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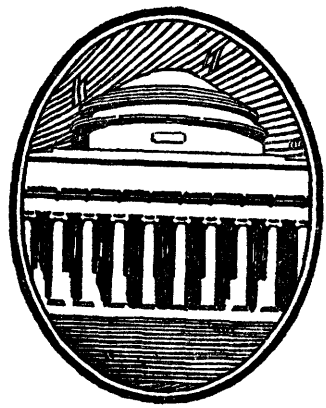

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President's Report

1931–1932

Covering period from meeting of Corporation October, 1931
to meeting of Corporation October, 1932

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REPORT OF THE PRESIDENT

TO THE MEMBERS OF THE CORPORATION:

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

In view of the general financial situation, projects looking toward an expansion of the activities of the Institute have generally been left in abeyance, and the year has been devoted primarily to the internal affairs of the institution with especial attention to the effectiveness and economy of operation. The main accomplishments of this program are summarized in the following report supplemented in greater detail by the individual reports of the various administrative officers.

CHANGES IN PERSONNEL

A review of the changes in personnel during the year shows serious losses in both the Corporation and Faculty.

On the eighteenth of October, a year ago yesterday, the sudden and unexpected death of Dr. Stratton deprived this Corporation of its Chairman. Coming to the Institute in January 1923, he served as President until July 1930, when he was elected Chairman, a position which he held for only one year.

A few days later, on October 26, occurred the death of Howard A. Carson, a graduate of the Institute in the Class of 1869. He was elected to the Corporation in November 1878, and for seventeen years prior to his death was senior member of that body.

On March 14, 1932, the Institute lost through the death of George Eastman its greatest benefactor, who served as a Life Member of this body from October 1920.

Mr. John R. Freeman, distinguished engineer, died after a

very short illness on October 6, 1932. He was a graduate of the Institute in the Class of 1876, and had been a Life Member of the Corporation since 1893. His generous and stimulating interest in the Institute continued up to the last, for within less than a week of his death he had written a letter of helpful suggestions to Dean Bush and had, with Mrs. Freeman, attended the President's reception to the Faculty.

In recognition of the distinguished services of these men to the Institute and to record the affectionate esteem in which they are held by their colleagues, appropriate resolutions on the deaths of Dr. Stratton, Mr. Eastman and Mr. Carson have been spread upon the records of the Corporation, and accounts of their lives and services to the Institute have appeared in Institute publications. It will be appropriate at this meeting to appoint a committee to prepare similar resolutions on the death of Mr. Freeman for adoption by the Corporation at its next meeting.

Another loss in the Corporation has been due to the resignation on October 14, 1931, of Mr. William Endicott, who had been a Life Member since 1913.

The Corporation has been strengthened during the year by election to Life Membership of Dr. Harlow Shapley and Alfred P. Sloan, Jr., the latter having served as Term Member from 1926 to 1931.

The only other changes in the Corporation have been owing to the expiration of the term of service of Messrs. Roger W. Babson, Elisha Lee and William Z. Ripley as Term Members, and the election of Messrs. Bradley Dewey, Martin H. Eisenhart and Jerome C. Hunsaker as new Term Members to serve until June 1937.

For reasons of economy, additions to the teaching staff of the Institute have been fewer this year than in recent years, and promotions have been made only in those cases for which a commitment had already been made.

Losses in the Faculty have been due to death, resignation and retirement. Clarence L. E. Moore, Professor of Mathematics, died on December 5, 1931; Frank Vogel, Professor Emeritus, for many years connected with our Department of Modern Languages, died on June 9, 1932; Associate Professor Winward Prescott, of the Department of English and History,

died on March 1, 1932; and Associate Professor Francis H. Slack, of the Department of Biology and Public Health, died on May 5, 1932.

In July of this year Professor Frank A. Laws, Professor Arthur G. Robbins, Professor Robert H. Smith, and Assistant Professor James R. Lambirth retired, each with the title of Professor Emeritus.

The following members of the Faculty have resigned during the year: H. Monmouth Smith, Professor of Inorganic Chemistry; Robert B. Brode, Associate Professor of Physics; Major Peter H. Ottosen, Associate Professor of Military Science and Tactics; Frank J. Robinson, Associate Professor of Architecture; Major Richard H. Somers, Associate Professor of Military Science and Tactics; Aubrey D. Beidelman, Assistant Professor of Naval Architecture and Marine Engineering; Captain Samuel G. Frierson, Assistant Professor of Military Science and Tactics; Captain Crawford M. Kellogg, Assistant Professor of Military Science and Tactics; and Arthur L. Russell, Assistant Professor of Electrical Engineering.

Additions to the Faculty have been as follows: Major Oscar J. Gatchell has been appointed Associate Professor of Military Science and Tactics; Frederick J. Adams, Assistant Professor of Town Planning; Eberhard Hopf, Assistant Professor of Mathematics; Captain Thomas J. Johnston, Assistant Professor of Military Science and Tactics; Captain Louis R. Knight, Assistant Professor of Military Science and Tactics; and John W. Williams, Assistant Professor of Public Health Laboratory Methods.

The following promotions have been made within the Faculty from the grade of Associate Professor to that of Professor: Colonel Robert Arthur, Carl G. A. Rossby, Louis B. Slichter, and Norbert Wiener.

Dr. Glennon Gilboy has been advanced from the grade of Assistant Professor to that of Associate Professor.

The following Instructors have been promoted to the rank of Assistant Professor: Harold E. Edgerton, Erik G. Rudberg and B. Alden Thresher.

ADMINISTRATION

Two years ago, realizing that the activities of the Institute had multiplied so as to require a more adequate organization for their effective administration, this Corporation created the new office of Chairman of the Corporation. After one year of happy and successful operation of this organization, further consideration of the problem of administration was forced by the untimely death of Chairman Stratton. This led to the development of the administrative organization which was adopted by the Corporation at its meeting on March 9, 1932.

The vacant office of Chairman of the Corporation has not as yet been filled, but in the new plan of administration there had been created the office of Vice-President. In order to add to his effectiveness and to the close coöperation between the Corporation and the staff of the Institute, the Vice-President has been made ex-officio a member of the Corporation.

The new plan divides the Institute for administrative purposes into five parts designated as the School of Engineering, the School of Science, the School of Architecture, the Division of Humanities and the Division of Industrial Coöperation. The three Schools are comprised of those departments of instruction in which degrees are awarded, while in the two Divisions are grouped those activities which are in the nature of "services." The Division of Humanities includes those departments of the Institute whose special task is the enrichment of the background of our students and the Division of Industrial Coöperation includes the various agencies by which the Institute coöperates with business and industry in the solution of their problems.

As the administrative head of each of the Schools there has been appointed a Dean, and as administrative head of each of the Divisions a Director, these officers being immediately responsible to the President and Vice-President. They are as follows: Dr. Vannevar Bush, Dean of Engineering; Dr. Samuel C. Prescott, Dean of Science; Professor William Emerson, Dean of Architecture; and Professor Charles L. Norton, Director of the Division of Industrial Coöperation. The office of Director of the Division of Humanities is as yet unfilled, the duties being for the present divided among the Deans of the three professional schools.

A further subdivision of administrative responsibility has been accomplished through the establishment of the Graduate School, administered by the Dean of the Graduate School. This is a recognition of an increasingly important aspect of the Institute's educational program as illustrated by the fact that approximately one in every three degrees which are now awarded by the Institute are for graduate work, and the annual enrollment of postgraduate students has increased from less than fifty before the war to five hundred sixty-one during the past year. This increase is not peculiar to the Institute, but is part of a nation-wide trend. The Institute's position of leadership in this trend is indicated, however, by the fact that it has awarded one-third of all advanced engineering degrees which have been awarded in this country.

In a discussion of graduate work by the Council of the American Society for the Promotion of Engineering Education, this Council was unanimously of the opinion that "the developments of engineering education in the near future will be in the field of postgraduate work."

In this new organization, the division of responsibility between the Deans of Science, Engineering and Architecture on the one hand, and the Dean of the Graduate School on the other, is clear cut. The deans of the professional schools are responsible under the President for the maintenance of strong faculties in their respective departments, for the preparation and administration of budgets, and for the programs of instruction and research. The Dean of the Graduate School is responsible for administering the regulations in regard to admission and handling of graduate students, for the general policies regarding examinations and requirements for degrees and for the administration of fellowships. It is naturally desirable that all the Deans should coöperate in the development of improved educational policies.

OPERATING UNITS

DIVISION OF INDUSTRIAL COÖPERATION. In accordance with careful study and recommendations by its Visiting Committee, all coöperative services to industry have been consolidated under the Division of Industrial Coöperation. This Division succeeds the Division of Industrial Coöperation and

Research, the Research Laboratory of Applied Chemistry and other groups through which service to industry in particular lines has heretofore been made available. The Division of Industrial Coöperation will have a departmental representative and subcommittee in each department of the Institute. The groups attached to the Research Laboratory of Applied Chemistry and the Research Laboratory of Applied Physics will, for example, constitute these subcommittees in their respective departments.

Individual members of the staff who engage in coöperative work for industry, with use of Institute facilities, are requested to carry on their activities under the Division of Industrial Coöperation, which will not exercise irritating restraints, but will keep track of the work which is going on and will supervise all agreements and contracts to safeguard the interests and reputation of the Institute.

The various types of research commonly carried on for industry have been classified as Open, Semi-closed and Closed, according as their results are freely available to the public, available only under restrictions, or entirely confidential, and a general plan of charges including overhead has been adopted appropriately to these three kinds of work.

It appears inevitable that activity of the staff in these lines of work should be remarkably sensitive to the general economic situation in the country, because in times of depression and unemployment industries will concentrate all their resources for the maintenance of their own personnel, with the result that the amount of work for which they contract in outside institutions such as ours is greatly diminished. This has been strikingly illustrated during the past year. It is nevertheless the unanimous opinion of those who have studied the situation that this work of industrial coöperation may and should be more adequately provided for than in the past, and it is planned to throw increasing emphasis on the development of this work as the general business situation improves.

DIVISION OF MUNICIPAL AND INDUSTRIAL RESEARCH. This Division, which was established in 1926 through the generosity of Mr. John E. Aldred of our Corporation, has been discontinued. It was established to carry on surveys of municipalities and industries, and to advise them in regard to their adminis-

trative, economic and engineering problems. There were obvious advantages in such an organization at an institution like Massachusetts Institute of Technology arising from absence of political or business bias and presence of an outstanding group of experts for consulting purposes.

Since its establishment, the Division completed eight major surveys and numerous minor ones. These surveys were to be charged for at cost so that the original fund contributed by Mr. Aldred would be a revolving fund to continue the Division indefinitely. In spite of the many valuable aspects of this work, the service has not been as successful as had been hoped, and the Division was therefore discontinued on July 1, 1932. A fuller evaluation of the work of this Division and a discussion of the problems which it encountered is given in the copy of a letter from the Director to Mr. Aldred included in the report of the Director of the Division of Municipal and Industrial Research which appears later in this report.

FUEL AND GAS ENGINEERING. The course in Fuel and Gas Engineering, which was set up with separate staff, has been discontinued and its essential features together with the leading members of its staff have been absorbed in the Department of Chemical Engineering, where they will provide courses in Fuel Engineering together with opportunities for research and theses.

PLAN OF INSTRUCTION

A greatly simplified course of study has been put into effect in the second year, thus carrying a step further the reorganization of curriculum which was started two years ago with a similar unification of the first year. In the present plan all students take the same course in basic science and English during the first year followed by additional basic science, English and history with minor introductory courses in the various departments in the second year, so that the specialized professional training now begins in the third year. This change, which has been made primarily for educational reasons, has at the same time introduced economies and has made it unnecessary for the student to make his final choice of course of specialization until the beginning of his third year. An exception to these arrangements is found in the School of Architecture, for

which a special course of study from the beginning has appeared advisable.

A faculty committee is now engaged in a thorough study of the upper class program of instruction, from the very fundamental point of view of ascertaining how a course of study can best be set up to meet the present and future needs of society. It is hoped that results of this study may be available during the coming year.

ACTIVITIES OF THE STAFF

PUBLICATIONS. While the productive activities of the staff cannot be adequately described in terms of the number of their publications during the past year, this number is at least indicative. There have been 356 publications by 167 members of the staff. These are principally articles in scientific and professional journals, but include also 22 books. A list of these publications, classified by departments, is appended to this report.

THE PROFESSORS' FUND. During this first year of operation of the new plan of faculty appointment, one hundred and sixty-five members of the staff in the professorial grades have been contributing to the Professors' Fund 50 per cent of their earnings from services rendered to parties outside the Institute during term time. As noted above, the demand for professional services of this type is greatly reduced in times of business depression. It is also true that the provisions of the new plan diminished, as was intended, the amount of such work which was not of great professional interest and not of such a nature as to give valuable experience and contacts. Nevertheless, there was paid into this Professors' Fund during the period October 1, 1931 to June 30, 1932, the amount of $21,304.

In accordance with the plan, a faculty committee elected by those professors on this plan of appointment, has recommended a program for the use of this fund in the interest of these professors. This committee has recommended unanimously "that the Professors' Fund may be applied most appropriately toward the establishment by the Institute of a definite policy of sabbatical leaves for men of faculty rank, with the hope that the policy of sabbatical leaves may be established

ultimately as a permanent feature carried by regular Institute funds. If and when a definite plan for establishment of sabbatical leaves may be put into effect by the Executive Committee, other plans for the disposal of the Professors' Fund may properly receive consideration." Consideration is now being given to the development of a plan which will be operable according to an acceptable policy within the funds thus made available.

CONTRIBUTIONS TO UNEMPLOYMENT RELIEF. The staff of the Institute has made notable contributions to the relief of unemployment and its accompanying evils in two distinct ways. In the first place its members have voluntarily conducted free courses in professional and humanistic subjects in which qualified persons could register without payment of fees. All together, courses in 11 different subjects were given to a total enrollment of 186. These courses were given for the principal purpose of providing opportunities for unemployed professional men to take advantage of their free time to improve their professional status through further study and acquaintance with the most recent developments in their fields of interest.

In the second place, a fund of several thousand dollars was voluntarily contributed by the members of the staff and was used to give employment at the rate of $15 per week to any Institute graduates whose economic situation was such that they were willing to work for this bare subsistence wage. Work for these men was found in a great variety of activities, which were of definite value to the Institute, but which would not otherwise have been carried on. The jobs included construction of equipment, work as mechanics or research assistants, improvement of grounds and buildings, and services as draftsmen and computers. Every Institute graduate who applied for such work was taken care of. A total of 41 men were employed with these funds, and several who were found to be particularly desirable helpers obtained permanent or semi-permanent positions through this connection, in the Institute or elsewhere.

The student body, through its Institute Committee, also took part in the relief of unemployment, by contributing $500 to the Cambridge Unemployment Relief Committee.

Similar action by the employees of the Institute took the form of a contribution of approximately $1,000.

