued excellent programs of student papers which are partly responsible for David B. Hoisington, VI-C, 1940, winning first place in the Stratton Prize Contest. During the past 10 years Electrical Engineering students have received 11 prizes, including six firsts, which is indicative of their serious interest in speaking ability under excellent staff encouragement. Also, the local Chapter of the honorary Electrical fraternity, Eta Kappa Nu, formed last year, initiated several constructive conferences between student and staff groups to consider student suggestions, and undertook several other helpful projects.

The Vail Library, one of the more important of the department's educational facilities, benefited by the transfer to its endowment of nearly $30,000 accumulated funds from the Quebradas holdings. Partly as a result of this, a new office for the Vail Librarian and her assistant was built during the past summer which will markedly facilitate their work and also relieve somewhat the crowded main Library offices. This endowment increase will also permit more nearly maintaining the outstanding position of the Vail Library. This year's experiment of having an electrical graduate as an Assistant Vail Librarian has proved very successful.

Several programs such as the sophomore orientation course, the important Honors Group Plan, the individual laboratory project discussed in last year's report, continue without major change. It is expected, however, that with the completion of part of the curriculum-revision program, further staff effort

will be available to the development of the Honors work along contemplated lines.

Placement of graduates was satisfactory even prior to the intensive National Defense activity which will eliminate any placement problem during its existence. Candidates for advanced degrees were all placed prior to receiving degrees as were all well-qualified undergraduate candidates. The numerous requests for men with special training in advanced fields such as ultrahigh frequency, automatic control, and power-system analysis, including the Network Analyzer technique, demonstrate the direct educational value of these programs.

Research activity has been at a very high level during the past year in both extent and significance, space limitations permitting only the briefest sketch.

Conspicuous for its importance and scope is the ultrahigh-frequency program directed by Professor Bowles which has enjoyed extensive support from numerous sponsors and which is giving the Institute an enviable scientific standing in this field. Professor Barrow's emphasis on radiation and detection was aided by a sponsored project on ultrahigh-frequency antennas. Measurements of dielectric properties of materials at microwave frequencies using suitably terminated hollow pipes and coaxial cables and a remarkably simple centimeter-wave magnetron were developed, aided by sponsorship by the International Telephone and Telegraph Company. Aided by support from Dr. Alfred L. Loomis, a study of microwave propagation, significant in communications and likely in meteorology, was initiated and was followed by summer coöperative microwave research at the Loomis Laboratory at Tuxedo Park, New York, where three of the Institute staff worked. The Institute's work on instrument landing of airplanes using microwave beams continues vigorously. Under Sperry Gyroscope Company sponsorship, a localizer beam was developed this summer complementing the glide-path beam already developed under Civil Aeronautics Authority sponsorship. Work under a third contract with the Civil Aeronautics Authority signed this summer contemplates a complete experimental microwave instrument landing installation at the Boston Municipal Airport from which detailed specifications for commercial installations can be

drawn. This work follows closely the recommendations of the Committee on Instrument Landing Equipment of the National Academy of Sciences. Through the Sperry Gyroscope Company the microwave program has the benefit of the Stanford klystron generator in the form of numerous tubes not commercially available, and the assistance of Dr. William W. Hansen of Stanford University, an outstanding authority on both theoretical and experimental microwave techniques, who will be here much of the year 1940–41. The entire ultrahigh-frequency program has benefited from the substantial aid of many individuals and groups outside the department, a convincing commentary on its vigor and value.

Another major research activity is that of the Center of Analysis directed by Professor Samuel H. Caldwell which was set up last year under a grant from the Carnegie Corporation of New York and is built primarily around the new Differential Analyzer, developed and constructed under grants from the Rockefeller Foundation. While last year's hope of full operation by this date has not been realized, most of the component parts have successfully operated as units. These include integrator-setting units; ratio gear units; tape mechanisms for feeding setup, gear-ratio, and initial-setting data into the machine; and the crossbar system for interconnecting the teletorque drives of various units. The director system which was one of the several entirely new developments has required more than the estimated time but is well along so that with an additional Rockefeller Foundation grant now available the time of initial operation appears near at hand, a time which will undoubtedly mark the start of a new era in mechanized calculus.

Though lacking its major tool, the Center of Analysis has had a good year with extended use of the original Differential Analyzer. The very successful Summer Conference on the Differential Analyzer is described in the Summer Session report. In addition, an associated extensive development of electronic numerical computation, sponsored through Research Corporation, has achieved several highly significant results.

In the Insulation Laboratory under Professor von Hippel further studies on electric conduction and breakdown from the

atomic physics point of view have shed new light on the fundamental mechanisms involved. The International Telephone and Telegraph Company's aid in this laboratory's part in the ultrahigh-frequency program has furthered progress toward its goal of establishing techniques and facilities for determining the response of materials to electromagnetic radiation throughout the range from long radio waves through X-rays. Studies on dry rectification and photoelectric effects in solids, integral parts of the fundamental insulation problem and aided by the Solar Energy Research are progressing.

The program on servomechanisms and automatic control inaugurated by Professor Gordon S. Brown has had notable success during its first year in both its research and graduate instruction aspects. The laboratory is rapidly growing aided by loans of apparatus and the demand for men trained in this field is large.

In the high-voltage X-ray field progress includes construction and preliminary tests of both the Godfrey M. Hyams Trust 3-megavolt X-ray and cathode-ray generator and the American Oncologic Hospital very compact 1.2 megavolt X-ray generator, both using gas-pressure insulation, the former located in a building (Building 28) specially constructed under the Hyams' grant for this and subsequent research. The initial atmospheric-pressure-insulated generator at the Huntington Memorial Hospital has been in continuous use for three years on a complete treatment series for over 1,000 patients with definitely favorable results on certain types of deep-seated malignancies. The second unit built, the first to be pressure-insulated, has been installed in the George Robert White Memorial Building of the Massachusetts General Hospital and in use there for cancer therapy since April 1940. The assistance of several physicians from this hospital but in residence at the Institute, each for a period of a few months to learn the electrotechnical aspects, has been most helpful. Paralleling the development of actual units are researches on various problems associated with very high-voltage generation and solid and compressed-gas insulation. Professor Trump continues in charge of these developments, with the collaboration of Professor Van de Graaff of the Department of Physics.

The oil research, continuing under Professor Balsbaugh's direction, sponsored partly through and by the Engineering Foundation, and supervised by the Committee on Research of the American Institute of Electrical Engineers, has resulted this year in techniques yielding highly reproducible data on the oxidation of oils, and in valuable data on extensive series of highly fractionated oil samples.

Under Mr. John H. Howard's immediate direction, a working laboratory unit of the Rapid Selector, originated by Dr. Vannevar Bush and developed under grants through Research Corporation by the National Cash Register and Eastman Kodak Companies, has been completed which meets all of the original performance specifications. Currently, studies are in progress to determine possible applications together with further developments and extensions to the machine itself.

A study made a year ago by Professor Bennett on microfilm for the Committee on Scientific Aids to Learning resulted in (1) the design of a very inexpensive microfilm reader, about 600 of which are to be produced and distributed by this Committee for trial; (2) a program now under way at the Institute, sponsored by the Committee, to develop and determine the usefulness of sheet microfilm for scholarly purposes.

This spring funds provided by guaranteed commercial use permitted the enlargement and removal to a better location of the Network Analyzer. This device is in very nearly continuous use either by graduate students for whom it provides a training much in demand, or by utilities for whom its location in a disinterested institution is often of material value.

In illumination, the application of the integral equation made possible by the Cinema Integraph and newly applied numerical and approximate analytical methods has resulted in advances in the basic methods of lighting calculation. Professor Moon has coöperated in several Institute lighting investigations and designs, including those for the swimming pool, Department of Biology, the dormitories, as well as in studies with the Department of Architecture. Work on the reflecting properties of surface continues. The Cinema Integraph has also been applied to the solution of integral equations arising in several other fields.

Acoustic research as a joint project with the Department of Physics on sound absorption has led to new types of sound source and to further useful precise methods of measuring acoustic impedance.

Professor Edgerton's work on very short light flashes shows continued vigor in new developments and new applications.

The foregoing resumé of research in the Department is necessarily incomplete, failing to cover numerous interesting and valuable investigations completed or under way, several of which are an integral part of the National Defense program.

Notable staff recognitions include the following:

Professors Bowles and Caldwell are members of the National Defense Research Committee headed by Dr. Bush. Professor Bennett has been in Washington during the summer and is on leave for the first term of the coming year in a responsible capacity on important National Defense work. Professor Balsbaugh was Chairman of the Boston Section of the American Institute of Electrical Engineers. Professor Barrow held the same position in the Institute of Radio Engineers and was also general chairman for the National Convention of the IRE held in Boston in June 1940. Professor Timbie, who a year ago was a vice-president of the A. I. E. E., was this year Chairman of Research Day in Boston. It may be noted that the Alfred Noble Prize, received by Dr. Claude E. Shannon of the Department of Mathematics, was for a paper based on his S.M. thesis in this department. Numerous other staff members were active in professional society matters.

Dr. Hoadley served as an Honors Examiner for Swarthmore College. He has accepted an Assistant Professorship at the Brooklyn Polytechnic Institute for the coming year. Drs. Neitzert and Howell have accepted similar posts at Stevens Institute of Technology and Tufts College respectively.

HAROLD L. HAZEN.

MECHANICAL ENGINEERING

During the year, the staff has made an extensive review of the curriculum in Applied Mechanics. Based on the findings

of this survey a somewhat drastic revision of course content, method of development and required texts seems necessary to accomplish two objectives: to strengthen the subject of dynamics and to bring the content more closely into line with current industrial needs. The change-over will be made for the sophomores in 1940–41, and the new program will be in complete effect in 1942–43.

The reorganization of the second year courses in Machine Drawing and Mechanism, initiated last year, has been advanced through the development of a new course in Engineering Kinematics which replaces the earlier courses in Mechanism. The modification serves as a pedagogical liaison between training in the principles of kinematics offered in the courses in Applied Mechanics and succeeding applications in Machine Design; and furthers coördination in the fundamental courses underlying training in design. Professor Sloane has completed a new text in Engineering Kinematics for the altered program.

A graduate course entitled "Advanced Mechanical Engineering Problems" was developed by Professor Soderberg this year for fifth year students in Mechanical Engineering and for Marine Engineers. It treats problems of current significance in the design of machinery by application of previous studies in dynamics, elasticity, strength of materials, etc. About 35 students elected this course.

The Department of Mathematics has coöperated with the Departments of Mechanical and Aeronautical Engineering in framing a new course in Applied Mathematics to include those portions of mathematical science most useful to graduate students in these fields of engineering.

Honors Course. Eight seniors, Class of 1940, who elected at the end of their junior year to follow the Honors Course in Mechanical Engineering through their senior and graduate years, leading to both Bachelor's and Master's degrees in 1941, have satisfactorily met the requirements to be admitted to the graduate year with scholarship grants covering full tuition for the graduate year. By devoting the time usually allotted to the Bachelor's thesis to subjects preparatory to the studies to be followed in the graduate year, and making their Master's thesis more extensive than ordinary, it is believed that these

students will obtain a better professional training than they would from a graduate year of study following the regular four-year course.

Army Ordnance. In June, 22 officers of the Ordnance Department of the United States Army completed the course leading to the degree of Master of Science. Twenty-five officers had been detailed here to follow this course for the next academic year. The War Department, however, found it necessary to order them to active duty and the course will be temporarily discontinued.

Textile Technology. The degree of Master of Science in Textile Technology was established this past year. A fundamental research program, under the auspices of the Textile Foundation, concerned with the study of creep and creep recovery in individual fibers, has been carried on. This work is producing the first authoritative data on the plastic and elastic properties of textile fibers and is correlated with the study of molecular orientation of fiber structure being conducted under the same auspices. The latter phase of the program has resulted in a simplified and rapid technique for the measurement of specific refractive index of fibers as related to fiber structure and fiber property problems. No similar work is being done to our knowledge elsewhere.

The laboratory staff has developed rapid techniques for preparation of precise cross sections of textiles (from blankets to single filaments) employing the newer synthetic resins, which are being adopted by the industry. Studies of improved methods for measuring flexural rigidity of fabrics subjected to various finishing treatments have resulted in a series of five papers, together with a photoelectric device for precise measurement of twist in single cotton or staple rayon yarns.

Lubrication. A research project on the effect of surface finish of machine parts has been undertaken for the Chrysler Corporation. This includes two major lines of investigation, namely: the effect of surface finish on the performance of a steel journal running in a babbitt bearing and the study of the metal removed from a steel shaft during "running-in" as measured by the iron collected in the oil. The results will be published shortly.

A pendulum machine has been constructed to study boundary lubrication and also an apparatus for the study of the mechanism of friction at very slow speeds and the stick-slip phenomenon involved in wear and galling.

Machine Tool Laboratory. There has been a further increase in the number of students using the laboratory. Increase in registration in certain engineering courses made it necessary to have an additional session in both lecture and laboratory in many of the subjects listed in the catalog. It was also necessary this summer to run the Machine Tool Laboratory for two consecutive summer session periods. The laboratory is being used more and more by people outside regular classes. During the first term of this year nearly 150 such persons used the laboratory.

There has been no change of major consequence in equipment. It looks improbable that any such change can take place now with the machine tool industry concentrating on National Defense. We are reaching a very serious condition, however, in the age of many of the tools. A definite program extending over a period of years must be initiated for replacement and repair of the present equipment.

Refrigeration and Air Conditioning. These laboratories continue to be actively used by students for thesis research. Only minor equipment changes were made.

Photoelasticity. Interest in this subject is increasing, with doubled registration for the elective, "Applied Photoelasticity." Research in three dimensional and dynamic problems has been successfully inaugurated.

During the year a large polariscope has been designed and built in the department and a small exhibit of Photoelasticity has been set up. Photoelastic pictures from the laboratory have been shown in both the A. S. T. M. and A. S. M. E. photographic contests.

A new development has been the introduction of a special course in Photoelasticity in the Summer Session, designed primarily for industry and for students and instructors from other schools.

Metal Processing. A research on the flowability of molding sands was reported to the Chicago meeting of the American

Foundrymen's Association. Additional minor equipment for foundry, welding and metal working process study was acquired by gift and loan. Instruction has been altered to include properties of non-metals, such as plastics, rubber, glass and protective coatings.

Tests on the surface endurance limits of materials have been continued. At present, a series of ground and "superfinished" surfaces in rolling and sliding contact are being tested to determine the influence of surface finish.

Preliminary tests have been made on the influence of errors on the strength of screw threads. As was anticipated, errors in lead appear to result in a measurable reduction in strength; but so far, the most critical error appears to be lack of squareness of bolt head and nut with the axis of the thread. An error here, of three or four degrees, appears to reduce the ultimate strength of the thread about 20 per cent. This work is under the auspices of the A. S. A. Sectional Committee on Screw Threads.

A method for analytical cam design has been developed, and a research in coöperation with a large machinery manufacturer is being started to determine the dynamic loads on cams, to check the practical application of the theoretical analysis.

Heat Measurements. The laboratory has continued the investigation of the variation of heat transfer across air spaces. A copper block comparator has been added for the more accurate calibration of thermocouples between fixed points. Thesis projects have investigated the effect of humidity on the thermal conductivity of insulating materials as well as building walls. A study of the thermal conductivity of crystals at high temperatures has been started in conjunction with the Metallurgy Department.

Dynamic Strength. The high-speed, three-element, cathode-ray oscillograph has been used for the study of explosions in water and the propagation of impact pressure waves in steel bars of various shapes. The equipment has also been used on impact strength of steel. Plans have been made for continuing coöperative work with the Navy on submarine explosions and means of measuring their effects.

A large amount of work was done in the investigation of an airplane crash. In conjunction with the Department of Metallurgy evidence was uncovered which led to practical conclusions. A paper on the subject of stresses in airplane-engine cylinders is in preparation describing the technical aspects of the work.

Previous development of the "brittle varnish" method of strain analysis has progressed very satisfactorily and the method has been turned over to a commercial organization for exploitation. Two of our former students are in charge of this work.

Plasticity. During the past year considerable time was spent in developing and equipping a new laboratory for Mechanics of Materials (Plasticity). A new hydraulic testing machine of 60,000 pounds capacity was installed and the following equipment designed and constructed here: a 5,000 pound capacity compression machine, a lathe comparator for measuring plastic deformations, an apparatus for studying elastic recovery, various strength theory models, and photographic and apparatus displays.

The following investigations were carried on through the year: True Stress-Strain and Reduction in Area Tests Leading to New Definitions of Ductility; Effects of Speed of Testing, Hardness, and High Temperatures on True Stress-Strain Relations; Residual Stress Tests on Necked-Down Tensile Bars; True Stress-Strain Relations for Rubber. Combined-stress tests, both static and dynamic, have been started. Four papers covering this work were published during the year.

Automotive. The increasing number of students using the Sloan Automotive Laboratory for research and thesis work, together with an increase in the number of research projects for government and industry, has led to crowding of facilities.

Fortunately, through the generosity of Mr. Alfred P. Sloan, Jr., funds were made available for an extension to the Laboratory, which will increase its capacity considerably. The entire staff in automotive engineering can now be housed together, which should lead to increased efficiency. The gift of Mr. Sloan includes funds for additional testing equipment for use in the field of aircraft engines.

Research projects completed during the year include the second phase of a research for the National Advisory Committee for Aeronautics on the two-stroke engine. Results of this were published in N. A. C. A. Technical Note No. 756, entitled "The Effect of Piston Head, Cylinder Head Shape and Exhaust Restriction on the Performance of a Piston-Ported Two-Stroke Engine." The second phase of the study of the charging process of the four-stroke engine for the N. A. C. A. has also been completed, and a report is in process of preparation. A third N. A. C. A. project is a continuation of the research on detonation. Several projects have been undertaken and completed for private industry.

Two notable contributions in the field of internal combustion engines were made by students. One of these, by Mr. P. M. Ku, was in the field of heat transfer from the cylinder gases, and the other by Lieutenants Booth, Dodson and Metsger on the fundamentals of some carburetor elements. Student theses in many cases resulted in contributions of importance.

Professor E. S. Taylor was called to Washington in May to join the staff of the Advisory Commission to the Council of National Defense for expert services in matters connected with the production of aircraft engines. Professor C. F. Taylor read a paper entitled "An Analysis of the Scavenging Process in the Two-Stroke Engine" at the summer meeting of the Society of Automotive Engineers. At the same meeting Professor D. A. Fales presented a paper on the subject of motor vehicle safety.

A high speed C. F. R. variable compression engine and electric dynamometer set-up, capable of speeds in excess of 3,500 RPM, has been added to the laboratory equipment.

The N. A. C. A. will sponsor three more projects for next year, and a project on engine efficiency for the Wright Aeronautical Corporation will be continued. These projects form an excellent backbone of work for the laboratory in addition to the normal load of teaching and student research. In view of the close connection of many members of the staff with the Department of Aeronautical Engineering, and with the aeronautic industry, it is planned to direct the course of staff research largely toward the aeronautic field. With the new

addition to the laboratory, which should be completed before the end of 1940, the automotive division may look forward to a period of increased usefulness, particularly in view of the close association between automotive engineering and National Defense.

In December, the Tenth Semi-Annual Meeting of the Eastern Photoelasticity Conference was held here under the auspices of this department, and had an all-time record in attendance. The proceedings have been published by us and are receiving very favorable comment.

In June, the department, in coöperation with the department of Metallurgy, called a special three-day Conference on Friction and Surface Finish to consider the fundamental problems in this and the allied fields of wear, seizure and lubrication. The meetings were attended by about 175 engineers of the machinery, metal cutting, grinding, lubrication and other industries, and by research men employing the disciplines of physics, chemistry, and mechanics to these problems. The Proceedings will be published by the department with funds supplied by the sponsor of our research in this field.

The Atlantic City symposium of the American Society for Testing Materials on "The Application of Mechanical Test Results to Design Problems" was organized by Professor Lessells, who acted as the Chairman.

Professor Lessells continues to act as editor of the *Journal of Applied Mechanics*, and the writer as editor of the *Journal of the Aeronautical Sciences*.

J. C. HUNSAKER.

METALLURGY

The department has completed a successful year in terms both of enrollment and of the professional activities of the staff. The quota limit was reached in all three years and a large number of students from other departments elected metallurgical subjects. There was also a gratifying increase in the number of candidates for the doctorate electing Metallurgy as a minor field. Twenty-five regular Army officers detailed to Watertown Arsenal did much of their work under the direction of the

department staff as most of their Master's theses were in metallurgical or closely allied subjects.

Very few physical changes have been made in the laboratories during the year. Additions to the equipment of the Ceramics laboratories have been made and a much needed furnace for the heat treatment of metals under controlled atmosphere was given to the Heat Treatment Laboratory.

The general teaching program has been revised for the purpose of including as much fundamental material as possible in the first three years, thus postponing a selection of the special field of Metallurgy until the senior year. The number of highly specialized subjects in Mineral Dressing made a separate option necessary in the fourth year. The schedule has also been made more flexible by reducing the number of required subjects in the fourth year and allowing a wide choice of professional electives.

The addition of the program in Mineral Dressing to the department has necessitated changes in physical equipment and in the teaching program. Under Professor Gaudin's direction the Ore Dressing laboratories in the Mining Engineering Department have been completely rearranged and much new equipment has been added, providing greatly increased facilities for fundamental studies in the field. Special attention will be paid to Flotation and to the applications of microscopic techniques to problems of mineral dressing.

The greatly enlarged National Defense Program and especially the increase in airplane production have made heavy demands on Professor Homerberg's time for advice on the uses of nitriding and nitrided parts in the construction of Army and Navy equipment.

The induction furnace equipment installed in Professor Chipman's laboratories two years ago has been in constant use and has proved to be ideally adapted to the purposes for which it was designed. Three technical papers have been presented during the year, the experimental work for four additional papers is complete, and these will be given shortly. Dr. Chipman served as a member of the Executive Committee of the Iron and Steel Division of the American Institute of Mining and Metallurgical Engineers and was Chairman of its Com-

mittee on the Physical Chemistry of Steelmaking. Dr. Fetters' work under a grant from the National Open Hearth Committee was so successful that their Executive Committee has decided to continue a graduate fellowship grant of $900 a year for a three-year period. In June Professor Chipman was awarded the honorary degree of Doctor of Science from the University of the South, his Alma Mater. Working with Professor Chipman, Professor Floe has completed an investigation of the solubility of sulfur dioxide in molten copper which will be published in the near future.

Interest in Professor Wulff's work in Powder Metallurgy continues to increase. Twenty-two students registered for class instruction of whom eight took additional laboratory work. Eight Bachelor's and three Master's theses were selected in the field and Dr. Volterra carried out a year of post-doctorate study. Professor Wulff is seriously handicapped by lack of space and facilities for experimental work. A conference in Powder Metallurgy was attended by almost 200 visitors from all parts of the country and was so successful that Professor Wulff has had many requests for another meeting next year.

ROBERT S. WILLIAMS.

MINING ENGINEERING

The year marked the end of the Mining Department which had existed from the very beginning of the Institute. This last year saw no let down in carrying on the courses in mining, although instruction was confined to senior and graduate students. It saw also the beginning of a new era of the teaching of ore dressing under Professor Gaudin, who has already laid out the curriculum for the ore dressing option in Metallurgy, has made a good start on a program of correlated research on fundamentals of flotation, and has started the modernization of the Richards Ore Dressing Laboratory.

Professor Gaudin's new book, *Principles of Mineral Dressing*, came off the press, and likewise the third and entirely revised edition of the Richards and Locke *Textbook of Ore Dressing*. Professor Bugbee has completed the manuscript of the revision of his book on fire assaying for a third edition.

Dr. Reinhardt Schuhmann, Jr., spent the midwinter vacation period at the Tuscaloosa, Alabama, station of the United States Bureau of Mines studying some of their problems and methods, and continued this work at Tuscaloosa for a month during the summer. Professor Gaudin made a trip to Cuba during the winter to investigate the problem of dressing Cuban manganese ore. We are greatly indebted to Dr. Walter L. Whitehead of the Department of Geology for a fine performance carrying on the instruction in petroleum production during the year. The members of the department were much saddened by the untimely death of their former colleague, Dr. Horace T. Mann, which occurred at the Missouri School of Mines on February 8.

Among the important items of staff and student research should be mentioned the geophysical survey of Cape Cod by magnetometric methods, the development of portable sand and gravel plants, the design of a special tool for directional drilling of oil wells and of an apparatus for measuring the so-called viscosity of oil well drilling muds, the evaluation of oil fields and studies of various fundamental aspects of flotation and comminution, including the effect of size on the rate of flotation of galena particles which involved the development of a radically new sedimentation balance for the determination of size distribution of particles, the effect of calcite on the flotation of galena, the activation of quartz for flotation by soaps, and the determination of small contact angles between air bubbles, ore particles, and water. As a result of these investigations one paper has already been published and other manuscripts have been submitted for publication.

Two fellowships have been established in flotation research, one by the Dow Chemical Company and the other by the Cuban Mining Company. The Cuban American Manganese Corporation has sponsored a research program with the coöperation of Professor Gaudin, through the Division of Industrial Coöperation.

The long record of the Mining Department is one in which the Institute may well take pride. Among the members of its staff have been men who were leading figures in the profession and among its graduates have been men who reached positions

of high responsibility and contributed in a large measure to the development of mineral resources all over the world and thus as Technology men to the fame of the Institute. May the future have something even better in store for us under the new program!

CHARLES E. LOCKE.

NAVAL ARCHITECTURE AND MARINE ENGINEERING

As reported last year, with the continued activity in shipbuilding, the graduates of Course XIII have had no difficulty in obtaining positions. Although the department is carrying as many students as the present staff and facilities can handle efficiently, it is believed that many more graduates might be placed if they were available.

Commencing with the academic year 1940–41, a new three-year course in Naval Construction and Engineering will be established to supersede the present three-year course in Naval Construction, and also the present course in Naval Engineering, two years of which are now spent at the Postgraduate School at Annapolis, and one year at the Institute. The present course in Naval Construction will therefore be discontinued in 1942 and that in Naval Engineering will be discontinued in 1945. The graduate course in Marine Engineering for civilian students will be continued, however, if conditions warrant.

During the past summer, a third group consisting of eight students in the course in Marine Transportation was placed with various steamship companies for their required year of sea duty. During the academic year 1939–40, the first group to go to sea under the new five-year course returned to the Institute as fifth year students. A decided improvement in progress was noted, as these men had obtained a practical knowledge of ships, ports, and ship operation which was noticeably absent in previous classes.

Beginning in 1940–41 opportunity will be offered to graduates of courses in Naval Architecture to work for the degree of Master of Science in Naval Architecture, in which case the student's program must include certain new subjects given by this department.

During the year the undergraduate course in Naval Archi-

tecture has been given by Lieutenant Commander R. M. Rush U.S.N. In the past this subject has been given to a combined class which consisted of undergraduate civilians and post-graduate naval officers. In view of the disparity in the preparation given to these two different groups, Lieutenant Commander Rush has recommended that the two groups be separated whenever conditions warrant. It is hoped that this recommendation can be placed in effect, either wholly or in part, during the coming year.

The propeller tunnel has had its final calibration and all gauges are now complete. Tests in coöperation with the United States Experimental Model Basin have been carried on, and special thesis work by civilian and naval students has also been undertaken. Experimental work and the construction of special apparatus for the manufacture of model propellers has been started, both of which indicate a practical and satisfactory solution of this difficult problem.

H. H. W. KEITH.

SCHOOL OF SCIENCE

BIOLOGY AND PUBLIC HEALTH

The year has been one of noteworthy progress, both in the development of scholastic and research procedures and in establishing new provision for more efficient and convenient conduct of the work of the department in the coming years. Educationally, the department has maintained a high degree of effectiveness, and without making any extended changes has enlarged and advanced its scope in several directions.

The great congestion under which the department has labored for many years has been relieved, at least temporarily, by extensive space changes, which will be of great benefit and permit unhampered conduct in several fields. The allocation to the department of a portion of the first year laboratory of physics has permitted the expansion and centralization of the teaching, and research laboratories and an adequate animal room have thus been provided. These laboratories are already in use. Another result of this change has been to permit the work in Biological Engineering and Biophysics to be advan-

tageously centered and expanded in the rooms in Building 3 which the department has occupied for the past two years. A well-equipped machine shop for construction of apparatus has also been established in what was formerly an inadequate lecture room.

Three large rooms in the basement of Building 35, formerly held by the Mechanical Engineering Department, have now been renovated and equipped to afford increased facilities for the work in Food Technology by providing space for an undergraduate laboratory, a semi-commercial or "practical" laboratory, and for a graduate laboratory. In addition, two small research rooms and a commodious dark room ample for use of optical instruments and for special types of research in fermentation, as well as for photography, have become available.

As a result of the transfer of the laboratory and research activities in these fields to new quarters and of other changes which will result in more intensive use of some of the original laboratories in Building 10, it has also been possible to provide a half dozen research units for graduate students and office-laboratories for an augmented teaching staff. These changes go far toward meeting the essential space requirements of the department for the present year and possibly for two or three years. Complete relief cannot be obtained, however, until the long-hoped-for Biological building unit becomes a reality.