STUDENT RELATIONS

REGISTRATION. The total registration for 1931–32 was 3,188, which was 21 below the preceding year, but larger than any other year in the history of the Institute except the two years immediately following the war. On the other hand, the number of students required to withdraw for scholarship deficiencies totaling 274, was 40 less than during the preceding year, so that the past year actually shows a net gain. These students came from every state and territory of the United States except South Dakota, and from 42 foreign countries. Approximately half the total enrollment was from Massachusetts.

The registration statistics show an interesting change in the distribution of students within the Institute. The entering first year class was smaller by 106 than in the preceding year, and the net undergraduate enrollment was smaller by 60. On the other hand, in spite of an increased severity in the requirements for admission to graduate work, which would have reduced the postgraduate enrollment by about 80, the actual postgraduate registration showed an increase of 30.

We attribute the decrease in number of students primarily to the financial depression of the country, which has prevented some students from entering college and has forced others to go to their own state universities to escape our higher tuition cost, many of them with the expectation of transferring to the Institute for their upper class work. The increase in the number of graduate students is in line with the steady trend since 1918, and the effects of the depression have been more than offset by this trend combined with the tendency for recent graduates out of positions to find in postgraduate study their most profitable employment for the year.

STUDENT AID. The benefits of student aid through scholarships and loans have been notably enhanced during the financial difficulties of the past year. Loans were made from the Technology Loan Fund to 495 students, totaling $178,672, and 178 applications were refused. These loans included 80 to graduate students, 175 to seniors, 127 to juniors, 99 to sophomores and 14 to freshmen. The indications are that the loans for the present year will be considerably in excess of these figures.

Because the Technology Loan Fund is only available, except in very exceptional circumstances, to students who have been in the Institute for at least a year, some of the general scholarship funds have been transferred to the freshman year to take care of very promising entering students, principally through competitive and regional scholarships. A fair number of scholarships have, however, remained distributed throughout the course as prizes for unusual scholastic attainment. Undergraduate scholarship awards for 1931–32 were made to 371 men and 19 women, totaling $75,305 and $6,006 respectively. Similarly, 182 awards of scholarships or fellowships were made to graduate students, totaling $67,960.

From these figures it is seen that the total extent of financial aid to students reached the sum of $327,943. To this may be added numerous temporary loans of the nature of deferred payments for tuition and room rent. In spite of the large number of such loans it is gratifying to know that they have been paid almost completely, the Bursar reporting only about $1,000 still outstanding on student bills for the past year.

STUDENT HEALTH. The report of the Department of Hygiene is eminently satisfactory and shows continuation of the progressive improvement in student health which has followed the establishment of the Homberg Infirmary. There were 23,602 visits to the clinic during the year, and 221 medical cases and 82 surgical cases were treated in the Infirmary. There were only 4 contagious cases as compared with 8 of the past year, which is a remarkable record in a community of approximately 4,000 individuals. Complete physical examinations were given to 2,983 men, of whom approximately 20 per cent were found to have defects, for many of which corrective measures were recommended and followed up.

SCHOLARSHIP. According to the criteria which can be applied, there has been a distinct improvement in scholarship during the past year. This improvement is particularly notable in the case of students who participate in extra-curricular activities. We interpret this improvement as due principally to three factors: the beneficial operation of the new numerical rating system, increasingly selective admission of students of high promise and a certain sobering influence of the present economic situation.

During the year careful studies have been made of various possible criteria for selection of students for admission. These studies have included a survey of what would have been the result had several plans of admission been in force during the past few years. As a result of this study it has appeared wise to provide a method of admission alternative to that of passing the customary entrance examinations, and the Faculty has therefore voted for a trial period to admit a limited number of students without examination, provided they have graduated in the upper fifth of their class in an accredited secondary school, and provided they can enter with a clear record in all subjects which we require for admission. This alternative plan of admission will afford relief to certain schools or students not favorably situated for special preparation to meet College Entrance Board Examinations. Our studies give reason for believing that our standards would not have been lowered had this alternative plan of admission been in force in recent years.

STUDENT EMPLOYMENT. The regular work of the Employment Secretary of the Technology Christian Association has taken on added significance during this period of depression, and it is a pleasure to report that through his office there have been made during the past year 479 placements of 291 individuals, with offerings of 338 positions. These have led to aggregate earnings of $52,010. The individual earnings range from $1 to $1,400, with an average of $178.72 per man.

These figures are not greatly below those of previous years, which is witness to the effectiveness of the Undergraduate Employment Bureau under difficult circumstances.

ALUMNI

From the standpoint of Alumni organization, the most important development of the past year has been a thorough canvass of possibilities in regard to Alumni organization, which has resulted in the draft of a new constitution which will be presented to the Alumni for adoption this fall. The principal change introduced in the new constitution is in the method of nominating Term Members for the Corporation whereby a representative nominating committee will be elected by the Alumni body and this committee will be given final jurisdiction

in the nomination of the three Term Members to be elected each year.

THE EDUCATIONAL PLANT

The two outstanding improvements in the educational plant of the Institute have been the completion of the George Eastman Research Laboratories and the reallocation of space among the various activities of the Institute following a thorough survey of present and probable future requirements.

THE GEORGE EASTMAN RESEARCH LABORATORIES. The construction of these laboratories was completed about June 1. During the late spring and summer the greater part of the research work in physics and chemistry was moved to the new quarters, which are now actively in use. The laboratories, which are the finest in the world for their purposes, have been announced and described to the scientific public through publications in Physics in April and in Science for May 1932.

The special features of these laboratories include unusual rigidity and freedom from vibration, a very flexible and complete system of electrical and other services, and in general an arrangement and equipment which seem to be ideally suited for the physics and chemistry of the near future and yet which are flexible enough to permit considerable rearrangement at a minimum expense if unforeseen developments should later require modifications. The unique feature of the laboratories is the separately attached Spectroscopy Laboratory, which is insulated against thermal and vibrational disturbances, provided with temperature and humidity regulators, and generally designed to take advantage of every development of spectroscopic art.

Other particular features of the laboratory are the well-arranged branch library for physics, chemistry and mathematics, and the Forris Jewett Moore social room made possible through the generosity of Mrs. Moore in honor of her late husband, who was Professor of Chemistry at the Institute from 1902 to 1925, and who was particularly interested in the human side of scientific work. This room is attractively finished and will be furnished as a social or club room in order to encourage social intercourse in connection with discussion groups, col-

loquia, and small scientific gatherings which has a very real influence in promoting coöperative effort and *esprit de corps*.

The final cost of the laboratories is approximately $1,228,000, including architects' and engineers' fees and an allowance of $125,000 for laboratory furniture and shop equipment. The cubage of the laboratories amounts to about 1,367,000 cubic feet for the main building and about 148,000 cubic feet for the spectroscopic laboratory.

I wish to give tribute to the splendidly generous and effective contribution of time and work on the part of the Building Committee, Messrs. Everett Morss and Charles T. Main. The Institute was exceedingly fortunate in obtaining the best possible construction and design at a minimum of expense through the services of Coolidge and Carlson, Architects, Charles T. Main, Inc., Engineers, and Stone and Webster, Inc., Builders.

It is planned formally to dedicate these buildings during the first week of May. This late date has been chosen in order that the buildings may be in full service, and also in order that the dedication ceremonies may be accompanied by an important scientific symposium conducted by a distinguished group of scientists including former distinguished members of the Institute staff.

ALLOCATION OF SPACE. The completion of the George Eastman Research Laboratories, to which have been moved most of the research laboratories of chemistry and physics, released about 18,000 square feet of floor space in the main buildings. This created an unusually favorable opportunity for a study of allocation of space to various Institute activities with particular reference to increasing the efficiency of utilization of space, to bringing into close proximity those activities which are closely related, and to giving a well-planned yet flexible program for future expansion. This survey was all the more necessary because the original occupation of the building was made without adequate anticipation of the subsequent development of new activities, particularly in the line of postgraduate research.

Accordingly, a survey has been made of facilities and requirements, including space and time utilization factors, to examine the efficiency of use of the complete educational plant including nine hundred rooms. A definite though flexible plan

of space allocation has been set up and the most urgent aspects of this plan have been put into effect during the summer. These have involved about one hundred changes in location, most important of which have been the combination of the organic chemistry laboratories, the transfer of the heat treatment laboratory from mechanical engineering to mining and metallurgy, and the beginnings of a program of consolidating the numerous departmental libraries and minor deposits into a small number of branch libraries advantageously distributed throughout the buildings and provided with adequate reading and study room.

As a result of these changes there will be a notable gain in efficiency, and it is believed, except in one or two cases, that provision has been made to allow for moderate growth of activities for some time to come without undue crowding within the present educational plant.

INSTITUTE POLICY IN REGARD TO PATENTS

It is difficult to estimate the extent to which the attention of the staff and the use of facilities have been directed toward the development of patentable inventions. Four things are, however, certain: (1) the nature of the work and of the contacts in an institution like ours are particularly favorable for such activities. (2) Such activities are occasionally of considerable importance by way of service to the public and as potential sources of financial profit. (3) The Institute should have an equity in such developments as are made with the aid of its facilities. (4) For the best interests of the public, important inventions should be patented and developed commercially.

In order to establish an Institute policy on patents which will fairly recognize the equities of the Institute and the individual inventor, safeguard the interest of the public, and create a favorable environment for the adequate development of important projects, a committee of the Faculty has given careful study to the problem and to the various plans which have been adopted in other educational institutions. This committee has recommended an Institute policy regarding patents which has been approved by the Faculty Council and by the Executive Committee of the Corporation, and which may briefly be summarized as follows:

1. Inventions or other developments, whether or not subject to patent or copyright, resulting from a program financed

entirely by the Institute, shall be the exclusive property of the Institute, which may at its discretion acquire title to any such patents or copyrights which shall be administered for the ultimate benefit of the public. If after a reasonable period the Institute does not choose to acquire such right, provision is made whereby that right shall revert to the individual who made the invention or development.

2. Inventions or developments produced by a staff member or student along lines unrelated to an Institute program with which the individual may be connected, and to the production and development of which the Institute contributes nothing in a substantial way in funds, space, facilities, or time of a staff member, shall be the exclusive property of the individual producing the invention or development.

3. In intermediate cases where the costs of the development are borne jointly by the Institute and the individual, equities shall be divided substantially in proportion to the contributions, in accordance with a special agreement in each case, except that in the absence of any such agreement the title remains with the Institute.

4. If such development is produced by a student who is paying tuition or who has received scholarship aid, it shall be considered that the Institute is not contributing to the research, inasmuch as space and facilities are considered to be provided for by the tuition payment. Similarly, if such developments arise in the course of work carried on under contract by the Division of Industrial Coöperation for an outside party which pays all expenses connected with the research, including overhead, the Institute shall have no claim to inventions resulting therefrom.

The committee on patent policy is now engaged in formulating plans for putting this policy into effect, and in particular for making contacts with suitable agencies through which patentable inventions may be given the best commercial development consistent with the above principles, but without financial commitment of the Institute.

Many of the subjects considered in this report are discussed in greater detail in the reports of other administrative officers and heads of departments, which follow. The individual department and special course reports are listed under their respective schools.

KARL T. COMPTON.

REPORTS OF ADMINISTRATIVE OFFICERS

Dean of Students. Four accomplishments during the period covered by the present report warrant special mention: increased financial assistance extended to students from the Technology Loan Fund; continued progress made in the methods for counseling freshmen; broadening of the basis of admission to the freshman year; and noteworthy improvement in the scholastic averages of fraternity members and of men participating in undergraduate activities.

In its second year of operation the Technology Loan Fund Board received 673 applications and acted favorably upon 495, or 73.6 per cent. Refusals were principally on account of failure to meet scholastic or health requirements. Loans made totalled $178,672, an average of $361 per individual. The fact that the number of applicants for 1931–32 increased markedly over the number for 1930–31 (292) may be attributed principally to the continuance of unfavorable economic conditions and to the tuition increase which became effective in the autumn of 1931.

Some of the notes signed by men who borrowed during 1930–31 matured during 1931–32 and, although the total amount thus due for repayment ($7,133 from 102 individuals) was small compared with the total amount loaned, it is encouraging to note that, despite the times, $3,948 was repaid by 55 individuals. Requests for extensions were granted to 35 men whose maturities totalled $2,260, while but 12 men, having maturities amounting to $925, failed up to the close of the fiscal year to reply to notices that their obligations had become due.

As the following table shows, 721 students have received assistance totalling $232,745 from the Loan Fund during its first two years of operation:

Class	No. of Applicants	No. of Loans	Amounts	Applications Refused
		Year 1930–31		
Grads:	32	26	$5,631	6
1931:	79	68	16,683	11
1932:	96	72	17,564	24
1933:	65	49	12,045	16
1934:	20	11	2,150	9
Totals:	292	226	$54,073	66
	(100%)	(77.4%)	(Average Loan $239)	(22.6%)
		Year 1931–32		
Grads:	101	80	$30,134	21
1932:	201	175	63,948	26
1933:	191	127	44,645	64
1934:	158	99	35,795	59
1935:	22	14	4,150	8
Totals:	673	495	$178,672	178
	(100%)	(73.6%)	(Average Loan $361)	(26.4%)
		TOTALS 1930–31 and 1931–32		
1930–31	292	226	$54,073	66
1931–32	673	495	178,672	178
	965 (100%)	721* (74.8%)	$232,745*	244 (25.2%)

* The 721 loans were made to 607 individuals inasmuch as 114 men received loans for both years. Hence the average amount loaned per individual was $383.

For 1932–33, 551 loan applications were received prior to June 30, 1932, and of these 356 were acted upon favorably, the total amount authorized being $153,530.

In addition to the financial aid extended through the Technology Loan Fund, undergraduate scholarship awards for 1931–32 were made to 371 men and 19 women, totalling $75,305 and

$6,006 respectively. The average award to women ($319) was greater than the average award to men ($206), as in previous years. This was because the funds restricted by their deeds of gift to women greatly exceed, in proportion to the number of qualified applicants, the unrestricted funds. The percentage of the undergraduate body receiving scholarship aid during 1931–32 was 14.95 compared with 18.2 in 1930–31, 15.8 in 1929–30, 15.0 in 1928–29, and 13.7 in 1927–28.

One of the chief duties of this office has long been that of counseling members of the first-year class on the numerous problems involved in becoming adjusted to their new environment. Many of the problems of administrating this work have been solved, and all have been appreciably attacked during the past year by the definite appointment of Thomas P. Pitre, who served in an acting capacity during 1930–31, as Assistant Dean of Students.

It should also be noted that the Scholastic Rating System devised by the Registrar has continued, during a second year of formal operation, to demonstrate its value in our dealing with freshman personnel problems. Not only has it operated fairly with respect to freshmen (and also with the upper classes) considered in the mass, but it has been conclusively demonstrated that the Rating System permits treatment of the individual as an individual where special consideration on account of sickness, home troubles, or other non-academic reason is needed.

With the freshman Class of 1935 the Assistant Dean has undertaken a detailed comparative study of the scholastic success at the Institute achieved by students coming from private preparatory schools and those from high schools, by those admitted without conditions and those conditioned, by those whose parents have attended college and those whose parentage shows no collegiate background, and by those from different geographical sections of the country.