Academically, a few minor changes in courses and one important new program have been brought about. Responding to what seemed to be a real need and demand from teachers and health department workers, the first term of a summer program involving four summers and leading to the Certificate in Public Health or the Master in Public Health was begun auspiciously in July of this year. The registration comprised more than 20 students, either teachers or those normally engaged in some form of public health activities, who can thus utilize the summer months in advanced study. The program is so organized and adjusted that a student who finds it possible to do so could advantageously continue his program during the succeeding regular academic year. This curriculum was under the special charge of Professors Turner, Horwood, and Williams. The degree, Master in Public Health, was authorized during the

year. The program is designed especially to meet the needs of physicians or college graduates who have majored in health work, but having a background less technical in character than our undergraduate course.

During the early part of July a week's program arranged by Professor Turner and dealing with Community Health Problems was given for school superintendents sent to us by the W. K. Kellogg Foundation of Battle Creek, Michigan, with which the department has coöperative relations. About 20 men from the State of Michigan were in attendance. Several members of our staff were responsible for the lectures and conferences which were held.

During the late summer a three-weeks' program in Food Technology was conducted by Professor Proctor, which was attended by about 25 men representing numerous food industries and food control divisions of large health departments. This is a good example of one form of service which the Institute renders to the public or to industrial groups.

The department is happy to participate in the daily chemical and bacteriological supervision of the new swimming pool. The carefully worked out program arranged by Professors Camp, Horwood and Jennison, together with special studies which are projected, makes this great addition to our recreational facilities also an installation which can be used for new lines of real research in swimming pool sanitation and control.

The outstanding events of the year in this department have undoubtedly been the generous provision of a fund by the Rockefeller Foundation which makes possible the extension of the work in Biological Engineering, and a donation of $5,000 a year for two years by Mr. Bartlett Arkell for the development of the work in Food Technology. Through these generous gifts which are here acknowledged with deepest gratitude, it has been possible to add effectively to the facilities, apparatus and working equipment of the new laboratories mentioned earlier in this report, and to the increase in personnel. Of special significance are the appointments of Professors E. Newton Harvey and John R. Loofbourow in the course in Biophysics and Biological Engineering as Lecturer in Electro-Physiology and Associate Professor of Biophysics respectively.

The appointment of Professor Bunker as Dean of the Graduate School will necessarily limit the amount of time he can bestow on the department, but it is hoped and expected that he will be able to participate to some extent in teaching and research, and the promotion of the work in Biological Engineering.

The American Institute of Baking has generously continued the fellowship in research which it established last year, and Mr. Henry J. Rugo will continue as its holder. The Charles H. Hood Foundation has also sponsored for another year a scholarship in Health Education. The research programs in the department have been carried on effectively. Special mention may be made of the continuation of research in Biological Engineering under Professor Horton's direction, the researches in Health Education under Professor Turner, the studies in Nutritional Physiology under Professor Harris, the food researches directed by Professor Proctor, the photographic investigation of respiratory sprays by Professor Jennison, and the researches in enzyme chemistry under Professor Sizer. While these have been especially fruitful all other members of the staff have made scientific contributions of distinct usefulness. A new text, *Industrial Microbiology*, by Professors Prescott and Dunn, was published in June by the McGraw Hill Book Company. The major credit for this work belongs to the junior author.

In public service, Professor Turner has been President of the International Health Education group, and Professor Prescott has been re-elected as President of the Institute of Food Technologists.

The enrollment in the graduate division of the department has continued satisfactorily, and it has been necessary to limit the number of graduate students. In the undergraduate years a larger number of students could be adequately accommodated, and the number of students undertaking the courses in Public Health Engineering, Food Technology and Biological Engineering is considerably below the number which could be placed on the completion of their four year period of training.

S. C. PRESCOTT.

Chemistry

A most important item in the educational process is the need of maintaining an awareness of the desirability of changes. Due to certain apparently ineradicable human qualities these changes in procedure, course content, and material cannot easily be made in that continuous, smooth-flowing manner which would otherwise be desirable.

Late in the preceding academic year the entire group of staff in the field of undergraduate and graduate organic chemistry began a series of conferences for the purpose of examining the content and significance of a large number of subjects offered to the graduate students of organic chemistry. The conferences continued during the present year and concluded with very satisfying results for students as well as staff. The major results are: first, each staff member is fully aware and will be kept informed of the content of his colleagues' courses; second, a complete reorganization in instruction has been worked out based on two major full-year courses with the elimination of many short special subjects; and third, the student's time is conserved with the result that he may begin research earlier than was possible under the previous schedule. The new arrangement also makes for better continuity with the undergraduate effort in organic chemistry.

The division of the curriculum in chemistry into undergraduate and graduate has its origin in an educational cloudy past. Certainly, whatever merit such a division once possessed is now rapidly vanishing. Due to the advances and rapid changes in the science of chemistry, students now attending the Institute cannot be prepared for a career in this field in four years, and seven is by no means too long. Moreover the academic year comprising two-thirds of a calendar year could very profitably be brought to eleven-twelfths of a calendar year basis. This is now partially realized for many students by the work of the summer school.

Responsive to the disabilities, a few of which have just been recited, a group of the department have discussed a five-year program for a number of selected students of chemistry. A student electing such a course would receive at the conclusion of the period the usual Bachelor's degree and the Master's

degree. The advantages proposed are that, (*a*) his course could be laid out with practically no compromises relative to material or content; (*b*) he would be far better prepared to enter either industry or graduate work; (*c*) in the event of continuing in the graduate school elsewhere, he becomes at once qualified for attractive scholarships requiring the Master's degree; (*d*) an early introduction to research becomes possible with the opportunity of undertaking a thesis subject of real importance instead of one fitted to a restricted time period. The latter is a point of fundamental importance for the most reliable test of a student's ability is obtained when he sets about to find things out "on his own." The proposal has been completely worked out in its details and has received the benefit of criticism from the Institute course committees.

The special undergraduate thesis laboratory referred to last year has more than fulfilled expectations. The interest of the students has been stimulated and many of the juniors have conducted research throughout the summer.

The course in special methods has been conducted by Mr. T. R. P. Gibb in a very satisfactory manner. It is particularly noteworthy that the instruments available such as the microscope, polariscope, refractometer, colorimeter, among others contribute a great deal in the identification and control of organic compounds. The further development of this important subject depends now on duplicating and adding equipment.

The program of vitamin synthesis research upon which Doctor Milas and his associates have been working received substantial financial support from a group of companies. Progress in this extremely difficult field has been steady and particularly encouraging during the summer months. The importance of the problem has of course been tremendously increased due to the disruption of the Norwegian fish oil industry by the German aggression. The prospects seem favorable that synthetic products may soon replace vitamins hitherto obtainable only from natural sources.

The department takes satisfaction in the developing program of inorganic chemistry research and the growing interest of students here and elsewhere in the field. Interest has been much enhanced due to the possibilities growing up around the

"marking" of atoms by induced radioactivity. This year the X-ray equipment has been renewed and improved, thereby making possible accelerated progress in following the generation of different polymorphic forms of metal oxides under controlled conditions.

The study of the elements scandium and hafnium continues under favorable conditions, thanks to a piece of good fortune in the acquisition of supplies of raw ore material from Norway prior to the German subjugation. The chemistry of these elements can now go forward with the expectation of establishing accurately the identity and qualities of many interesting compounds.

The attempt by Professor Collins to perfect an engine for producing refrigeration at 10° Kelvin scale temperature (441° below zero Fahrenheit) produced most encouraging results despite several obstacles. There now exist two practical engines which have survived thorough testing. One of these is particularly adapted for experimental measurements and insures a realization of the desire to eliminate the use of liquid air and the very dangerous liquid hydrogen universally in use in producing sub-liquid air temperatures. The second engine is suitable for large scale refrigerating operations and while tests have not been as extensive as desirable, enough data are available to indicate the complete practicability of the design. The work has been greatly assisted by a grant of funds from the Research Corporation and the scale of effort is being greatly expanded.

While much effort has been expended in perfecting the refrigeration engines, there has been no interruption of low temperature scientific research. This will be indicated by the fact that 7,550 liters of liquid nitrogen and about 92 liters of liquid hydrogen were employed in this type of research. When the new refrigeration engine methods are in operation, considerable amounts of money will be saved and the time of scientific operators conserved. Dr. Robert Jacobs, Lalor Fellow for 1939–40, who had been collaborating in part with Professor Collins, was obliged to leave in June to accept an important post in the National Research Council.

Measurements at low temperatures in the Magnetic Laboratory have been centered mainly on inorganic salts. The

results obtained by Dr. Starr have suggested more comprehensive explanations of magnetic behavior and during the forthcoming year new equipment for extended susceptibility measurements at high magnetic fields will be in operation.

The department took a generous share of the responsibility attending the American Chemical Society Convention held in Boston in September 1939. Professor Huntress acted as General Vice-Chairman of the meeting, and Professor A. R. Davis as Executive Secretary. Chairmen of committees and subcommittees, and committee members included Professors Ashdown, Blanchard, T. L. Davis, Dietrichson, Gamble, Hamilton, Keyes, Marvin, Norris, Simpson, and Young. The *Technology Review* for November 1939 contains a full report of the contribution Technology made to the success of the meeting both from the point of view of organization and presentation of papers.

This year's report records a very sad event; the death on August 4 of our beloved friend and colleague, Professor James F. Norris. To many of us he was a dear friend of many years. To his young colleagues especially, his joyous spirit was ever an inspiration. The period of his teaching at the Institute began forty-five years ago, and his students constitute an unusually large group, each one of whom will sorely miss a generous friend and gifted teacher.

FREDERICK G. KEYES.

GENERAL SCIENCE AND GENERAL ENGINEERING

The number of seniors registered in Course IX at the middle of the year was 60, which is higher than for any previous year and represents fifth place among the various courses of the Institute.

Continuous attention has been given to the development and improvement of new schedules of study. At the moment there are 59 such schedules available to students who do not wish to select one of the standard courses. Two of the schedules under recent development relate to vibration engineering and plastics.

Additional barriers have been raised to prevent students of low scholarship from entering Course IX so that the average

rating will be improved. In addition to the general rule that no students are admitted without a clear record, students are not accepted from the unclassified group who have a term rating less than 3.00. Furthermore, students are not admitted who have just received a record below the minimum scholastic standards.

RALPH G. HUDSON.

GEOLOGY

No noteworthy changes in curriculum or general departmental activities have been made during the year. Minor changes have been made and will continue to be made in the direction of increased efficiency in instruction by reducing the number of subjects offered through a process of combination and elimination and by giving certain advanced courses in alternate years instead of every year.

The research work of the staff and students has been pleasingly productive over a wide range of earth science, and is briefly summarized in the following paragraphs.

Under the direction of Professor Slichter, the program of seismic investigations of the earth's crust has been continued during the year with thoroughly satisfactory and fundamentally important results. The area of exploration in New England has been extended westward into New York State, and during the spring and summer a considerable number of large blasts were successfully observed in the area of Wisconsin and upper Michigan. The work in New England has been made possible through grants from the Geological Society of America, and the work in Wisconsin and Michigan was carried on in coöperation with the University of Wisconsin. Dr. C. L. Pekeris has given much of his time to assisting Professor Slichter in this work, in which the entire group of Graduate and Senior students have coöperated.

Under the direction of Professor Newhouse, spectrographic examination of ores, minerals, and rocks has continued in the Godfrey Cabot Spectrographic Laboratory of the department. This work is opening up an entirely new field of investigation in geology, and important results have been obtained on ores from gold mines in Ontario and from granitic rocks of

the Front Range of Colorado. This program is being enlarged by the aid of a grant from the Carnegie Institution of Washington. Professor Newhouse has completed a Symposium on "The Relations of Ore Deposits to Structural Features," which work has been generously assisted by mining geologists in many parts of the world.

Professor Shimer and Professor Shrock have devoted all of their research efforts to a revision of the two-volume work on *North American Index Fossils* which is to be published under the auspices of the Institute.

Under a grant from the National Research Council, Professor Buerger has developed the first instrument of a group known as the Crystal Pattern Analyzer. When completed, it is expected that this apparatus will give information regarding the interatomic distances in crystals by purely photographic means and without the necessity of complicated calculations. In connection with this development, it was necessary to investigate the character of the corrections necessary to apply to the recorded intensities of X-ray diffraction.

Professor Morris has continued a study of the materials collected during his sabbatical year of 1937–38; and especially those bearing on the large problem of granitization by replacement of sediments with minerals characteristic of the coarse-grained igneous rocks.

Professor Fairbairn has continued investigations in his field of Petrotectonics and has spent the summer in field study in Canada.

W. J. MEAD.

MATHEMATICS

During the year work was begun on a fundamental revision of the general undergraduate course in mathematics. The new program, which becomes effective for freshmen in 1940–41, is designed to cover more completely the requirements of the various professional courses and to provide a better introduction to advanced subjects.

Department members carried on an extensive program of research in pure and applied mathematics and statistics. Some of these studies, particularly in the applied fields, have resulted

in contacts with industrial organizations which it is believed will prove most helpful to all parties concerned. Also some, such as the work of Dr. Reissner on stresses in airplane wings, may be of value in the program of national defense.

In coöperation with the Department of Economics statistical investigations were made in several industrial plants and a summer course was given to acquaint plant executives with practical methods of statistical control.

For students in Course XVIII we have long felt the need of a book in which the foundations of calculus are treated in a thoroughly rigorous manner. This is now covered by the *Treatise on Advanced Calculus*, recently written by Professor Franklin, which will be available before the beginning of the next academic year.

For his paper on the application of Boolian algebra to electrical circuits, Dr. Claude E. Shannon was awarded the Alfred Noble prize. This prize of $500, instituted in honor of Alfred Noble, Past President of the American Society of Civil Engineers, is awarded by a committee representing the four national societies of civil, mining, mechanical, and electrical engineers, and the Western Society of Engineers.

Four distinguished lecturers, Dr. Stefan Bergman, Dr. Harry R. Seiwell, Dr. Alexander Wundheiler, and Dr. Antoni V. Zygmund, were associated with the department during the year, and carried on valuable research, both individually and in collaboration with members of the department.

H. B. PHILLIPS.

PHYSICS

The year has been one of steady and sound progress in the Physics Department. Undergraduate instruction has seen few changes during the year. The sophomore electricity laboratory has had its equipment improved, and the rearrangement of the freshman mechanics laboratory in the summer of 1940, though it has meant a slight decrease of floor space, nevertheless has made the laboratory more usable. The publication of Professor Frank's text on electricity and optics will be of advantage to the special group of 8.03 and 8.04 for electrical engineers and

physicists. The undergraduate schedule of Course VIII has not been appreciably altered. During the summer of 1940 rearrangements of space have made possible improved laboratory facilities for the junior and senior experimental laboratories, following recommendations made by the visiting committee the year before.

The major research programs of the department have made normal advances. The spectroscopic project with its Works Progress Administration assistance has continued at its rapid pace, and the Eighth Spectroscopy Conference, held in the summer of 1940, was in many ways the most successful of the series. Professor Harrison's services in this field have been recognized during the year by his appointment to the post of editor of the *Journal of the Optical Society of America*, a society of which Professor Hardy is secretary. Professor Harrison's popular book on the applications of physics, *Atoms in Action*, has received widespread attention. The magnet for Zeeman effect has been in constant use during the year. The new spectroscopic data obtained in the project are already finding their scientific uses, as seen in the progress made by Professor Albertson and others in the analysis of the spectra of cerium and other rare earths, the most complicated atomic spectra, hitherto too difficult to interpret.

The large high voltage outfit of Professor Van de Graaff has been adapted during the year for electron beams, and the X-rays produced by these beams have been studied, both on their own account, and as agents in producing nuclear disintegrations. In particular, the disintegration of the deuteron by X-rays, a fundamental nuclear process, has been observed and studied for the first time; the high voltage outfit at the Institute seems to be, in fact, the only one in existence able to handle this problem. The development of positive ion sources has been carried out actively by Professor Lamar and Dr. Buechner, and it is hoped that the very efficient sources which they have developed will be applied to the accelerating tube early in the coming year. The high voltage project in the Physics Department has collaborated with Professor Trump of the Electrical Engineering Department in the construction of X-ray outfits for therapeutic purposes, outfits which have not only been suc-

cessful in a technical way, but which have proved to have real clinical value.

The construction of the cyclotron has been practically completed during the year, though it has not yet reached the point of operation. In the meantime, the nuclear research program of Professor Evans and his collaborators has had rapid developments. The geological work on the age of minerals has reached the stage where a new set of standards of weak radioactivity has become necessary, and a committee of the National Research Council has been set up, on Standards of Radioactivity, with Professor Evans as chairman, and Dr. Goodman as secretary, to supervise the preparation of such standards. The medical work on the effect of radioactive iodine on the thyroid, in collaboration with Drs. Means and Hertz of the Massachusetts General Hospital, has made excellent progress, as has the research on radioactive arsenic in its relation to leukemia in collaboration with Dr. Hunter of the Massachusetts General Hospital.

Research in theoretical physics has been particularly devoted to problems of practical importance. Professors Stratton and Morse, and students, have studied the production and propagation of ultra-high frequency electromagnetic waves. Professor Morse and Dr. Bolt have made important advances in the study of room acoustics by the method of standing waves. Professor Allis has worked in the theory of the electric arc, and Professor Lamar, also working in this field, has contributed greatly to the theoretical knowledge of arc discharges. Professor Mueller has made interesting contributions to the theory of the dielectric properties of Rochelle salt. Professor Vallarta has continued the study of cosmic rays.

The X-ray crystal structure work, under Professor Warren, continues to throw light on the structure of many kinds of substances, and continues to be of interest in a practical way, in particular to the glass manufacturers. They again contribute to the support of a research fellow in glass research, Mr. Biscoe again holding the fellowship. Professor Harvey, in addition to his work with X-rays, is beginning the construction of an electron microscope, which when completed should be useful, not only to physicists but to other departments of the Institute.

The X-ray branch of the department had as guest during the year Professor Rose C. L. Mooney of Newcomb College, who was prevented by the war from carrying on research in Europe under a Guggenheim fellowship.

Electronic work, under Professor Nottingham, has continued actively during the year. The electronics conference, held during the spring, was successful as usual, with a large attendance of both academic and industrial physicists interested in this field. Numerous other fields of physics, in addition to those enumerated, have been advanced actively during the year.

As the year ends, the National Defense effort is beginning to claim the services of a number of staff members. Professor Harrison has been appointed chairman of the Instruments Section of the National Defense Research Committee. Presumably the coming year will see a large intensification of the effort, though it is hoped that the interference with the regular research and teaching of the department will not be too severe.

JOHN C. SLATER.

SCHOOL OF ARCHITECTURE

ARCHITECTURE

Upon assuming the position of Dean of the School of Architecture at the beginning of the school year of 1939–40, the task of taking up the new duties of a position different from any experience in private practice was made much easier by the splendid spirit of coöperation of the officers of administration, the staff of the School, and the heads of the various departments in the Institute. It soon became apparent that the smooth running organization which was turned over for administration was due to the great ability of Dr. Emerson in building up an able staff and a fine spirit of coöperation between the staff and the student body.

It is apparent that the location of the School of Architecture within the physical plant of the Institute is of immeasurable value to the students and the staff because of the very useful coöperation with departments which have to do specif-

ically with architectural and city planning problems. This has of necessity been a year of observation and examination of the department and its curriculum with a view to making such changes as will be beneficial to the students. In many Schools of Architecture, collaborative problems have been worked out between groups of architects, painters, and sculptors. The School of Architecture at Technology, while lacking the opportunity of coöperating with painters and sculptors within the Institute itself, has what would seem to be a far better field for collaboration: that between groups of architects, city and regional planners, engineers, and research groups. This field of coöperation is directly comparable to the problems met in private practice and it is proposed to further develop collaboration of this sort in architectural and city planning problems with the departments of the Institute which bear a close relationship to the social, economic, and physical elements which go to make up the practice of architecture in the present day. It is also proposed to create a much closer relationship between City Planning and Architecture, as it is becoming more and more evident that city and regional planning must be developed to a far greater extent in our municipalities and that individual buildings cannot be intelligently planned or located without discovering their proper relationship to their surroundings. It is also proposed to extend the architectural planning and design further into the small house field, as it is evident from social and economic studies that the greatest field for architectural activity at the present time and for several years to come will be in the construction of shelter units for the low-income groups. Since this is likely to be the first activity of the young architect on leaving the School, it seems fitting that he should be thoroughly prepared to meet this challenge when he begins his life work.

The work of the Graduate School is to be strengthened to include more research and to bring about a closer relationship with the City Planning Department. The Graduate School should be not merely an extension of the regular course. Its activities should be broadened to prepare the students for immediate usefulness in practice.

The curriculum of the School is also being studied in order

to bring it into closer harmony with the other departments of the Institute with respect to the length of the course and to work out some of the inequalities which appear to be in the present course organization.

One of the important events in the department has been the appointment of Mr. Alvar Aalto of Finland as a Research Professor in Architecture. Mr. Aalto will lecture and assist in guiding the students in developing research in the problems assigned during that portion of the year when he is in residence. Mr. Aalto brings to the department a wide experience in a country whose economic and social values are very similar to our own and we look forward to the benefit of his fresh and invigorating point of view.

As was the case last year, one of our students, George R. McClellan, was successful in winning the Rotch Traveling Scholarship of $1,000 for study and work in Mexico. It is gratifying to note that in the four Insulux Glass Block Competitions, open to all architects throughout the United States, Technology men won fifteen of the thirty-seven prizes offered, or, of the $15,000 awarded, $9,150 went to graduates and students of the School.

We are grateful to Mrs. Emerson for the portrait of Dr. Emerson painted by Mrs. Sally DeCamp Moffat and one of the pleasant events of the year was the acceptance by Dr. Compton of this portrait which has been hung in the office of the Dean of the School. We are also grateful to the following friends of the School for their gifts to the Architectural Library:

William Emerson — papers and letters of William R. Ware, as well as miscellaneous collections of architectural magazines, pamphlets, and books.

Frederick B. Stearns, of the firm of Shepard & Stearns — twenty useful books.

Mrs. Nelson S. Bartlett, Mrs. Malcolm Donald, and Mrs. Franklin H. Palmer, daughters of the former Boston architect, Henry S. Hunnewell, M.I.T. '77—sixty valuable books from his library.

In addition, Dr. Alfred L. Loomis presented to the School two of his new Sunlight Analysis Machines which have been constantly useful to the students in City Planning and in Architecture.

It is hoped that most of the changes which have been discussed in this brief report will be put into effect at the beginning of the school year of 1940–41.

WALTER R. MACCORNACK.

CITY PLANNING

No major changes in policy were made in the city planning course during the year — the seventh year of operation since the inauguration of the undergraduate course. During this period 53 students have registered in Course IV-B and IV-C, over 70 per cent of the registration being in the Graduate School. Fifteen degrees of Master in City Planning and 13 degrees of B.Arch. in City Planning have been awarded, in addition to which seven students have completed all requirements for the M.C.P. except their thesis. It is worth noting that while about two-thirds of the graduate students have come from the professional field of architecture, six students had received their undergraduate training in engineering, six in landscape architecture, and one in law.

The research program inaugurated in 1938 was carried forward during the year, the major field of study being the improvement of technical procedures and methods for the selection of sites for housing projects. A trial application of the techniques developed was made in the city of Haverhill with excellent results and with the utmost coöperation of city officials. These studies are being closely coördinated with the research program of the Committee on the Hygiene of Housing of the American Public Health Association.

Three students in the Graduate School carried on an independent research into the physical and economic problems of land utilization in the Merrimack River watershed, particularly as they related to flood control. During the progress of the study they had the benefit of the advice and assistance of Mr. Benton Mackaye of the United States Forest Service, Professor Harold K. Barrows of the Department of Civil and Sanitary Engineering, and Mr. Justin R. Hartzog, consultant to the State Planning Boards of New Hampshire and Rhode Island. Mr. Hartzog, who was for many years associated with the late John Nolen, has recently been appointed to the Institute Faculty.

During the year the department received a valuable addition to its library in the form of the complete collection of books, pamphlets and clippings of the late John Nolen, one of the foremost city planners of the past quarter century. Through the generosity of Mrs. Nolen this collection, which comprises over 1,500 titles covering the fields of housing, city and regional planning and related professions, together with a complete card index, has been loaned to the Institute for a period of at least five years. It is housed in new shelves and cabinets in the city planning alcove of the Arthur Rotch Memorial Library.

The demand for well-qualified technicians in the field of city and regional planning continues to run ahead of the supply and it would appear that the placement situation for graduates of the city planning course is not going to be a serious one for some time to come. While this situation may not result in a substantial increase in enrollment, especially as other colleges and universities are in the process of developing city planning courses of their own, it does place a responsibility on those in charge to see that the course at the Institute keeps abreast of improved techniques and procedures in this rapidly expanding professional field.

FREDERICK J. ADAMS.

DRAWING

During the year the name of the Section was changed from "Drawing" to "Graphics." It was felt that the Section's function was to cover the broad field of graphical representation and that the new name gave clearer expression to this concept.

In line with this a new course in Nomography is being offered, beginning this year, for upperclassmen interested in the graphical solution of equations.

A summer course in Graphics for High School teachers was offered for the second year.

The development of stereoscopic drawing is being furthered by a grant from the Committee on Scientific Aids to Learning of the National Research Council for constructing automatic machinery for making such drawing.

JOHN T. RULE.

DIVISION OF HUMANITIES

Economics and Social Science

In order to improve the course in Economic Principles we have this year conducted two experiments with small groups. In one class, we introduced case material, and in the other, the report on *The Structure of the American Economy* by the National Resources Committee. Because of the success of these experiments we plan next year to use both types of material in our regular classes and to diminish the time devoted to price theory. We also have added a somewhat enlarged Economic Principles course for a selected group of students in Chemical Engineering. These students take their beginning economics in the second year and in the third and fourth years elect additional subjects in the social science field. To meet the requirements of this group we have introduced two courses in Industrial Relations. This innovation is a recognition of the value to engineering students of studies which bring them into touch with problems of human relationships.

Those of our staff specializing in industrial statistics have been so occupied in this field that it has been necessary to relieve them from other work. The burden upon these men has been increased by the additional teaching involved in the Industrial Statistics Option of Course XVIII, and by the greater demands upon their time arising from problems submitted by research workers in other departments and by industrial enterprises. The special summer course for business executives has been shifted from June to September. The development of this activity has exceeded our original expectations.

The Industrial Relations Section, while taking on an increased teaching load, has been pursuing various research projects. These projects may be divided into six groups. (1) A study has been made, in coöperation with the Bureau of Labor Statistics, of the relations between wages, costs, and prices in selected industries. In this connection, a field survey was undertaken of five firms in the cotton textile, paper, and men's shoe industries, and the results were published in the summer of 1940 in the form of a report of the Bureau of Labor Statistics to the Temporary National Economic Committee.

(2) An investigation has been made of the informal lines of authority and communication between the technical personnel of a small industrial plant in Cambridge. A report has been drawn up and approved by the company. (3) Progress is being made on a study of the causes and effects of migration of industries from New England. (4) The Section is continuing its Fitchburg-Leominster labor market survey begun over a year ago. The purpose is to discover characteristics of the demand for and supply of labor in a well-diversified industrial community. During the year, additional wage and personnel records for individual employees were photographed by the microfilm process, and the collection of these records now totals about 15,000 from 35 different firms. This is a larger and more complete sample than has been available to research workers heretofore. During the summer of 1940 an effort is being made to tabulate and analyze certain information from these records which would throw light on the characteristics of and reasons for movement of workers between firms and industries in a given industrial area. Attention is also centered on the movement in and out of employment, particularly in relation to the adequacies and inadequacies of Social Security legislation. For this purpose, a research grant of $1,000 was secured from the Committee on Social Security of the Social Science Research Council, and personal interviews with selected workers have been undertaken in Fitchburg and Leominster. (5) Partly an outgrowth of the Fitchburg project, but extending much beyond it, is a comprehensive study now being undertaken of the paper industry of the United States and Canada. Primary emphasis is on the movement of wage rates, their causes and inter-relations with other factors, such as the financial status of the companies, their production, location, and so forth. Data have been secured by interview and questionnaire from about 260 American and Canadian paper companies. (6) Finally, an investigation is being made of job analysis as practiced by certain American companies. This has involved field interviews with a number of concerns which are experimenting with this method of setting and adjusting individual wage rates.

RALPH E. FREEMAN.

English and History

Two changes in the method of presenting material in the options in literature and history have this year brought encouraging results. The first change, made possible by adding to the library duplicate copies of numerous books, has been to place less emphasis upon the material in textbooks and more upon original writings and works generally recognized as outstanding treatments of their respective subjects. We hope gradually to extend this procedure, for by means of it the student inevitably acquires a broader perspective.

The second change has been the elimination of subjects for written reports that demand merely a chronological account of events and the substitution of topics so phrased that they force the student to exercise his powers of analysis and judgment. This approach to composition in the options in literature and history has provided one more opportunity for the student to develop the ability to attack a specific problem and has made for a greater degree of originality in student papers than heretofore.