Much of the data are, as yet, necessarily inconclusive, but some such as the following are significant: high school graduates did better than those who came from private preparatory schools or who entered our freshman class by transfer from college or university; men who were admitted without conditions did better than those who were conditioned; students

from New England did not do so well as those from the remainder of the country.

It is planned that this study be carried out through the sophomore and successive years of the Class of 1935.

In selecting students for admission to the Institute's freshman class there are two primary considerations which apply to each case: has the applicant demonstrated in his preparatory education that he possesses the aptitude for our work and has his preparation included the subjects needed to equip him to undertake it? To be sure these are not the only considerations, for a candidate must also possess character, habits of industry, reasonably good health and sufficient financial backing, as well as personal adaptability to an academic environment. The possession of one, or all, of these latter, however, will not overcome a lack of aptitude and insufficient preparation.

Although the Institute has always maintained that the quality of training in English, history, languages, mathematics, and science given in the better class of secondary schools affords the best criteria for its work, the determination of whether an applicant is qualified to matriculate has been almost entirely his accomplishment on the tests of the College Entrance Examination Board or on the Institute's own entrance examinations. Except for foreign students and men entering our freshman class by transfer from colleges, universities or other technical schools, the Institute's Faculty has thus for many years placed its faith solely in the examination method which, in the main, has selected good students.

The examination method, however, is not a means of admission universally employed by institutions of higher learning in the United States. This situation has operated in many instances to discourage promising high school graduates from coming to the Institute, at least without an intervening year or two at some nearby college or university.

A recent study of the Institute records of men who ranked in the upper quarters of their classes at high and preparatory schools has shown that they have done exceedingly well in their studies at the Institute. Most of them have stood in the upper half of their Institute class and only a small percentage in the lowest quarter. In order, therefore, to give recognition to systematic and thorough preparation the Faculty has voted to

try the experiment of admitting without examination those applicants who submit evidence of having completed their fundamental preparatory training with high standing in an accredited secondary school.

Under this alternative plan a trial group will be admitted in the autumn of 1932. It will be composed of men who have ranked in the *upper fifth* of their preparatory school class for their last two years of attendance, with the further stipulation that the school's graduating class must have had a minimum of ten students and that the applicant must have completed the program of subjects required for admission to the Institute under the entrance examination plan.

Beginning with 1932–33 the Faculty has also voted to accept, as an experiment, records of 80 per cent, or better, in the New York State Regents examinations as being the equivalent of records of 60 per cent, or better, on the College Board or regular Massachusetts Institute of Technology entrance examinations. This will remove what has been a source of inconvenience to applicants from that state who have often been hampered by conflicts between the dates of the Regents and College Board examinations.

It is hoped that these changes will operate to attract to the Institute more of the outstanding, promising graduates of high and preparatory schools from nearby as well as from distant sections of the country. The early reactions to the announcement of these alternative admission plans have been decidedly favorable from headmasters and principals, from alumni and parents.

For the second successive year comparative scholastic standings have been computed for the activity and non-activity groups and it is pleasing to report that the averages of fraternity and activity men as of June, 1932, were appreciably higher than a year ago. A detailed report of these standings will be printed in a forthcoming number of the *Technology Review*, but it is pertinent to point out in this report that, whereas the *General Average of All Undergraduates* rose 0.02 to 3.11 between June, 1931, and June, 1932, the *Average of Activity Men* rose 0.154 to 3.36, the *Average of Dormitory Residents* rose 0.08 to 3.23, and the *Average of Fraternity Men* rose 0.17 to 3.10. Of 22 activity groups, 16 improved their standing while six experienced a

decline; and of 27 fraternity groups, 18 improved, seven declined, and two showed no change.

Although individual undergraduate activity enterprises have been affected by current economic conditions, the system as a whole has functioned well during 1931–32. In particular the conduct of the affairs of student government by the Institute Committee under the leadership of Donald B. Gilman '32, President of the Senior Class, and of the Budget Committee, under the chairmanship of Carroll L. Wilson '32, have elicited favorable comment.

The problem of Tech Show, noted a year ago, finally resolved itself by a recommendation from its undergraduate management that the Show be abandoned. The proposal met with the approval of the Institute Committee and of the Alumni Advisory Council on Tech Show and became effective, the deficit (amounting to about $1,200) being assumed by the reserve and contingent fund of the Institute Committee.

From its beginnings in the early nineteen hundreds up to the time of the War, the Show had as one of its principal purposes the raising of money for the support of athletics. With the adoption of the undergraduate dues or "student tax" in 1917 the pressing necessity of an annual contribution to athletics from the Show's profits ceased. The expenses of staging a musical comedy or revue type of student performance, which mounted steadily since the War, coupled with the dwindling student interest in the Show as evidenced by the falling off in ticket sales, made its suspension inevitable. It is to be hoped that the rise of the Dramashop, which offers an alternative outlet for student theatrical ambition, will to some extent fulfill the place in student life which Tech Show occupied for so many years. The fact that during this year an Alumni Advisory Council on the Dramashop, under the chairmanship of Professor D. M. Fuller, has been appointed should operate distinctly to its benefit.

Open House was suspended for 1932, not only to save expense, but in consonance with the conviction that the standard of this event might be improved if it came biennially instead of once each year.

Upon the urging of a group of enthusiasts a revival of the Technology Circus was authorized by the Institute Committee,

after a lapse of some years. Seemingly, however, the task of operating the Circus was again demonstrated to be so formidable that once in a student generation is about the maximum frequency with which undergraduate government may persuade itself to undergo the responsibility for conducting such an affair.

Publications during 1931–32 experienced further declines in advertising revenues. *The Tech*, faced with the situation more acutely than the others, was obliged to revert from the tri-weekly basis to a bi-weekly schedule. Financially all four student publications have about broken even except *Technique* which, by judicious curtailment of its outgo, made a surplus in excess of any of its previous half dozen volumes.

During the year undergraduate journalism suffered the loss of one of its most devoted and able friends, Professor Winward Prescott, who died on March 1, 1932. He had been a member of the Advisory Council on Undergraduate Publications since 1923, and its chairman since 1925. His tenure on the Council embraced practically the whole span of years during which *The Tech*, operated by alumni during the War, was successfully returned to student control; *The Tech Engineering News* and *Voo Doo* were getting established on a workable basis; the *Technique* was being transformed from a class annual to an Institute yearbook; and the trust funds of the publications were expanded over fourfold. To Professor Prescott more than to anyone else is due credit for the progress of undergraduate journalism at Technology in the post-war period.

The athletic program apparently did not reflect the prevailing depression. All of the teams were maintained and it was possible for the various squads to carry on at the same level of numbers as in earlier years. This desirable situation unquestionably arose in the fact that the student income for athletics is directly regulated by the size of the undergraduate body, by the second and equally important fact that the Corporation made the same indirect grants as in previous years, and thirdly that the guarantees on contests away from Cambridge were maintained and Technology derives but little financial return from gate money on home contests. The situation may be regarded as one of the definite advantages intrinsic in our method of operation as providing a stability to our situa-

tion not enjoyed by institutions whose very large athletic income is dependent upon the caprice of the public.

Attention was called a year ago to the increasing emphasis laid upon the so-called "carry-over" sports or games. This has been a feature of the program of 1931–32 and may safely be counted on to stimulate and maintain widespread interest in a number of these athletic activities.

Another point noted in last year's report was the increasing tendency on the part of a number of New England colleges to relax the rigor of operation of the amateur rule. Summer baseball is the chief cause of difficulty and today over half of the colleges in New England permit students to play on summer teams and receive salaries for so doing, while subsequently certifying these men as eligible to represent the institution in amateur intercollegiate competition. The whole situation is anomalous and a satisfactory answer to the problem which it raises is not immediately forthcoming. The question, however, is a very real one and it is plain that it must be answered authoritatively sometime in the not far distant future. Happily it is a problem of but minor import at Technology as the conditions of our curriculum practically preclude an intercollegiate baseball team and the few men who do play professionally in the summer are debarred from further participation on the Institute teams.

As we are obliged to forego competition in baseball in the spring, so are we equally debarred from football in the fall of the year. This game has reached a point of technical development, and makes such a physical demand on the individual player as to require, for safe participation, much more time than the Technology student can afford to give. The question is raised yearly by some undergraduates and alumni, but a glance at the schedules of varsity football squads and of the Institute's program shows the impossibility of the initiation of the game here under existing conditions.

During 1931–32, 82 students were disqualified from attendance at the Institute for one term because of poor scholarship, 114 for one year, and 78 finally. The corresponding figures for 1930–31 were: 171, 85, and 54.

Disciplinary cases during 1931–32 included two students who were dismissed by the Faculty on account of misconduct

and three who were placed on probation by the Dean of Students. The corresponding figures for 1930–31 were: two and one.

H. E. LOBDELL.

Dean of the Graduate School. The most important development in connection with the graduate work of the Institute during the past year has been the establishment of a Graduate School in science, engineering, and architecture. This action was taken by the Corporation upon recommendations submitted to it in a report of a special committee appointed by the President to study the status of graduate work at the Institute and to suggest means for its further development and administration. This report was discussed in the Faculty Council and by the Faculty and received the full approval of these bodies.

The number of students coming to the Institute for graduate work has increased very rapidly in recent years, the registration the past year being over one-sixth of the total enrollment of the school. The number of advanced degrees conferred during the past school year was 27 Doctors' degrees and 211 Masters' degrees, by far the largest number of advanced degrees awarded by any engineering school in the country. It seemed logical therefore that the graduate work should be given the recognition which it receives in other corresponding institutions by differentiation from the undergraduate work and by an organization best adapted to deal with problems peculiar to it. Under the plan as adopted, the control of the Graduate School rests as heretofore with the Faculty of the Institute. The Faculty elects annually a representative Committee on the Graduate School, consisting of one member of each department giving graduate work; the Dean of the Graduate School; its executive officer appointed by the Corporation, is Chairman ex-officio. With this Committee rests the conduct of the work of the school, the Committee acting with power on matters delegated to it by vote of the Faculty. All recommendations for degrees are presented to the Faculty and voted upon by that body. The work of administration is facilitated by various sub-committees charged with certain phases of the work. In 1872 the catalogue of the Institute an-

nounced for the first time that facilities for advanced instruction were offered leading to the degree of Doctor of Science. In 1884 opportunities for advanced study and research leading to the degrees of Master of Science and Doctor of Philosophy were announced. The former degree was first conferred in 1886 and the latter in 1907. From such modest beginnings the present Graduate School has grown. The vision of the early members of the Corporation and of the Faculty who, sixty years ago, inaugurated the policy of providing for graduate as well as undergraduate instruction is evident today. It is to be doubted, however, that their wildest flights of imagination pictured a future graduate school of the magnitude of the present one.

With the many engineering schools throughout the country providing excellent undergraduate instruction the Institute cannot hope in the future to draw from a distance as large a percentage of its undergraduates as it did formerly. It is, however, now attracting graduates from these schools in increasing numbers. While the undergraduate school of the Institute will undoubtedly continue to constitute the main student body, a flourishing Graduate School is essential if the Institute is to maintain its position of leadership. The policy of the school, however, is to restrict admission to applicants of proved ability and to maintain a high standard of scholarship for graduation. A larger registration than is consistent with this policy is not desired. The success of the Graduate School is to be measured by the quality of its graduates and not by the size of its enrollment.

The opening of the George Eastman Research Laboratories concurrently with the establishment of the Graduate School is a happy omen for the latter. The erection of these splendid laboratories is evidence that facilities for advanced study and research is hereafter to be as amply provided for in the fundamental sciences as in the fields of applied science. It is pleasant to note that already the registration of graduate students in Physics has doubled in the past two years (with a corresponding increase in undergraduates), since the reorganization of the Department of Physics and the announcement of facilities for research provided in the Eastman and spectroscopic laboratories.

Notwithstanding the higher scholastic standard required for admission to the Graduate School, which became operative during the past year, and the more rigid requirements for the Master's degree, the number of regular graduate students as of November, 1931, was the largest in the history of the Institute, namely 551.* This group includes graduates from 160 colleges and universities located in 43 states, the District of Columbia, Porto Rico, Philippines, and the following foreign countries:

Australia
Austria
Belgium
British West Indies
Canada
China
Cuba
Czechoslovakia
Danish East Indies
England
Ecuador
Germany
India
Ireland
Japan
Lithuania
Mexico
Russia
South Africa
Scotland
Sweden
Switzerland
Turkey

Details as to distribution of students by departments will be found in the Registrar's Report. The distribution according to degrees applied for was as follows:

Doctor of Science	66
Doctor of Philosophy	85
Doctor of Public Health	2
Master of Science	386
Master in Architecture	12
Total	551

Of these students 61 per cent completed the work for their Bachelor's degree at other institutions than the Institute. In this group 72 entered from colleges with Arts degrees, 18 from the United States Naval Academy, 5 from West Point, and 10 presented credentials from foreign universities which award only the Doctor's degree. Of the students pursuing courses leading to the Master's degree 63 per cent came from other colleges while of the students pursuing studies leading to the doctorate the corresponding percentage was 61. The number

* These figures do not include 29 special students with college degrees.

of graduate students holding full or part-time positions on the staff was 83. Of these, 44 were pursuing courses leading to the doctorate and 39 for the Master's degree.

The number of applications for graduate scholarship aid during the past year was the largest ever received. Funds available from all sources were not materially reduced from those of the preceding year and amounted to $67,960. Three hundred and thirty-four applications were received and 182 awards made, varying in amounts from tuition to fellowships carrying stipends of $1,500. Of these awards 80 were made to members of the staff, of whom 53 were working for the Doctor's degree and 27 for the Master's degree. Approximately one-third of the tuition scholarship funds were awarded to students engaged as full or part-time assistants. The recently created position of "teaching fellow" is proving very attractive to those who find it necessary to finance themselves during the long period of study necessary to obtain the Doctor's degree. The tuition of these "fellows" may be met by grants from the scholarship funds. Of the 25 candidates receiving the Doctor's degree in June, 15 had received scholarship assistance during their period of study, and of 199 candidates receiving the Master's degree, 61 or about one-third had received financial aid.

During the past year the Loan Fund has been of the greatest assistance to graduate students, a number of whom could not possibly have continued their work without financial aid. The number of loans made to graduate students will be found in the report of the Chairman of the Loan Fund Committee.

Again the great need of additional graduate scholarship funds is emphasized if the Graduate School is to secure and retain some of the outstanding men who apply for assistance each year. A number of fellowships carrying from $750 to $1,000 each are particularly needed as stipends of these amounts are offered by many other institutions. The Redfield Proctor Traveling Fellowship for graduate study in an English-speaking university was awarded the past year to Mr. Sanford Moss, of the Department of Chemical Engineering, who spent a most profitable year in Cambridge, England. This fellowship is a prize eagerly sought by honor students in the graduating class and is much appreciated.

H. M. GOODWIN.

The Registrar. The total registration in the Institute has been growing in recent years. Starting from the post-war low of 2,671 in 1926–27 it reached a peak of 3,209 in 1930–31. Last year, however, the registration decreased 21. In considering the period since 1926 the undergraduates and graduates should be dealt with separately. Table I shows that the undergraduate trend was upward for three consecutive years and then remained practically stationary, while the graduate registration continued to grow.

TABLE I

UNDERGRADUATE AND GRADUATE REGISTRATION 1926–27 TO 1931–32

Year	*Undergraduates*	*Graduates*	*Total*
1926–27	2309	362	2671
1927–28	2338	374	2712
1928–29	2456	412	2868
1929–30	2621	445	3066
1930–31	2670	539	3209
1931–32	2610	578	3188

Neglecting the minor effects due to former students returning and new special students, the three main factors affecting the trend of undergraduate registration are new students from secondary schools, undergraduate transfers from other colleges, and the number of students required to withdraw.

TABLE II

NEW STUDENTS FROM SECONDARY SCHOOLS, COLLEGE TRANSFERS, AND STUDENTS REQUIRED TO WITHDRAW

Year	*Students from Secondary Schools*	*College Transfers*	*Total New Undergraduates*	*Students Required to Withdraw*
1926–27	381	222	603	147
1927–28	465	250	715	145
1928–29	483	297	780	133
1929–30	549	280	829	230
1930–31	609	230	839	314
1931–32	526	208	734	274

Table II shows that the students from secondary schools kept increasing until last year, while the number of college

transfers has been declining since 1928–29. The total of these two sources of new students kept rising until 1930. This produced a rising undergraduate registration for a few years and it would have continued longer as the larger entering classes worked into the upper years if it had not been for the gradual introduction of the scholastic rating system. This raising of the scholastic standards resulted in more withdrawals during the last three years, the net effect being to keep the undergraduate registration about 2,600 for the last three years. The decrease in the number of new students last year and the anticipation of a further decrease the coming year will combine to produce a lower undergraduate registration in the future unless the new method of admission attracts a larger number of superior students.

The number of students who transferred from other colleges for graduate work and the number of our own graduates who returned for advanced work have been continually increasing. This has resulted in a larger graduate registration in spite of the raising of the scholastic standards for the degree of Master of Science. The total graduate registration reached a new peak of 578 last year.

The attraction for Engineering has been fairly constant during the last six years. Our registration in Engineering courses has not varied by more than 6 per cent from 2,400. Electrical Engineering still continued the largest course with 502, Chemical Engineering was second with 402, and Business and Engineering Administration was next with 378. The keen enthusiasm for Aeronautical Engineering has been waning the last two years and the registration in this course will probably stabilize in the very near future. In the meantime the registration in Architecture rose from 150 in 1926–27 to 228 in 1929–30 and since then has been decreasing. Last year it was 190. On the other hand the interest in Science has been increasing. The registration has practically doubled, and last year it was 439. The changes in the various Science courses have been gradual except in Physics where the growth has been somewhat phenomenal. The increase last year was 60 per cent. The registration was 125 and was only exceeded by Chemistry which was 158.

Statistics for the year 1931–32 follow:

All statistics on registration are as of November 2, 1931
All statistics on degrees are through June, 1932

TABLE 1
THE CORPS OF INSTRUCTORS

	'19	'20	'21	'22	'23	'24	'25	'26	'27	'28	'29	'30	'31
Faculty Members of the Staff	124	139	170	174	175	174	179	185	199	215	220	240	253
Professors	52	56	56	56	61	64	63	68	73	82	81	86	98
Associate Professors	33	34	35	40	43	42	49	55	58	61	59	63	68
Assistant Professors	39	49	54	48	46	51	53	51	58	64	71	80	79
Ex-Officio	—	—	—	—	—	—	—	—	—	—	2	4	3
Instructors	—	—	25	30	25	17	14	11	10	8	7	7	5
Other Members of the Staff	169	236	224	217	200	220	236	264	268	272	295	323	335
Instructors	99	109	84	80	92	98	112	116	115	119	116	123	133
Assistants	39	79	93	87	60	59	53	63	55	53	68	70	96
Lecturers	13	14	15	15	6	16	21	23	30	29	32	32	34
Research Associates	8	19	19	19	25	26	21	24	29	22	21	31	31
Research Assistants	10	15	13	16	17	21	29	38	39	49	58	65	36
Research Fellows (D. I. C. & R.)	—	—	—	—	—	—	—	—	—	—	—	2	5
Total	293	375	394	391	375	394	415	449	467	487	515	563	588
Other Members of the Faculty	13	14	14	16	16	15	17	14	13	11	14	15	15
Professors: Emeriti	5	6	5	8	8	7	7	6	6	4	4	6	7
Retired	6	6	7	6	5	5	7	5	4	3	4	3	3
Non-Resident	2	2	2	2	3	3	3	3	3	4	6	6	5

TABLE 2
REGISTRATION SINCE THE FOUNDATION OF THE INSTITUTE

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

TABLE 3

Classification of Students by Courses and Years

Course Name and Number	1929–30						1930–31						1931–32					
	YEAR						YEAR						YEAR					
	1	2	3	4	G	Total	1	2	3	4	G	Total	1	2	3	4	G	Total
Aeronautical Engineering XVI	148	34	35	31	30	278	112	27	26	38	30	233	83	26	27	32	25	193
Architectural Engineering IV-A	16	21	16	14	6	73	19	18	17	13	5	72	7	15	12	18	1	53
Architecture IV	48	55	40	77	8	228	47	35	45	56	17	200	29	45	36	42	13	*165
Army Ordnance	—	—	—	11	—	11	—	—	—	11	—	11	—	—	—	10	—	10
Biology and Public Health VII	10	19	30	16	18	93	13	16	21	28	21	99	11	21	18	23	27	100
Building Construction XVII	23	29	23	27	—	102	16	26	22	18	—	82	14	17	15	20	1	67
Business and Engineering Administration XV	63	90	72	71	3	299	94	102	72	70	9	347	102	98	84	71	23	378
Chemical Engineering X	89	66	59	43	64	321	88	70	60	37	80	335	92	85	62	48	61	348
Chemical Engineering Practice X-A, X-B	—	—	—	12	51	63	—	—	—	10	59	69	—	—	—	7	47	54
Chemistry V	15	24	16	14	49	118	30	18	26	11	61	146	24	21	22	16	75	158
Civil Engineering I	42	42	57	47	26	214	47	46	39	52	33	217	37	38	40	42	53	210
Electrical Engineering VI	57	42	60	54	65	278	63	42	53	65	69	292	48	40	69	67	55	279
Electrical Engineering (Coöperative) VI-A	53	49	44	31	29	206	61	64	32	42	32	231	64	61	30	31	37	223
Electrochemical Engineering XIV	12	12	6	10	7	47	13	10	6	6	2	37	13	13	11	4	4	45
Fuel and Gas Engineering	—	—	—	—	7	7	—	—	—	—	11	11	—	—	—	—	9	9
General Engineering IX-B	6	10	9	12	—	37	4	5	14	23	—	46	1	3	11	28	—	43
General Science IX-A	2	6	3	2	—	13	3	1	1	4	—	9	—	2	—	2	—	4
Geology XII	2	6	3	5	8	24	1	1	3	3	9	17	—	2	2	4	12	20
Mathematics IX-C	3	7	5	1	8	24	6	4	6	3	10	29	4	7	3	7	11	32
Mechanical Engineering II	64	78	78	55	28	303	70	117	68	73	41	369	57	72	99	68	48	344
Metallurgy III$_{3,4}$	7	9	3	3	12	34	7	21	13	3	15	59	6	20	15	13	16	70
Mining Engineering III$_{1,2}$	3	11	10	8	1	33	10	11	10	12	3	46	9	10	8	9	8	44
Naval Architecture and Marine Engineering XIII	9	19	18	9	1	56	14	12	16	6	1	49	14	23	13	12	2	64
Naval Construction XIII-A	—	—	—	8	6	14	—	—	—	7	8	15	—	—	—	13	7	20
Physics VIII	10	20	10	13	16	69	7	23	21	9	18	78	10	36	21	23	35	125
Railroad Operation I-A	9	7	7	3	—	26	1	4	4	7	3	19	—	2	2	4	6	14
Sanitary Engineering XI	2	5	1	4	2	14	1	2	6	2	2	13	1	3	3	3	2	12
Ship Operation XIII-C	—	—	—	—	—	—	7	3	6	6	—	22	2	12	5	6	—	25
Unclassified	—	—	—	—	—	81	—	—	—	—	—	56	—	—	—	—	—	54
(*Architecture (IV) Fifth Year 25; Total in Architecture 190)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	25
Totals	693	661	605	581	445	3,066	734	678	587	615	539	3,209	628	672	608	623	578	3188

TABLE 4-A

Classification of Students by Courses, Options and Years

COURSE NO.	NAME	OPTION	YEAR 1 Opt.	1 Tot.	2 Opt.	2 Tot.	3 Opt.	3 Tot.	4 Opt.	4 Tot.	GRAD. Opt.	GRAD. Tot.	TOTAL Opt.	TOTAL Tot.	COURSE NUMBER
I	Civil Engineering.	1. General	—		—		14		14		—		—		
		2. Transportation Engineering	—		—		13		8		—		—		
		3. Hydroelectric Engineering	—	37	—	38	12	40	20	42	—	53	—	210	I
		4. Geodesy & Seismology	—		—		1		—		—		—		
I-A	Railroad Operation		—	—	—	2	—	2	—	4	—	6	—	14	I-A
II	Mechanical Engineering		—	57	—	72	—	99	—	68	—	48	—	344	II
III	Mining Eng. & Metallurgy	1. Mining Engineering	8		10		6		8		8		40		
		2. Petroleum Production	1		—		2		1		—		4		
		3. Metallurgy	5	15	10	30	8	23	9	22	16	24	48	114	II
		4. Physical Metallurgy	1		10		7		4		—		22		
IV	Architecture		—	29	—	45	—	36	—	42	—	13	—	*165	IV
IV-A	Architectural Engineering		—	7	—	15	—	12	—	18	—	1	—	53	IV-A
V	Chemistry		—	24	—	21	—	22	—	16	—	75	—	158	V
VI	Electrical Engineering		—	48	—	40	—	48	—	42	—	55	—	233	VI
VI-C	Electrical Engineering (Communications Option)		—	—	—	—	—	21	—	25	—	—	—	46	VI-C
VI-A	Electrical Engineering (Coöperative)		—	64	—	61	—	30	—	31	—	37	—	223	VI-A
VII	Biology & Public Health	1. Biology & Public Health	7		13		15		15		—		—		
		2. Industrial Biology	2	11	7	21	2	18	7	23	—	27	—	100	VII
		3. Public Health Engineering	2		1		1		1		—		—		
VIII	Physics		—	10	—	36	—	21	—	23	—	35	—	125	VIII
IX-A	General Science		—	—	—	2	—	—	—	2	—	—	—	4	IX-A
IX-B	General Engineering		—	1	—	3	—	11	—	28	—	—	—	43	IX-B
IX-C	Mathematics		—	4	—	7	—	3	—	7	—	11	—	32	IX-C
X	Chemical Engineering		—	92	—	85	—	62	—	48	—	61	—	348	X
X-A	Chemical Engineering Practice — Graduate		—	—	—	—	—	—	—	—	—	47	—	47	X-A
X-B	Chemical Engineering Practice — Undergraduate		—	—	—	—	—	—	—	7	—	—	—	7	X-B
XI	Sanitary Engineering		—	1	—	3	—	3	—	3	—	2	—	12	XI
XII	Geology		—	—	—	2	—	2	—	4	—	12	—	20	XII
XIII	Naval Architecture & Marine Engineering		—	14	—	23	—	13	—	12	—	2	—	64	XIII
XIII-A	Naval Construction		—	—	—	—	—	—	—	13	—	7	—	20	XIII-A
XIII-C	Ship Operation		—	2	—	12	—	5	—	6	—	—	—	25	XIII-C
XIV	Electrochemical Engineering		—	13	—	13	—	11	—	4	—	4	—	45	XIV
XV	Business and Engineering Administration	1a. Civil Engineering	18		18		9		10		—		—		
		1b. Mech. & Elec. Engineering	48	102	51	98	50	84	53	71	—	23	—	378	XV
		1c. Industrial Practice	1		12		8		—		—		—		
		2. Chemical Engineering	35		17		17		8		—		—		
XVI	Aeronautical Engineering		—	83	—	26	—	27	—	32	—	25	—	193	XVI
XVII	Building Construction		—	14	—	17	—	15	—	20	—	1	—	67	XVII
	Army Ordnance		—	—	—	—	—	—	—	10	—	—	—	10	A. O.
	Fuel and Gas Engineering		—	—	—	—	—	—	—	—	—	9	—	9	F & G
	Unclassified		—	—	—	—	—	—	—	—	—	—	—	54	Unc.
	*Architecture (IV) Fifth Year		—	—	—	—	—	—	—	—	—	—	—	25	IV (5th Yr.)
Total				628		672		608		623		578		3188	Total

TABLE 4-B

CLASSIFICATION OF SPECIAL STUDENTS BY COURSES AND YEARS
(Included in Table 4-A)

COURSE	OPT.	YEAR 1	2	3	4	G	TOTAL	COURSE
I Civil Engineering		—	1	3	1	3	8	I
II Mechanical Engineering		1	1	3	4	5	14	II
III Mining Engineering and Metallurgy	1	—	—	—	—	1	1	III_1
	3	—	1	—	—	—	1	III_3
IV Architecture		2	8	7	7	1	*25	IV
IV-A Architectural Engineering		—	—	1	—	—	1	IV-A
V Chemistry		—	—	1	1	4	6	V
VI Electrical Engineering		—	—	—	2	4	6	VI
VI-C Communications		—	—	1	3	—	4	VI-C
VII Biology and Public Health	1	—	1	2	3	2	8	VII_1
	2	—	—	—	1	—	1	VII_2
	3	1	—	—	—	—	1	VII_3
VIII Physics		—	1	—	1	1	3	VIII
IX-C Mathematics		—	—	—	—	1	1	IX-C
X Chemical Engineering		—	2	1	1	4	8	X
X-A Chemical Engineering Practice		—	—	—	—	3	3	X-A
XII Geology		—	1	—	1	—	2	XII
XIII Naval Architecture and Marine Eng.		—	4	4	—	—	8	XIII
XV Business and Eng. Administration		1	—	1	2	3	7	XV
XVI Aeronautical Engineering		—	—	1	3	2	6	XVI
XVII Building Construction		—	—	1	1	—	2	XVII
Army Ordnance		—	—	—	10	—	10	A.O.
Unclassified		—	—	—	—	—	13	Unc.
*Architecture IV (Fifth Year)		—	—	—	—	—	6	IV (5th Yr.)
Total		5	20	26	41	34	145	

TABLE 4-C

CLASSIFICATION OF FORMER STUDENTS WHO RETURNED THIS YEAR
(Included in Table 4-A)

COURSE	OPT.	YEAR 1	2	3	4	G	TOTAL	COURSE
I Civil Engineering		1	5	1	4	6	17	I
II Mechanical Engineering		5	8	10	4	2	29	II
III Mining Engineering and Metallurgy	1	1	1	1	—	—	3	III_1
	2	—	—	1	—	—	1	III_2
	3	1	4	—	—	1	6	III_3
IV Architecture		—	3	2	2	2	*9	IV
IV-A Architectural Engineering		1	2	1	—	—	4	IV-A
V Chemistry		1	—	4	—	4	9	V
VI Electrical Engineering		1	5	3	3	8	20	VI
VI-A Coöperative		—	—	1	—	—	1	VI-A
VI-C Communications		—	—	1	2	—	3	VI-C
VII Biology and Public Health	1	2	2	1	—	—	5	VII_1
	2	—	2	—	—	—	2	VII_2
VIII Physics		—	—	1	2	6	9	VIII
IX-B General Engineering		—	—	4	1	—	5	IX-B
IX-C Mathematics		—	—	—	—	1	1	IX-C
X Chemical Engineering		—	5	6	3	3	17	X
X-B Chemical Engineering Practice		—	—	—	1	—	1	X-B
XII Geology		—	—	—	—	2	2	XII
XIII Naval Architecture & Marine Eng.		—	3	2	1	1	7	XIII
XIII-C Ship Operation		1	2	1	1	—	5	XIII-C
XIV Electrochemical Engineering		—	—	2	1	—	3	XIV
XV Business and Eng. Administration		8	6	11	1	6	32	XV
XVI Aeronautical Engineering		3	—	—	—	—	3	XVI
XVII Building Construction		1	1	3	—	—	5	XVII
Unclassified		—	—	—	—	—	15	Unc.
*Architecture IV (Fifth Year)		—	—	—	—	—	2	IV (5th Yr.)
Total		26	49	56	26	42	216	

Excluding 15 Special Students.