In coöperation with the Department of Business and Engineering Administration, our department organized a group of seniors in Course XV to take the General Study, Biography in Science, which for many years has been a part of the program for seniors in Electrical Engineering. As a result, we were able to give an intensive training in oral presentation to an increased number of upperclassmen.

During the year several recipients of the Alfred P. Sloan Foundation Fellowships have come to members of the department for assistance in composition. The association proved mutually profitable: the students were helped to eliminate undesirable habits of expression, and the instructors were made more aware of the type of writing demanded of young executives.

Members of the department have continued to assist the students with their extra curricular activities and to meet the requests of various organizations for speakers.

Howard R. Bartlett.

General Studies

These studies have been defined by the Faculty as "subjects of a general and essentially non-vocational character which are offered for the purpose of giving the student an opportunity to broaden his education by introducing him to fields of thought and interest outside of his chosen professional work."

The importance of this part of our work is shown by the fact that, during the first term of last year, 617 students were enrolled in these courses and 787 in the second term. The courses from which the students made their selection varied widely in character and content, including 57 separate subjects, or approximately 30 for each term. With one or two exceptions, the fairly large number of courses made possible small sections and intimate contact with the instructor. In many cases the individual subject has been coördinated with earlier required courses in English, history, history of science, and economics; and this tendency has been encouraged by the committee on General Studies. In some courses, notably in the one entitled "Biography in Science," it has been possible to emphasize continued training in written and oral expression along lines already commenced in the freshman and sophomore years. During the year many courses have been changed from four units to six in order to give more time for reading and preparation, and this change seems to have been welcomed by the students.

A constant effort has been made to avoid rigidity in the list, and to keep it in definite relation to the needs and interests of the students. Some subjects have been discontinued, at least for the time being, and one or two which were essentially technical in character have been transferred to the appropriate professional department. The title of the subject previously called "Humanics" has been changed to "Human Relations."

Two new subjects were offered last year. "An Introduction to Latin-American Problems and Institutions" was given during the first term and a coöperative subject entitled "The Arts of the Book" during the second. In this subject, which proved very successful, six members of the Faculty participated under the chairmanship of Professor H. L. Seaver, and effective use was made of the facilities of the Dard Hunter Paper Museum.

Other new courses will be given for the first time next year.

These include another coöperative course, an "Introduction to Architecture," designed to introduce nonarchitects to the historical, aesthetic and practical aspects of this subject. This course will be under the chairmanship of Dean MacCornack. Eminent visiting architects will take part in the lectures and discussions. A "Reading Seminar," limited to 15 students, offers an opportunity to read some great books under direction.

On the historical side, there will be a new course on "French Civilization," to be conducted in English by Professor Langley; and in the field of economics and sociology three new courses on "The Economics of War," "Technology and Society," and "Social Institutions and Labor Relations."

In addition to considering individual subjects, the committee on General Studies has commenced a careful study of possible ways in which the whole program in the Humanities may be coördinated and made more effective. The heads of the various departments have been consulted, and with their help and that of the Visiting Committees of the Corporation on English and History, Modern Languages, and Economics, the committee hopes to be able to report definite progress before the end of next year.

ROBERT G. CALDWELL.

MILITARY SCIENCE AND TACTICS

Instruction was given during the year in accordance with the War Department program for the Reserve Officers' Training Corps. Probably due to conditions in Europe, there has been increased interest on the part of students and an increase in the number of applications for the Advanced R. O. T. C. courses for next year. It is felt that the quota of last year, 320, should be increased to 365, and this increase has been requested.

The rifle and pistol teams have had the usual successful seasons. The rifle team won 14 of its 21 matches and won second place in the Hearst Trophy match. The pistol team won 11 of its 14 matches.

As usual all units of the department were rated as excellent by the Corps Area inspectors. Increased range facilities and fire safe storage facilities remain the most pressing needs of the department.

C. THOMAS-STAHLE.

Modern Languages

The policies and methods pursued in the past three years and mentioned in previous reports have been continued and improved with good results. Registration increased slightly over that of all other years since 1934. The total in the department, November 1939, was 399; in 1938 it was 390. German decreased from 290 in 1938 to 277 in 1939, owing to modification of language requirements of Course X. French in the same period increased from 81 to 99, and Spanish from 16 to 23.

In extra-curricular activities the *Cercle Français* continued its meetings at which a number of French plays were read, five films were shown, and interesting addresses in French were given by the French Consul, Monsieur Brière, by Madame Waterhouse, and Professor Gaudin. The *Grupo de Habla Española* offered very interesting programs including Spanish songs by a Wellesley group directed by Señorita Oyarzábal, and addresses in Spanish by Professor de Aragón of Boston University, the Colombian Consul in Boston, Señor Gomez Durán, Professor Rivera of Harvard, Professor Salinas of Wellesley, Dean Caldwell, and Professor Vallarta of the Institute. Miss Amelia Tataronis, teacher of music at the Cambridge School, Kendall Green, generously served as accompanist for all the musical activities. The weekly luncheons of the *Table Français* were continued. In the Phonograph Room the repertory was enriched by a collection of records from Spanish literary masterpieces. The department acted as host to the annual meeting of the New England Chapter of the American Association of Teachers of Spanish.

In view of the greatly increased interest in Spanish America the question of the desirability of encouraging more actively the study of the Spanish language may well be raised. Hitherto the preference given for scientific considerations to German and French, combined with schedule and staff limitations, has made it impossible to create a place for a second year of Spanish, but the department will be glad to offer such a course if the demand arises and suitable conditions are provided.

The department has been delighted to join in the welcome offered our new Dean of Humanities, Dr. Caldwell, whose counsel has been greatly appreciated.

E. F. Langley.

TREASURER'S STATEMENT

To the Corporation:

The statements and schedules submitted herewith in accordance with Section VI of the By-Laws of the Corporation show the financial condition of the Institute as of June 30, 1940, and also summarize the financial transactions during the year ended on that date.

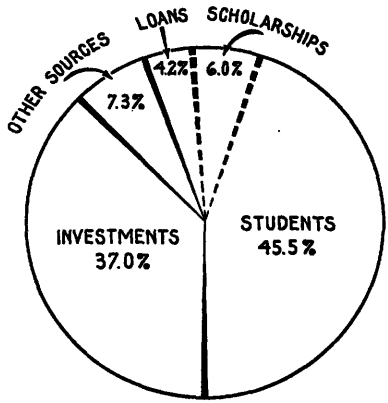
The order of the presentation of these schedules has been changed from previous years, partly to conform to a greater degree with generally approved reporting practices among educational institutions and particularly to facilitate comparison with such institutions.

Three major schedules, (A) BALANCE SHEET, (B) OPERATING INCOME AND EXPENSE FOR THE YEAR and (C) CURRENT SURPLUS, in the order named, summarize the whole report. The first two are further broken down into supporting schedules designated A-1, B-1, etc.

EDUCATIONAL PLANT

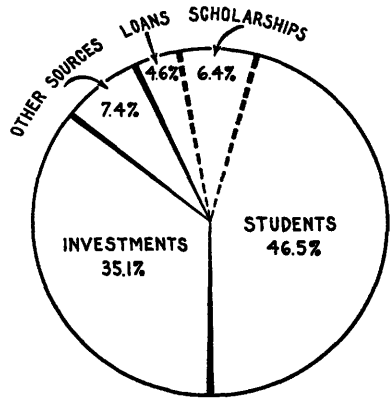
Plant assets now stand at $16,328,000, an increase of $332,000 during the past year — and an increase of $2,300,000 during the past ten years. The principal addition is the eagerly anticipated and now completed Alumni Swimming Pool — easily the most beautiful and most useful addition to our student recreational facilities since the completion of Walker Memorial in 1916. Other new units on the campus are the Solar Energy Laboratory and the Hyams Radiation Laboratory. A large addition to the Sloan Automotive Laboratory is already under way as well as an extensive space addition and renovation of the Guggenheim Aeronautical Laboratory — both to be completed in the early autumn.

OPERATING INCOME 1939-1940



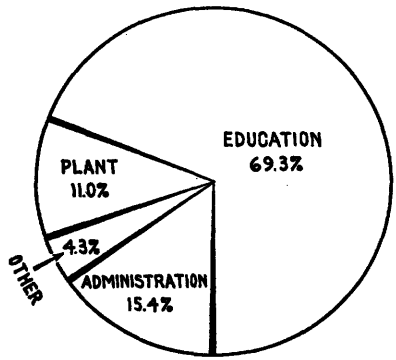
TOTAL $3,334,000

OPERATING INCOME 1938-1939



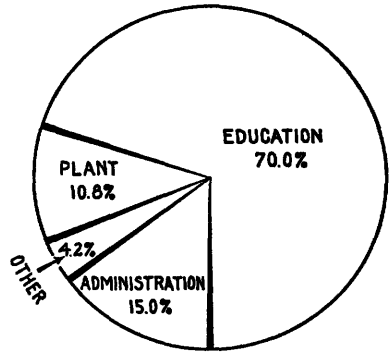
TOTAL $3,203,000

OPERATING EXPENSE 1939-1940



TOTAL $3,333,000

OPERATING EXPENSE 1938-1939



TOTAL $3,208,000

Operation

The charts on the previous page give a graphic presentation of the sources of net operating income and the distribution of net operating expense compared with the preceding year.

It will be noted that Income from Students (including Loans and Scholarships granted) amounted to 55.7 per cent of the total — compared with 57.5 per cent last year. The actual receipts from this source, however, were $1,817,000 — $17,000 *more* than last year. Total income increased $131,000 of which $104,000 was from investment income.

Investment income exceeded estimates by about 10 per cent and this made it possible to cover budgeted expenditures without resorting either to the Income Equalization Fund ($40,000) or to certain other funds that were available for appropriation if needed. The excess of income over expense was $945.67.

There was also available $4,782.35 from previous year's operations. As a result, the Current Surplus ($516.85 on June 30, 1939) now stands at $6,244.87.

Endowment Funds

The Book Value of the Endowment Funds is $36,012,-773.77, a decrease of $217,000.

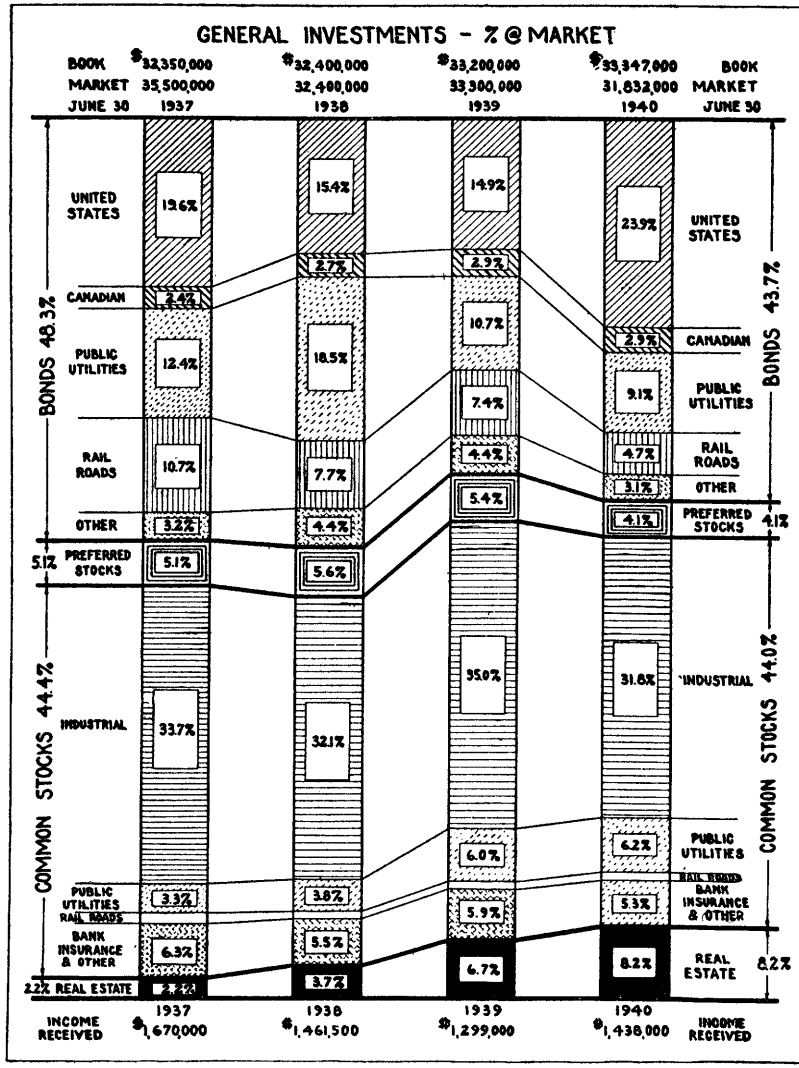
Capital gift additions amounted to $465,000 (see page 11) but these were offset principally by payments from certain unrestricted funds for new construction and other projects, $132,000 — by payment from the Alumni Fund for the new Swimming Pool, $250,000 — by a decrease in the Endowment Reserve Fund resulting from investment changes of $116,000, and a decrease similarly in the principal of the Technology Loan Fund account of $184,000.

INVESTMENTS

SUMMARY AS OF JUNE 30, 1940

General Investments	*Book*	*Market*	*Per Cent at Market*
Bonds —			
United States Government	$7,532,000	$7,604,000	23.9
Canadian (all issues)	1,178,100	935,000	2.9
Public Utility	2,681,300	2,886,000	9.1
Railroads	1,841,500	1,522,000	4.7
Other	1,091,600	963,000	3.1
	$14,324,500	$13,910,000	43.7
Preferred Stocks	$1,342,800	$1,306,000	4.1
Common Stocks —			
Industrial	$10,395,100	$10,134,000	31.8
Public Utility	1,983,700	1,959,000	6.2
Railroads	374,400	230,000	.7
Bank, Insurance and Other	2,322,300	1,689,000	5.3
	$15,075,500	$14,012,000	44.0
Mortgages and Real Estate	$ 2,604,400	$ 2,604,000	8.2
Total General Investments	$33,347,200	$31,832,000	100%
Special Investments	$ 2,592,300	$ 2,426,000	
TOTAL INVESTMENTS	$35,939,500	$34,258,000	

Changes in the pooled or general investments during the past four years are shown in the one hundred per cent component bar graph presented on the following page.


GENERAL INVESTMENTS - % @ MARKET
BOOK $32,350,000 $32,400,000 $33,200,000 $33,347,000 BOOK
MARKET 35,500,000 32,400,000 33,300,000 31,832,000 MARKET
JUNE 30 1937 1938 1939 1940 JUNE 30
BONDS 48.3%
UNITED STATES 13.6% 15.4% 14.9% 23.9% UNITED STATES
CANADIAN 2.4% 2.7% 2.9% 2.9% CANADIAN
PUBLIC UTILITIES 12.4% 18.5% 10.7% 7.4% 9.1% PUBLIC UTILITIES
RAIL ROADS 10.7% 7.7% 4.4% 4.7% RAIL ROADS
OTHER 3.2% 4.4% 5.4% 3.1% OTHER
PREFERRED STOCKS 5.1% 5.1% 5.6% 4.1% PREFERRED STOCKS 4.1%
COMMON STOCKS 44.4%
INDUSTRIAL 33.7% 32.1% 35.0% 31.6% INDUSTRIAL
PUBLIC UTILITIES 3.3% 3.8% 6.0% 6.2% PUBLIC UTILITIES
RAIL ROADS
BANK INSURANCE & OTHER 6.3% 5.5% 5.9% 5.3% BANK INSURANCE & OTHER
REAL ESTATE 2.2% 3.7% 6.7% 8.2% REAL ESTATE 8.2%
BONDS 43.7%
COMMON STOCKS 44.0%
1937 1938 1939 1940
INCOME RECEIVED $1,670,000 $1,461,500 $1,299,000 $1,438,000 INCOME RECEIVED

INVESTMENTS — *Continued*

The market value of the pooled or general investments fell below the book value for the first time in some years. It was 109 per cent of book value in 1937, 100 per cent in 1938 and 1939, and 95 per cent as of June 30, 1940.

INVESTMENT INCOME

The amount of income distributable to the pooled funds made possible an allocation of 4.38 per cent contrasted with 4.02 per cent last year — 4.55 per cent in 1938. The yield on all investments figured on market values as of June 30, 1940 was 4.32 per cent — 3.89 per cent last year.

GENERAL

On the following pages will be found (1) a Record of the Gifts and Bequests received by the Institute during the fiscal year, (2) The Report of the Operations of the Technology Loan Fund Committee for the year and (3) the Report of the Trustees of the M. I. T. Pension Association.

Respectfully submitted,

HORACE S. FORD,
Treasurer.

August 20, 1940

AUDITORS' CERTIFICATE

We have made an examination of the books and accounts of the Treasurer and the Bursar of the Massachusetts Institute of Technology for the year ended June 30, 1940, and we report thereon as follows:

We checked the investment accounts at June 30, 1940, with lists of securities at that date, certified by the Old Colony Trust Company of Boston, Massachusetts, custodian, and we examined or tested the accounts and supporting records relating to the other assets and the liabilities shown in the Balance Sheet, Schedule A. The collectibility of one account receivable for research, etc. (approximately $60,500.00), is doubtful and by direction of the executive committee an equivalent amount has been earmarked in unrestricted funds as a reserve therefor.

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.

In our opinion, the accompanying Balance Sheet and Statements of Operating Income and Expense with the supporting schedules, which are in accordance with the books of the Institute, present fairly, on the basis indicated, the financial condition of the Institute at June 30, 1940, and the operating results for the year ended at that date.

We extended our examination for the year to include the transactions of the Joseph Hewett and George S. Witmer 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 for the same period, which we found to be correctly stated.

The investment accounts of the Joseph Hewett and George S. Witmer Funds and of the Massachusetts Institute of Technology Pension Association at June 30, 1940, were also checked by us with lists of securities at that date certified by the Old Colony Trust Company of Boston, Massachusetts, Custodian.

PATTERSON, TEELE & DENNIS,
Accountants and Auditor

1 Federal Street, Boston, August 27, 1940

REPORT OF THE AUDITING COMMITTEE

To the Corporation of the
Massachusetts Institute of Technology:

The Auditing Committee reports that the firm of Patterson, Teele & Dennis, Accountants and Auditors, was employed to make an audit for the fiscal year ending June 30, 1940, and we submit herewith their certificate dated August 27, 1940.

Their full report covers the accounts of the Massachusetts Institute of Technology, the Hewett Fund, and the George S. Witmer Fund of both of which the Massachusetts Institute of Technology acts as Trustee.

The report also covers the account of the Massachusetts Institute of Technology Pension Association.

Respectfully submitted,

J. WILLARD HAYDEN,
MARSHALL B. DALTON,
DONALD G. ROBBINS, *Chairman*

September 11, 1940.

GIFTS AND BEQUESTS RECEIVED DURING YEAR ENDED JUNE 30, 1940

CAPITAL

A. D. Little Estate for Memorial Fund (additional)	$110,860.00
Marcella B. Upham Estate for Thomas Upham Fund (additional)	98,261.40
John Wells Morss Estate	50,000.00
Charles Hayden Foundation for Scholarship Fund	50,000.00
Charles A. Richards Estate for C. A. Richards Fund	31,719.32
1923 Class Fund for Alumni Swimming Pool Sun Garden	10,000.00
Contributions to Alumni Gymnasium Fund (additional)	28,812.43
Contributions to M. I. T. Alumni Fund (new)	27,127.44
Professor and Mrs. William Emerson for Ware Fund	15,000.00
Professor and Mrs. William Emerson for Chandler Fund	5,000.00
C. W. Eaton Estate for C. W. Eaton Fund (additional)	15,985.00
Anna Spooner Estate for Anna Spooner Fund	7,500.00
Eliza Atkins Stone Estate for George Stone Fund	4,677.35
George R. Cooke, Jr. for George R. Cooke Fund	3,500.00
Emeline Roach Estate for John Roach Scholarship (additional)	3,212.18
H. N. Slater for Wind Tunnel (additional)	2,500.00
A. F. Bemis Charity Trust for Research (additional)	400.00
H. B. Perkins Estate for H. B. Perkins Fund	250.00
Contributions to Emerson Prize Fund (additional)	86.00
Elizabeth R. Stevens Estate (additional)	61.19
	$464,952.31

MISCELLANEOUS

Contributions to Research Associates 1939–40	$19,200.00
Contributions to Industrial Relations Fund	36,050.00
Contributions to Markle Foundation Cyclotron Research Fund	25,000.00
Contributions for Glass Industrial Fellowship Fund	1,800.00
Anonymous for Tuition	300.00
Anonymous for Geology Salaries	800.00
Anonymous for Cosmic Terrestrial Research Fund	30,000.00
Contributions to Marine Engineering Scholarship	3,000.00
American Institute of Baking, for Fellowship	750.00
American Institute of Mining and Metallurgy Engineering, Inc., for Research	900.00
American Oncologic Hospital, for Oncologic Fund	5,000.00
American Philosophical Society, for Research	1,500.00
Bausch & Lomb Optical Company, for Fellowship	3,000.00
Bartlett Arkel, for Food Technology	10,000.00
Dixie Lee Bryant, for Scholarship	600.00
Carnegie Corporation of New York, for Nuclear Research	6,000.00
Carnegie Corporation of New York, for Aerodynamics	8,000.00
Carnegie Corporation of New York, for Center of Analysis	15,000.00
Carnegie Institution of Washington, for Radio Distance Measurements	2,500.00
Carnegie Institution of Washington, for Spectroscopic Research	3,000.00

Carnegie Institution of Washington, for Spectrograph Research	$2,500.00
Cuban-American Manganese Corp., for Fellowship	600.00
Dow Chemical Company, for Fellowship	1,500.00
E. I. duPont de Nemours & Co., for Fellowship	750.00
Henry B. duPont, for Boat House Equipment	100.00
Lammot duPont, for Boat House Equipment	1,000.00
Eastman Kodak Company, for Chemical Engineering Salaries	1,000.00
Eastman Kodak Company, for Rapid Selection Research	6,250.00
General Radio Company, for Electrical Engineering Course VI-A	1,200.00
Charles H. Hood Educational Trust for Scholarships	6,800.00
L. J. &. M. E. Horowitz, for Building Construction Course	3,000.00
Godfrey M. Hyams Trust, for Research	16,000.00
International Standard Electric Corp., for Research	3,750.00
International Telephone and Telegraph Co., for Research	3,750.00
A. D. Little, Inc., for Fellowship	2,000.00
H. W. Prentis, Jr., for President's Fund	300.00
Alfred L. Loomis, for President's Special Fund	5,000.00
Alfred L. Loomis, for Loomis Fund	5,000.00
Loomis Institute for Scientific Research, Inc.	750.00
J. C. Melvin Trust for Scholarships	6,900.00
C. Lillian Moore Trust, for Grimmons Fund	1,922.59
E. L. Moreland, for Bursar's Fund	300.00
National Academy of Sciences, for Research	4,000.00
Research Corporation, for Research	14,300.00
Rockefeller Foundation, for Salaries and Research	6,750.00
Alfred P. Sloan Foundation, for Fellowships	35,750.00
Sperry Gyroscope Company, for Research	15,500.00
Tech Review, for A. F. Bemis Fund	313.97
Textile Foundation, for Research	3,750.00
C. E. Turner, for Research	1,500.00
Contribution to Business and Engineering Case Research Fund	100.00
Miscellaneous Contributions to Business and Engineering Humane Relations	370.00
Corning Glass Works, for Glass Fracture Research	500.00
	$325,606.56
TOTAL CAPITAL AND MISCELLANEOUS GIFTS	$790,558.87

REPORT OF THE TECHNOLOGY LOAN FUND COMMITTEE

COMPARATIVE BALANCE SHEET

ASSETS

	June 30, 1940		*June 30, 1939*	
Cash	$2,197.50		$5,158.14	
Investments (Schedule A-1)	[1]724,717.72	$726,915.22	924,520.15	$929,678.29
Student Notes Receivable (Schedule A-3) Loans (1930 to date)	$1,482,983.40		$1,320,140.40	
Less repayments (1930 to date) (Includes write-off, $2,227.35.)	597,354.11	885,629.29	495,953.32	824,187.08
TOTAL ASSETS		$1,612,544.51		$1,753,865.37

[1] Market Value, June 30, 1940, $633,000.00.

LIABILITIES

Total Subscriptions (1930 to date)		$1,435,735.18		$1,435,735.18
Net Profit or (Loss) on securities (1930 to date)		(176,642.16)		7,781.89
Income from Investments (1930 to date) (net)		256,217.98		226,878.66
Interest from Student Loans (1930 to date)		110,044.54		93,037.91
Less: Loss (deceased borrowers and life insurance premiums)		(12,811.03)		(9,568.27)
TOTAL FUND		$1,612,544.51		$1,753,865.37

RECEIPTS AND EXPENDITURES FOR 1939–1940

RECEIPTS

Income from Investments (net)	$29,339.32	
Interest from Student Loans	17,006.63	
TOTAL RECEIPTS		$46,345.95

EXPENDITURES

Loans made during year	$162,843.00	
Less repayments	101,400.79	
		$61,442.21
Net Loss from sale of securities and Premium Amortization	$184,424.05	
John Hancock Mutual Life Ins. Co. Group Life Premium (net)	3,242.76	187,666.81
TOTAL EXPENDITURES		$249,109.02
NET DECREASE IN CASH AND INVESTMENTS (ABOVE)		$202,763.07

TECHNOLOGY LOAN FUND COMMITTEE

Karl T. Compton, *Chairman*

Gerard Swope Pierre S. du Pont John E. Aldred
Edwin S. Webster Horace S. Ford

REPORT OF THE TRUSTEES OF THE M. I. T. PENSION ASSOCIATION

COMPARATIVE BALANCE SHEET

Assets

	June 30, 1940	*June 30, 1939*
Cash	$38,307.40	$49,193.89
Investments (Schedule A-1)	[1]1,381,037.30	1,283,741.71
Total	$1,419,344.70	$1,332,935.60

[1] Market Value June 30, 1940, $1,279,550.00.

Liabilities

	June 30, 1940	*June 30, 1939*
Teachers' Annuity Fund (5% Salary deduction, plus interest)	$793,685.68	$737,393.89
*M. I. T. Pension Fund (3% appropriation, plus interest)	506,646.41	471,865.19
Special Reserves for Annuity Payments	100,215.45	102,038.78
Total Liabilities	$1,400,547.54	$1,311,297.86
Reserve Fund	18,797.16	21,637.74
Total	$1,419,344.70	$1,332,935.60

*The Institute appropriates annually the equivalent of the 5% salary deduction, using 2% for payment of group insurance premiums.

RECEIPTS AND EXPENDITURES FOR 1939–1940

Receipts

5 per cent salary deductions added to Teachers' Annuity Fund	$77,464.74
3 per cent appropriations added to M. I. T. Pension Fund	46,640.41
Income from investments	53,775.57
Profits on sales of securities	8,274.17
Contribution to Reserve Fund (M. I. T.)	15,000.00
Total Receipts	$201,154.89

Expenditures

Loss on sales of securities	$4,977.09
Paid on account of withdrawal or decease	24,624.14
Used to purchase annuities for retiring members	67,270.23
Pensions paid directly to former retired members	10,525.75
Amortization of Bond Premiums	7,348.58
Total Expenditures	$114,745.79
Net Increase of Ledger Assets	$86,409.10

Trustees, M. I. T. Pension Association

Charles B. Breed
Karl T. Compton
Horace S. Ford
Ralph E. Freeman
John R. Macomber

BURSAR'S STATEMENT

To the Treasurer:

The following principal Schedules

BALANCE SHEET	(A)
OPERATING INCOME AND EXPENSE	(B)
SURPLUS AND PROFIT AND LOSS	(C)

together with their respective supporting schedules (A-1, B-1, etc.) have been drawn from the Institute's books of account. These summarize the financial condition of the Institute as of June 30, 1940, as well as the transactions during the year.

D. L. RHIND, *Bursar.*

W. A. HOKANSON, *Assistant Bursar.*

August 1, 1940

SCHEDULE A

BALANCE SHEET
JUNE 30, 1940

ENDOWMENT FUNDS, ASSETS			
Securities and Real Estate	(A-1)		$35,939,506.35
Cash: For Investment			73,267.42
Total			$36,012,773.77
STUDENT LOAN ASSETS			
Notes Receivable	(A-3)		$ 912,000.95
Total			$ 912,000.95
CURRENT AND DEFERRED ASSETS			
Cash: For General Purposes			$ 152,617.88
Accounts Receivable	(A-4)		94,531.70
Students' Fees and Deposits, Receivable			1,669.92
Deposit on Fire Insurance Account			43,175.02
Advances and Inventories for 1940–41	(A-5)		230,070.78
Total			$ 522,065.30
EDUCATIONAL PLANT ASSETS			
Land, Buildings and Equipment	(A-8)		$16,328,084.76
Total			$16,328,084.76
Total Assets			$53,774,924.78
AGENCY FUNDS, ASSETS			
Joseph Hewett Fund:			
Securities	(A-1)	$ 207,695.00	
Cash		1,085.56	
			$ 208,780.56
M. I. T. Pension Association:			
Securities	(A-1)	$1,381,037.30	
Cash		38,307.40	
			1,419,344.70
George S. Witmer Fund:			
Securities	(A-1)	$ 29,810.96	
Cash		230.40	
			30,041.36
[1]Students' Deposits:			
Cash			34,200.14
Total			$1,692,366.76

[1] Held for safe keeping only.

SCHEDULE A

BALANCE SHEET
JUNE 30, 1940

ENDOWMENT FUNDS, CAPITAL		
Endowment and Other Funds	(A-2)	$36,012,773.77
Total		$36,012,773.77
STUDENT LOAN CAPITAL		
Total	(A-3)	$ 912,000.95
Total		$ 912,000.95
CURRENT LIABILITIES AND SURPLUS		
Accounts Payable		$ 43,814.70
Students' Fees and Deposits	(A-6)	96,945.57
Current Funds	(A-7)	338,175.60
1939–40, Salaries Payable		36,884.56
Current Surplus (Schedule C)		6,244.87
Total		$ 522,065.30
EDUCATIONAL PLANT CAPITAL		
Endowment for Educational Plant	(A-9)	$16,328,084.76
Total		$16,328,084.76
Total Capital, Liabilities and Surplus		$53,774,924.78

AGENCY FUNDS, CAPITAL	
Joseph Hewett Fund	$ 208,780.56
M. I. T. Pension Association	1,419,344.70
George S. Witmer Fund	30,041.36
[1]Students' Deposits	34,200.14
Total	$1,692,366.76

[1] Held for safe keeping only.

SCHEDULE B

OPERATING INCOME FOR YEAR 1939–1940

	Supporting Schedules		
EDUCATIONAL AND GENERAL			
FROM STUDENTS			
Cash		$1,459,698.12	
Fees Receivable		1,439.47	
Scholarship Awards		206,879.00	
Student Loans		141,438.91	
Total, Tuition Fees		$1,809,455.50	
Locker, Examination and Other Fees		7,663.26	
			$1,817,118.76
FROM INVESTMENTS			
Income — General and Special Investments	(A-1)	$1,548,785.74	
Less: Income Added to Funds	(A-2)	317,971.96	
			1,230,813.78
FROM OTHER SOURCES			
Federal Aid — Acts 1862 and 1890		$22,088.35	
Appropriations from Funds	(B-1)	203,601.30	
Contributions and Other Income	(B-2)	21,236.45	
			246,926.10
Total, Educational and General			$3,294,858.64
AUXILIARY ACTIVITIES			
Dormitories (*excl. Graduate House)	(B-11)	$138,394.35	
Dining Service, Walker Memorial	(B-13)	149,517.98	
Dining Service, Graduate House	(B-14)	98,093.65	
Total, Auxiliary Activities			386,005.98
Total Operating Income			$3,680,864.62

* See Investments, (A-1), also (B-12).

SCHEDULE B

OPERATING EXPENSE FOR YEAR 1939–1940

	Supporting Schedules		
EDUCATIONAL AND GENERAL			
EDUCATIONAL EXPENSES			
Salaries	(B-3)	$1,944,804.56	
Departmental Expenses	(B-4)	275,791.36	
Library and Museum	(B-5)	88,024.39	
			$2,308,620.31
GENERAL EXPENSES			
Salaries of Officers		$134,125.00	
Clerical and Office Expenses	(B-6)	123,669.30	
General Administration	(B-7)	255,217.38	
			513,011.68
PLANT OPERATION			
Department of Buildings and Power	(B-8)	$364,833.11	
Fire Insurance		3,428.20	
			368,261.31
OTHER EXPENSES			
Medical Department	(B- 9)	$52,936.18	
Undergraduate Budget Board	(B-10)	90,496.60	
			143,432.78
Total Educational and General			$3,333,326.08
AUXILIARY ACTIVITIES			
Dormitories (*excl. Graduate House)	(B-11)	$98,981.24	
Dining Service, Walker Memorial	(B-13)	149,517.98	
Dining Service, Graduate House	(B-14)	98,093.65	
Total Auxiliary Activities			346,592.87
Total Operating Expense			$3,679,918.95
Excess Income over Expense (*Schedule C*)			945.67
Total			$3,680,864.62

* See Investments, (A-1), also (B-12).

SCHEDULE C

CURRENT SURPLUS

BALANCE, June 30, 1939		$ 516.85
Add:		
Excess Income 1939–40 (Schedule B)		945.67
Adjustments of Previous Years' Operations		
Appropriations unexpended	$3,273.47	
Tax Refund — City of Boston	1,063.11	
Miscellaneous	1,339.42	
		5,676.00
		$7,138.52
Deduct:		
Adjustments of Previous Years' Operations		
Student Accounts charged off		893.65
BALANCE, June 30, 1940		$6,244.87

SCHEDULE A-1

INVESTMENTS — GENERAL

Par Value				*Book Value*	*Net Income*
	U. S. GOVERNMENT BONDS				
$600,000	U. S. Treasury.....	2s	1950	$606,000.00	$5,862.88
500,000	U. S. Treasury.....	2s	1947	520,000.00	4,861.11
1,000,000	U. S. Treasury.....	2½s	1948	1,071,000.00	3,645.83
750,000	U. S. Treasury.....	2½s	1952	790,000.00	2,493.06
1,000,000	U. S. Treasury.....	2½s	1953	1,048,000.00	12,152.78
1,000,000	U. S. Treasury.....	2¾s	1954	1,066,000.00	13,368.06
900,000	U. S. Treasury.....	2¾s	1959	967,950.00	10,977.08
1,000,000	U. S. Treasury.....	3¼s	1945	1,045,000.00	32,500.00
400,000	U. S. Treasury.....	3⅜s	1947	418,000.00	13,499.96
	Income from bonds sold				77,121.09
	Total U. S. Government Bonds.....			$7,531,950.00	$176,481.85
	CANADIAN GOVERNMENT AND OTHER BONDS				
$250,000	Canada.....	2¾s	1944	$249,322.50	$5,625.00
220,000	Canada.....	5s	1952	218,740.82	11,000.00
91,000	Montreal.....	4¼s	1941	91,000.00	3,867.50
150,000	Ontario.....	5s	1942	150,000.00	7,500.00
50,000	Ontario.....	6s	1943	50,000.00	3,000.00
35,000	Ottawa.....	5s	1940	35,000.00	1,750.00
35,000	Ottawa.....	5s	1945	35,000.00	1,750.00
8,000	Ottawa.....	6s	1940	8,000.00	480.00
24,325	Toronto.....	4s	1948	22,622.25	973.32
9,000	Toronto.....	5s	1942	8,830.80	450.00
50,000	Gatineau Power ..	3¾s	1969	49,125.00	1,875.00
200,000	Shawinigan W. & P..	4½s	1967	201,500.00	9,000.00
59,000	Canadian Pac.Eq.Tr.	5s	1944	59,000.00	2,950.00
	Income from bonds sold or matured				1,209.19
	Total Canadian Bonds			$1,178,141.37	$51,430.01
	INDUSTRIAL BONDS				
$250,000	Eastern Gas and Fuel	4s	1956	$220,477.53	$7,541.23
191,000	National Dairy.....	3¾s	1951	192,443.66	7,162.50
17,000	Smith & Wesson....	5½s	1948	16,830.00	935.00
	Income from bonds sold or called				17,492.90
	Total Industrial Bonds.....			$429,751.19	$33,131.63

SCHEDULE A-1 — (Continued)

Shares		*Book Value*	*Net Income*
	INDUSTRIAL PREFERRED STOCKS		
500	American Tobacco, Pfd.	$69,405.80	$3,000.00
1,125	duPont de Nemours, Pfd.	130,226.50	5,531.26
1,500	General Motors, Pfd.	181,251.37	7,500.00
500	Liggett & Myers, Pfd.	82,246.24	3,500.00
1,000	U. S. Steel, Pfd.	103,412.85	7,000.00
	Income from stocks sold		12,125.00
	Total Industrial Preferred Stocks	$566,542.76	$38,656.26
	INDUSTRIAL COMMON STOCKS		
5,500	Air Reduction	$235,099.17	$9,625.00
2,920	American Can	297,817.67	9,280.00
1,095	Anaconda Copper	30,294.00	1,642.50
500	Beechnut Packing	46,198.36	2,875.00
3,500	Borden	77,850.80	4,810.00
6,000	Borg Warner	216,251.72	8,100.00
2,000	Caterpillar Tractor	92,194.13	4,000.00
6,000	Central Aguirre Associates	158,208.85	9,000.00
100	Christiana Securities	250,000.00	15,610.00
800	Chrysler	46,641.63	2,500.00
2,700	Dow Chemical	357,215.79	7,500.00
2,200	Draper Corp.	101,780.20	8,800.00
2,844	du Pont de Nemours	347,582.24	21,152.00
13,000	Eastman Kodak	1,141,298.11	78,000.00
11,995	General Electric	280,711.80	16,187.50
5,796	General Motors	205,447.21	19,428.75
1,000	Hazel Atlas Glass	108,081.25	2,875.00
400	Hercules Powder	31,080.25	240.00
7,500	Humble Oil & Refining	486,789.80	14,625.00
2,700	Inland Steel	289,763.32	12,500.00
656	International Business Machines	89,865.24	3,796.50
3,100	International Harvester	123,863.98	4,960.00
7,600	International Nickel, Canada	275,274.96	11,970.00
812	Island Creek Coal	15,590.50	1,574.00
1,000	Johns Manville	127,451.87	3,500.00
7,200	Kennecott Copper	307,957.09	17,500.00
4,000	Kroger Grocery and Baking	132,053.95	2,000.00
1,500	Libbey-Owens-Ford	104,047.84	4,125.00
1,000	Minneapolis-Honeywell	27,250.57	2,250.00
3,322	Monsanto Chemical	233,762.31	7,666.00

SCHEDULE A-1 — (Continued)

Shares		*Book Value*	*Net Income*
	INDUSTRIAL COMMON STOCKS (*Continued*)		
3,400	Montgomery Ward	$197,775.27	$6,800.00
4,000	National Biscuit	124,737.69	6,400.00
2,000	National Lead	65,726.17	1,750.00
3,000	National Steel	230,901.41	5,700.00
5,300	Owens Illinois Glass	310,399.07	4,750.00
2,500	J. C. Penney	225,238.84	12,500.00
3,700	Pittsburgh Plate Glass	204,508.92	10,625.00
5,853	Procter & Gamble	270,386.89	13,659.00
5,000	St. Joseph Lead	219,990.15	11,250.00
4,000	Sears Roebuck	308,712.07	17,000.00
1,000	Sherwin Williams	100,988.10	3,250.00
4,000	Standard Oil, Cal.	137,724.21	4,000.00
11,199	Standard Oil, N. J.	503,259.34	19,523.25
1,321	Texas Corp.	46,442.34	2,642.00
1,500	Timken Roller Bearing	106,312.70	4,875.00
6,600	Union Carbide & Carbon	385,797.66	11,725.00
2,000	United Carbon	137,565.94	6,000.00
5,825	United Fruit	265,536.06	22,400.00
3,618	United Shoe Machinery	249,615.58	14,334.50
800	Westinghouse Electric	66,005.80	.....
	Income from stocks sold		51,916.00
	Total Industrial Common Stocks	$10,395,048.82	$539,192.00

Par Value					
	PUBLIC UTILITY BONDS				
$199,000	Alabama Power	5s	1946	$190,543.74	$9,950.00
50,000	Am. Tel. & Tel.	3¼s	1961	51,000.00	740.28
100,000	Arkansas Power & Light	5s	1956	100,800.00	5,000.00
150,000	Bell Tel. of Pa.	5s	1948	158,500.00	7,500.00
100,000	Columbia Gas & Elec.	5s	1952	95,914.50	5,000.00
100,000	Consumers Power	3¼s	1969	105,300.00	1,002.06
30,000	Conn. Light & Power	7s	1951	28,255.06	2,100.00
100,000	Cons. Edison, N. Y.	3¼s	1946	100,500.00	3,250.00
100,000	Dayton Pr. & Lt.	3s	1970	104,000.00	*—366.67*
102,000	Detroit Edison, D.	4½s	1961	102,140.00	4,500.00
104,000	Georgia Power	5s	1967	91,803.41	5,200.00
100,000	Kentucky Utilities	4½s	1955	101,400.00	*—527.50*
105,000	Miss. River Power	5s	1951	97,759.61	5,250.00
100,000	N. E. Power Assoc.	5s	1948	94,750.00	5,000.00

SCHEDULE A-1 — (Continued)

Par Value				*Book Value*	*Net Income*
	PUBLIC UTILITY BONDS *(Continued)*				
$80,000	North American	3½s	1949	$80,800.00	$2,800.00
100,000	North Boston Ltg.	3½s	1947	100,000.00	3,500.00
47,000	Ohio Edison	4s	1967	50,000.00	694.56
50,000	Ohio Power	3¼s	1968	51,300.00	731.24
100,000	Penn. Power & Light	4½s	1974	103,500.00	2,087.50
50,000	Phila. Elec.	3½s	1967	53,000.00	651.39
75,000	Providence Gas	4s	1963	74,437.50	3,000.00
90,000	Pub. Service Colorado	3½s	1964	91,800.00	1,549.03
50,000	Sierra Pacific Pr.	5½s	1957	44,875.00	2,750.00
100,000	Southeastern Pr. & Lt.	6s	2025	103,500.00	6,000.00
100,000	Southern Cal. Gas	4½s	1961	89,250.00	4,500.00
50,000	Syracuse Lighting	5s	1951	52,700.00	2,500.00
165,000	Texas Power & Light	5s	1956	170,000.00	8,250.00
100,000	West Penn. Power	5s	1963	93,482.50	5,000.00
100,000	Western Mass.	3¼s	1946	100,000.00	3,250.00
	Income from bonds sold, called or matured				27,346.02
	Total Public Utility Bonds			$2,681,311.32	$128,207.91
Shares					
	PUBLIC UTILITY PREFERRED STOCKS				
3,000	Cons. Edison N. Y., Pfd.			$302,176.46	$15,000.00
2,500	Public Service N. J., 5%, Pfd.			254,816.98	12,500.00
3,000	United Corp., Pref.			139,276.75	12,750.00
	Income from stocks sold				14,697.00
	Total Public Utility Preferred Stocks			$696,270.19	$54,947.00
	PUBLIC UTILITY COMMON STOCKS				
5,000	Am. Gas. & Elec.			$203,626.96	$9,250.00
4,303	American Tel. & Tel.			572,017.91	38,727.00
3,231	Boston Edison			467,241.05	25,370.00
10,000	Commonwealth Edison			285,340.24	17,500.00
1,500	Cons. Gas, El. Lgt. & Pr. Balt.			132,250.73	5,400.00
1,700	Detroit Edison			251,695.77	10,200.00
1,500	Pacific Gas & Elec.			39,225 [illegible]	.....
1,000	Western Mass.			32,322.00	500.00
	Income from stocks sold				3,204.00
	Total Public Utility Common Stocks			$1,983,720.26	$110,151.00

SCHEDULE A-1 — (Continued)

Par Value				*Book Value*	*Net Income*
	RAILROAD BONDS				
$100,000	Albany & Susquehanna..	3½s	1946	$70,000.00	$3,500.00
100,000	Atch.Top.& Santa Fe C&A	4½s	1962	99,956.25	4,500.00
160,000	Atch. Top. & Santa Fe..	4s	1995	157,470.00	6,400.00
100,000	B.& O., P., L.E. & W. Va.	4s	1951	97,337.50	4,000.00
100,000	Boston & Maine.....	5s	1967	45,035.49	478.78
100,000	Chicago & N. W.....	4s	1987	96,500.00	.....
100,000	Chicago Union Sta.....	3¾s	1963	103,500.00	3,750.00
75,000	Northern Pacific	4s	1997	67,875.00	3,000.00
100,000	Northern Pacific	6s	2047	105,688.91	6,000.00
100,000	Oreg. R.R. & Navigation.	4s	1946	99,410.83	4,000.00
100,000	Pennsylvania.....	4½s	1960	114,000.00	4,500.00
100,000	Pennsylvania.....	4½s	1965	100,400.00	4,500.00
100,000	Pere Marquette A.....	5s	1956	88,820.69	5,000.00
51,000	Rio Grande West.....	4s	1939	49,935.00	.....
88,000	St. L., Iron Mt. & So....	4s	1933	77,355.00	3,520.00
100,000	Southern Pacific.....	3¾s	1946	98,750.00	3,750.00
100,000	Southern Pacific.....	4s	1955	95,250.00	4,000.00
100,000	Union Pacific.....	4s	1947	100,000.00	4,000.00
75,000	Washington Term.....	3½s	1945	68,196.37	2,625.00
100,000	Washington Term.....	4s	1945	106,000.00	4,000.00
	Income from bonds sold or matured...				32,827.33
	Total Railroad Bonds.....			$1,841,481.04	$104,351.11
Shares					
	RAILROAD PREFERRED STOCKS				
1,000	Pere Marquette, Pr. Pref.....			$80,024.40	.....
	Total Railroad Preferred Stocks.....			$80,024.40	.....
	RAILROAD COMMON STOCKS				
800	Atch. Top. & S. Fe.....			$110,175.00	$.....
2,000	Chesapeake & Ohio.....			97,840.60	5,500.00
400	Norfolk & Western.....			58,542.78	6,000.00
800	Union Pacific.....			107,831.90	4,800.00
	Total Railroad Common Stocks.....			$374,390.28	$16,300.00

SCHEDULE A-1 — (Continued)

Par Value				*Book Value*	*Net Income*
	OTHER BONDS				
$200,000	Adams Express	4¼s	1946	$199,388.81	$8,500.00
100,000	Aldred Invest. Trust	4½s	1967	107,000.00	4,500.00
90,000	Lawyers Mtge. Inv. Corp.	5½s	1940	89,705.89	3,000.00
200,000	Niagara Shares Corp.	5½s	1950	195,780.81	11,000.00
70,000	Railway Express Agency	1s	1940	70,000.00	700.00
	Income from bonds sold, called or matured				4,477.22
	Total Other Bonds			$661,875.51	$32,177.22
Shares					
	BANK STOCKS				
2,600	Bankers Trust, N. Y.			$162,550.00	$5,200.00
1,600	Central Hanover Bk. & Tr., N. Y.			194,225.00	6,400.00
5,000	Chase National, N. Y.			261,212.50	7,000.00
2,700	Chemical Bank & Trust, N. Y.			177,343.75	4,860.00
4,891	First National, Boston			295,984.96	9,782.00
80	First National, N. Y.			172,170.60	8,000.00
725	Guaranty Trust, N. Y.			239,093.04	8,700.00
5,000	National City, N. Y.			234,212.50	5,000.00
100	New England Trust, Boston			40,000.00	3,000.00
	Total Bank Stocks			$1,776,792.35	$57,942.00
	INSURANCE AND OTHER STOCKS				
275	Boston			$180,786.00	$5,775.00
2,500	Hartford			156,168.76	6,250.00
1,500	Phoenix			107,424.50	4,500.00
1,000	Stone & Webster, Inc.			29,507.65	250.00
680	Boston R. E. Trust			71,661.64	680.00
	Income from stocks written off				294.00
	Total Insurance Stocks			$545,548.55	$17,749.00
Par Value					
	MORTGAGE NOTES				
$51,000	Edw. Babb & Co.			$51,000.00	$2,328.75
7,800	S. C. Babbitt			7,800.00	402.50
3,000	Beta Nu House Corp.			3,000.00	163.19
16,000	Beta Theta Pi			16,000.00	718.57
4,300	Bigelow			4,300.00	215.00
30,000	Delta Kappa Epsilon			30,000.00	1,537.53
14,250	Gamma Pi Corp.			14,250.00	743.99
146,625	Jordan Marsh Co.			146,625.00	4,466.25
2,750	McKenzie			2,750.00	143.76
15,000	Palfrey, J. G.			15,000.00	562.50

SCHEDULE A-1 — (Continued)

Par Value		*Book Value*	*Net Income*
	MORTGAGE NOTES (*Continued*)		
$150,000	M. I. T. Dormitory	$150,000.00	$6,000.00
2,175	Orlogski	2,175.00	110.32
3,250	Phi Beta Epsilon Corp. (partial)	3,250.00	181.25
8,500	Phi Delta Theta	8,500.00	453.13
11,250	Phi Gamma Delta	11,250.00	603.65
8,000	Phi Kappa Sigma Trust	8,000.00	450.20
6,125	Phi Mu Delta	6,125.00	322.28
10,500	Theta Chi Trust	10,500.00	542.43
64,000	Walton Trust	64,000.00	3,289.00
	Income from mortgages sold		36.31
	Total Mortgage Notes	$554,525.00	$23,270.61
	REAL ESTATE		
	111 Bay State Road, Boston	$11,474.50	$.....
	Broad and High Streets, Boston	100,000.00	5,680.81
	Franklin Street, Boston	289,750.00	3,889.93
	Newbury Street, Boston	45,000.00	*—1,230.01*
	Memorial Drive, Cambridge	40,000.00	*—1,397.25*
	Graduate House, Cambridge	652,481.32	16,375.00
	Bexley Hall, Cambridge	165,000.00	7,874.68
	Worcester, Mass.	222,700.00	10,095.32
	Taunton, Mass.	112,201.49	3,940.81
	New London, Conn.	228,685.46	5,265.00
	Willimantic, Conn.	182,625.72	6,091.21
	Expense of real estate sold		*—2,053.08*
	Total Real Estate	$2,049,918.49	$54,532.42
	RECAPITULATION, GENERAL INVESTMENTS		
	U. S. Gov. Bonds	$7,531,950.00	$176,481.85
	Canadian Gov. and Other Bonds	1,178,141.37	51,430.01
	Industrial Bonds	429,751.19	33,131.63
	Industrial Preferred Stocks	566,542.76	38,656.26
	Industrial Common Stocks	10,395,048.82	539,192.00
	Public Utility Bonds	2,681,311.32	128,207.91
	Public Utility Preferred Stocks	696,270.19	54,947.00
	Public Utility Common Stocks	1,983,720.26	110,151.00

SCHEDULE A-1 — (Continued)

	Book Value	*Net Income*
RECAPITULATION, GENERAL INVESTMENTS (*Continued*)		
Railroad Bonds	$1,841,481.04	$104,351.11
Railroad Preferred Stocks	80,024.40	.....
Railroad Common Stocks	374,390.28	16,300.00
Other Bonds	661,875.51	32,177.22
Bank Stocks	1,776,792.35	57,942.00
Insurance and Other Stocks	545,548.55	17,749.00
Mortgage Notes	554,525.00	23,270.61
Real Estate	2,049,918.49	54,532.42
Total General Investments	$33,347,291.53	$1,438,520.02

INVESTMENTS — SPECIAL

Par Value or Shares					
	INVESTMENTS, BABSON FUND				
950	American Public Welfare Trust			$10,000.00	$237.50
	INVESTMENTS, (Real Estate) ALBERT FARWELL BEMIS FUND				
	Miscellaneous building lots and land in Wellesley, Weston and Dedham, carried at			$62,450.00	.....
	INVESTMENTS, MALCOLM COTTON BROWN FUND				
$25,000	Met. West Side	4s	1938	$10,850.00	
1,400	U. S. Treasury	3¼s	1945	1,400.00	$45.50
	Income from bonds sold				22.48
	Total Brown Fund			$12,250.00	$67.98
	INVESTMENTS, COFFIN MEMORIAL FUND				
$6,000	U. S. Treasury	3s	1948	$6,000.00	$180.00
350	Light & Pr. Sec. Co., Pfd.			35,000.00	2,100.00
10	United Gas & Imp., Pfd.			973.04	50.00
	Total Coffin Fund			$41,973.04	$2,330.00

SCHEDULE A-1 — (Continued)

Par Value or Shares				*Book Value*	*Net Income*
	INVESTMENTS, DRAPER FUND				
$12,000	U. S. Treasury	2½s	1952	$12,650.00	$44.17
12,000	U. S. Treasury	3¼s	1945	12,200.00	390.00
5,000	U. S. Treasury	3⅜s	1947	5,000.00	168.75
10,000	Ontario	5s	1959	9,950.00	500.00
8,000	Cons. Edison, N. Y.	3¼s	1946	8,100.00	260.00
10,000	Detroit Edison, D.	4½s	1961	10,500.00	450.00
20,000	Montana Power	3¾s	1966	19,852.49	404.17
13,000	Ohio Power	3¼s	1968	13,500.00	422.50
10,000	Texas Power & Light	5s	1956	10,200.00	500.00
	Income from bonds sold or matured				885.00
	Total Draper Fund			$101,952.49	$4,024.59
	INVESTMENTS, ARTHUR D. LITTLE MEMORIAL FUND				
466	A. D. Little, Inc., Pfd.			$46,600.00	$2,796.00
5,543	A. D. Little, Inc., Com.			110,860.00	19,400.50
	Total Little Fund			$157,460.00	$22,196.50
	INVESTMENTS, RICHARD LEE RUSSEL FUND				
$3,000	Mortgage Note (participation)			$3,000.00	$150.00
	INVESTMENTS, SOLAR ENERGY FUND				
100	Godfrey L. Cabot, Inc.			$647,700.00	$17,500.00
	INVESTMENTS, FRANCES E. WESTON FUNDS				
$8,950	Mortgage Note, Bartlett			$8,950.00	$357.96
	INVESTMENTS, JONATHAN WHITNEY FUND				
$40,000	U. S. Treasury	2½s	1952	$42,600.00	*—$69.44*
41,000	U. S. Treasury	3¼s	1945	42,000.00	1,332.50
50,000	U. S. Treasury	4s	1954	53,000.00	2,000.00
46,000	U. S. Treasury	3⅜s	1947	47,800.00	1,552.49
40,000	Canada	5s	1952	43,500.00	2,000.00
50,000	Appalachian Electric	4s	1963	49,375.00	2,000.00
25,000	Bangor Hydro. Elec.	3¾s	1966	25,900.00	937.50
25,000	Detroit Edison, D.	4½s	1961	28,000.00	1,125.00
25,000	Montana Power	3¾s	1966	24,826.99	505.21
17,000	Niagara Falls Pr.	3½s	1966	17,894.74	595.00

SCHEDULE A-1 — (Continued)

Par Value or Shares				*Book Value*	*Net Income*
	INVESTMENTS, JONATHAN WHITNEY FUND *(Continued)*				
$25,000	Pacific Gas & Elec.	3¾s	1961	$25,400.00	$937.50
25,000	So. Cal. Edison	3¾s	1960	24,760.00	937.50
20,000	Va. Elec. Power	3⅛s	1968	21,040.00	700.00
13,000	Un. Elec. of Mo.	3¾s	1962	13,400.00	135.73
25,000	Atch. Top. & S. Fe	4½s	1962	24,381.25	1,125.00
50,000	Kansas City Term.	4s	1960	42,750.00	2,000.00
25,000	Southern Pacific	4s	1955	24,471.99	1,000.00
25,000	Virginia Ry.	3¾s	1966	25,400.00	937.50
	Income from bonds sold, called or matured				3,386.88
	Total Whitney Fund			$576,499.97	$23,138.37
	INVESTMENTS, TECHNOLOGY LOAN FUND				
$55,000	U. S. Treasury	3⅜s	1947	$57,000.00	$1,856.25
50,000	U. S. Treasury	4s	1954	53,000.00	2,000.00
100,000	U. S. Treasury	2½s	1952	104,000.00	77.43
38,000	U. S. Treasury	2⅞s	1960	40,660.00	233.20
100,000	U. S. Treasury	2¾s	1954	107,500.00	381.94
50,000	Am. International	5½s	1949	51,800.00	2,750.00
25,000	Am. Power & Light	6s	2016	25,000.00	1,500.00
100,000	Eastern Gas & Fuel	4s	1956	93,496.00	4,000.00
14,000	Pac. Gas & Elec.	3¾s	1961	14,500.00	525.00
50,000	Southern Bell Tel.	3¼s	1962	48,985.01	1,625.00
50,000	Baltimore & Ohio	4½s	1960	50,000.00	.....
1,000	North American			36,447.80	1,216.50
115	Standard Oil, N. J.			5,630.16	201.25
1,250	Stone & Webster, Inc.			36,698.75	312.50
	Income from bonds sold or called				12,660.25
	Total Technology Loan Fund			$724,717.72	$29,339.32
	INVESTMENTS, EDWIN A. WYETH FUND				
$10,000	U. S. Treasury	2¾s	1965	$10,000.00	$275.00
22,000	U. S. Treasury	3s	1948	22,200.00	660.00
25,000	U. S. Treasury	4s	1954	26,500.00	1,000.00
17,000	U. S. Treasury	3⅛s	1952	17,871.56	313.70
100	American Can			11,944.73	400.00
125	American Tel. & Tel.			13,125.00	1,125.00
200	General Electric			7,832.20	70.00
250	General Motors			8,500.00	937.50
101	Standard Oil, N. J.			5,816.08	176.75
100	Union Carbide and Carbon			4,640.00	210.00
100	United Shoe Machinery			8,941.25	400.00

SCHEDULE A-1 — (Continued)