TABLE 5

Classification of Students by Courses since 1924

	1924–25	1925–26	1926–27	1927–28	1928–29	1929–30	1930–31	1931–32
Engineering Courses . . . . . *Total*	2,548	2,423	2,253	2,240	2,305	2,405	2,564	2,495
Aeronautical Engineering XVI	14	15	72	170	224	278	233	193
Architectural Engineering IV-A	68	92	110	90	84	73	72	53
Building Construction XVII	—	—	—	66	90	102	82	67
Business and Engineering Administration XV	421	365	334	307	303	299	347	378
Chemical Engineering X, X-A, X-B	313	294	286	300	318	384	404	402
Civil Engineering I, I-A	322	298	273	233	260	240	236	224
Electrical Engineering VI, VI-A, VI-C	676	711	622	554	513	484	523	502
Electrochemical Engineering XIV	61	58	50	55	50	47	37	45
Fuel and Gas Engineering	—	3	8	14	13	7	11	9
General Engineering IX-B	99	81	44	32	30	37	46	43
Mechanical Engineering II	397	365	329	297	283	303	369	344
Military Engineering	—	—	1	—	—	—	—	—
Mining Engineering and Metallurgy III	96	68	57	51	51	67	105	114
Naval Architecture and Marine Eng. XIII, XIII-C	40	39	35	39	55	56	71	89
Naval Construction (Grad. U. S. N. A.) XIII-A	12	19	15	15	12	14	15	20
Naval Construction (Not Grad. U. S. N. A.) XIII-A Sp.	17	—	—	—	—	—	—	—
Sanitary Engineering XI	12	15	17	17	19	14	13	12
Science Courses . . . . . *Total*	220	219	227	248	291	341	378	439
Biology and Public Health VII	32	41	36	51	68	93	99	100
Chemistry V	127	110	122	108	123	118	146	158
General Science IX-A	10	10	6	10	11	13	9	4
Geology XII	20	21	15	14	26	24	17	20
Mathematics IX-C	10	13	17	18	19	24	29	32
Physics VIII	21	24	31	47	44	69	78	125
Architecture IV . . . . . *Total*	126	133	150	189	218	228	200	190
Army Ordnance . . . . . *Total*	12	9	8	10	9	11	11	10
Unclassified . . . . . *Total*	32	29	33	25	45	81	56	54
Grand Total	2,938	2,813	2,671	2,712	2,868	3,066	3,209	3,188

TABLE 6

GEOGRAPHICAL CLASSIFICATION OF STUDENTS SINCE 1927

UNITED STATES	1927	1928	1929	1930	1931
North Atlantic . . . . . Total	1,965	2,098	2,241	2,361	2,375
Connecticut	71	81	89	76	81
Maine	53	47	45	41	54
Massachusetts	1,349	1,411	1,540	1,612	1,558
New Hampshire	40	41	36	32	39
New Jersey	79	96	105	109	113
New York	241	278	285	322	345
Pennsylvania	88	102	100	107	114
Rhode Island	24	26	25	43	54
Vermont	20	16	16	19	17
South Atlantic . . . . . Total	132	138	146	156	143
Delaware	8	10	8	15	12
District of Columbia	58	57	51	46	43
Florida	15	13	10	11	10
Georgia	4	7	6	5	4
Maryland	13	18	22	19	22
North Carolina	9	10	11	13	10
South Carolina	7	5	9	5	4
Virginia	10	12	23	33	27
West Virginia	8	6	6	9	11
South Central . . . . . Total	71	71	85	86	81
Alabama	7	6	8	6	11
Arkansas	4	2	4	6	3
Kentucky	14	14	15	13	12
Louisiana	7	5	12	10	10
Mississippi	2	4	4	5	4
Tennessee	4	8	9	11	11
Texas	33	32	33	35	30
North Central . . . . . Total	265	270	290	302	286
Illinois	71	80	86	83	64
Indiana	19	13	15	17	16
Iowa	13	8	10	8	11
Kansas	12	13	9	15	11
Michigan	25	24	35	43	27
Minnesota	13	14	13	20	20
Missouri	38	43	42	36	37
Nebraska	7	5	8	7	8
North Dakota	3	3	4	3	6
Ohio	46	50	53	58	66
South Dakota	—	—	—	—	—
Wisconsin	18	17	15	12	20
Western . . . . . Total	82	89	98	103	109
Arizona	6	4	5	3	4
California	26	32	27	30	39
Colorado	23	14	15	22	18
Idaho	1	3	2	2	3
Montana	8	7	9	8	6
Nevada	—	—	—	—	1
New Mexico	2	1	3	2	1
Oklahoma	6	3	5	8	7
Oregon	3	9	8	5	9
Utah	5	4	4	3	1
Washington	11	12	18	18	19
Wyoming	1	—	2	2	1
Territories and Dependencies . Total	29	19	19	20	12
Alaska	—	1	1	1	1
Canal Zone	8	—	—	—	1
Hawaii	6	3	4	4	5
Philippine Islands	7	8	7	6	3
Porto Rico	8	6	6	8	2
Virgin Islands	—	1	1	1	—
Total for United States	2,544	2,685	2,879	3,028	3,006

TABLE 6 (*Continued*)

FOREIGN COUNTRIES	1927	1928	1929	1930	1931
Total	168	183	187	181	182
Africa	—	—	1	—	—
Argentine Republic	—	—	—	—	1
Australia	—	1	3	1	2
Austria	—	1	1	1	1
Bahamas	1	—	—	1	—
Belgium	4	1	3	1	2
Bermuda	2	1	1	—	—
Bolivia	1	—	—	—	—
Brazil	—	2	—	2	—
British West Indies	—	—	—	1	2
Bulgaria	1	—	—	—	—
Canada	32	33	29	32	34
Chile	—	—	1	1	1
China	32	24	29	24	17
Colombia	6	10	6	6	6
Costa Rica	2	2	2	2	1
Cuba	9	7	6	10	14
Czechoslovakia	—	—	—	—	1
Denmark	—	1	1	1	1
Dominican Republic	—	—	1	1	—
Ecuador	—	1	1	1	2
Egypt	1	2	3	2	1
England	2	3	5	7	3
Esthonia	1	1	1	1	—
France	4	3	4	5	4
Germany	1	3	8	7	5
Greece	1	—	1	1	—
Guatemala	—	—	—	1	—
Haiti	1	2	1	—	—
Iceland	—	—	1	—	—
India	8	8	11	12	6
Irak	1	2	1	—	2
Ireland	1	1	—	1	1
Italy	1	1	1	2	—
Japan	6	10	5	6	5
Korea	1	1	1	—	—
Lithuania	1	1	3	1	2
Mexico	13	16	14	13	13
Netherlands	—	2	1	—	—
Newfoundland	2	—	—	—	—
Norway	—	1	2	2	2
Palestine	—	3	4	3	4
Panama	—	8	8	7	3
Peru	1	2	1	1	3
Poland	—	—	—	—	1
Roumania	1	—	—	—	—
Russia	3	3	2	—	25
Salvador	—	1	1	2	2
Scotland	2	1	1	—	1
Siam	2	3	5	4	3
South Africa, Union of	2	4	4	3	4
Spain	1	3	5	6	2
Straits Settlements	—	1	1	1	—
Sweden	3	1	1	2	2
Switzerland	2	1	1	1	1
Syria	5	3	—	2	—
Turkey	4	2	2	1	—
Uruguay	1	—	—	—	—
Venezuela	6	6	3	2	2
Grand Total, United States and Foreign	2,712	2,868	3,066	3,209	3,188

TABLE 7

Women Students Classified by Courses and Years

COURSE	YEAR					Total
	1	2	3	4	G	
Aeronautical Engineering XVI	1	—	—	1	1	3
Architecture IV	2	2	4	4	—	12
Biology and Public Health VII	—	2	1	5	4	12
Business and Engineering Administration XV	—	—	—	1	—	1
Chemistry V	—	—	—	—	4	4
General Engineering IX-B	—	—	—	1	—	1
General Science IX-A	—	1	—	—	—	1
Geology XII	—	—	1	1	—	2
Mathematics IX-C	1	—	—	—	1	2
Metallurgy III$_4$	—	—	1	—	—	1
Naval Architecture and Marine Engineering XIII	—	1	—	—	—	1
Physics VIII	—	—	—	1	1	2
Unclassified	—	—	—	—	—	2
Total	4	6	7	14	11	44

TABLE 8

Old and New Students

Year	1926–27	1927–28	1928–29	1929–30	1930–31	1931–32
Students registered at end of last academic year (including specials)	1,759	1,654	1,749	1,861	1,938	1,949
Students who have previously attended the Institute, but were not registered at end of last academic year	138	147	132	152	165	231
New students who entered by examination	381	465	483	549	609	526
New students who entered from other colleges as candidates for degrees	341	381	417	434	421	395
New students (specials, not candidates for degrees)	52	65	87	70	76	87
Total	2,671	2,712	2,868	3,066	3,209	3,188

TABLE 8-A

New Students Admitted by Examination

Status of Admission	Year of Entrance				
	1927	1928	1929	1930	1931
Admitted Clear	282	298	319	419	373
1 Condition	101	105	134	110	81
2 Conditions	49	46	60	57	48
3 Conditions	22	27	25	21	16
More than 3 Conditions	11	7	11	2	8
Total	465	483	549	609	526

TABLE 9

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

College		College		College	
Agr.& Mech.Coll.ofTexas	1	Michigan State	1	University of Arizona	1
Alabama Polytechnic Inst.	3	Middlebury	1	University of California	6
Amherst	6	Missouri School of Mines	1	University of Chicago	1
Armour Inst. of Tech.	1	Mount Holyoke	1	University of Cincinnati	2
Baker	1	Municipal Univ.ofWichita	1	University of Colorado	1
Baldwin-Wallace	1	Municipal Univ.of Akron	1	University of Dayton	1
Bates	1	Muskingum	2	University of Delaware	1
Baylor	1	New York	3	University of Florida	1
Boston College	5	North Carolina State	1	University of Illinois	8
Boston University	1	North Dakota Agricultural	3	University of Kansas	3
Bowdoin	2	Northeastern	12	University of Kentucky	5
Brigham Young	1	Northwestern	2	University of Louisville	1
Broaddus Institute	1	Norwich	3	University of Maine	4
Brown	4	Oberlin	1	University of Maryland	1
Bryn-Mawr	1	Ohio State	3	University of Michigan	5
Bucknell	1	Ohio	2	University of Minnesota	3
California Inst. of Tech.	2	Oklahoma Agr. andMech.	1	University of Missouri	2
Canisius	1	Oregon State Agricultural	4	University of Nebraska	2
Carleton	2	Pennsylvania State	5	University of Nevada	1
Carnegie Inst. of Tech.	4	Poly. Inst. of Brooklyn	4	Univ. of New Hampshire	1
Case School of App. Sci.	4	Pomona	1	Univ. of North Carolina	1
Catholic Univ. of America	1	Pratt Institute	1	University of Notre Dame	2
Colby	1	Princeton	10	University of Oklahoma	4
Colgate	2	Purdue	2	University of Oregon	2
Coll. of the City of N. Y.	2	Radcliffe	1	Univ. of Pennsylvania	3
College of the Pacific	1	Randolph-Macon	2	University of Pittsburgh	1
Colorado	2	Reed	1	University of Richmond	1
Columbia	5	Regis	1	University of Rochester	3
Connecticut Agricultural	2	Rensselaer Poly. Inst.	4	University of the South	1
Cornell	5	Rice Institute	4	University of Texas	5
Dartmouth	13	Roanoke	1	University of Virginia	2
Davidson	1	Rose Polytechnic Inst.	1	University of Washington	7
Drexel Institute	3	St. Lawrence	2	University of Wisconsin	4
Duke	1	St. Louis	1	Vassar	4
Emmanuel	1	St. Mary's (Oakland,Cal.)	1	Virginia Military Inst.	6
Emory	1	St. Olaf	2	Virginia Polytechnic Inst.	5
Fordham	1	Simmons	2	Washington and Jefferson	1
Franklin and Marshall	1	Simpson	1	Washington and Lee	1
Furman	1	Smith	2	Wellesley	2
Gallaudet	1	Southern Methodist	1	Wesleyan	2
Georgia School of Tech.	1	Stanford	8	Western Reserve	1
Hamilton (N. Y.)	1	State Coll. of Washington	2	Westminster University	2
Hampden-Sidney	1	State University of Iowa	2	West Virginia	2
Harvard	11	State Univ. of Montana	2	Willamette	1
Haverford	3	Susquehanna	1	Williams	6
Holy Cross	5	Swarthmore	1	Worcester Polytechnic Inst.	4
Iowa State Col. of A. & M. A.	3	Syracuse	1	Yale	7
Jefferson Medical	1	The Citadel	1		
Johns Hopkins	1	Trinity College (Conn.)	2	Total	695
Kalamazoo	2	Trinity University	1		
Kansas State Agricultural	2	Tufts	8	Number of American Colleges Represented	159
Lehigh	1	Tulane	2	Number of Foreign Colleges Represented (Not listed)	57
Louisiana State	2	Union	2	Total	216
Massachusetts State	1	U. S. Military Academy	19		
Mass. Inst. of Tech.	255	U. S. Naval Academy	34		
Miami	5	University of Alabama	2		

TABLE 10

New Students Entering from Other Colleges as Candidates for Degrees

Class Joined at the Institute	Years Spent at College				Total
	One	Two	Three	Four or more	
First year	39	23	3	5	70
Second year	7	28	7	13	55
Third year	—	6	3	30	39
Fourth year	—	—	1	29	30
Graduate year	—	—	9	178	187
Unclassified	2	8	3	1	14
Total	48	65	26	256	395

TABLE 11

Regular Students from Colleges Classified by Courses

COURSE	No Previous Degree			Graduates of Other Colleges					Graduates of M. I. T. Taking Graduate Work		
	Entered		Total	Entered				Total	S. B. Degree June 1931	Other Graduates	Total
	Sept. 1931	Previous Years		Sept. 1931		Previous Years					
				Undergrad.	Grad.	Undergrad.	Grad.				
Aeronautical Engineering XVI	7	12	19	3	12	2	6	23	2	3	5
Architecture IV	7	26	33	3	9	11	2	25	—	1	1
Architectural Engineering IV-A	2	14	16	1	—	2	—	3	—	1	1
Biology and Public Health VII	2	9	11	—	9	—	3	12	5	8	13
Building Construction XVII	7	8	15	2	—	3	—	5	—	1	1
Business and Eng. Administration XV	13	58	71	7	6	5	2	20	6	6	12
Chemical Engineering X	22	37	59	1	24	—	21	46	1	11	12
Chemical Engineering Practice X-A	—	—	—	—	12	—	19	31	13	—	13
Chemical Engineering Practice X-B	—	1	1	—	—	—	—	—	—	—	—
Chemistry V	2	4	6	1	23	—	24	48	5	19	24
Civil Engineering I, I-A	11	31	42	5	28	1	8	42	10	10	20
Electrical Engineering VI, VI-A, VI-C	25	52	77	15	22	18	14	69	42	10	52
Electrochemical Engineering XIV	1	4	5	—	—	—	—	—	2	2	4
Fuel and Gas Engineering	—	—	—	—	1	—	3	4	2	3	5
General Science IX-A	—	—	—	—	—	—	—	—	—	—	—
General Engineering IX-B	1	11	12	3	—	2	—	5	—	—	—
Geology XII	—	4	4	—	4	—	4	8	1	3	4
Mathematics IX-C	1	—	1	—	1	—	3	4	2	4	6
Mechanical Engineering II	17	40	57	9	20	9	8	46	6	9	15
Mining Engineering and Metallurgy III	4	12	16	2	6	2	9	19	4	4	8
Naval Architecture XIII, XIII-C	2	10	12	1	—	2	1	4	—	1	1
Naval Construction XIII-A	—	—	—	13	—	—	7	20	—	—	—
Physics VIII	4	8	12	—	8	—	5	13	6	15	21
Sanitary Engineering XI	—	2	2	—	2	—	—	2	—	—	—
Unclassified	13	7	20	1	—	3	—	4	—	—	—
Total	141	350	491	67	187	60	139	453	107	111	218

TABLE 12

NUMBER OF DEGREES AWARDED IN DECEMBER, 1931 AND JUNE, 1932

Name of Course	S.B.		B.Arch.		S.M.		M.Arch.		Ph.D.		Sc.D.		Totals	
	Dec. '31	June '32	Dec. '31	June '32	Dec. '31	June '32	Dec. '31	June '32	Dec. '31	June '32	Dec. '31	June '32	Dec. '31	June '32
Aeronautical Engineering	7	25	—	—	—	4	—	—	—	—	—	—	7	29
Architectural Engineering	—	15	—	—	—	—	—	—	—	—	—	—	—	15
Architecture	4	2	—	8	—	—	—	5	—	—	—	—	4	15
Biology and Public Health	—	10	—	—	—	2	—	—	—	1	—	—	—	13
Building Construction	—	18	—	—	—	—	—	—	—	—	—	—	—	18
Business and Engineering Administration	6	68	—	—	3	6	—	—	—	—	—	—	9	74
Chemical Engineering	2	38	—	—	5	21	—	—	—	—	—	5	7	64
Chemical Engineering Practice	—	7	—	—	2	30	—	—	—	—	—	—	2	37
Chemistry	—	14	—	—	—	4	—	—	3	11	—	—	3	29
Civil Engineering	9	36	—	—	4	16	—	—	—	—	1	1	14	53
Electrical Engineering (Inc. VI-A)	17	67	—	—	8	44	—	—	—	—	—	2	25	113
Electrochemical Engineering	—	4	—	—	1	2	—	—	—	—	—	—	1	6
Fuel and Gas Engineering	—	—	—	—	—	5	—	—	—	—	—	—	—	5
General Engineering	3	23	—	—	—	—	—	—	—	—	—	—	3	23
General Science	—	3	—	—	—	—	—	—	—	—	—	—	—	3
Geology	—	1	—	—	—	2	—	—	—	—	—	—	—	3
Industrial Biology	—	4	—	—	—	—	—	—	—	—	—	—	—	4
Mathematics	1	3	—	—	1	3	—	—	—	1	—	—	2	7
Mechanical Engineering	6	54	—	—	2	10	—	—	—	—	—	2	8	66
Metallurgy	—	9	—	—	2	—	—	—	—	—	1	—	3	9
Meteorology	—	—	—	—	—	4	—	—	—	—	—	—	—	4
Military Engineering	—	4	—	—	—	—	—	—	—	—	—	—	—	4
Mining Engineering	—	9	—	—	—	1	—	—	—	—	—	—	—	10
Naval Architecture and Marine Engineering	1	10	—	—	—	—	—	—	—	—	—	—	1	10
Naval Construction	—	—	—	—	—	7	—	—	—	—	—	—	—	7
Physics	—	21	—	—	1	5	—	—	—	2	—	2	1	30
Public Health Engineering	—	—	—	—	—	2	—	—	—	—	—	—	—	2
Railroad Operation	—	—	—	—	—	5	—	—	—	—	—	—	—	5
Sanitary Engineering	—	3	—	—	—	—	—	—	—	—	—	—	—	3
Ship Operation	—	5	—	—	—	—	—	—	—	—	—	—	—	5
Without Course Classification	—	—	—	—	3	31	—	—	—	—	—	—	3	31
Totals	56	453	—	8	32	204	—	5	3	15	2	12	93	697

TABLE 13

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

Class	Aeronautical Eng.	Architectural Eng.‡	Architecture§	Biology or Natural History	Building Constr.	Business and Eng. Admin.	Chemical Eng.	Chemical Eng. Practice X-B	Chemistry	Civil Engineering	Electrical Eng. (Inc. VI-A)	Electrochemical Engineering*	General Eng.	General Science or General Course	Geology	Mathematics	Mechanical Eng.	Military Eng.	Mining Eng. and Metallurgy	Naval Arch.	Physics	Sanitary Eng.	Total	Total by Decades
1868	—	—	—	—	—	—	—	—	—	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	1,571
1901	—	—	21	1	—	—	14	—	17	37	25	—	—	6	1	—	39	—	18	16	1	4	200	
1902	—	—	18	5	—	—	9	—	14	24	35	—	—	3	—	—	46	—	14	14	3	7	192	
1903	—	—	15	1	—	—	10	—	13	26	39	1	—	1	1	—	37	—	27	12	3	4	190	
1904	—	—	24	3	—	—	7	—	15	34	34	8	—	5	1	—	45	—	32	17	5	2	232	
1905	—	—	12	3	—	—	13	—	23	46	31	3	—	3	1	—	54	—	26	24	—	5	244	
1906	—	—	22	2	—	—	10	—	21	47	37	3	—	—	—	—	69	—	38	19	4	6	278	
1907	—	—	21	—	—	—	14	—	10	37	32	5	—	2	—	—	52	—	22	10	—	3	208	
1908	—	—	19	4	—	—	15	—	16	48	38	2	—	—	—	—	62	—	19	5	—	2	230	
1909	—	—	18	5	—	—	13	—	12	51	42	3	—	—	—	—	41	—	30	5	3	9	232	
1910	—	—	18	3	—	—	18	—	10	57	36	3	—	2	—	—	57	—	24	11	—	12	251	2,257
1911	—	—	10	1	—	—	19	—	12	46	49	5	—	2	—	—	49	—	17	6	1	15	232	
1912	—	—	21	4	—	—	31	—	7	55	52	3	—	1	—	—	47	—	21	3	2	14	261	
1913	—	—	26	2	—	—	30	—	12	58	43	8	—	—	—	—	50	—	20	4	1	15	269	
1914	—	—	19	6	—	—	37	—	9	60	51	8	—	4	—	—	65	—	17	8	1	19	304	
1915	—	—	30	3	—	—	33	—	23	49	42	10	—	3	—	—	69	—	5	7	3	12	289	
1916	—	—	37	5	—	—	32	—	11	45	56	14	—	2	—	—	84	—	5	9†	3	18	321	
1917	—	—	27	10	—	37	43	—	12	49	45	10	—	5	2	—	63	—	14	9†	1	17	344	
1918	—	—	28	7	—	29	40	—	10	45	50	11	2	4	1	—	75	—	10	4	3	5	324	
1919	—	—	16	9	—	28	44	—	8	45	50	6	3	1	—	—	66	—	7	7	4	6	299	
1920	—	—	19	2	—	48	63	—	6	52	30	9	1	4	—	—	55	—	13	12	2	2	319	2,96
1921	—	—	11	3	—	70	92	—	9	98	75	15	15	—	3	—	128	—	24	18	1	3	565	
1922	—	—	32	8	—	127	98	15	11	65	109	25	25	1	8	—	56	—	27	16	8	7	638	
1923	—	13	18	6	—	115	73	19	16	64	78	16	23	2	8	3	106	—	23	13	9	3	608	
1924	—	6	15	6	—	81	57	8	13	69	125	17	36	4	2	1	82	—	19	11	3	1	556	
1925	—	6	18	2	—	94	53	8	18	57	108	9	37	2	3	2	98	—	23	10	5	—	553	
1926	—	9	24	5	—	95	45	13	19	76	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	75	8	9	1	2	1	48	—	6	6	11	4	458	5,40
1931	39	10	18	16	15	68	32	10	12	48	76	6	22	5	3	4	70	—	12	13	7	2	488	
**1932	25	15	10	14	18	68	38	7	14	31	42	4	23	3	1	3	54	4	18	15	20	3	430	
Total	132	133	870	202	65	1,150	1,227	116	691	2,081	2,339	255	277	150	57	26	2,567	5	773	373	151	245	13,885	

*Prior to 1909 this Course was designated as Option 3 (Electrochemistry) of Course VIII.
†Two received the degree in XIII-B in 1916 and three in 1917.
‡Prior to 1923 degrees were awarded in Architecture.
§In 1932 includes eight B.Arch.
**Includes only June degrees awarded in Class 1932

TABLE 14

Degrees of Master of Science Awarded

	Aeronautical Engineering	Architectural Engineering	Architecture	Biology and Pub. Health	Business and Eng. Admin.	Chemical Engineering	Chem. Eng. Practice	Chemistry	Civil Engineering	Electrical Eng. (Inc. VI-A)	Electrochemical Eng.	Fuel and Gas Eng.	General Science	Geology	Mathematics	Mechanical Engineering	Metallurgy	Meteorology	Mining Engineering	Naval Architecture	Naval Con., U. S. N.	Naval Con., Foreign Stud.	Physics	Railroad Operation	Sanitary Engineering	Without Course Classification	Total
1886								1																			1
1887								1																			1
1888																											
1889																											
1890													1														1
1891																											
1892																											
1893			1																								1
1894										1																	1
1895			1					1														1					2
1896			2					1																			3
1897			2			1																1					4
1898			1			2										1						1					5
1899			1	1				1																			3
1900																											
1901			2													2											4
1902			3					3								2											8
1903			5													1								1			7
1904			4					1		2						1					3		1				12
1905			9																		8			1			18
1906			3					1												2	3						9
1907			6			1															8						15
1908			1					1		3											7						12
1909			6			1		1	2	1				1		1			2		3		1				19
1910			6	1				1	2	1						1					7						19
1911			5	2				2	2	4						2					3						20
1912			4	2				3	3	2									2		4			2			22
1913			4	1		7			1	1				1		2			1		2						20
1914			3	2		3		5	3	2				1		1					2			3			25
1915	1		4			2		2	1	10	1					4			1	1	2						29
1916	5		7	1		1		3	5	6	1					4					22	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								16
1919	2							3	4	4	1				1	1											16
1920				1		3		2	4	7	1			3	1	5			1		19		1			4	52
1921	3	1				29		6	2	4				2		10					20					17	94
1922	5	1				6	32	4	5	37	1			2	2	4			3		10		1			18	131
1923	10					3	34	1	5	45				2		15	1			4	21		3			26	170
1924	4					6	41	1	5	34	1			1		8	1		1		12		5			28	148
1925	5	1			1	3	35	3	5	35	1					10	2		1				2		1	21	126
1926	6	1				5	20	2	2	60	1			3		6	1				12					25	144
1927	9			1		2	26	4	6	54	2	2		6	1	13			2		6		1			32	167
1928	9					5	14	2	8	63	3	7			2	13					9		1			43	179
1929	5	1			2	3	21	4	6	79	2	6		4	2	16					6		2		1	45	205
1930	3	4			1	7	22	5	9	51	5	2		1	2	5	3		1	1	5		1		1	53	182
1931	4	3		2	5	15	34	5	12	57	2	4		2	5	10	4	4	2		8		2	3		20	203
*1932	4			4	6	21	30	4	16	44	2	5		2	3	10		4	1		7		5	5		31	204
Total	84	12	84	19	15	128	309	76	113	613	24	26	1	31	19	151	12	8	20	8	198	5	30	8	13	364	2,371

* Includes only June degrees.

TABLE 15

Degrees of Master in Architecture Awarded

Year	Number
1921	3
1922	2
1923	7
1924	8
1925	5
1926	9
1927	7
1928	6
1929	9
1930	7
1931	9
*1932	5
Total	77

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	11	—	1	2	15
Total	12	105	18	8	10	153

*Includes only June degrees.

TABLE 17

Degrees of Doctor of Science Awarded

Year	Aero. Eng.	Chem. Eng.	Chemistry	Civil Eng.	Elec. Eng.	Electrochem. Eng.	Geology	Mathematics	Mech. Eng.	Metallurgy	Min. Eng.	Naval Arch.	Physics	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	—	—	—	2	—	—	—	2	12
Total	6	31	4	3	20	1	3	2	6	15	1	1	7	100

*Includes only June degrees.

TABLE 18

Degrees of Doctor of Public Health Awarded

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

TABLE 19

Degrees of Doctor of 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 (1868–1932)

Bachelor of Science	13,877
Bachelor in Architecture	8
Master of Science	2,371
Master in Architecture	77
Doctor of Philosophy	153
Doctor of Science	100
Doctor of Public Health	4
Doctor of Engineering (Discontinued after 1918)	4
Grand Total	16,594

J. C. MacKinnon.

Summer Session. The total registration in the Summer Session 1932 was 1,351 which was 334 less than last year. The special courses for teachers were discontinued this year which accounted for a decrease of 112. There were no special courses offered for industry, while last year there were 36 students who attended the special program for metermen. The number of reserve officers was 30 less than last year. The changes in such special groups as the above are variable from year to year, and they are minor factors as regards income and salaries.