Par Value or Shares				*Book Value*	*Net Income*
	INVESTMENTS, EDWIN A. WYETH FUND *(Continued)*				
$10,000	Central N. Y. Power....	3¾s	1962	$10,300.00	$375.00
9,000	Columbia Gas & Elec. ..	5s	1952	8,310.78	450.00
10,000	Cons. Edison, N. Y.....	3¼s	1946	10,000.00	325.00
13,000	Miss. River Power.....	5s	1951	13,200.00	650.00
16,000	So. Cal., Edison.....	3¾s	1960	15,880.00	600.00
10,000	Texas Pr. & Lgt.....	5s	1956	10,200.00	500.00
15,000	Balt. & Ohio.....	4s	1948	15,000.00	600.00
5,000	Can. Pac. Eq. Tr.....	5s	1944	5,000.00	250.00
10,000	Kansas City Term.....	4s	1960	10,000.00	400.00
10,000	Union Pacific.....	4s	1947	10,000.00	400.00
	Income from investments sold or called				805.55
	Total Wyeth Fund.....			$245,261.60	$10,923.50
	Grand Total, General and Special Investments .			$35,939,506.35	$1,548,785.74
				(Schedule A)	(Schedule B)

AGENCY FUNDS

Par Value or Shares				*Book Value*	*Net Income*
	INVESTMENTS, JOSEPH HEWETT FUND				
$20,000	U. S. Treasury.....	2½s	1952	$21,150.00	—$54.17
15,000	U. S. Treasury.....	2⅞s	1960	15,800.00	63.54
15,000	U. S. Treasury.....	3¼s	1941	15,000.00	487.50
23,000	U. S. Treasury.....	4s	1954	24,000.00	920.00
19,000	Dom. of Canada	5s	1952	19,000.00	432.78
12,000	Adams Express.....	4¼s	1946	12,000.00	510.00
8,000	Scovill Mfg. Co.	5½s	1945	7,920.00	440.00
15,000	Alabama Power.....	5s	1951	13,425.00	750.00
15,000	Cent. N. Y. Power	3¾s	1962	15,000.00	562.50
15,000	Georgia Power.....	5s	1967	15,000.00	750.00
23,500	Texas Power & Light ...	5s	1956	24,000.00	1,175.00
20,000	Atch. Top. & S. Fe.....	4½s	1948	21,400.00	900.00
4,000	Can. Pac. Ry.....	5s	1944	4,000.00	200.00
	Income from bonds sold or called.....				2,270.37
	Total Hewett Fund.....			$207,695.00	$9,407.52
				(Schedule A)	

SCHEDULE A-1 — (Continued)

Par Value or Shares				*Book Value*	*Net Income*
	INVESTMENTS, M. I. T. PENSION ASSOCIATION				
$35,000	U. S. Treasury	2⅞s	1960	$37,956.26	−$10.38
100,000	U. S. Treasury	3¼s	1945	104,000.00	3,250.00
100,000	U. S. Treasury	4s	1954	108,148.00	4,000.00
10,000	U. S. Treasury	3s	1948	10,000.00	300.00
35,000	Dom. of Canada	5s	1952	37,318.75	607.64
16,000	Scovill Mfg.	5½s	1945	15,840.00	880.00
33,000	Alabama Power	5s	1946	33,660.00	1,650.00
50,000	Appalachian Elec.	4s	1963	49,375.00	2,000.00
30,000	Bell Tel. of Pa.	5s	1948	31,400.00	1,500.00
50,000	Central N. Y. Power	3¾s	1962	50,000.00	1,875.00
50,000	Detroit Edison	4s	1965	53,600.00	2,000.00
25,000	Georgia Power	5s	1967	26,000.00	527.50
29,000	Miss. River Power	5s	1951	29,200.00	1,450.00
70,000	Pac. Gas & Elec.	3¾s	1961	76,243.75	1,378.13
25,000	Texas Pr. &. Lgt.	5s	1956	26,300.00	688.62
25,000	Atch. Top. & S. Fe	4½s	1948	26,900.00	1,125.00
25,000	Atlantic Coast Line	4s	1952	24,753.15	1,000.00
25,000	Balt. & Ohio	4s	1948	25,000.00	1,000.00
25,000	Can. Pacific Eq.	5s	1944	25,000.00	1,250.00
50,000	Chicago Union Sta.	3¾s	1963	52,500.00	1,875.00
50,000	Kansas City Term.	4s	1960	52,300.00	2,000.00
50,000	Pennsylvania Co.	4s	1963	50,600.00	2,000.00
35,000	Southern Pacific	4s	1955	33,638.79	1,400.00
Shares					
200	Eastman Kodak			28,500.00	1,200.00
600	General Motors			29,332.24	2,250.00
800	General Electric Co.			42,462.59	1,200.00
163	Int. Business Machines			26,292.86	942.00
800	National Biscuit			21,220.31	1,280.00
400	Sears Roebuck			29,391.89	1,700.00
505	Standard Oil, N. J.			29,567.08	883.75
300	Union Carbide & Carbon			27,360.28	630.00
400	United Fruit			31,355.21	1,600.00
300	United Shoe Machinery			24,986.88	1,200.00
200	Am. Tel. & Tel. Co.			34,459.26	1,800.00
500	First National Bank, Boston			27,500.00	1,000.00
400	Bankers Trust Co.			23,687.50	200.00
500	Chemical Bank & Trust			25,187.50	225.00
	Income from investments sold or called				3,918.31
	Total Pension Association			$1,381,037.30	$53,775.57

(Schedule A)

SCHEDULE A-1 — (Continued)

Par Value or Shares		*Book Value*	*Net Income*
	INVESTMENTS, GEORGE S. WITMER FUND		
$2,000	Niagara Shares Corp.... 5½s 1950	$2,000.00	$63.24
26,500	Mortgage Notes, Washington, D. C...	26,500.00	1,450.00
25	General Motors.....	1,310.96	43.75
	Total Witmer Fund	$29,810.96	$1,556.99
		(Schedule A)	

SCHEDULE A-2

ENDOWMENT FUNDS FOR GENERAL PURPOSES

No.	*Restricted Funds*	*Funds, June 30, 1939*	*Investment Income Added to Principal*	*Other Receipts*	*Expended or Transferred*	*Funds, June 30, 1940*
101	George Robert Armstrong ..	$5,000.00	$.....	$.....	$.....	$5,000.00
103	George Blackburn Mem. ...	907,654.36	.....	.....	.....	907,654.36
105	Charles Choate.....	35,858.15	.....	.....	.....	35,858.15
107	Eben S. Draper.....	102,535.61	.....	1,235.00	1,628.75	102,141.86
109	Coleman du Pont.....	221,325.48	.....	.....	.....	221,325.48
111	Eastman Contract.....	9,498,869.55	.....	.....	.....	9,498,869.55
113	George Eastman (Building)	554,701.70	.....	1,719.50	3,407.31	553,013.89
115	Charles W. Eaton.....	243,337.03	.....	16,585.00	.....	259,922.03
117	Educational Endowment ...	7,573,834.60	.....	.....	.....	7,573,834.60
119	Martha Ann Edwards... ..	30,000.00	.....	.....	.....	30,000.00
121	William Endicott.....	25,000.00	.....	.....	.....	25,000.00
123	Francis Appleton Foster....	1,000,000.00	.....	.....	.....	1,000,000.00
125	John W. Foster.....	299,650.64	.....	.....	.....	299,650.64
127	Alexis H. French.....	5,000.00	.....	.....	.....	5,000.00
129	Jonathan French.....	25,212.48	.....	.....	.....	25,212.48
131	Henry C. Frick.....	1,831,053.42	.....	.....	.....	1,831,053.42
133	General Endowment.....	1,527,449.00	.....	.....	.....	1,527,449.00
135	Eliot Granger.....	21,568.43	.....	.....	.....	21,568.43
136	Charles Hayden.....	1,000,000.00	.....	.....	.....	1,000,000.00
137	James Fund.....	163,654.21	.....	.....	.....	163,654.21
139	Katherine B. Lowell.....	5,000.00	.....	.....	.....	5,000.00
141	Thomas McCammon	15,000.00	.....	.....	.....	15,000.00
143	M. I. T. Alumni (Gym.) ...	217,719.43	4,380.00	28,812.43	250,911.86	.....
144	M. I. T. Alumni Fund (New)	.....	87.20	27,127.44	11,098.04	16,116.60
145	Kate M. Morse.....	25,000.00	.....	.....	.....	25,000.00
147	Everett Morss.....	25,000.00	.....	.....	.....	25,000.00
149	Richard Perkins.....	50,000.00	.....	.....	.....	50,000.00
150	J. W. and B. L. Randall ...	83,452.36	.....	.....	.....	83,452.36
151	Wm. Barton Rogers Mem. .	250,225.00	.....	.....	.....	250,225.00
152	Saltonstall Fund.....	62,728.98	686.43	.....	.....	63,415.41
153	Samuel E. Sawyer.....	4,764.40	.....	.....	.....	4,764.40
155	Andrew Hastings Spring ...	50,000.00	.....	.....	.....	50,000.00
156	George G. Stone.....	.....	.....	4,677.35	.....	4,677.35
157	Seth K. Sweetser.....	25,061.62	.....	.....	.....	25,061.62
159	William J. Walker.....	23,613.59	.....	.....	.....	23,613.59
161	Horace Herbert Watson....	34,076.69	.....	.....	.....	34,076.69
163	Albion B. K. Welch.....	5,000.00	.....	.....	.....	5,000.00
165	Everett Westcott.....	171,394.00	.....	.....	.....	171,394.00
167	Marion Westcott.....	238,202.00	.....	.....	.....	238,202.00
169	George Wigglesworth.....	25,879.73	113.42	.....	.....	25,993.15
171	Edwin A. Wyeth.....	252,627.49	4,334.65	2,089.29	11,480.28	247,571.15
		$26,636,449.95	$9,601.70	$82,246.01	$278,526.24	$26,449,771.42
	Unrestricted Funds					
172	Edmund D. Barbour.....	$27,822.53	.....	.....	$7,085.59	$20,736.94
173	Stephen L. Bartlett.....	281,739.28	.....	.....	75,238.02	206,501.26
176	N. Loring Danforth	5,000.00	.....	.....	5,000.00	.....
180	Henrietta G. Fitz.....	10,000.00	.....	.....	10,000.00	.....

Note. Where no investment income is indicated the amount allocated has been carried directly to Current Income.

SCHEDULE A-2 — (Continued)

No.	*Unrestricted Funds (Continued)*	*Funds, June 30, 1939*	*Investment Income Added to Principal*	*Other Receipts*	*Expended or Transferred*	*Funds, June 30, 1940*
187	Industrial Fund	$12,332.72	.....	$17,208.18	$20,732.78	$8,808.12
189	Hiram H. Logan	6,632.99	.....	.....	6,632.99	.....
190	John Wells Morss	.....	.....	50,000.00	.....	50,000.00
195	Emerette O. Patch	5,240.84	.....	.....	.....	5,240.84
196	H. B. Perkins	.....	.....	250.00	.....	250.00
201	Robert E. Rogers	7,680.77	.....	.....	7,300.00	380.77
205	Frank G. Webster	25,000.00	.....	.....	.....	25,000.00
		$381,449.13	.....	$67,458.18	$131,989.38	$316,917.93

FUNDS FOR DESIGNATED AND SPECIAL PURPOSES

Special Deposit and Agency Funds

210	Endowment Reserve	$714,381.37	$4,269.62	$686,171.18	$806,821.23	$598,000.94
211	Income Equalization Reserve	38,315.68	1,677.88	.....	.....	39,993.56
212	Albert Fund	4,438.06	152.60	.....	1,912.72	2,677.94
214	Alpha Chi Sigma House Fund	3,179.32	139.52	60.00	.....	3,378.84
216	Anonymous (1924)	2,184.13	95.92	.....	.....	2,280.05
220	Basket Ball Fund	3,316.46	143.88	.....	400.00	3,060.34
221	Bess Bigelow Fund	27,159.12	1,190.92	.....	.....	28,350.04
222	Ednah Dow Cheney	15,572.90	683.16	.....	254.32	16,001.74
223	Class of 1914	.....	13.08	750.00	.....	763.08
224	Class of 1918 (Organ Fund)	.....	.....	311.00	.....	311.00
225	Class of 1923	20,886.35	876.00	338.25	10,386.30	11,714.30
226	Class of 1924	21,440.60	941.40	149.23	133.34	22,397.89
227	Class of 1925	13,534.25	595.96	167.90	178.12	14,119.99
229	Class of 1926	16,420.34	726.76	406.90	16.97	17,537.03
230	Class of 1927	14,353.31	657.00	773.12	.....	15,783.43
231	Class of 1928	33,658.62	1,489.40	.....	.....	35,148.02
232	Class of 1929	10,587.77	481.60	642.39	.....	11,711.76
233	Class of 1930	1,445.00	65.40	65.90	.....	1,576.30
237	Class of 1934	436.62	17.44	.....	.....	454.06
238	Class of 1935	355.06	17.44	.12	.....	372.62
239	Class of 1936	498.10	21.80	.....	.....	519.90
240	Class of 1939	559.50	26.16	82.50	.....	668.16
245	Cosmic Terr. Research	9,995.42	657.00	30,000.00	9,995.42	30,657.00
248	Drama Club Theatre Fund	416.08	17.44	.....	.....	433.52
250	Industrial Relations	45,785.60	2,628.00	44,650.37	17,091.76	75,972.21
255	M. I. T. Employees Fund	685.07	21.80	617.60	1,088.60	235.87
260	M. I. T. Teachers' Insurance	6,821.34	.....	31,434.23	31,013.22	7,242.35
261	M. I. T. Teachers' Insurance (Special)	103,787.99	4,729.80	14,147.61	25,232.70	97,432.70
263	M. I. T. Alumni Association Permanent Funds	84,727.82	3,709.92	35.00	.....	88,472.74
264	Henry A. Morss Nautical	3,057.44	122.08	.....	1,200.00	1,979.52
265	Louisville Technology Foundation Fund	50.00	.....	.....	.....	50.00

Note. Where no investment income is indicated the amount allocated has been carried directly to Current Income.

SCHEDULE A-2 — (Continued)

No.		*Funds, June 30, 1939*	*Investment Income Added to Principal*	*Other Receipts*	*Expended or Transferred*	*Funds, June 30, 1940*
	SPECIAL DEPOSIT AND AGENCY FUNDS (*Continued*)					
266	Class of 1917, Special.....	$108.57	$4.36	$.....	$.....	$112.93
268	Class of 1934, Special.....	586.06	26.16	.....	.....	612.22
270	Class of 1898 Loan.....	†9,145.77	403.12	114.16	.....	†9,663.05
273	Class of 1874.....	217.57	8.72	.....	.....	226.29
275	Richards Portrait.....	732.49	30.52	.....	.....	763.01
277	W. P. Ryan, Special.....	3,922.08	170.04	.....	.....	4,092.12
279	Sedgwick Memorial Lecture.	11,159.01	499.04	231.53	240.20	11,649.38
281	Lillie C. Smith.....	5,261.62	232.08	.....	200.00	5,293.70
283	Walter B. Snow.....	7,781.40	200.56	.....	4,398.11	3,583.85
285	Technology Matrons' Teas .	9,123.46	398.76	.....	369.84	9,152.38
286	W. B. S. Thomas' Fund....	2,348.71	100.28	.....	225.00	2,223.99
290	Undergraduate Activities Trust.....	1,321.27	56.68	.....	.....	1,377.95
292	Undergraduate Publication Trust.....	17,141.02	748.56	.....	500.00	17,389.58
294	Undergraduate Dues, Res. Athletics.....	15,428.30	555.72	.....	5,420.08	10,563.94
296	Undergraduate Dues, Res. Contingent.....	16,660.27	731.12	.....	900.00	16,491.39
		$1,298,986.92	$30,334.70	$811,148.99	$917,977.93	$1,222,492.68
	FUNDS FOR SALARIES					
301	Samuel C. Cobb For General Salaries.....	$36,551.31	.....	.....	.....	$36,551.31
303	Sarah H. Forbes For General Salaries.....	500.00	.....	.....	.....	500.00
305	George A. Gardner For General Salaries.....	20,000.00	.....	.....	.....	20,000.00
309	James Hayward Professorship of Engineering	18,800.00	.....	.....	.....	18,800.00
311	William P. Mason Professorship of Geology ...	18,800.00	.....	.....	.....	18,800.00
313	Henry B. Rogers For General Salaries.....	25,000.00	.....	.....	.....	25,000.00
315	Nathaniel Thayer Professorship of Physics....	25,000.00	.....	.....	.....	25,000.00
317	Elihu Thomson Professorship of Elec. Eng...	23,680.87	.....	.....	.....	23,680.87
		$168,332.18	.....	.....	.....	$168,332.18

Note. Where no investment income is indicated the amount allocated has been carried directly to Current Income.
Exclusive of student notes receivable. (See Schedule A-3.)

SCHEDULE A-2 — (*Continued*)

No.		Funds, June 30, 1939	Investment Income Added to Principal	Other Receipts	Expended or Transferred	Funds, June 30, 1940
	FUNDS FOR LIBRARY					
321	Walter S. Barker	$10,407.41	$455.44	$.....	$435.61	$10,427.24
325	Frank Harvey Cilley	85,614.17	3,749.16	.....	3,667.00	85,696.33
327	Charles Lewis Flint	5,720.82	249.52	.....	216.32	5,754.02
341	William Hall Kerr	3,927.77	170.04	.....	113.86	3,983.95
343	George A. Osborne	10,462.94	459.80	.....	558.14	10,364.60
345	Arthur Rotch, Architectural	6,652.44	293.12	.....	109.75	6,835.81
349	John Hume Tod	3,146.35	135.16	.....	24.08	3,257.43
351	Theodore N. Vail Mem. Library	39,692.32	2,912.40	28,425.00	2,000.00	69,029.72
		$165,624.22	$8,424.64	$28,425.00	$7,124.76	$195,349.10
	FUNDS FOR DEPARTMENTS					
401	William Parsons Atkinson	$13,082.20	$.....	$.....	$.....	$13,082.20
403	Frank Walter Boles Memorial	33,255.15	1,458.88	.....	1,388.26	33,325.77
405	William E. Chamberlain	7,309.77	.....	.....	.....	7,309.77
407	Chemical Engineering Practice	257,772.97	.....	.....	.....	257,772.97
409	Crosby Honorary Fund	1,724.50	74.12	.....	.....	1,798.62
411	Susan E. Dorr	95,955.67	.....	.....	.....	95,955.67
412	George Eastman	400,000.00	.....	.....	.....	400,000.00
414	Arthur Dehon Little Memorial	46,600.00	22,196.50	110,860.00	22,196.50	157,460.00
417	George Henry May	5,000.00	.....	.....	.....	5,000.00
419	Susan Minns	40,000.00	.....	.....	.....	40,000.00
420	Forris Jewett Moore	22,052.20	963.20	.....	36.11	22,979.29
422	William E. Nickerson	4,021.03	.....	.....	4,021.03	.....
424	Edward D. Peters	6,399.95	280.04	.....	.....	6,679.99
425	Pratt Naval Architectural	392,489.58	2,700.00	.....	2,669.14	392,520.44
426	Frances E. Roper	2,000.00	.....	.....	.....	2,000.00
427	Arthur Rotch	25,000.00	.....	.....	.....	25,000.00
429	W. T. Sedgwick	79,882.23	3,328.60	.....	10,000.00	73,210.83
431	Edmund K. Turner	261,871.18	4,200.29	.....	1,776.78	264,294.69
433	William Lyman Underwood	16,159.58	683.16	.....	1,700.00	15,142.74
434	William R. Ware	.....	657.00	15,012.50	948.31	14,721.19
		$1,710,576.01	$36,541.79	$125,872.50	$44,736.13	$1,828,254.17
	FUNDS FOR RESEARCH					
442	Albert Farwell Bemis	$376,725.69	$13,140.00	$688.97	*$21,876.36	$368,678.30
443	Samuel Cabot	51,369.67	2,242.32	.....	2,500.00	51,111.99
444	Crane Automotive Research	4,024.95	.....	.....	4,024.95	.....
449	Ellen H. Richards	22,920.61	1,003.44	.....	600.00	23,324.05
451	Charlotte B. Richardson	46,054.32	2,018.96	.....	2,000.00	46,073.28
452	William Barton and Emma Savage Rogers	134,967.02	5,869.40	.....	445.65	140,390.77
453	Solar Energy	647,516.70	17,500.00	.....	15,895.00	649,121.70
454	Henry N. Sweet	9,098.44	398.76	.....	.....	9,497.20
456	Textile Research Fund	3,297.18	87.20	.....	1,212.80	2,171.58
		$1,295,974.58	$42,260.08	$688.97	$48,554.76	$1,290,368.87

Note. Where no investment income is indicated the amount allocated has been carried directly to Current Income.

* Includes Real Estate Expenses.

SCHEDULE A-2 — (*Continued*)

No.		*Funds, June 30, 1939*	*Investment Income Added to Principal*	*Other Receipts*	*Expended or Transferred*	*Funds, June 30, 1940*
	FUNDS FOR FELLOWSHIPS					
462	American Institute of Baking.	$750.00	$.....	$750.00	$1,500.00	$.....
463	William Sumner Bolles.....	27,968.75	1,226.80	.....	945.14	28,250.41
464	Malcolm Cotton Brown.....	12,379.02	67.98	44.44	.....	12,491.44
465	Francis W. Chandler.....	5,151.81	438.00	5,000.00	.....	10,589.81
466	Collamore.....	14,666.10	643.92	.....	600.00	14,710.02
467	Dalton Graduate Chemical...	7,497.69	328.00	.....	300.00	7,525.69
468	Dow Chemical.....	.....	.....	1,500.00	1,500.00	.....
469	du Pont de Nemours.....	.....	.....	750.00	750.00	.....
474	Rebecca R. Joslin.....	9,230.06	403.12	.....	.....	9,633.18
476	Wilfred Lewis.....	5,895.05	258.24	.....	250.00	5,903.29
478	Moore.....	33,436.34	1,463.24	.....	1,500.00	33,399.58
480	Willard B. Perkins.....	6,380.18	284.40	.....	.....	6,664.58
484	Proprietors Locks and Canals.	3,668.96	152.60	.....	600.00	3,221.56
486	Henry Bromfield Rogers	25,559.64	1,121.16	.....	1,100.00	25,580.80
488	Richard Lee Russel.....	3,351.35	150.00	.....	125.00	3,376.35
490	Henry Saltonstall.....	10,966.14	481.60	.....	500.00	10,947.74
492	James Savage.....	13,055.75	560.08	.....	900.00	12,715.83
493	Sloan.....	.....	.....	1,000.00	.....	1,000.00
495	Susan H. Swett.....	9,438.60	411.84	.....	.....	9,850.44
496	Gerard Swope.....	138.75	.....	.....	.....	138.75
497	Frank Hall Thorp.....	10,699.30	468.52	.....	500.00	10,667.82
498	Luis Francisco Verges.....	10,725.91	459.80	.....	1,000.00	10,185.71
		$210,959.40	$8,919.30	$9,044.44	$12,070.14	$216,853.00
	FUNDS FOR SCHOLARSHIPS					
501	Elisha Atkins.....	$5,197.29	$223.36	$.....	$350.00	$5,070.65
503	Billings Student.....	51,700.58	2,251.04	.....	2,700.00	51,251.62
504	Jonathan Bourne.....	10,931.02	459.80	.....	1,300.00	10,090.82
505	Albert G. Boyden.....	585,452.64	25,640.44	61.19	22,245.82	588,908.45
506	Harriet L. Brown.....	7,654.77	336.72	.....	300.00	7,691.49
508	Nino Tesher Catlin.....	1,048.81	43.60	.....	75.00	1,017.41
511	Lucius Clapp.....	5,232.86	223.36	.....	400.00	5,056.22
513	Class of 1896.....	†6,553.65	288.76	.....	250.00	†6,592.41
514	Class of 1909.....	1,724.84	74.12	52.11	.....	1,851.07
515	Class of 1938.....	547.28	26.16	53.88	.....	627.32
516	Lucretia Crocker.....	79,404.71	3,477.84	.....	3,550.00	79,332.55
517	Isaac W. Danforth.....	5,519.90	232.08	.....	650.00	5,101.98
520	Ann White Dickinson.....	42,071.94	1,778.16	.....	3,350.00	40,500.10
521	Thomas M. Drown.....	51,725.56	2,268.48	.....	2,150.00	51,844.04
524	Farnsworth.....	5,686.10	249.52	.....	200.00	5,735.62
526	Charles Lewis Flint.....	5,704.90	236.44	.....	850.00	5,091.34
527	Sarah S. Forbes.....	3,826.37	165.68	.....	150.00	3,842.05
528	Charles Hayden Memorial....	.....	1,576.60	50,000.00	9,750.00	41,826.60
531	George Hollingsworth.....	5,387.64	236.44	.....	200.00	5,424.08
533	T. Sterry Hunt.....	3,304.95	135.16	.....	400.00	3,040.11

† Exclusive of student notes receivable. (See Schedule A-3.)

SCHEDULE A-2 — (*Continued*)

No.		*Funds, June 30, 1939*	*Investment Income Added to Principal*	*Other Receipts*	*Expended or Transferred*	*Funds, June 30, 1940*
	FUNDS FOR SCHOLARSHIPS (*Continued*)					
534	William F. Huntington	$5,458.91	$227.72	$	$500.00	$5,186.63
536	Joy Scholarships	17,783.30	780.08		700.00	17,863.38
538	William Litchfield	5,560.57	232.08		600.00	5,192.65
539	Elisha T. Loring	5,561.26	245.16		220.00	5,586.42
541	Lowell Institute Scholarship	2,789.55	122.08		150.00	2,761.63
542	Rupert A. Marden	2,085.54	91.56		100.00	2,077.10
543	George Henry May	†7,818.77	332.36	370.00	600.00	†7,921.13
545	James H. Mirrlees	2,822.70	117.72		200.00	2,740.42
547	Nichols Scholarship	5,530.74	232.08		600.00	5,162.82
548	Charles C. Nichols	5,518.19	240.80		200.00	5,558.99
550	John Felt Osgood	5,373.92	223.36		450.00	5,147.28
551	George L. Parmelee	18,699.92	819.32		850.00	18,669.24
552	Richard Perkins	52,737.28	2,307.72		2,050.00	52,995.00
553	Thomas Adelbert Read	21,676.84	937.04		1,325.00	21,288.88
554	John Roach	3,180.14	275.68	3,212.18	250.00	6,418.00
555	William P. Ryan Memorial	4,555,01	200.56	25.00		4,780.57
556	John P. Schenkl	46,944.64	2,023.32		3,500.00	45,467.96
557	Thomas Sherwin	5,500.85	227.72		500.00	5,228.57
558	Horace T. Smith	33,835.95	1,466.60		1,900.00	33,402.55
559	Sons and Daughters New England Colony	639.94	26.16		50.00	616.10
560	Samuel E. Tinkham	2,516.89	109.00		100.00	2,525.89
562	F. B. Tough	662.71	30.52			693.23
563	Susan Upham	1,205.93	52.32		50.00	1,208.25
565	Vermont Scholarship	25,253.50	1,108.08		800.00	25,561.58
567	Ann White Vose	60,877.45	2,667.24		2,700.00	60,844.69
569	Arthur M. Waitt	10,553.23	446.72		1,050.00	9,949.95
571	Louis Weissbein	4,399.48	183.12		400.00	4,182.60
573	Frances Erving Weston	7,475.87	288.00			7,763.87
574	Samuel Martin Weston	5,924.69	222.56		750.00	5,397.25
576	Amasa J. Whiting	4,904.50	204.92		550.00	4,559.42
577	Elizabeth Babcock Willmann	5,454.79	240.80		200.00	5,495.59
		$1,261,978.87	$56,606.16	$53,774.36	$70,215.82	$1,302,143.57
	FUNDS FOR PRIZES					
580	Babson	$10,356.25	$237.50	$	$	$10,593.75
581	Robert A. Boit	5,413.19	236.44		135.00	5,514.63
583	Class of 1904	636.59	26.16		15.00	647.75
584	William Emerson	2,059.00	91.56	86.00		2,236.56
585	Roger Defriez Hunneman	1,013.29	43.60			1,056.89
587	James Means	3,329.17	143.88		100.00	3,373.05
589	Arthur Rotch	7,411.70	323.64		200.00	7,535.34
591	Arthur Rotch, Special	11,081.98	485.96		200.00	11,367.94
593	Samuel W. Stratton	1,702.67	74.12		120.35	1,656.44
		$43,003.84	$1,662.86	$86.00	$770.35	$43,982.35

† Exclusive of student notes receivable. (See Schedule A-3.)