The largest part of the attendance in the Summer Session depends upon two other groups. In the first are those students who have previously attended the Institute and are here for the summer taking required courses, making up back work, or anticipating their studies. The attendance at the required Summer Session in some courses does not average, at the present time, over 50 per cent of what it should be, due to the fact that the men take the subjects in the regular academic year in order to decrease their expenses. There was a decrease of 28 in this group in spite of the fact that required summer work was inaugurated following the second year of the Mechanical Engineering course. The other large group is made up of new students who are either college transfers, entrance students, or outsiders attending our regular courses for the summer only. The decline in this group was 128. This makes the net decrease 156 in the major groups in the Summer Session.

The teaching salaries have usually averaged about 60 per cent of the tuition receipts. Due to the increase in salaries which took effect in July 1931, this ratio has increased to about 75 per cent. This change in salary scale, together with the decreased attendance, has caused the net difference between tuition receipts and salaries to fall to $29,700; the corresponding amount last year was $52,200.

The smaller entering classes the last two years will probably react to produce another decline in the registration for the Summer Session in 1933.

E. F. MILLER,
Chairman, Committee on Summer Session.

The Librarian. The home use of the Institute Library showed a steady increase during the past year as indicated by the following figures:

	1930–31	*1931–32*
Volumes borrowed from the Central Library.....	33,196	37,904
Volumes borrowed from the branch libraries.....	21,787	29,965
	54,983	67,869

The term "volumes" as used here and throughout this report includes pamphlets, periodicals and theses but not prints. The Architecture branch circulated 10,849 prints.

Probably the most notable item going to make up the above table is the circulation from Walker Memorial Library, which increased from 2,042 in 1930–31 to 6,696 in 1931–32. This tremendous gain was due in part to the fact that the branch was kept open during the summer vacation of 1931 and on Sundays beginning in November 1931, when the entire Walker Memorial building was first opened on Sunday, but even more to the systematic use of the branch as a source of supply for required reading in connection with English and History subjects.

Interlibrary borrowing and lending has more than doubled in the past five years, as shown in the following table:

	1927–28	*1928–29*	*1929–30*	*1930–31*	*1931–32*
Volumes borrowed from other libraries	328	496	463	655	811
Volumes lent to other libraries	581	768	902	974	1,012

Photostat prints were supplied in response to 83 requests, of which about two-thirds were from outside the Institute.

The growth of the Library is indicated by the following figures, which this year include all items permanently added (other than prints), whether formally "accessioned" or not:

Acquired by purchase.....	4,282
Acquired by binding.....	1,716
Acquired by gift or exchange.....	4,467
Total.....	10,465
Less volumes discarded.....	237
Net growth.....	10,228

Of the above items, 5,228 were added to the Central Library and 5,000 to the branch libraries. The latter figure is unusually large because of the addition of 1,657 volumes to Walker Memorial Library and the acquisition of 875 volumes as a nucleus for the Eastman Library.

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

	Books	*Periodicals*	*Binding*	*Total*
From Library budget	$6,507.80	$5,182.79	$3,383.92	$15,074.51
From endowment funds	5,809.39	59.53	70.26	5,939.18
From special appropriation 774 (Physics)	.....	564.22	.....	564.22
From special appropriation 880, 912 (Eastman Library)	2,609.81	303.81	129.69	3,043.31
From income from sale of Vail duplicates*	20.72	5.00	876.00	901.72
From departmental appropriations	532.73	255.42	10.72	798.87
	$15,480.45	$6,370.77	$4,470.59	$26,321.81

* Augmented by special appropriation from the Vail Fund.

The size of the Institute Library, including the branches, was on June 30, 1932, approximately 277,706 volumes.

While funds have not been available to begin a thoroughgoing revision of the card catalogue, a great deal of revision work has been accomplished in connection with the merging of the old Vail catalogue with the Central catalogue and the building of the new Eastman Library catalogue. A considerable amount of time and attention has been devoted to subject-heading improvement and coördination in the catalogue.

The Library's collection of literature (*i.e.*, belles lettres) and literary criticism has long been out of date and inadequate as a working collection for students and instructors. It represents an accumulation since 1896 by gift and casual purchase to fill the need of the moment. This year the collection was checked, with the aid of several good lists of representative books of classic and literary value (including the Shaw List of Books for College Libraries), with the purpose of adding to the collection important titles which were missing. A list of one thousand titles was compiled and of these one hundred fifty have been purchased, also many of the better books of contemporary writers. From time to time, as funds are available, the remaining titles will be added. In the course of this work the Essay Index was carefully checked and a substantial group

of notable collections of essays was purchased with the intention of developing our resources on present-day historical, political, biographical and sociological subjects. For the money to accomplish reconstructive purchasing of this sort, the Library is indebted to the fund bequeathed to it in 1927 by Walter S. Barker.

For the better protection of the rare books two small treasure rooms were created by erecting a grating between the two elevator shafts on the sixth and seventh floors of the stack. In these are kept the most valuable book treasures. A considerable number, however, must still remain in the larger and older treasure room, which must also be used for a variety of other purposes.

An important step for the improvement of the library service was taken when the Faculty Special Committee on the Library, consisting of Professors Jackson (Chairman), Keyes, Pearson, Prescott, and Babcock, submitted its report and recommendations for closer coördination of the Central and branch libraries. This report, dated June 12, 1931, came before the Faculty in November, and its recommendations were adopted, with slight modifications, at the meeting of December 16, 1931. Because this action established a fundamental library policy for the Institute, the recommendations as adopted are here given in full:

Recommendations of the Special Committee on the Library

1. That a strong and effective library administration be maintained under the direction of the Librarian, who is placed in charge of all library activities of the Institute, and that a suitably paid professional staff be provided to render high grade and prompt reference or research service to all departments needing it.

2. That a Faculty Standing Committee on the Library be created for defining library policy, of which committee the Librarian shall be a member and shall serve as secretary.

3. That the principal library collections be maintained as a central library, and that branch libraries be concentrated in a few group libraries (instead of many small collections), each with suitable professional library attendance under the direction of the Institute Librarian.

4. That small branch or departmental libraries be abolished by consolidation with conveniently located branch libraries of group character as far as practicable, and no further such small libraries be maintained independently from Institute funds. Special deposits may be authorized

by the Librarian for laboratory, seminar, research or reference purposes, such deposits being catalogued in the Central Library catalogue.

5. That authority to transfer books to or from a branch library should rest with the Librarian with the consent of a majority of the members of the Committee on the Library. A department representative should deal with the Librarian in such matters, either directly or through a department library committee.

6. Finally, the Committee urges the need of additional suitable seminar rooms for advanced work, and study-reading rooms for undergraduate work, which are now lacking, but which ought to be included as a part of future comprehensive planning for the Institute.

At the same meeting the following rule was added to the existing Rules of the Faculty:

The Committee on the Library shall consist of seven members: the Librarian, who shall act as secretary of the committee, and six other members, two of these to be elected annually to serve for three years. Its duty shall be to formulate policies for the administration of the Library.

At the same meeting the following were elected members of the committee: Professors Pearson (Chairman), Babcock, P. M. Morse, Waterhouse, Sherwood and Franklin.

The first application of the new policy was made in the organization of the Eastman Library of physics, chemistry and mathematics. This library, to be primarily for the use of research workers, had been planned by the Departments of Physics and Chemistry as a necessary feature of the new George Eastman Research Laboratories. For its housing a reading room was provided with seats for thirty-six readers and an adjoining double-deck stack with capacity for thirty-five thousand volumes and having seventeen carrels for private study. Later the Department of Mathematics merged into the new library one of its own small libraries and the greater part of another.

Among certain specific suggestions in the report of the Special Committee on the Library was the following:

"Plans for the proposed Physics-Chemistry-Mathematics Library in the new George Eastman Research Laboratories should be worked out in consultation with the Librarian, so as to provide a high order of professional service for a branch library which may serve as a model for reorganizing the older existing branches."

In accord with this policy, every effort was made to establish the Eastman Library upon sound principles. Lists of required material were prepared by each of the three departments, estimates of cost were worked out at the Central Library and an appropriation of $14,000 was made by the Executive Committee. Recognizing that the new branch would serve a limited clientele and that other departments and the undergraduates would still depend upon the Central Library for material in physics and chemistry, the vote of the Executive Committee approved the policy of duplication of material required in the Central Library "where duplication is deemed essential for the most effective work." This appropriation was later augmented by the sum of $2,500 from the accumulated income of the Osborne Fund to aid the Department of Mathematics in completing its sets of journals.

A branch catalogue was built and the necessary readjustments made in the Central Catalogue so that by June it was possible to move to the new library the small libraries hitherto maintained by the research laboratories of organic, inorganic and physical chemistry, the advanced mathematics library, and the more advanced works from the mathematics library. The new library thus replaced four small libraries and took over part of a fifth.

The Eastman Library has been planned primarily as a library for research workers, that is, for graduate students and members of the Instructing Staff. What its relation shall be to the undergraduate body and readers from outside the Institute remains to be decided, but a definite operating plan will be worked out early in the coming year.

Improved conditions have been brought about in two other branches. In the Civil Engineering-Economics branch the bibliographic work of the branch librarian, particularly on account of the Department of Business and Engineering Administration, had grown to such an extent that it was found necessary to provide a student assistant to attend the desk each afternoon and Saturday forenoon, in term-time. The branch was also opened Tuesday and Thursday evenings until nine o'clock to enable students to prepare for certain courses on the days following.

From July 1 the Walker Library was open Monday to

Friday afternoons throughout the summer, with an average daily attendance of 11 and an average monthly circulation of 100 books. Beginning in November, the Library was opened Sundays from twelve to nine, and showed an average Sunday attendance through the year of 26 and an average circulation of six books. The attendance figures at least would seem to justify the continuance of both these experiments, since the main purpose of the Library is to serve as a "browsing-room" and its function as a lending library is supplementary.

With regard to the future of the Institute Library as a whole it becomes increasingly evident that the Library cannot keep step with the expanding interests and requirements of the Institute without the provision of adequate funds. This is true not only with regard to the systematic building up of the book and periodical collections but also with regard to the proper care of those collections and their full development through intelligent service. A long list could be submitted of necessary reconstructive work and less pressing but useful bibliographic contributions which the Library should undertake but for which funds are not available. With the great increase in graduate work the Library is called upon virtually to render the service of a university library, yet its annual budget is barely sufficient to meet the day-to-day needs of a small college, and its endowment funds are few and (except for Walker Memorial branch) small. The solution seems to lie in the obtaining of an adequate endowment fund, elastic in its terms so as to be available either for books, equipment or service. Although such an undertaking would obviously be impossible at the present time, there is a pressing need for increased facilities. The eventual need for a new library building should be borne in mind and a suitable location reserved for it.

When the Division of Municipal and Industrial Research was discontinued near the end of the year, the Reference Librarian examined its collected literature and accepted for the Library about seven shelves of material that seemed to have permanent value. This included about 100 industrial surveys and 50 reports on traffic and transportation; the remainder consisted of public documents in engineering and other fields in which the Library receives constant inquiries.

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

From the library of Dr. Samuel W. Stratton: fifty volumes of the *Physical Review*, thirty-three volumes of *Science Abstracts*, and two hundred fifty other volumes and pamphlets.

Professor Frank Vogel: three hundred nineteen German texts and readers.

Mrs. Elihu Thomson: a large quantity of unbound scientific periodicals from the collection of Professor Thomson, many of which proved useful in equipping the Eastman Library.

Bell Telephone Laboratories: several lots of unbound periodicals for the Eastman Library.

Mr. E. S. Wilson, of the American Telephone and Telegraph Co.: twenty volumes of *Public Utilities Reports, Annotated*, with fourteen volumes of the *Digest*.

Mrs. Horace Pettit, from the library of her father, Wilfred Lewis, of the Class of 1875: seventy-four volumes in mechanical engineering.

Mrs. H. B. R. Kenyon, from the library of George D. Rogers: twenty-one volumes on chemical subjects.

Miss Marguerite V. Doggett: fifteen volumes from the library of Professor Charles S. Doggett, at one time on the Institute staff.

W. L. Puffer '84: twelve volumes of General Electric Company *Bulletin*.

Professor C. E. Locke: A complete set of Proceedings of the World Engineering Congress, Tokyo, 1929.

World Engineering Congress, Tokyo Office: a complete set of Proceedings of the Congress.

Professor C.-G. A. Rossby: forty-three volumes of *Aus dem Archiv der deutschen Seewarte*.

Professor C. E. Turner: thirty-one volumes on health subjects.

Lever Brothers: periodicals devoted to soaps and perfumes.

Among the many single volumes of particular interest were the following:

Mary L. Corliss: Her: Life and Work of George H. Corliss. 1930.

John R. Freeman '76: Earthquake damage and earthquake insurance. 1932.

George L. Gilmore '90: Sugden and Edmonson's History of English Wallpaper.

Marine Research Society: Matthews's American Merchant Ships. 1930.

Masaji Ohba, Takagi: Katano's Physics (1878) and Shinoto's Mathematics (about 1850), in Japanese.

Dr. Ing. Theodor Rehbock: Wasserbauliche Modellversuche zur Klärung der Abflusserscheinungen beim Abschluss der Zuiderzee. . . . 1931.

Dr. G. A. Watermeyer and S. N. Hoffenberg: Their: Witwatersrand mining practice. 1932.

Gifts of several volumes each were received from the following libraries: Baker Library (Harvard Business School), Newton Free Library, University of Minnesota, and University of Pennsylvania.

Among foreign donors were the Université de Liège, the Universität Basel, and the Staatliche Lehrmittelanstalt für Gewerbe und Fachschulen, Prague.

Current numbers of certain periodicals and society publications were presented regularly by President Compton and by Professors Bigelow, Dewey, Doten, Gill, Hayward, Hutchinson, Kennelly, C. E. Locke, Prescott, Schell, Schwarz, Tyler, and Waterhouse.

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

President Compton: Electrical discharges in gases. (In collaboration with Irving Langmuir.) 1930. (Three copies.)
Professor Earle Buckingham: Stirnräder mit geraden Zähnen . . . deutsche Bearbeitung von Georg Olah. 1932.
Professor R. F. Elder: Scientific management in marketing. 1931.
Professor A. H. Gill: Automobile gasoline. 1923.
Professor W. T. Hall: History of chemistry, by F. J. Moore; revised by W. T. Hall, Ed. 2, 1931.
Analytical chemistry. Vol. 1, Ed. 8, 1932.
Professor G. B. Haven: Mechanical fabrics. 1932.
Professor F. A. Magoun: History of aircraft. (In collaboration with Eric F. Hodgins '22.) 1931.
Professor E. B. Millard: Physical chemistry for colleges. Ed. 3. 1931.
Professor F. H. Norton: Refractories. 1931.
Major P. H. Ottosen: Trench artillery, A. E. F. 1931.
Mr. J. H. Pillionnel: Les graminées. 1932. (Two copies.)
Poèmes d'Amérique. 1928.
Professor W. Spannhake: Mitteilungen des Institutes für Strömungsmaschinen der Technischen Hochschule Karlsruhe. Heft 2. 1932.
Professor C. F. Taylor: The airplane and its engine. (In collaboration with C. H. Chatfield.) Ed. 2. 1932.
Professor W. H. Timbie: Essentials of electricity. Ed. 2. 1931. (Two copies.)