SCHEDULE A-2 — (*Continued*)

No.		Funds, June 30, 1939	Investment Income Added to Principal	Other Receipts	Expended or Transferred	Funds, June 30, 1940
	FUNDS FOR RELIEF					
601	Edward Austin	$438,150.58	$19,053.00	$.....	$23,357.00	$433,846.58
603	Thomas Wendell Bailey	2,745.91	122.08	25.00	550.00	2,342.99
604	Charles Tidd Baker	32,878.50	1,440.44	.....	625.00	33,693.94
606	Levi Boles	11,103.51	485.96	.....	500.00	11,089.47
608	Bursar's Fund	†19,631.40	867.28	2,682.91	1,965.00	†21,216.59
610	Mabel Blake Case	27,346.88	1,195.28	.....	1,050.00	27,492.16
612	Fred L.and Florence L.Coburn	5,266.03	227.72	.....	300.00	5,193.75
614	Coffin Memorial	42,321.00	2,330.00	.....	2,650.00	42,001.00
615	George R. Cooke	.....	100.28	3,500.00	100.00	3,500.28
616	Dean's Fund	†5,713.38	249.52	720.61	375.00	†6,308.51
618	Carl P. Dennett	†866.07	39.24	1.00	.....	†906.31
620	Dormitory Fund	4,079.51	178.76	.....	175.00	4,083.27
621	Frances and William Emerson	†101,643.67	4,449.76	20.07	3,935.00	†102,178.50
623	Norman H. George	95,254.22	4,174.08	.....	3,600.00	95,828.30
625	John A. Grimmons	†363.86	43.60	2,216.34	.....	†2,623.80
627	James H. Haste	182,596.33	7,997.36	.....	5,100.00	185,493.69
628	David L. Jewell	26,477.99	1,160.40	.....	1,000.00	26,638.39
629	Llora Culver Krueger	5,374.71	187.48	.....	1,200.00	4,362.19
630	Charles A. Richards	.....	1,133.60	31,719.32	1,100.00	31,752.92
631	William B. Rogers	†41,969.18	1,839.20	747.17	1,800.00	†42,755.55
632	Anna Spooner	.....	261.60	7,500.00	200.00	7,561.60
633	Summer Surveying Camp	†1,843.49	78.48	104.57	275.00	†1,751.54
634	Teachers' Fund	113,487.03	4,905.20	.....	6,600.00	111,792.23
635	Technology Loan Fund	†929,678.29	29,339.32	124,121.75	356,224.14	†726,915.22
636	Alice Brown Tyler	1,109.72	47.96	.....	.....	1,157.68
637	Thomas Upham	303,598.00	15,330.00	98,261.40	22,276.98	394,912.42
638	Samson R. Urbino	1,090.09	47.96	.....	100.00	1,038.05
639	Jonathan Whitney	588,980.48	23,138.37	2,827.77	36,542.40	578,404.22
640	Morrill Wyman	73,070.55	3,196.80	.....	4,800.00	71,467.35
		$3,056,640.38	$123,620.73	$274,447.91	$476,400.52	$2,978,308.50
	Totals	$36,229,975.48	$317,971.96	$1,453,192.36	$1,988,366.03	$36,012,773.77

RECAPITULATION OF FUNDS

	Funds June 30, 1939	Funds June 30, 1940
Restricted	$26,636,449.95	$26,449.771.42
Unrestricted	381,449.13	316,917.93
Special Deposit Funds	1,298,986.92	1,222,492.68
Salaries	168,332.18	168,332.18
Libraries, etc.	165,624.22	195,349.10
Departments	1,710,576.01	1,828,254.17
Research	1,295,974.58	1,290,368.87
Fellowships	210,959.40	216,853.00
Scholarships	1,261,978.87	1,302,143.57
Prizes	43,003.84	43,982.35
Relief	3,056,640.38	2,978,308.50
	$36,229,975.48	$36,012,773.77

†Exclusive of student notes receivable. (See Schedule A-3.)

(Schedule A)

SCHEDULE A-3
STUDENT NOTES RECEIVABLE

Fund	*Notes Receivable June 30, 1939*	*Loans Made 1939–40*	*Loans Repaid 1939–40*	*Notes Receivable June 30, 1940*	*Interest Received 1939–40*
Technology Loan Fund ...	$824,187.08	$162,843.00	$101,400.79	$885,629.29	$17,006.63
Bursar's Fund.....	6,879.55	1,965.00	*2,593.35	6,251.20	91.96
Rogers Fund.....	4,497.72	.....	655.77	3,841.95	91.40
Dean's Fund.....	2,752.37	375.00	662.31	2,465.06	58.30
C. E. Summer Camp Fund	330.00	275.00	100.00	505.00	4.57
Grimmons Sch. Loan Fund	1,420.00	.....	236.00	1,184.00	57.75
Dennett Fund.....	665.00	.....	.....	665.00	1.00
G. H. May Sch. Fund	4,675.00	600.00	370.00	4,905.00	.....
Hygiene Special Fund.....	4,051.57	41.00	173.74	3,918.83	3.16
Class of 1896 Fund.....	1,250.00	250.00	.....	1,500.00	.....
Class of 1898 Fund.....	100.00	.....	100.00	.....	14.16
Emerson Fund.....	550.00	.....	20.07	529.93	.....
Chemical Engineering Fund	380.69	.....	25.00	355.69	.....
C. W. Eaton Fund.....	600.00	.....	600.00	.....	.....
President's Fund.....	.....	250.00	.....	250.00	.....
Total.....	$852,338.98	$166,599.00	$106,937.03	$912,000.95	$17,328.93

(Schedule A)

* Includes $302.40 written off.

SCHEDULE A-4
ACCOUNTS RECEIVABLE

Chemical Foundation, Div. Ind. Coöperation.....	$18,000.00
Chemical Foundation, Cellulose Research.....	42,469.14
Carnegie Foundation Pensions as of June 30, 1940.....	4,157.78
Dividends receivable as of June 30, 1940.....	13,855.90
United States Government, Navy Contracts.....	3,620.00
Division of Industrial Coöperation Accounts.....	7,106.59
Miscellaneous Accounts.....	5,322.29
Total (Schedule A).....	$94,531.70

SCHEDULE A-5

ADVANCES AND INVENTORIES FOR 1940–1941

Advances:		
1940 Summer Session Salaries	$4,940.00	
1940–41 Salaries	1,240.00	
1940 Civil Engineering Summer Camp	2,752.21	
Carnegie Foundation Pension	4,350.40	
1940–41 Sloan Fellowships	5,555.00	
Research in Progress	35,551.96	
1940 Register Former Students	545.28	
Premiums Paid on Unexpired Insurance	4,344.42	
Electrical Engineering Special No. 1642	316.88	
Tech Press Special No. 1494	5,171.74	
1940–41 Purchases and Expenses	12,067.15	
Architecture Department Project, Wakefield	4,374.86	
Solar Energy Laboratory	4,500.00	
Bexley Hall, Alterations in Progress	8,000.00	
Sloan Automotive Laboratory	559.25	
Alumni Swimming Pool	62,008.12	
		$156,277.27
Inventories:		
Lecture Notes, Technology Store	$850.50	
Undergraduate Dormitories, Supplies	2,503.31	
Graduate House, Supplies	4,427.10	
Walker Dining Service, Food and Utensils	6,565.69	
Graduate House Dining Service, Food and Utensils	7,588.09	
Fuel Oil	1,523.25	
Walker Games, Candy and Cigars	318.04	
Letter Shop, Supplies	625.50	
Postage Stamps	166.85	
Department of Buildings and Power, Supplies	16,906.92	
Division of Laboratory and Office Supplies	30,116.87	
Photographic Service, Supplies	2,091.60	
Civil Engineering Camp, Supplies	109.79	
		73,793.51
Total (Schedule A)		$230,070.78

SCHEDULE A-6

STUDENTS' FEES IN ADVANCE, AND DEPOSITS RETURNABLE

1940 Summer Session:		
Tuition Fees	$71,869.32	
Students' Deposits	5,568.04	
Dormitory Rentals	4,828.50	
Graduate House Rentals	6,634.00	
Civil Engineering Camp	1,715.00	
		$90,614.86
1939–40 Students' Deposits, Returnable		6,330.71
Total (Schedule A)		$96,945.57

SCHEDULE A-7

CURRENT FUNDS

Name	*Balance June 30, 1939*	*Receipts or Transfers*	*Expenditures or Transfers*	*Balance June 30, 1940*
Additional Group Insurance Fund	$19.65	$7,811.97	$7,790.14	$41.48
Aeronautical Engineering				
Spec. No. 1613 Equipment ...	.....	2,962.95	1,694.27	1,268.68
Spec. No. 1598 Equipment ...	.....	500.00	298.99	201.01
Spec. No. 1580 Equipment ...	.....	1,014.98	1,014.98	.....
C. A. A. Pilot Training.....	.....	2,396.50	1,937.50	459.00
Forest Service Research.....	.....	900.00	274.90	625.10
Flying Instruction.....	.....	500.00	500.00	.....
Weather Bureau Research....	.....	6,873.15	6,867.78	5.37
Aerodynamic Research	9,000.00	8,000.00	6,860.00	10,140.00
Spec. 500–762 Acct.....	.....	4,048.25	2,579.74	1,468.51
Spec. No. 1564 Equipment ...	.....	1,062.00	1,062.00	.....
Summer Shop Course.....	731.38	.....	335.40	395.98
Wind Tunnels.....	.....	8,154.00	3,143.64	5,010.36
Alcohol Research No. 1175...	27.24	.....	.....	27.24
No. 1282a Wind Tunnel Equip.	3,059.59	.....	3,059.59	.....
Hurricane Research.....	.....	1,426.50	1,426.50	.....
Detonation Research.....	60.56	7,534.00	5,761.65	1,832.91
Alumni Day 1940.....	.....	5,685.71	5,685.71	.....
Alumni Fund —(Gymnasium) ..	4,000.00	62.14	4,062.14	.....
Alumni Fund —(New) Expense.	.....	3,661.04	3,661.04	.....
Architecture:				
Spec. No. 1533A Cases	2,995.00	.....	266.03	2,728.97
Spec. No. 1533 Student Shop	1,516.79	186.27	1,703.06	.....
Spec. No. 1606 Nolan Library	.....	1,500.00	1,483.70	16.30
Traveling Scholarship	.....	1,500.00	.....	1,500.00
Special No. 1095A.....	3,532.19	4,374.86	7,907.05	.....
1940 Bulletin.....	.....	3,000.00	.....	3,000.00
Needy Student Scholarship...	.....	600.00	600.00	.....
Bemis Foundation Research....	.....	10,979.86	10,979.86	.....
Biology — Food Research.....	4,665.71	2,383.36	5,885.66	1,163.41
Biology Eng. Special.....	78.46	3,074.16	3,152.62	.....
Special Equipment No. 1878..	.....	200.00	90.00	110.00
Hospital Research.....	.....	5,406.30	5,406.30	.....
Health Education.....	549.97	1,501.00	1,954.98	95.99
Dow Fellowship.....	.....	2,000.00	522.06	1,477.94
Hood Fund.....	.....	6,000.00	1,415.93	4,584.07
Special Research.....	487.28	.....	487.28	.....
Hood Scholarship Fund.....	.....	800.00	800.00	.....
Rockefeller Vitamin Research.	648.08	798.18	1,446.26	.....
Account 4133.....	10.51	64.40	73.29	1.62

SCHEDULE A-7 — (Continued)

Name	*Balance June 30, 1939*	*Receipts or Transfers*	*Expenditures or Transfers*	*Balance June 30, 1940*
Biology (*Continued*)				
Nat. Res.Council Grant N.A.S.	$569.03	$.....	$488.05	$80.98
Bartlett Arkel Fund.....	.....	10,000.00	.....	10,000.00
Spec. No. 1648 Biol. Eng. Shop.	.....	10,000.00	.....	10,000.00
Blue Cross Hospitalization.....	8.10	8,395.40	8,403.50	.....
Boat House Equipment.....	209.48	3,173.99	3,383.47	.....
Bryant (Dixie Lee), Sch. 1940–41	.....	600.00	.....	600.00
Building Key Account.....	2,344.11	1,243.44	1,075.91	2,511.64
Bus. and Eng. Administration				
Case Research Account.....	92.80	100.00	122.62	70.18
Graduate Fellowship Fund ...	180.22	.....	.....	180.22
Human Relationships Acct. ..	.....	466.25	293.94	172.31
Sloan Fellowship Fund 1938..	312.46	.....	312.46	.....
Sloan Fellowship Fund 1939..	.....	38,095.92	35,393.61	2,702.31
Sloan Fellowship Fund 1940..	.....	5,555.00	5,555.00	.....
Special No. 1556, Alterations .	.....	829.75	829.75	.....
J. R. Macomber Fund.....	5.84	.....	.....	5.84
Carnegie Foundation Pensions ..	....	55,989.45	55,989.45	.....
Chemistry:				
Special No. 1628 (Ventilation).	.....	685.72	545.19	140.53
Moore Lecture Fund.....	87.50	.....	.....	87.50
Special No. 1260 — Foyer....	174.02	.....	.....	174.02
Inorganic Equipment.....	981.36	.....	72.34	909.02
Special No. 1324, Alterations .	501.44	.....	450.71	50.73
Special No. 1617 Compressor .	.....	3,000.00	2,059.06	940.94
Warren Fund — Schumb.....	98.77	.....	24.63	74.14
A. A. A. & S.— Davis.....	103.75	.....	20.25	83.50
Phys. Chem. Royalties	472.33	.....	.....	472.33
Chemical Eng.: Equipment.....	1,000.00	.....	1,000.00	.....
Special No. 1498 — Hauser...	330.24	35.65	365.89	.....
Alsifilm Research.....	.....	2,362.74	2,362.74	.....
Special No. 1449, Research...	1,535.46	.....	1,535.46	.....
Fuels Research.....	2,929.26	.....	500.00	2,429.26
Special No. 1635, Colloid Res..	.....	1,000.00	396.68	603.32
Hauser Inorganic Film Res. ..	80.00	50.86	130.86	.....
Special No. 1207, Colloid Chem.	479.99	.....	198.71	281.28
Special No. 1421, Research...	250.00	.....	.....	250.00
Civil Engineering:				
Special No. 1364, Research...	4,224.76	.....	669.48	3,555.28
Soil Mechanics.....	830.80	990.62	1,646.27	175.15
Special No. 1056, Cement Res.	747.39	1,000.00	1,391.29	356.10
Special No. 1326, Equipment .	665.95	.....	75.92	590.03
River Hydraulic Laboratory..	2.73	760.00	755.48	7.25
Structural Laboratory.....	521.65	1,140.00	1,549.21	112.44
U. S. Cape Cod Canal Res....	93.35	.....	.....	93.35
Cosmic Terrestrial Research....	2,294.51	10,065.97	8,446.30	3,914.18

SCHEDULE A-7 — (Continued)

Name	*Balance June 30, 1939*	*Receipts or Transfers*	*Expenditures or Transfers*	*Balance June 30, 1940*
Crafts Library Fund	$479.53	$.....	$.....	$479.53
Dining Service Reserve	4,064.04	2,537.25	4,934.13	1,667.16
Div. of Indus. Coöperation	.....	106,089.95	94,700.13	11,389.82
D. I. C. Stainless Steel Research	.....	2,929.35	2,929.35	.....
D. I. C. Special No. 5925	.....	2,319.64	2,319.64	.....
Economics:				
Industrial Relations	8,600.37	.....	8,600.37	.....
Electrical Engineering:				
A. E. I. C. Research	2,651.53	12,131.79	12,446.98	2,336.34
VI-A Fund — Travel, etc.	683.56	350.50	1,034.06	.....
Humane Society of Mass.—				
Fog Research	18.87	.....	6.78	12.09
Fog Research — Navy	303.38	7.00	214.92	95.46
Network Analyzer	5,122.65	6,748.18	2,779.69	9,091.14
Edgerton Film Fund	189.66	363.39	288.10	264.95
Research — Timoshenko	2.42	10.14	12.56	.....
Round Hill Research	217.61	15.00	69.35	163.26
Carnegie Cosmic Ray Research	187.50	.10	187.60	.....
Differential Analyzer	991.31	2,951.00	3,231.39	710.92
Spec. No. 1588, Fire Cont. Lab.	.....	300.00	71.32	228.68
General Radio Co., for VIA	.....	1,200.00	.....	1,200.00
Nat. Res. Council, Micro. Film	.....	2,000.00	52.50	1,947.50
Oncologic Fund	.....	5,042.15	5,042.15	.....
Spec. No. 1535, U. S. W. R.	.....	5,467.00	5,467.00	.....
Rapid Selection Research	12,228.87	6,270.00	9,023.22	9,475.65
Rapid Selec. Research Spec.	713.93	2,040.31	2,198.11	556.13
Blind Landing Research	.....	16,081.47	16,081.47	.....
Center of Analysis	30,000.00	15,994.38	21,726.61	24,267.77
Comm. Lab. Equipment	1,014.90	.....	1,014.90	.....
Int. Tel. and Tel. Research	.....	8,705.40	8,082.00	623.40
Glass Fracture Research	1,132.24	500.00	1,173.78	458.46
Microwave Research	.....	13,500.00	100.00	13,400.00
Notes — Special No. 1642	.....	316.88	316.88	.....
Equipment, Special No. 1450A	258.07	.....	250.34	7.73
Radio Research, No. 1269	291.49	.....	291.49	.....
Radio Research, No. 1541	5,000.00	.....	3,630.70	1,369.30
Radio Research, No. 1550	.....	4,891.49	2,185.52	2,705.97
Research Corp., High Volt.	1,119.62	475.00	814.54	780.08
Rock. Diff. Anal., No. 2	1,042.63	70.53	1,112.03	1.13
Rock. Diff. Anal., No. 3	.....	3,001.03	1,994.03	1,007.00
von Hippel Res. 1219, 1275	199.39	5,051.00	5,058.46	191.93
Course Revision No. 1250	1,312.35	5,537.50	5,818.85	1,031.00
Loomis Fund Research	.....	5,000.00	4,266.14	733.86
Sperry Localizer Research	.....	3,000.00	646.30	2,353.70
Sperry Short Wave Antenna Res.	.....	5,000.00	3,956.50	1,043.50
Eng. and History, Spec. No. 1536	.....	500.00	345.73	154.27
Genrado Trust	9,500.00	.....	9,500.00	.....

SCHEDULE A-7 — (Continued)

Name	*Balance June 30, 1939*	*Receipts or Transfers*	*Expenditures or Transfers*	*Balance June 30, 1940*
Geology: Rockefeller Res.	$45.59	$.....	$45.59	$.....
Carnegie Institution of Washington, Research	.....	2,500.00	344.48	2,155.52
N. R. C. Research	.....	2,000.00	537.74	1,462.26
Age of Earth Research	.....	5,155.00	4,330.00	825.00
Special No. 242–38	.....	4,196.23	2,328.83	1,867.40
Spectrograph Account	81.06	.....	80.53	.53
Graphics—Nat.Res.Council Grant	.....	500.00	.....	500.00
Haskins Fellowship	.....	2,000.00	2,000.00	.....
Historic Memorials	.....	1,170.68	1,170.68	.....
Housing Research	800.00	.....	800.00	.....
Humanics, Jansen	.....	150.00	150.00	.....
Hyams X-Ray Research	.....	1,077.66	1,077.66	.....
Hyams Radiation Project	.....	27,308.69	27,308.69	.....
Hygiene Dept. Special	†1,191.02	176.90	41.00	†1,326.92
International Relations Library	154.69	.....	49.40	105.29
Journal of Math. and Physics	562.63	2,148.16	2,248.37	462.42
A. D. Little Mem. Income Acct.	35,683.47	21,877.75	35,000.00	22,561.22
Library: Special No. 1	125.45	390.52	9.20	506.77
Walker Library, No. 1655	.....	3,000.00	.....	3,000.00
Lindgren Library, No. 1508	563.31	.....	331.19	232.12
Library Growth Account	.....	3,327.97	589.33	2,738.64
Dewey Library	.....	1,000.00	795.60	204.44
Markle Cyclotron Res.	3,694.30	27,900.00	24,891.41	6,702.80
Math., Putnam Fund	300.00	.....	230.26	69.79
Maclaurin Room	.....	1,100.00	1,100.00	.....
Mechanical Engineering:				
Textile Executive School	.....	500.00	500.00	.....
Special Research	385.22	810.00	803.32	391.90
Research No. 1254	406.04	2,386.00	2,590.69	201.35
Quoddy Project	213.65	.....	213.65	.....
No. 1099 Air Conditioning	1,718.58	314.00	2,032.58	.....
Navy Contract No. 14611	.....	400.00	400.00	.....
Navy Contract No. 14091	300.00	.....	300.00	.....
A. S. M. E. Gear Research	473.81	.....	436.10	37.71
Applied Mechanics Congress	846.19	1,453.20	2,299.39	.....
Friction Conference	.....	170.00	155.50	14.50
Spec. No. 1523 T. M. Lab.	955.24	824.64	963.48	816.40
Spec. No. 1555 (1939–40 Bal.)	1,074.86	1,000.00	2,074.86	.....
Special No. 1595, Equipment	.....	413.04	413.04	.....
Strength of Materials Equip.	5.90	.....	5.90	.....
Testing Machine, No. 1624	.....	7,300.00	30.86	7,269.14
Cavitation Research	.....	1,573.82	533.83	1,039.99
Textile Lab., Spec. No. 1595	.....	700.55	500.55	200.00

† Exclusive of Student Notes Receivable. (Schedule A-3).

SCHEDULE A-7 — (Continued)

Name	*Balance June 30, 1939*	*Receipts or Transfers*	*Expenditures or Transfers*	*Balance June 30, 1940*
Mechanical Engineering (*Continued*):				
Nat. Aero. W., No. 465	$351.71	$65.79	$417.50	$.....
Nat. Aero. W., No. 550	.....	2,222.57	2,222.57	.....
Nat. Aero. W., No. 563	.....	3,636.99	3,636.99	.....
Nat. Aero. W., No. 566	.....	1,407.15	1,154.38	252.77
Nat. Aero. W., No. 567	.....	2,894.84	2,894.84	.....
Nat. Aero. W., No. 643	.....	719.49	719.49	.....
Nat. Aero. W., No. 727	.....	512.83	512.83	.....
Vib. Research, No. 1333	8.40	540.00	454.20	94.20
Melvin Trust Scholarships	.....	6,900.00	6,900.00	.....
Metallurgy:				
Magnetic Laboratory, No. 1222	.12	5,025.00	4,859.15	165.97
Magnetic Research, Power	1,500.00	.....	1,500.00	.....
Magnet Lab., No. 1546	.....	464.94	464.94	.....
Magnet Lab., No. 1599	.....	1,587.12	1,587.12	.....
International Nickel Co.	.....	750.00	449.03	300.97
Phelps Dodge Fellowship	21.46	11.82	33.28	.....
Vanadium Corporation	.....	450.00	450.00	.....
Clay Research	984.37	1,500.00	1,211.86	1,272.51
Chilled Iron Research	401.17	.....	340.35	60.82
Cuban Am. Manganese Fell.	.....	600.00	.....	600.00
Chipman Research, No. 1337	178.63	2,176.57	2,355.20	.....
Special No. 1380, Equipment	736.61	22.67	759.28	.....
Special No. 1354, Research	378.01	475.00	116.14	736.87
Am. Inst. Min. and Met. Eng., O. H. Comm. Fellowship	600.00	900.00	600.00	900.00
Special No. 1259, Equipment	916.78	320.19	927.91	309.06
Special No. 1129, Research	.....	632.78	632.78	.....
American Welding Society Acct.	137.05	.....	73.52	63.53
Special No. 1234, Equipment	345.96	26.06	103.90	268.12
Penrose Fund	131.11	600.00	646.09	85.02
Mining Engineering:				
Ore Dressing	737.77	39.25	774.15	2.87
Mineral Dress., No. 1528	.....	3,936.38	3,934.48	1.90
Museum Committee	2,991.53	7,299.17	8,150.79	2,139.91
National Academy of Sciences — De-Icing	.....	4,051.67	4,051.67	.....
Naval Architecture:				
Marine Eng. Scholarship	.....	3,000.00	3,000.00	.....
Propeller Tank, No. 1548A	.....	1,105.00	1,000.55	104.45
Towing Tank, No. 1377	57.25	.....	45.39	11.86
Naval Construction, No. 1547	.....	3,900.00	3,900.00	.....
Naval Engineering, No. 1548	.....	3,700.00	3,700.00	.....
Propeller Testing, No. 1340	52.04	.....	52.04	.....
N. Y. Exhibit Special 1473	2,163.12	8.55	1,459.74	711.93
1940 Open House	.....	1,025.27	1,025.27	.....
Paper Museum	212.43	5,000.00	5,069.42	143.01
Patent Committee	.....	100.00	22.49	77.51
Placement Committee Fund	10.83	.....	.....	10.83

SCHEDULE A-7 — (Continued)

Name	*Balance June 30, 1939*	*Receipts or Transfers*	*Expenditures or Transfers*	*Balance June 30, 1940*
Photographic Service	$62.13	$42,092.30	$41,076.46	$1,077.97
Physics Department:				
Nuclear Research	.....	17,935.10	12,998.09	4,937.01
Bausch & Lomb Optical Co.	.....	3,000.00	2,466.74	533.26
Rumford, Harrison No. 4	7.63	.....	7.63	.....
Rumford, Harrison No. 5	.....	400.00	331.59	68.41
Rumford, Hardy	120.72	.....	.....	120.72
Rumford, Stockbarger	371.19	.....	.....	371.19
Roentgen Ray	232.26	.....	.....	232.26
Hale Spectroscopic Fund	302.50	.....	302.50	.....
Rockefeller Special Research	1,119.32	3,767.84	4,287.16	600.00
Milton Iodine Research	670.36	.....	660.22	10.14
Nat. Res. Protein Fell., Warren	.....	400.00	400.00	.....
A. P. S. Research, Evans	242.53	1,503.86	1,746.39	.....
Crystal Research	350.63	25.00	25.00	350.63
Microscope, No. 1650	.....	2,500.00	60.35	2,439.65
Carnegie Institution of Washington, Vallarta	.....	1,500.00	600.00	900.00
Loomis Institute, Evans	.....	750.00	750.00	.....
Special No. 1615, Alterations	.....	297.50	297.50	.....
Glass Industry Fellowship	250.00	1,800.00	1,300.00	750.00
Radioactivity Research	2,156.90	1,183.16	551.41	2,788.65
Carnegie Institution of Washington, Boyce	2,099.70	3,000.00	2,227.46	2,872.24
Nat. Res. Council No. 185	266.93	75.00	338.69	3.24
Spectroscopy, Special	1,602.98	1,476.63	2,019.35	1,060.26
Polymerization Research	150.00	1,250.00	1,066.90	333.10
President's Fund	.....	2,050.00	1,603.75	446.25
President's Special Fund	200.00	5,000.00	5,200.00	.....
Register Former Students 1940	2,000.00	13,128.66	15,128.66	.....
Research Corp. Function Unit Res.	3,402.52	37.49	3,440.01	.....
Research Corp. Arith. Mach.	2,546.89	2,151.78	3,997.85	700.82
Research Corp., Vitamin C. Res.	138.51	.....	121.96	16.55
Research Corp., Vit. A-D Res.	1,727.74	3,603.01	5,330.75	.....
R. O. T. C. Uniforms	496.82	10,220.66	10,275.09	442.39
Research Associates M.I.T. 1940	1,250.00	19,200.00	20,450.00	.....
Royalty Receipts, Patent 665135	1,071.82	2,254.91	1,159.51	2,167.22
Sailing Trophy Fund	3.52	.....	.....	3.52
Society of Arts	.....	2,222.01	2,222.01	.....
Salary Reserve 1939–40	.....	42,967.95	42,967.95	.....
Solar Energy Research	6,576.89	588.49	6,544.09	621.29
Solar Energy No. 1475	673.35	.....	673.35	.....
Solar Energy No. 1476	142.63	.....	14.45	128.18
Solar Energy — C	.....	1,500.00	1,474.03	25.97
Solar Energy — E	.....	1,021.07	806.60	214.47
Solar Energy — H	.....	1,626.95	1,626.95	.....
Solar Energy — M	.....	500.00	290.48	209.52
Special, No. 1575	.....	3,300.00	3,300.00	.....
Special, No. 1561, Alterations	.....	1,017.87	1,017.87	.....

SCHEDULE A-7 — (Continued)

Name	*Balance June 30, 1939*	*Receipts or Transfers*	*Expenditures or Transfers*	*Balance June 30, 1940*
Special, No. 1562, Parking	$.....	$5,000.00	$5,000.00	$.....
Special, No. 1601, Briggs Field	.....	702.67	702.67	
Special, No. 1682, Visiting Committees, Reports	150.03	300.00	175.87	274.16
Special, No. 1656, New Boats	.....	1,200.00	1,163.85	36.15
Special, No. 1519, News Ser.	.....	1,000.00	925.00	75.00
Special, No. 1513, Alterations	498.56	.....	498.56	.....
Special, No. 1543, Parking	2,500.00	517.33	3,017.33	.....
Special, No. 1500-1484-1582	.....	2,000.00	2,000.00	.....
Special, No. 1558, Guide Ser.	.....	900.00	334.14	565.86
Special, No. 1559, Alumni Fund — Study	.....	3,000.00	2,000.00	1,000.00
Special, No. 1560, Alumni Fund — Bulletin	.....	3,000.00	.....	3,000.00
Special, No. 1649, Space Changes	.....	50,000.00	9,406.39	40,593.61
Special, No. 1510, Space Changes	1,769.92	.....	1,769.92	.....
Special, No. 1540A, Space Changes	6,895.52	247.00	7,142.52	.....
Special, No. 1540C, Equipment	2,000.00	435.61	2,435.61	.....
Special, No. 1542, Pres. Office	2,500.00	.....	2,500.00	.....
1938 Spectroscopy Conf. Pub.	500.00	.....	500.00	.....
Suspense Accounts	788.24	500.00	1,288.24	.....
Suspense Acct. 1939–40 Balances	.....	31,341.34	.....	31,341.34
Swimming Pool Equipment	.....	100.00	.....	100.00
Tau Beta Fellowship	.....	1,800.00	1,800.00	.....
Tech Press, No. 1494	.....	7,935.21	7,935.21	.....
Tech Press, No. 1468	2,494.64	982.53	5.50	3,471.67
Tech Press, No. 1468A	31.64	1,053.31	357.90	727.05
Textile Fund Grant	.....	3,750.00	2,940.73	809.27
Textile Foundation, Research	172.00	462.80	634.80	.....
Tucker (Ross Francis), Mem. Fd.	232.52	.....	8.06	224.46
Tyler Portrait Fund	559.64	.....	.....	559.64
Undergraduate Dues	.....	21,196.00	21,196.00	.....
U. S. Navy Torpedo Research	.....	2,500.00	2,500.00	.....
Walker Memorial Library	270.61	3,000.76	2,830.61	440.76
Totals	$254,932.78	$1,039,603.48	$956,360.66	$338,175.60

(Schedule A)

SCHEDULE A-8

EDUCATIONAL PLANT

LAND, BUILDINGS AND EQUIPMENT

Land, east of Massachusetts Avenue, Cambridge	$1,125,766.67	
Land, west of Massachusetts Avenue	850,014.82	
Main Educational Building Group	5,633,419.62	
George Eastman Research Laboratories	1,225,098.58	
Pratt School of Naval Architecture	674,971.70	
Guggenheim Aeronautical Laboratory	293,637.46	
Wright Memorial Wind Tunnel	217,506.25	
Magnetic Substation	76,272.73	
Aeronautical Engine Testing Laboratory	121,101.92	
Mechanic Arts Building	83,658.89	
Power Plant (including Machinery and Equipment)	389,064.17	
Homberg Memorial Infirmary	188,441.60	
Nuclear Research Laboratory and Equipment	34,891.27	
Cyclotron Research Laboratory	20,247.92	
Solar Energy Laboratory	10,500.00	
Hyams Radiation Laboratory	13,500.00	
Educational Equipment	2,039,953.60	
Steam and Electrical Distribution System	154,055.24	
Gas Engine, Hydraulic and Compression Laboratories	68,301.88	
Service Building and Garages	55,369.74	
Walker Memorial and Equipment	714,587.02	
[1]Dormitories and Equipment	1,308,923.79	
[2]Alumni Swimming Pool	269,666.15	
Boathouse	54,244.13	
Barbour Field House and Squash Courts	84,042.54	
Sailing Pavilion	28,849.09	
Briggs Field House and Track	114,440.13	
Camp, East Machias, Maine	120,558.00	
Camp, Dover, New Jersey	35,000.00	
Miscellaneous	321,999.85	
Total June 30, 1940 (Schedule A)		$16,328,084.76

[1]Not including Graduate House (see Investments, page 163).
[2]$62,008.12, advanced for construction, not included. (Schedule A-5).

SCHEDULE A-9

PRINCIPAL GIFTS AND APPROPRIATIONS FOR EDUCATIONAL PLANT

George Eastman for Buildings	$5,432,617.99
T. C. and P. S. duPont, Charles Hayden, for Mining Building	215,000.00
Pratt Fund, for School of Naval Architecture	675,150.00
Guggenheim Fund, for Aeronautical Laboratory	230,000.00
A. P. Sloan, Jr., for Aero Engine Laboratory	65,000.00
Subscriptions to Homberg Memorial Infirmary	110,225.00
Maria A. Evans Fund, for Land and Buildings	269,080.60
T. C. duPont, for Land	625,000.00
Miscellaneous subscriptions and appropriations for Land	382,222.89
Emma Rogers Fund, for Equipment	528,077.06
F. W. Emery Fund, for Equipment	126,423.80
Caroline L. W. French Fund, for Equipment	100,843.34
Equipment from Boston, 1916 (estimated)	500,000.00
Sale of Land and Buildings, Boston, 1916 and 1938	1,629,202.78
Maria A. Evans, for Dormitories	261,192.55
Class of '93, for Dormitories	100,000.00
T. C. duPont, for Dormitories	100,000.00
Alumni Dormitory Fund	516,945.66
Barbour Fund, for Dormitories, Field House, etc.	490,133.88
Miscellaneous Funds, for Dormitories	129,816.26
Walker Memorial Fund, for Walker Memorial	167,303.96
Wright Memorial Wind Tunnel Fund, for Wind Tunnel	95,795.00
Alumni Fund, for Equipment, Dormitories, Walker, Briggs Field House, Track and Swimming Pool	999,028.24
Other Funds, Donations, Appropriations	2,579,025.75
Total, June 30, 1940 (Schedule A)	$16,328,084.76

SCHEDULE B-1

APPROPRIATIONS FROM FUNDS FOR TEACHING AND RESEARCH BY DEPARTMENTS

Aeronautical Engineering				$12,249.97
Aerodynamic Res.	$2,500.00	N. A. W. 643	$500.00	
Weather Bureau	4,600.00	N. A. W. 556	500.00	
Detonation Res.	2,200.00	Nat. Acad. of		
Rockefeller Found.	750.00	Science	1,199.97	
Architecture				800.00
Housing Research	800.00			
Biology				14,283.30
Genradco Research	5,500.00	Hospital Research	2,083.30	
Health Education	1,500.00	Underwood Fd.	1,700.00	
Food Research	3,500.00			
Business and Engineering Administration				1,000.00
Sloan Fellowship	1,000.00			
Chemistry				26,100.00
Richards Fund	600.00	Nat. Acad. of		
Chemical Found.	2,700.00	Science	1,800.00	
Teachers Fund	2,500.00	A. D. Little Fund	15,000.00	
		Res.Corp.Vit.Res.	3,500.00	
Chemical Engineering				22,250.00
Richardson Fund	2,000.00	A. D. Little Fund	16,500.00	
Chemical Eng. Equip.	1,000.00	Cabot Fund	2,500.00	
Fuel Research	250.00			
Civil Engineering				500.00
Teachers Fund	500.00			
Electrical Engineering				41,721.57
Center of Analysis	6,466.65	Int.Tel.& Tel.Res.	2,950.00	
Assoc. Edis. Co. Acct.	7,800.00	Rock. Diff. Anal.	1,400.00	
Glass Fracture Res.	850.00	Hyams Research	3,960.00	
Arith. Mach. Res.	2,054.34	Sperry-Barrow		
Network Anal.	1,474.20	Research	1,970.00	
No. 1219	1,900.00	Rapid Selection	5,302.38	
No. 1550	1,760.00	No. 1535	3,834.00	
English				1,000.00
Teachers Fund	1,000.00			
Geology				800.00
Anonymous	800.00			
Humanics				4,021.03
Nickerson Fund	4,021.03			

SCHEDULE B-1 — (Continued)

Library				$2,692.00
Vail Fund	$2,000.00	Cilley Fund	$667.00	
Miscellaneous	25.00			
Mechanical Engineering				14,749.31
Industrial Fund	5,190.00	Textile Research	2,990.73	
N. A. W. 567	870.00	1254 Acct.	2,300.00	
Air Cond. Research	1,718.58	D. I. C.	1,680.00	
Metallurgy				750.00
Magnet Research	450.00	Clay Research	300.00	
Mining				7,500.00
Bartlett Fund	7,500.00			
Naval Architecture				5,400.00
Teachers Fund	1,000.00	Spec. 1547 and 1548	4,400.00	
Physics				33,784.12
Age of Earth Research	1,800.00	Rockefeller Res.	2,900.00	
Glass Industry	1,300.00	Nuclear Research	2,073.37	
Bausch & Lomb Co. Fellowships	1,900.00	No. 1288	800.00	
Markle Cyclotron	9,520.75	Carnegie Institution of Washington	1,350.00	
Cosmic Ray Research	600.00	Res. Associates	11,540.00	
Upham Fund for Staff Scholarships				14,000.00
Total (Schedule B)				$203,601.30

SCHEDULE B-2

CONTRIBUTIONS AND OTHER INCOME

L. J. and M. E. Horowitz Foundation for Building Engineering and Construction Course	$3,000.00
General Electric Company for Course VI-A	3,750.00
Boston Edison Company for Course VI-A	2,500.00
Anonymous for Chemical Engineering	500.00
Division of Laboratory Supplies	5,000.00
From Trustees of H. C. Frick Estate	2,993.17
United States Navy Torpedo Research	1,893.28
Photographic Service, Rental	1,600.00
Total (Schedule B)	$21,236.45

SCHEDULE B-3

SALARIES OF TEACHERS, ACCESSORY TO TEACHING AND LABORATORY SERVICE

Department	*Teachers Salaries*	*Wages Accessory to Teaching*	*Wages Laboratory Service*	*Total*
Summer Session 1939	$72,934.21	$.....	$.....	$72,934.21
Aeronautical Engineering	85,549.57	3,576.65	6,237.20	95,363.42
Architecture	66,508.00	5,798.88	1,664.00	73,970.88
Biology and Public Health	64,048.30	1,557.00	3,910.54	69,515.84
Business and Eng. Adminis.	54,600.00	4,647.36	.....	59,247.36
Chemistry	177,550.00	7,345.06	17,680.24	202,575.30
Chemical Engineering	88,845.76	4,920.00	6,551.80	100,317.56
Chemical Eng. Practice School	14,053.32	.....	.....	14,053.32
Civil Engineering	104,677.13	4,273.00	5,613.00	114,563.13
Division of Laboratory Supplies	.....	.....	22,749.81	22,749.81
Drawing	25,100.00	828.74	.....	25,928.74
Economics	43,450.00	2,599.98	.....	46,049.98
Electrical Engineering	196,835.07	9,326.43	17,526.86	223,688.36
English and History	59,000.00	1,049.99	.....	60,049.99
Gen. Eng. and General Science	1,500.00	1,200.00	.....	2,700.00
General Studies	2,250.00	.....	.....	2,250.00
Geology	53,050.00	2,323.37	2,399.80	57,773.17
Humanics	5,000.0	.....	.....	5,000.00
Lantern Operation	.....	.....	1,803.12	1,803.12
Mathematics	69,200.00	997.50	.....	70,197.50
Mechanical Engineering	197,078.76	7,964.33	21,442.94	226,486.03
Metallurgy	80,480.00	2,846.75	8,366.19	91,692.94
Military Science	8,250.00	1,100.00	.....	9,350.00
Mining Engineering	26,450.00	1,773.83	.....	28,223.83
Modern Languages	18,500.00	316.23	.....	18,816.23
Naval Architecture	45,784.31	1,614.48	1,860.60	40,250.48
Physics	163,501.60	5,477.54	31,265.22	200,244.36
Totals	$1,724,196.03	$71,537.12	$149,071.41	$1,944,804.56

(Schedule B)

SCHEDULE B-4

DEPARTMENT EXPENSES

Aeronautical Engineering				$13,158.41
General	$6,244.41	Equip. Spec. No. 1580	$1,000.00	
Flying Instruction	500.00	Staff Scholarships	654.00	
Hurricane Research	1,425.00	Reserved for 1940–41	2,535.00	
Tuition, Spec. No. 1582	800.00			
Architecture				4,887.47
General	4,021.31	Staff Scholarships	100.00	
Special No. 1472	366.16	Reserved for 1940–41	400.00	
Biology and Public Health				9,804.02
General	3,079.02	Biol. Eng. Equip.	2,850.00	
Food Research	2,375.00	Staff Scholarships	1,500.00	
Business and Engineering Administration				8,856.72
General	3,352.72	Special No. 1639	504.00	
Special No. 1556	800.00	Staff Scholarships	1,200.00	
Sloan Fellowship	3,000.00			
Chemistry				26,520.00
General	16,991.20	Staff Scholarships	7,800.00	
Special No. 1574	200.00	Reserved for 1940–41	1,073.80	
Special No. 1628	455.00			
Chemical Engineering				30,826.20
General	12,197.60	Special No. 1632	145.00	
Practice School	7,912.60	Staff Scholarships	6,771.00	
Stain. Steel Res. No. 1571	2,000.00	Reserved for 1940–41	1,800.00	
Civil Engineering				16,885.85
General	3,945.07	River Hydraulic Res.	760.00	
Soil Mechanics	950.00	Summer Camp	7,040.78	
Structural Laboratory	1,140.00	Staff Scholarships	1,700.00	
Cement Research	950.00	Reserved for 1940–41	400.00	
Division of Graphics				765.89
General	765.89			
Economics and Social Sciences				2,904.14
General	2,304.14	Reserved for 1940–41	600.00	
Electrical Engineering				47,905.25
General	17,996.85	New Lathe No. 1608	960.40	
Special No. 1588	300.00	Special No. 1627	350.00	
von Hippel Research	3,025.00	Micro-Wave Research		
Differential Analyzer	2,951.00	No. 1670	10,000.00	
Ultra Short Wave Res.		Special No. 1573	75.00	
No. 1535	5,000.00	Staff Scholarships	3,247.00	
E. E. Course Rev.No.1549	4,000.00			

SCHEDULE B-4 — (Continued)

English and History				$2,053.35
General	$553.35	Reserved for 1940–41	$1,000.00	
Special No. 1536	500.00			
General Engineering and General Science				86.60
General	86.60			
General Studies				213.75
General	213.75			
Geology				4,650.00
General	2,850.00	Staff Scholarships	1,800.00	
Humanics				426.68
General	426.68			
Mathematics				3,508.75
General	663.75	Special No. 1597	200.00	
Journal of Mathematics	1,600.00	Staff Scholarships	1,045.00	
Mechanical Engineering				26,156.65
General	16,130.18	Textile Exec. Course	500.00	
Special No. 1555	1,000.00	Staff Scholarships	3,963.00	
Books and Periodicals	1,000.00	Reserved for 1940–41	3,088.47	
Vibration Research	475.00			
Metallurgy				19,455.84
General	4,649.00	Magnetic Res. Power	2,165.90	
Magnetic Research	3,325.00	Chipman Research	1,651.00	
Magnetic No. 1526	800.00	Withdrawal Allowance	1,800.00	
Magnetic No. 1546	464.94	Staff Scholarships	2,400.00	
Magnetic No. 1569	1,200.00	Reserved for 1940–41	500.00	
Magnetic No. 1672	500.00			
Military Science				1,112.68
General	1,112.68			
Mining Engineering				2,671.06
General	1,425.00	Summer Camp	646.06	
Staff Scholarships	600.00			
Modern Languages				293.66
General	293.66			
Naval Architecture				9,913.13
General	987.31	Naval Engineering	4,700.00	
Naval Construction	3,900.00	Reserve for 1940–41	325.82	
Physics				41,983.35
General	26,128.35	Staff Scholarships	6,390.00	
Nuclear Research	5,985.00	Reserved for 1940–41	650.00	
Age of Earth Research	2,830.00			
United States Army and Navy Officers				751.91
Total (Schedule B)				$275,791.36

SCHEDULE B-5

LIBRARY AND MUSEUM

Library		$75,824.39
Salaries of Officers	$14,794.00	
Wages, Office and Clerical	37,610.39	
Expenses	20,420.00	
Special No. 1655, Walker Library	3,000.00	
Museum		12,200.00
Museum Committee	$ 7,200.00	
Dard Hunter Museum	5,000.00	
Total (Schedule B)		$88,024.39

SCHEDULE B-6

CLERICAL AND OFFICE EXPENSE

	Salaries	*Expenses*	*Total*
President	$6,427.25	$3,160.02	$9,587.27
Dean of Engineering	1,407.50	334.37	1,741.87
Dean of Science	1,153.34	197.62	1,350.96
Dean of Humanities	.....	182.53	182.53
Dean of Students	2,040.00	304.62	2,344.62
Dean of Graduate School	.....	548.86	548.86
Registrar	26,242.99	9,965.76	36,208.75
Director of Admissions	10,439.30	4,146.02	14,585.32
Treasurer and Bursar	21,794.90	6,830.36	28,625.26
Superintendent	8,688.00	1,619.37	10,307.37
News Service	1,164.00	1,052.54	2,216.54
Undergraduate Scholarship and Loan Fund Board	6,303.19	3,550.94	9,854.13
New Student Publicity	.....	2,000.00	2,000.00
Register of Former Students	.....	4,115.82	4,115.82
Totals	$85,660.47	$38,008.83	$123,669.30

(Schedule B)

SCHEDULE B-7

GENERAL ADMINISTRATION

Bulletins				$12,994.38
President's Report	$1,309.30	Summer Bulletin	$3,142.86	
Directory	894.00	General Catalogue	7,648.22	
Other Publicity				13,548.03
Honoraria	500.00	Spectroscopy Conf.	1,500.00	
Tech Review to Schools	2,060.00	News Bulletin in Review	600.00	
Research Reports	1,523.32	President's Letter	2,087.93	
Summer Publicity	959.14	Architectural Bulletin	3,000.00	
Alumni Day	1,000.00	Course Folders and School Prizes	317.64	
General Expense				211,741.02
Allowances	18,000.00	Graduation, etc.	6,585.56	
Pensions	15,480.00	Travel	10,994.54	
[1]Insurance, etc.	5,979.13	Telephone Service	24,790.42	
Taxes, Cambridge	7,561.35	Dues, fees, etc.	2,964.08	
Auditing	1,500.00	Services (net)	2,661.31	
Staff Pensions	77,391.65	Society of Arts	2,222.01	
Employees Pensions	33,860.97	President's Fund	1,750.00	
Special Expenses				16,933.95
Alumni Fund Study	3,000.00	Equipment	800.00	
Alumni Fund Bulletin	3,000.00	News Service	1,000.00	
Reg. of Former Students	2,000.00	Guide Service	900.00	
Historic Memorials	1,170.68	Foreign Students	651.00	
President's Special	1,635.00	Drama Shop	145.00	
No. 1587 Patent Comm.	100.00	Visiting Comm. Reports	300.00	
New Equipment	873.27	Tuition Awards (3)	1,359.00	
Total (Schedule B)				$255,217.38

[1] Includes Workmen's Compensation, General Liability and all coverages except Fire Insurance (see Schedule B).

SCHEDULE B-8

DEPARTMENT OF BUILDINGS AND POWER

Building Service				$127,961.16
Janitors	$41,958.88	Heat'g and Vent'g	$10,508.13	
Night Cleaners	41,215.83	Shop Foreman(net)	3,058.86	
Watchmen	10,953.90	Mail and Elevators	6,143.96	
Window Clean.	8,043.26	Shipper, Stock Room, Matron, Messenger	6,078.34	
Power Plant and Electric Power (net)				106,037.77
Fuel Oil			$66,724.09	
Cambridge Electric Light Co., Power			55,167.54	
Salaries			18,275.09	
Repairs			8,262.99	
Water Supplies, etc.			3,292.48	
Total Operating Cost			$151,722.19	
[1]Less: Credits — Electric Power		$18,604.82		
Steam		27,079.60	45,684.42	
Repairs, Alterations and Maintenance				130,834.18
Buildings	$57,809.13	Water and Gas	$12,317.79	
President's House	6,107.43	Furniture	4,635.12	
Grounds, Roads, etc.	29,463.42	Elevators	3,293.37	
Mains and Conduits	8,986.99	Undistributed(net)	8,220.93	
Total (Schedule B)				$364,833.11

[1] Including Dormitories, Graduate House, Walker Memorial and Bexley Hall.

SCHEDULE B-9

MEDICAL DEPARTMENT

Salaries, Staff				$20,990.00
Expense of Clinic				17,676.51
Salaries	$8,035.66	X-Ray Operation	$1,032.43	
Supplies, etc.	3,186.83	Physical Examinations	5,421.59	
Expense of Infirmary				14,269.67
Salaries	9,998.62	Food (net)	1,378.48	
Equipment	1,020.33	Laundry	1,872.24	
Total (Schedule B)				$52,936.18

SCHEDULE B-10

UNDERGRADUATE BUDGET BOARD

Athletic Coaches Salaries	$17,920.00	
Undergraduate Dues	21,196.00	
Walker Memorial (excluding Dining Service) (net)	22,858.86	
Athletic Fields, Maintenance	13,567.63	
Sailing Pavilion and Activities (net)	5,860.14	
Boat House and Launches, Maintenance	6,538.09	
Musical Clubs	575.00	
Open House	1,025.27	
Publicity and Administration Expense	955.61	
Total (Schedule B)		$90,496.60

SCHEDULE B-11

UNDERGRADUATE DORMITORY OPERATION

Income: Total, Schedule B			$138,394.35
Rentals	$145,338.50		
Miscellaneous	1,780.35	$147,118.85	
Less: Refunds	$5,617.00		
House Tax Allowance	3,107.50	8,724.50	
Expense: Total, Schedule B			98,981.24
Salaries	$48,047.63	Equipment	$2,864.75
Light, Heat, Power, Water	17,324.98	Laundry	3,126.60
Repairs	17,675.74	Administration	2,184.49
Supplies (net)	1,757.05	Mortgage Int.	6,000.00
Net Income			$39,413.11

SCHEDULE B-12

GRADUATE HOUSE OPERATION

Income:			
Rentals	$91,124.37		
Miscellaneous	2,289.68	$93,414.05	
Less: Refunds	$834.83		
House Tax Allowance	1,922.50	2,757.33	
Total			$90,656.72
Expense:			
Salaries	$38,554.86		
Real Estate Tax	11,052.45		
Light, Heat, Power and Water	10,341.90		
Repairs	1,781.21		
Supplies (net)	2,232.46		
Equipment	659.11		
Laundry	2,672.58		
Administration	3,532.08		
Depreciation	3,455.07		
Total		$74,281.72	
Balance transferred to Investment Income		16,375.00	
Total			$90,656.72

SCHEDULE B-13
WALKER DINING SERVICE

Income:			
Sale of Coupon Books (net)	$74,315.38		
Cash	75,202.60		
Total (Schedule B)			$149,517.98
Expense:			
Food	$80,995.33		
Salaries	49,200.46		
Light, Heat, Power, Water	5,593.12		
Laundry	2,955.53		
Equipment	2,428.18		
Repairs	1,451.89		
Administration	3,573.51		
Occupancy	1,000.00		
Total Expense		$147,198.02	
Less: Increase in Inventory at June 30, 1940		217.29	
		$146,980.73	
Balance transferred to Dining Service Reserve		2,537.25	
Total (Schedule B)			$149,517.98

SCHEDULE B-14
GRADUATE HOUSE DINING SERVICE

Income:			
Cash	$98,093.65		
Total (Schedule B)			$98,093.65
Expense:			
Food	$57,932.87		
Salaries	31,489.90		
Light, Heat, Power, Water	2,677.74		
Laundry	2,055.18		
Equipment	2,777.57		
Repairs	291.50		
Administration	1,637.96		
Total Expense		$98,862.72	
Less: Increase in Inventory at June 30, 1940		945.96	
		$97,916.76	
Balance transferred to Profit and Loss		176.89	
Total (Schedule B)			$98,093.65

A BRIEF DESCRIPTION OF THE ENDOWMENT AND OTHER FUNDS OF THE INSTITUTE

Including funds which have been wholly expended since 1916 for plant, equipment, facilities and special projects. The reference numbers correspond with the active funds, listed by groups on pp. 170–176, Schedule A-2.

212 ALBERT FUND, 1930–1940. Gifts from anonymous donor to pay fourteen years rental of M. I. T. Student House on Bay State Road, Boston.

214 ALPHA CHI SIGMA HOUSE FUND (Alpha Zeta Chapter), 1935–1940. Deposited for investment purposes only.

462 AMERICAN INSTITUTE OF BAKING FUND, 1939–40, $1,500. Contribution to provide fellowships in Food Technology on problems relating to baking.

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

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.

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

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

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

580 BABSON FUND, 1938, $10,000. Gift of Babson's Statistical Organization, Inc. Income to be applied at intervals of not more than three years as prizes for one or more persons for certain studies and research in Economics.

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

604 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.

172 EDMUND DANA BARBOUR FUND, 1926, $847,000. Bequest. Principal and income for general purposes of Institute. Over $800,000 used for buildings and equipment.

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

SIDNEY BARTLETT FUND, 1889, $10,000. Bequest. Appropriated for new dormitories, 1924.

173 STEPHEN L. BARTLETT FUND, 1939, $306,747.40. Bequest. Principal and income unrestricted. $42,700 appropriated in 1940 for plant and current purposes.

220 BASKET BALL FUND. Excess receipts from Eastern Massachusetts basket ball competitions held for account of M. I. T. A. A. for investment purposes only.

442 ALBERT FARWELL BEMIS FUND, 1938, $385,483.42. Bequest. To establish and maintain the Albert Farwell Bemis Foundation for research on housing.

ALBERT FARWELL BEMIS, 1923. $100,000. Gift. Used for new dormitory unit, 1923.

221 BESS BIGELOW FUND, 1936–38, $25,000. Anonymous donation for special purposes subject to approval of President.

503 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.

103 GEORGE BLACKBURN MEMORIAL FUND, 1931–36, $907,000. Bequest of Harriette A. Nevins. Income for general purposes.

STANTON BLAKE FUND, 1889, $5,000. Bequest. Used for educational plant, 1926.

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

403 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.

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

463 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.

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

505 ALBERT G. BOYDEN FUND, 1931–37, $580,772. Bequest. Estate of Elizabeth R. Stevens. Income for scholarships. Preference to students from Fall River and Swansea, Mass.

506 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.

464 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., for advanced study and research in Physics.

608 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.

443 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.

HOWARD A. CARSON FUND, 1932, $1,000. Bequest. Used for new equipment.

610 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.

508 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.

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

465 CHANDLER FUND, 1927–36, $4,511. Originally a gift from Architectural Society and used as a loan fund to be administered by Head of Architectural Department. Increased by $5,000 in 1939, gift of Mr. and Mrs. William Emerson and income to be used for Travelling Fellowship in City Planning.

WILLIAM L. CHASE FUND, 1925, $11,590.09. Bequest, $7,500 appropriated for Homberg Infirmary, 1927. Balance used for educational plant, 1928.

407 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.

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

105 CHARLES CHOATE FUND, 1906–21, $35,800. Bequest. Income for general purposes.

325 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.

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

273 CLASS OF 1874 FUND, 1934, $180. Held subject to use by Class of 1874.

513 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.

270 CLASS OF 1898 FUND, $5,535. By subscription of certain members of class from 1927–31. Income only for scholarship loans, as authorized by committee of class.

583 CLASS OF 1904 FUND, 1925, $392. Contributions received by Professor Gardner for Architectural Department prizes.

514 CLASS OF 1909 SCHOLARSHIP FUND. Being accumulated through contributions and from proceeds of life insurance policies. Principal to be invested, income available for scholarship aid with preference to direct descendants of members of Class of 1909.

223 CLASS OF 1914 FUND. Held for investment purposes only.

266 CLASS OF 1917. SPECIAL, 1937, $100. For deposit only.

224 CLASS OF 1918 (ORGAN) FUND. Subscriptions by class members toward purchase of an organ for Walker Memorial.

268 CLASS OF 1934 FUND, SPECIAL. Held for investment purposes only.

515 CLASS OF 1938 SCHOLARSHIP FUND, 1938, $165. Gift of Class of 1938. Income for scholarships.

225–240 inc.

CLASS 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. From certain of these, a portion 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. By vote of the Class of 1923, $10,000 was appropriated in 1940 from their Class Fund toward construction of the sun garden adjoining new swimming pool.

301 SAMUEL C. COBB FUND, 1916, $36,000. Bequest. Income for salaries of President and professors.

612 FRED L. AND FLORENCE L. COBURN FUND, 1932, $5,000. Bequest. Income to aid needy and worthy students, preference being given to those residing in Somerville, Mass.

614 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.

466 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.

HELEN COLLAMORE FUND, 1917, $12,384.97. Bequest. Used for new dormitories, 1924.

SAMUEL P. COLT FUND, 1920–22, $20,000. Bequest. Used for new dormitories, 1924.

615 GEORGE R. COOKE, 1939–40, $3,500. Gift of George R. Cooke, Jr. Income to be awarded, preferably in Civil Engineering or related field, to student preparing for Public Service and Government.

245 COSMIC TERRESTRIAL RESEARCH FUND, 1938–40, $61,000. Gift (anonymous) for special research.

CRANE AUTOMOTIVE FUND, 1928, $5,000. Gift of Henry M. Crane. Used for purchase of equipment for Aeronautical Laboratory, 1928–40.

516 LUCRETIA CROCKER FUND, 1916, $50,000. Bequest of Matilda H. Crocker. Income for establishment of scholarships for women in memory of sister.

409 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.

EDWARD CUNNINGHAM FUND, 1917, $15,000. Gift. For new building and equipment at Civil Engineering Summer Camp, Maine.

467 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.

517 ISAAC W. DANFORTH FUND, 1903, $5,000. Bequest of James H. Danforth. Income for scholarship purposes as a memorial to brother.

N. LORING DANFORTH FUND, 1937, $5,000. Bequest. Principal and income for general purposes. Appropriated for educational plant, 1940.

616 DEAN'S FUND, 1924, $3,350. Contributions. To be loaned by Dean to needy students.

618 CARL P. DENNETT FUND, 1926, $500. Gift. To be loaned to students, preferably Freshmen, at discretion of President.

520 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.

620 DORMITORY FUND, 1903, $2,700. Contributions. Income for scholarship purposes.

GEORGE B. DORR FUND, 1890, $49,573.47. Bequest. Appropriated for educational plant, 1918.

411 SUSAN E. DORR FUND, 1914, $95,000. Bequest. Income for use and benefit of Rogers Physical Laboratory.

468 DOW CHEMICAL COMPANY FUND, 1939–40. Gift. $1,500 for fellowships.

248 DRAMA CLUB THEATRE FUND, 1938, $400. Deposited by Drama Club of M.I.T. toward future purchase of theatrical equipment.

107 EBEN S. DRAPER FUND, 1915, $100,000. Bequest. Income used for general purposes of the Institute.

CHARLES C. DREW FUND, 1920, $305,171.52. Bequest. Appropriation to educational plant, 1921–24.

521 THOMAS MESSINGER DROWN FUND, 1928, $50,000. Bequest of Mary Frances Drown. Income to establish scholarships for deserving undergraduate students.

109 COLEMAN DU PONT FUND, 1931–38, $216,000. Bequest. Income for support and maintenance of the Institute.

PIERRE DU PONT FUND, 1938, $25,000. Gift. Used for new equipment.

469 DU PONT DE NEMOURS FUND. For graduate scholarship in Chemical Engineering.

111 EASTMAN CONTRACT FUND, 1924, $9,500,000. Gift of George Eastman. Income for general purposes of the Institute.

113 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. Balance to be used as needed for new educational buildings. $1,225,000 used for George Eastman Research Laboratories in 1932, $725,000 for New Rogers Building and Wind Tunnel in 1939.

412 GEORGE EASTMAN FUND, 1918, $400,000. Gift of George Eastman. Income for Chemistry and Physics. Principal available for addition to EASTMAN BUILDING FUND after latter is exhausted.

115 CHARLES W. EATON FUND, 1929–40, $259,000. Bequest. Income for advancement of general purposes of Institute (also from 1911 to 1923 Mr. Eaton gave $1,550.45 for Civil Engineering Summer Camp in Maine).

117 EDUCATIONAL ENDOWMENT FUND, 1920–21, $7,574,000. $4,000,000 gift from George Eastman and balance contributed by alumni and others. Income for current educational expenses.

119 MARTHA ANN EDWARDS FUND, 1890, $30,000. Gift. Income for general purposes.

621 FRANCES AND WILLIAM EMERSON FUND, 1930, $100,000. Gift. Income for aid of regular and special students in Department of Architecture.

584 WILLIAM EMERSON PRIZE FUND, 1939, $2,059. Contributed by friends as a fund for prizes to architectural students.

F. W. EMERY FUND, 1916, $120,000. Bequest. Used for buildings and equipment.

121 WILLIAM ENDICOTT FUND, 1916, $25,000. Bequest. Income for general purposes.

210 ENDOWMENT RESERVE FUND, 1924. Created and otherwise increased by gains from sales or maturities of investments and decreased by premium amortization of bonds and losses and charges from sales or maturities. Belongs to all funds sharing general investments.

ARTHUR F. ESTABROOK FUND, 1923–38, $100,800. Bequest. Used for purchase of land and equipment.

IDA F. ESTABROOK FUND, 1926–37, $22,157.51. Bequest. Used for educational plant.

524 FARNSWORTH FUND, 1889, $5,000. Bequest of Mary E. Atkins. Income for scholarships.

HENRIETTA G. FITZ FUND, 1930, $10,000. Bequest. For general purposes. Appropriated for educational plant, 1940.

526 CHARLES LEWIS FLINT FUND, 1889, $5,000. Bequest. Income for support of worthy student, preference given graduate of English High School, Boston.

327 CHARLES LEWIS FLINT FUND, 1889, $5,000. Bequest. Income for purchase of books and scientific publications for library.

303 SARAH H. FORBES FUND, 1901, $500. Gift of Malcolm Forbes as memorial to mother. Income for salaries.

527 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.

123 FRANCIS APPLETON FOSTER FUND, 1922, $1,000,000. Bequest. Income for purposes of Institute.

125 JOHN W. FOSTER FUND, 1938, $299,650. Bequest. Income for purposes of the Institute.

127 ALEXIS H. FRENCH FUND, 1930, $5,000. Bequest. Income for general purposes of Institute.

CAROLINE L. W. FRENCH FUND, 1916, $100,843.34. Bequest. Used for new equipment, 1928.

129 JONATHAN FRENCH FUND, 1915–16, $25,000. Bequest of Caroline L. W. French. Income for purposes of the Institute.

131 HENRY CLAY FRICK FUND, 1925–38, $1,831,000. Bequest. Institute received ten shares of a total of one hundred shares of his residuary estate. Income for general purposes.

WALTER L. FRISBIE FUND, 1923, $7,614.98. Bequest. Used for educational plant, 1928.

305 GEORGE A. GARDNER FUND, 1898, $20,000. Gift. Income for salaries of instructors.

133 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).

623 NORMAN H. GEORGE FUND, 1919–25, $93,400. Bequest. Income for assistance of worthy and needy students.

CHARLES W. GOODALE FUND, 1929, $50,000. Bequest. Used for new dormitory, 1930.

135 ELIOT GRANGER FUND, 1936, $20,000. Bequest under will of Mary Granger in memory of deceased son. Income for the general purposes of the Institute.

625 JOHN A. GRIMMONS FUND, 1930–40. Bequest of C. Lillian Moore of Malden. Principal held by Old Colony Trust Co., Trustee. Income for loans to undergradutaes in Electrical Engineering. Unused balances available for purchase of apparatus and equipment in Department of Electrical Engineering.

GEORGE WYMAN HAMILTON FUND, 1935, $54,414.15. Appropriated for new equipment, 1937–39.

627 JAMES H. HASTE FUND, 1930, $181,000. Bequest. Income for aid of deserving students of insufficient means.

136 CHARLES HAYDEN FUND, 1937, $1,000,000. Bequest of Charles Hayden. Income for general educational purposes of the Institute.

CHARLES HAYDEN, 1925, $42,700.76. Gift. Used for educational plant.

CHARLES HAYDEN, 1927, $100,000. Gift for new dormitories.

528 CHARLES HAYDEN MEMORIAL SCHOLARSHIP FUND, 1940, $50,000. From the Charles Hayden Foundation. For entrance scholarships and preference given to students from Boston and New York City.

309 JAMES HAYWARD FUND, 1866, $18,800. Bequest. Income for salaries.

JAMES W. HENRY FUND, 1935, $8,226. Bequest. Used for new equipment.

FREDERICK S. HODGES FUND, 1928, $57,316.26. Bequest. Appropriated for new dormitories.

531 GEORGE HOLLINGSWORTH FUND, 1916, $5,000. Bequest of Rose Hollingsworth. Income used for scholarship.

585 ROGER DEFRIEZ HUNNEMAN PRIZE 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.

ABBY W. HUNT FUND, 1936–38, $76,000. Bequest. For general purposes. $60,000 used for alterations, 1937. Balance for new equipment, 1938.

533 T. STERRY HUNT FUND, 1894, $3,000. Bequest. Income to a student in Chemistry.

534 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.

211 INCOME EQUALIZATION RESERVE FUND, 1937. Created by appropriation of excess income from general investments for year 1936–37 toward maintenance of income for ensuing years.

187 INDUSTRIAL FUND, 1924–40. This fund succeeded "Tech Plan" Contracts, payments under which went to the Educational Endowment Fund. Now receives surplus from operations of Division of Industrial Coöperation and Research. Used for purchase of new equipment and support of special research.

250 INDUSTRIAL RELATIONS FUND, 1938, $42,100. Contributions from Industrial organizations in support of the Industrial Relations Section of the Department of Economics.

CHARLES C. JACKSON, 1912, $25,000. Gift. Used for purchase of new site.

137 JAMES FUND, 1898–99, $163,000. Bequest of Julia B. H. James. Income for development of M. I. T.

628 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.

474 REBECCA R. JOSLIN FUND, 1924–36, $6,540. Gift and Bequest. 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.

536 JOY SCHOLARSHIPS, 1886, $7,500. Gift of Nabby Joy. Income for scholarships for one or more women studying natural science at M. I. T.

WILLIAM R. KALES, 1925–27, $11,000. Gift for new dormitories.

341 WILLIAM HALL KERR FUND, 1896, $2,000. Gift of Alice M. Kerr. Income for the annual purchase of books and drawings in machine design.

DAVID P. KIMBALL FUND, 1924, $10,000. Bequest. Used for educational plant, 1926.

629 LLORA CULVER KRUEGER SCHOLARSHIP FUND, 1936, $5,573.75. Bequest. Both principal and income to be available for needy and worthy students from Schenectady and vicinity.

476 WILFRED LEWIS FUND, 1930, $5,000. Gift of Emily Sargent Lewis. Income for maintenance of graduate student in Mechanical Engineering.

538 WILLIAM LITCHFIELD FUND, 1910, $5,000. Bequest. Income for scholarship on competitive examination.

414 ARTHUR DEHON LITTLE MEMORIAL FUND, 1937, $157,460. Bequest under will of Dr. A. D. Little. Income to be used in Departments of Chemistry and Chemical Engineering. (The income from 5,543 shares of common stock of A. D. Little, Inc., held by Voting Trustees for the benefit of the Institute under declaration of trust dated November 18, 1936 and in force for twenty years is included in this total.)

HIRAM H. LOGAN FUND, 1933–38, $19,455. Bequest. Principal and income for general purposes of M. I. T. Appropriated for educational plant, 1940.

JOHN M. LONGYEAR, 1915–16, $30,000. Gift. Used for land and equipment, 1916.

539 ELISHA T. LORING FUND, 1890, $5,000. Bequest. Income for assistance of needy and deserving pupils.

265 LOUISVILLE TECHNOLOGY FOUNDATION FUND, 1935, $50. Founded by Louisville Tech Club toward scholarship aid for local student.

541 LOWELL INSTITUTE FUND, 1923, $2,300. Gift from alumni of Lowell Institute to establish scholarship for its graduates.

139 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.

ARTHUR T. LYMAN FUND, 1913, $5,000. Bequest. Used for educational plant, 1926.

JAMES MCGREGOR FUND, 1913, $2,500. Bequest. Used for educational plant, 1926.

542 RUPERT A. MARDEN FUND, 1933, $2,000. Gift (anonymous). Income to aid worthy student — Protestant and of American origin — preference to student taking Coöperative Course in Electrical Engineering (Course VI-A).

311 WILLIAM P. MASON FUND, 1868, $18,800. Bequest. Income to support a professorship in the Institute.

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.

143 M. I. T. ALUMNI (GYMNASIUM) FUND, 1938–40. Total subscription $400,000. Appropriated for Briggs Field House, Athletic Field and for new swimming pool unit of the proposed alumni gymnasium.

144 M. I. T. ALUMNI FUND (NEW), 1940. Plan adopted by the alumni of the Institute for the annual raising of funds for support of the Alumni Association and the *Technology Review* — the balance to be applied toward specific purposes other than operating expenses of the Institute.

263 M. I. T. ALUMNI ASSOCIATION PERMANENT FUND, 1929–38. Deposited with M. I. T. for investment purposes only.

255 M. I. T. EMPLOYEES' FUND, 1938. Proceeds of employees' social activities held for benefit and relief purposes.

260 M. I. T. TEACHERS' INSURANCE FUND, 1926–38. Balance of two per cent salary deductions under M. I. T. Pension and Insurance Plan in excess of Group Insurance Premiums paid.

261 M. I. T. TEACHERS' INSURANCE FUND, SPECIAL, 1928–38. Refund of premiums paid on Group Insurance under M. I. T. Pension and Insurance Plan held at interest and accumulated. Appropriated for special pension purposes.

JOHN LAWRENCE MAURAN FUND, 1934, $10,000. Bequest. Principal and income for benefit of Department of Architecture. Used, in part, toward house projects in Wellesley and Wakefield, 1937–40.

417 GEORGE HENRY MAY FUND, 1914, $4,250. Gift. Income for benefit of Chemical Department.

543 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.

141 THOMAS McCAMMON FUND, 1930, $15,000. Bequest in honor of father, James Elder McCammon. Income available for general purposes.

587 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.

METALLURGY, SPECIAL FUND, 1938, $10,000. Subscription (anonymous) used for special equipment for Department of Metallurgy.

HIRAM F. MILLS FUND, 1923, $10,175. Bequest. Appropriated for educational plant, 1937.

419 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.

545 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.

420 FORRIS JEWETT MOORE FUND, 1927–31, $32,000. 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.

478 MOORE FUND, 1914–28–29, $24,200. 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.

145 KATE M. MORSE FUND, 1925, $25,000. Bequest. Income for general purposes of M. I. T.

147 EVERETT MORSS FUND, 1934, $25,000. Bequest. Income for general purposes of M. I. T.

EVERETT MORSS, 1916, 1921–25, $35,000. Gifts. For Walker Memorial murals.

264 HENRY A. MORSS NAUTICAL FUND, 1937, $3,500. Gift for maintenance of sailing activities and sailing pavilion.

190 JOHN WELLS MORSS FUND, 1940, $50,000. Bequest. Principal and income for general purposes.

ALBERT H. MUNSELL FUND, 1920, $7,908.28. Bequest. Used for educational plant, 1928.

MARGARET A. MUNSELL FUND, 1920, $1,105.32. Bequest. Used for educational plant, 1928.

NATHANIEL C. NASH FUND, 1881, $10,000. Bequest. Appropriated for new dormitories, 1924.

547 NICHOLS FUND, 1895, $5,000. Bequest of Betsy F. W. Nichols. Income for scholarship to student in Chemistry.

548 CHARLES C. NICHOLS FUND, 1904, $5,000. Bequest. Income for scholarship.

WILLIAM E. NICKERSON FUND, 1928, $50,000. Gift. Principal and income used to finance chair in Humanics, 1928–40.

MOSES W. OLIVER FUND, 1921, $12,870.49. Used for educational plant, 1938.

343 GEORGE A. OSBORNE FUND, 1928, $10,000. Bequest. Income for benefit of mathematical library.

550 JOHN FELT OSGOOD FUND, 1909, $5,000. Bequest of Elizabeth P. Osgood in memory of husband. Income for scholarship in Electricity.

551 GEORGE L. PARMELEE FUND, 1921, $17,000. Bequest. Income for tuition of either special or regular worthy students.

195 EMERETTE O. PATCH FUND, 1935–38, $8,240.84. Bequest. $3,000 used for special expenditures, 1938.

FRANK E. PEABODY FUND, 1920, $51,467.35. Bequest. Used for educational plant, 1921 and 1926.

FRANCES M. PERKINS, 1912, $122,569.67. Bequest. Used for educational plant.

196 H. B. PERKINS, 1940, $250. Bequest.

149 RICHARD PERKINS FUND, 1887, $50,000. Bequest. Income for general purposes.

552 RICHARD PERKINS FUND, 1887, $50,000. Bequest. Income for scholarships.

480 WILLARD B. PERKINS FUND, 1898, $6,000. Bequest. Income to be expended every fourth year for travelling scholarships in architecture.

424 EDWARD D. PETERS FUND, 1924, $5,000. Bequest of Elizabeth W. Peters. Income for the Department of Mineralogy.

E. S. PHILBRICK FUND, 1922, $36,213.92. Bequest. Used for educational plant, 1926.

PRESTON PLAYER FUND, 1933, $20,000. Bequest. Used for educational plant, 1938.

425 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.

CHARLES O. PRESCOTT, 1935, $30,640.78. Principal and income used for educational plant, 1938.

484 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.

150 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.

553 THOMAS ADELBERT READ FUND, 1934–35, $21,117. Bequest of Julia A. Read to establish scholarship in memory of her brother and their father and mother. Income to be awarded to some worthy and needy student, preferably resident of Fall River, Mass.

275 RICHARDS PORTRAIT FUND, 1929. Balance of subscriptions from friends for portrait of Prof. R. H. Richards available for Mining Department.

630 CHARLES A. RICHARDS, 1939, $31,719.32. Bequest. Income only to be used for assistance of poor Protestant students in the Institute.

449 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.

451 CHARLOTTE B. RICHARDSON FUND, 1891, $30,000. Bequest. Income to support of Industrial Chemical School.

554 JOHN ROACH SCHOLARSHIP FUND, 1937, $3,000. Bequest under will of Emeline Roach, income to provide annual scholarship to needy and deserving student in Naval Architecture and Marine Engineering.

RUSSELL ROBB FUND, 1928, $28,750. Bequest. Appropriated for new dormitories, 1930.

ROCKEFELLER FOUNDATION RESEARCH FUND, 1931–36, $170,000. Contributed and expended for Research in Science Departments over period of five years.

313 HENRY B. ROGERS FUND, 1873, $25,000. Gift. Income for salaries of one or more professors or instructors.

486 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.

201 ROBERT E. ROGERS FUND, 1886, $7,600. Bequest in memory of brother, William B. Rogers. For general purposes.

631 WILLIAM BARTON ROGERS FUND. Present, $39,000. Established by subscriptions of members of Alumni Association through Prof. R. H. Richards for loans to students. By vote of Executive Committee in March 1935, approved by Alumni Council, the income, not now needed for loans, is made available for special scholarship aid in the discretion of the President and Treasurer.

151 WILLIAM BARTON ROGERS MEMORIAL FUND, 1883–84–85, $250,000. Contributions from 91 persons. Income for support of Institute.

452 WILLIAM BARTON AND EMMA SAVAGE ROGERS FUND, 1937, $102,064.18. Bequest of Dr. Francis H. Williams. Income to be added to principal for twenty years — after which eighty (80) per cent of income may be used for research in pure science — balance to be added to fund.

426 FRANCES E. ROPER FUND, 1936, $2,000. Bequest. Income for use in Department of Mechanical Engineering.

345 ARTHUR ROTCH ARCHITECTURAL FUND, 1895, $5,000. Bequest. Income for Library or collection of Department of Architecture.

427 ARTHUR ROTCH FUND, 1895, $25,000. Bequest. Income for general purposes of Department of Architecture.

589 ARTHUR ROTCH FUND, 1895, $5,000. Bequest. Income for annual prize to student in regular course in Architecture graduating highest in class.

591 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.

488 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.

555 WILLIAM PATRICK RYAN MEMORIAL FUND, 1935, $3,637. Contributed by friends of Professor Ryan. Income for scholarship in Chemical Engineering.

277 WILLIAM PATRICK RYAN SPECIAL FUND, 1933, $3,000. Appropriation. Educational fund for three children of late Prof. W. P. Ryan.

152 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.

490 HENRY SALTONSTALL FUND, 1901, $10,000. Bequest. Income to aid one or more needy students.

492 JAMES SAVAGE FUND, 1873, $10,000. Bequest. Income for scholarships in institution "where my son-in-law, William B. Rogers, is President."

153 SAMUEL E. SAWYER FUND, 1895, $4,700. Bequest. Income to be used in such manner as will best promote interests of M. I. T.

556 JOHN P. SCHENKL FUND, 1922, $43,800. Bequest of Johanna Pauline Schenkl in memory of father. Income for scholarships in Department of Mechanical Engineering.

THEODORE EDWARD SCHWARZ MEMORIAL FUND, 1937–38, $4,391.86. Gift. For equipment of a suitable room for proposed map collection.

279 SEDGWICK MEMORIAL LECTURE FUND, 1930–38, $9,500. 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.

429 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.

RICHARD B. SEWALL FUND, 1919, $30,000. Bequest. Used for educational plant, 1924.

557 THOMAS SHERWIN FUND, 1871, $5,000. Gift of Committee on Sherwin Memorial Fund for free scholarship to graduate of English High School.

493 SLOAN FUND, 1933–38, $1,000. Annual gift of A. P. Sloan, Jr. for Fellowship in Automotive Engineering.

ELLEN VOSE SMITH FUND, 1930, $25,000. Bequest. Used for new equipment.

558 HORACE T. SMITH FUND, 1930, $32,988.76. Bequest. Income for scholarships. Preference to graduates of East Bridgewater (Mass.) and Bridgeport (Conn.) High Schools.

281 LILLIE C. SMITH FUND, 1937, $4,800. Bequest to M. I. T. Women's Association for purposes of the Association.

283 WALTER B. SNOW, 1938. Reserve funds of Technology Christian Association. Deposited for investment purposes.

453 SOLAR ENERGY FUND, 1938, $647,700. Gift of Dr. Godfrey L. Cabot. Principal to be held for fifty years — income to be used in development of the art of converting energy of the sun to use of man by mechanical, electrical or chemical means. After fifty years, fund becomes part of general unrestricted endowment of the Institute.

559 SONS AND DAUGHTERS OF NEW ENGLAND PURITAN COLONY SCHOLARSHIP FUND, 1931, $600. Gift. Income for scholarship aid to a boy of New England ancestry.

632 ANNA SPOONER FUND, 1939, $7,500. Bequest. Income to be used in assisting meritorious students.

155 ANDREW HASTINGS SPRING FUND, 1921, $50,000. Bequest of Charlotte A. Spring in memory of nephew as a permanent fund. Income for general purposes.

CHARLES A. STONE, 1912–24, $15,000. Gift for land. 1928, $25,023.59. Gift for dormitories.

GALEN L. STONE, 1912, $10,000. Gift for land. 1916, $10,000. Gift for Mining Building.

156 GEORGE G. STONE, 1939, $4,677.35. Bequest by will of Eliza A. Stone, as memorial to brother, a graduate in Mining Engineering in 1889. Income to be used in manner most useful to Institute as well as a most fitting memorial.

593 SAMUEL W. STRATTON PRIZE FUND, 1933, $1,680. Contributed by friends of the late Dr. S. W. Stratton for competition prizes in the presentation of scientific papers.

633 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.

454 HENRY N. SWEET, 1936, $8,036.50. Bequest. For industrial research.

157 SETH K. SWEETSER FUND, 1915, $25,000. Bequest as a permanent fund. Income for general purposes.

495 SUSAN H. SWETT FUND, 1888, $10,000. Bequest. Income to support a graduate scholarship.

496 GERARD SWOPE FUND, 1926, $2,500. Gift for fellowships in Electrical Engineering.

634 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.

635 TECHNOLOGY LOAN FUND, 1930–37, $1,435,720.18. Contributed by eighteen alumni to provide loans for students.

285 TECHNOLOGY MATRONS TEAS FUND, 1916–22–31, $8,500. Gifts of Mrs. F. Jewett Moore. Income for social activities of Technology Matrons.

456 TEXTILE RESEARCH FUND, 1937, $3,065. Gift. For research.

STURGIS H. THORNDIKE FUND, 1928, $15,000. Bequest. Appropriated for new dormitories, 1930.

NATHANIEL THAYER, 1906, $25,000. Gift. Used for educational plant.

315 NATHANIEL THAYER FUND, 1868, $25,000. Gift. Income for professorship of Physics.

286 W. B. S. THOMAS FUND, 1935–37, $2,000. Gift of parents of W. B. S. Thomas '29, the income only to be expended, one half for the benefit of the M. I. T. Crew and one half to other activities of the M. I. T. A. A.

317 ELIHU THOMSON FUND, 1933–37, $18,000. Contributed toward fund for Professorship in Electrical Engineering.

ELIHU THOMSON, 1912, $25,000; 1924, $5,000. Gift. Used for purchase of land.

497 FRANK HALL THORP FUND, 1932, $10,000. Anonymous gift. Income for fellowship in Industrial Chemistry.

560 SAMUEL E. TINKHAM FUND, 1924, $2,400. Gift of Boston Society of Civil Engineers. Income to assist worthy student in Civil Engineering.

349 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.

562 F. B. TOUGH FUND, 1924, $465. Gift to extend financial assistance to worthy students in mining or oil production.

431 EDMUND K. TURNER FUND, 1915–17, $203,000. Bequest. Income, three-quarters for Department of Civil Engineering and one-quarter to be added annually to principal.

LUCIUS TUTTLE FUND, 1916, $50,000. Bequest. Used for educational plant, 1918.

636 ALICE BROWN TYLER FUND, 1937, $1,000. Gift of Prof. and Mrs. H. W. Tyler. Income to be used for benefit of women students at the Institute.

290 UNDERGRADUATE ACTIVITIES TRUST FUND, 1935, $1,097.26. Established by 1916 Technique Board from which recognized student activities may borrow if deemed necessary and desirable, at a low rate.

292 UNDERGRADUATE PUBLICATIONS TRUST FUND, 1935, $16,018. Deposited by Alumni Advisory Council on Publications for investment purposes only.

294 UNDERGRADUATE DUES RESERVE FUND, ATHLETICS, 1924–40. Transferred from Undergraduate Dues (current operating account) to secure investment income.

296 UNDERGRADUATE DUES RESERVE FUND, CONTINGENT, 1924–40. Transferred from Undergraduate Dues (current operating account) to secure investment income.

433 WILLIAM LYMAN UNDERWOOD FUND, 1932, $16,252. Bequest. For benefit of Biological Department or otherwise for general purposes.

563 SUSAN UPHAM FUND, 1892, $1,000. Gift. Income to assist students deserving financial aid.

637 THOMAS UPHAM FUND, 1939, $392,000. Bequest of Marcella B. Upham. Principal to be held as a permanent trust fund, the income to be used in assisting poor and deserving students or graduates of the Institute.

638 SAMSON R. URBINO FUND, 1927, $1,000. Bequest. Income for students who need assistance, Germans preferred.

351 THEODORE N. VAIL FUND, 1925, $68,000. Bequest. For benefit of Vail Library.

498 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.

565 VERMONT SCHOLARSHIP FUND, 1924–37, $25,000. 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 students preferably from Vermont. Mr. Proctor reserves right to designate recipients as long as he lives.

567 ANN WHITE VOSE FUND, 1896, $60,000. Bequest. Income for free scholarships for young men of American origin.

HORACE W. WADLEIGH FUND, 1916–20, $22,143.14. Bequest. Appropriated for new buildings, 1924.

569 ARTHUR M. WAITT FUND, 1925, $9,700. Bequest. Income for deserving students in second, third and fourth year classes in Mechanical Engineering.

159 WILLIAM J. WALKER FUND, 1915–17, $23,000. Bequest. Income for general purposes.

434 WILLIAM R. WARE FUND, 1939, $15,000. Gift of Mr. and Mrs. William Emerson, the income to be at the disposal of the Dean of the Architectural School for extra budgetary purposes.

161 HORACE HERBERT WATSON FUND, 1930, $34,000. Bequest of Elizabeth Watson Cutter as a permanent fund. Income for general purposes.

EDWIN S. WEBSTER FUND, 1912–24, $15,000. Gift. Used toward purchase of land.

205 FRANK G. WEBSTER FUND, 1931, $25,000. Bequest. For general purposes.

571 LOUIS WEISBEIN FUND, 1915, $4,000. Bequest. Income for scholarship for student in Architectural Department, preference to be given to a Jewish boy.

163 ALBION B. K. WELCH FUND, 1871, $5,000. Bequest as a permanent fund. Income for general purposes.

CHARLES G. WELD FUND, 1907, $15,000. Gift. Used for educational plant, 1924.

165 EVERETT WESTCOTT FUND, 1935–38, $171,394. Bequest as a permanent fund. Income for general purposes.

167 MARION WESTCOTT FUND, 1938, $238,200. Bequest for endowment. Income for general purposes.

573 FRANCES ERVING WESTON FUND, 1912–31, $5,000. Bequest. Income to aid a native-born American Protestant girl of Massachusetts.

574 SAMUEL MARTIN WESTON FUND, 1912–31, $5,000. Bequest of Frances E. Weston in memory of husband. Income to aid a native-born American Protestant boy; preference to be given one from Roxbury.

ALEXANDER S. WHEELER FUND, 1907–16, $30,000. Contributed by friends. Used for new dormitories, 1924.

GEORGE R. WHITE FUND, 1912, $10,000. Gift. Used toward purchase of new site.

576 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.

EDWARD WHITNEY FUND, 1910, $37,171. Bequest as a memorial to him and his wife, Caroline. Principal and interest used (1930–38) for conduct of research in geophysics.

639 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.

169 GEORGE WIGGLESWORTH FUND, 1931, $25,000. Bequest. Ten (10) per cent of gross annual income to be added to principal, balance of income for general purposes of the Institute.

GEORGE WIGGLESWORTH, 1917–24, $65,000. Gift. Used for additional land purchase, 1924.

577 ELIZABETH BABCOCK WILLMANN FUND, 1935, $5,065. Bequest. Income to be used toward tuition of young women students taking Chemistry courses.

KENNETH F. WOOD FUND, 1926, $25,000. Bequest. Appropriated for new dormitory, 1930.

171 EDWIN A. WYETH FUND, 1913–35, $269,665. Balance of Trust Fund held by M. I. T. since 1913 for itself and five other beneficiary institutions subject to annuity. Distributed January 1935. Fund separately invested and still subject to annuity. Balance of net income available for general purposes of the Institute.

640 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.

WRIGHT MEMORIAL WIND TUNNEL, 1937–40, $87,250. Contributed by friends toward construction of new wind tunnel.

LIST OF PERIODICAL PUBLICATIONS, BOOKS AND REVIEWS BY MEMBERS OF THE STAFF

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