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

President Compton
Professor R. P. Bigelow
Professor Earle Buckingham
Professor D. R. Dewey
Professor W. Emerson
Professor A. H. Gill
Professor H. W. Hayward
Professor W. S. Hutchinson
Professor J. R. Jack
Professor D. C. Jackson
Professor W. Lindgren
Dean H. E. Lobdell
Professor H. T. Mann
Professor E. B. Millard
Professor S. P. Mulliken
Professor C. L. Norton
Professor H. G. Pearson
Professor C. H. Porter
Professor C.-G. A. Rossby
Professor E. H. Schell
Professor E. R. Schwarz
Professor J. L. Tryon
Professor G. B. Waterhouse
Dr. S. Ikehara
Mr. L. B. Johnson
Mr. H. B. Litchman
Mr. C. E. Littlefield
Mr. J. D. Sawyer '71
Dr. A. W. Grabau '96
Mr. John R. Macomber '97
Mr. Maurice E. Allen '08
Mr. T. C. Desmond '09
Dr. H. A. Babcock '12
Mr. Ralph Ilsley '25
Mr. J. R. Killian '26
Dr. J. A. Serrallach '29
Mr. V. G. Mukhdjian '30
Mr. John M. Slater '32
Mr. H. S. Gardner, G

To the student activities and alumni organizations the Library is indebted as usual for current and bound copies of their publications.

W. N. SEAVER.

Medical Director. The outstanding feature of the year was the marked decrease in seriously ill patients. This was undoubtedly due to the close checkup kept on all men with defects and the splendid coöperation of the men at all times.

There will be increasing possibilities for even greater service with the growth of our work. During the coming year more intensive attention will be given to "follow-up" work of men with defects and greater numbers will have the opportunity to listen to lectures on the subjects of physical defects.

There were 23,602 visits to the clinic made during the fiscal year, subdivided as follows:

22,433 clinic
866 rechecks on men having physical defects
303 patients in the Infirmary

There were 2,983 men examined. Of this group 688 were found to have defects, or roughly 1 out of 5.

269	class of '35
126	class of '34
116	class of '33
90	class of '32
9	special
78	graduates
688	

Three hundred three patients were treated in the Infirmary for approximately five days for each man, or a total of 1,523 days. Of this number 221 cases were medical and 82 were surgical.

There were four contagious cases compared with eight last year.

For the year 1932–33 it has been deemed advisable to examine first all freshmen and men out for competitive sports. Examinations will begin on September 19. Since Physical Training will not start until November these men will have ample time to complete their examinations and arrange their schedules if any physical defect is found which would prevent them from participating in competitive sports, Military Science, or Physical Training.

GEORGE W. MORSE, M.D.

Industrial Coöperation. The outstanding development of the year in connection with the Division of Industrial Coöperation has been the consolidation of practically all of the outside industrial work carried on by the Institute. In furtherance of this consolidation Professor Gordon B. Wilkes of the Laboratory of Industrial Physics, Professor Leroy F. Marek, the acting Director of the Research Laboratory of Applied Chemistry, and Professor Hoyt C. Hottel, the acting Director of the Fuels Research Laboratory, have been added to the Division staff.

Early in the year a series of conferences with the Advisory Committee of the Division and the staff members was held, and a number of changes of procedure were adopted. The name of the Division was changed by the omission of the words "and

Research," leaving the designation "Division of Industrial Coöperation." The Institute's policy in the matter of outside contacts has been much more definitely outlined, and substantially all of the outside industrial work which makes use of the facilities of the Institute's laboratories is now routed through the Division of Industrial Coöperation. A thoroughly satisfactory coöperation between the several industrial laboratory units is now assured, and the work of carrying on research for industry will be greatly helped both from the point of view of the Institute and of industry itself.

The amount of business carried on in the Division office has reflected the general state of industry, and shows considerable shrinkage.

A number of investigations have been carried on for industrial companies, some of them resulting in the material improvement or development of processes and products. These include further work in the development of refractories for high temperature work; the investigation and development of the radically new method of insulation consisting of the use of multiple layers of aluminum foil; the careful fundamental study of the method of operation of some special detergents. Research has been carried on in the plastic flow or creep of pure metals in addition to the work which has been going on for several years on the creep of alloy steels. The development of an insulator of great efficiency at high temperatures has proceeded to the point of manufacture upon a large scale at a plant in Augusta, Georgia. The usual number of tests for control of processes for which our equipment is especially fitted have been carried out. The research on the distribution of light through windows for the Solid Section Steel Window Industry has been completed. The textile laboratory in the Department of Mechanical Engineering has continued its practice of supporting research associates who shall spend part of their time in the laboratories of the textile mills. This coöperative procedure has already resulted in the setting up of permanent research laboratories in several mills, and in the development of a number of marked economies in textile processes.

During the year the Division has been brought into contact frequently with problems for the various cities and towns of New England, and has had constant contact with the New

England Council, which met at Technology and made a tour of inspection of the industrial research laboratories in the spring. The reports made by the members of the Council who visited here have stimulated a considerable number of inquiries and investigations.

The Institute's policy in regard to the handling of patentable developments or inventions which may occur while industrial work is being carried on in the laboratories has now been definitely determined. The ownership rights where the work is supported by the industrial companies or by the Institute, or carried on wholly at the expense of the inventor himself, have now been defined by a committee of the Faculty, and definite working rules of procedure adopted.

The Ceramics Laboratory which has been badly hampered by lack of room is now provided with larger quarters so that the researches now under way may be more adequately taken care of.

Because of the business depression and very general reduction of forces in industry the personnel office of the Division has been heavily taxed with requests from Alumni for aid in securing new positions. Owing to the very limited requests from industry to recommend men, the office has been handicapped in its efforts to help materially. Special efforts have been made to help the older graduates, and assistance has been given heads of departments in placing the graduating class. In coöperation with officers of the Alumni Association aid has been sought of the various local Alumni clubs and of Honorary secretaries throughout the country. Several of the clubs have appointed special committees to help in this work. Lists of men available and of positions open have been circulated, and in a number of cases worthwhile help has resulted. The interest shown by the local clubs has been most encouraging, and suggests the advantage to the Institute of further development of this organized coöperation, not only in placement problems, but also in student recruiting and in furthering the interests of the Institute in general.

C. L. NORTON, *Director.*

Municipal and Industrial Research. During the year the Division has emphasized the municipal aspect of its work,

this appearing to offer a more likely field than that of industrial development for the utilization of its services. The preparation of three research pamphlets (No. 12 — Principles of Sewage Disposal, No. 13 — The Municipal Refuse Problem, and No. 14 — Municipal Costs in Massachusetts) the completion of a preliminary study of population trends for the Massachusetts Housing Association, and a preliminary survey and report of the municipal government of Haverhill, are representative of our efforts in this direction.

Our two bulletins on municipal sanitation were prepared in line with our promise to the chief executives of New England cities, made last year, to develop material asked for in their replies to our questionnaires. The first of these (No. 12) was characterized as "an extraordinarily clear and cogent presentation of the whole subject" by Dr. William B. Munroe, formerly Professor of Government at Harvard University.

The bulletin on Massachusetts municipal costs was distributed early in February of this year, received considerable notice in newspapers throughout the state, and was the subject of editorial comment in leading Boston papers. The State Auditor of Municipal Accounts personally stated that the bulletin had been of very great help to him in dealing with local officials. The widespread reductions in 1932 municipal budgets were unquestionably facilitated by its appearance.

A preliminary survey of the government of Haverhill was one of the direct results of the distribution of Bulletin No. 14. This report, the contents of which were reported to the Advisory Committee on May 1, has been distributed to the municipal officials of that city and will serve as a basis for future action. Like the Somerville survey, that in Haverhill was financed by the city government itself. With the development of "tax consciousness" on the part of the Massachusetts public, there is little doubt but what other surveys of this character could have been arranged.

Our preliminary analysis of population trends for the Massachusetts Housing Association was submitted only a few days before the closing of the Division — on June 27 last. Owing to a change of policy on the part of the Association which took place last April it was necessary to curtail the analysis and transmit the results of our work in memorandum form.

The memorandum presents basic figures on the distribution, density, character, scale of living and probable trend of the population of the Boston Metropolitan District for the next twenty years and can be used as a convenient point of departure for detailed housing studies. It also covered a study of possible industrial developments in the communities comprising the metropolitan district.

Considerable time was devoted to research activities in coöperation with civic and business organizations. For example, service was rendered the Massachusetts Chamber of Commerce in its efforts to encourage municipal economy by collaborating in the preparation of an outline on municipal administration and finance, which was distributed to local chambers of commerce throughout the state and has been an important factor in the reduction of governmental budgets. In Cambridge, working with the Cambridge Industrial Association, we were able to assist in securing needed information as to certain municipal properties by directing a field survey of these properties by unemployed engineers. Information was furnished to the chamber of commerce in Greenfield, with regard to the conduct of an analysis of municipal finances.

Advisory service in connection with past surveys has continued as in other years, this work in some cases leading to direct assistance to parties attracted to certain localities through the medium of our reports and in others to technical research by other Institute departments. In connection with the controversy over New England railroad consolidation the Division, through its references to railroad conditions in its survey report of Metropolitan Providence, was brought into the picture to the extent of reiterating its position as defined in that report.

While there have been repeated attempts to stimulate industrial growth in Metropolitan Boston, no study had ever been made as to possible or probable industrial location. In coöperation with chambers of commerce and real estate agencies the Division compiled a detailed description of industrial sites now on the market. This, together with information as to areas available for industrial occupation under local zoning ordinances, transportation facilities — rail and highway, rapid transit facilities — and other factors influencing industrial devel-

opment, were presented in map form and comprise a significant picture of possible and probable industrial development in Metropolitan Boston.

Various outside organizations still express willingness to coöperate with this Division in industrial development work but have been required to curtail their activities due to economic conditions. The general state of affairs is evidenced by the cancellation of the regular annual meeting of the American Industrial Development Council this year.

Both in connection with our bulletin service and in the case of other material the press has been increasingly appreciative of our efforts, judging by the number of editorial and news notices coming to our attention. The position taken by us on the question of municipal expenditures has eventually been taken by most other agencies interested in the reduction of governmental costs.

Supervision of thesis work has been, as in past years, an important feature of the Division's activities.

A particularly interesting example of thesis supervision was a study of waterfront industrial sites in the Boston port district. In response to several requests copies of this thesis were made available for public distribution. It also served as the basis for a feature article on local port development in a leading Boston newspaper.

Another specific contribution of the Division to the solution of local economic problems was instanced by the direction of a thesis on industrial taxation in Cambridge, the results of the study being of value to the business and civic interests of that city.

The balance in the Aldred fund as of June 30, 1932, was $27,098.20. This figure includes an adjustment for depreciation of securities and does not include interest accumulation for the year, account receivable from Providence — $6,761.51 — and account receivable from the Massachusetts Housing Association — $1,500.00.

The Director, in a letter dated July 15, 1932 to Mr. J. E. Aldred, has summarized in a brief review the results of the work of the Division during the five and one-half years of its existence. Part of this letter is given here:

"Organized in December, 1926, and discontinued in July, 1932, the life of the Division was approximately five and one-half years. During this period it completed eight major surveys — two of them regional in character — involving intensive analyses of municipal and industrial conditions in thirteen cities and towns and of the economic areas tributary to them; it published fourteen technical and two general bulletins and engaged in a great variety of miscellaneous activities in its field. It expended a net sum of approximately $70,000 over the period of its existence; that is to say, it cost about $13,000 a year, net, to operate. It is pertinent to inquire what the significance of its work has been.

When the Division first began operations, the science of industrial surveying, if such it may be called, was in a nebulous state. The Division's first survey, that of Metropolitan Providence, established at once a standard for studies of this nature which even in the present year has been acknowledged as such by one of the leading private consultants in the field. With the entrance of national organizations and the national government itself into the work of planning and organizing community industrial surveys the technique of fact-finding has become common property. Comparison of the great majority of industrial survey reports with those of this Division will, however, disclose wide differences in respect to the use made of basic information. It is demonstrable that in respect to the quality of analytical treatment to which community data have been subjected and the significance of the relationships discovered through such analysis the surveys of the Division typify a standard which few other agencies in this field have approached.

The Division's surveys have produced both specific and general benefits. In the communities for which they have been made they have been the acknowledged means of attracting new industry, of achieving definite improvements in the conduct of local government and effecting reductions in municipal costs, of bettering transportation facilities, of arousing public interest and morale, of stimulating local civic and commercial organizations, and in particular of setting up definite objectives for community effort. General benefits include the raising of the general standards for the conduct of industrial surveys, as outlined, the provision of a central clearing house, free from commercial bias, for information relative to community problems of an economic nature, and the contribution of its almost unique point of view to the consideration of social-economic problems.

In addition to its formal survey projects, the Division has identified itself through its coöperative research activities with many business and civic organizations, particularly in the Boston district. It has collaborated with these agencies in the study of their problems. Its work has brought it into contact with public officials who availed themselves on several occasions of its disinterested point of view, especially in regard to questions of municipal finance. The Division was also able in the course of its work to secure research assignments for several departments and members of the instructing staff of the Institute.

Through its bulletin service, the Division was able to establish itself

as an authoritative source of information and advice in both industrial and municipal fields of activity. Its files attest the appreciation felt by public officials and others for the contents of many of its publications; outstanding editorial comment of a favorable nature from representative newspapers was of frequent occurrence.

The Division did not, of course, "pay its way." This might have been predicted from the first as it is extremely rare to find any agency of economic research which is self-supporting. That the Division succeeded in defraying its expenses to the extent indicated by its financial statements should be a matter of gratification to its sponsors.

During the year prior to its discontinuance, agreements had been negotiated with several of the leading utility industrial development departments covering practically the entire United States, to utilize the facilities of the Division in future work. Due to the unfortunate economic conditions prevailing it has not been possible to determine the effectiveness of these agreements which had been expected to provide work to more than utilize the present facilities of the Division under normal conditions.

What the career of the Division would have been if it had not lost its director, Professor William A. Bassett, if the economic crisis had not intervened, and if the finances of the Institute had permitted a continuance of the demonstration, are questions which, in the words of Doctor Compton, have been asked but not answered. The record, in other words, cannot be considered conclusive; under different auspices different things might have happened. Certainly the work done stands on its own merits, and those who have been so fortunate as to be a part of it are grateful for the opportunity for service which the operation of the Division has afforded."

THOMAS L. HINCKLEY, *Acting Director.*

Society of Arts. The activities sponsored by the Society of Arts remained unchanged during the past year. The usual four Popular Science Lectures, each given on three consecutive days, continued from December to March and attracted capacity audiences on almost every occasion.

The topics chosen for the lectures reflected recent developments in pure and applied science. Many novel experiments, shown before a public audience for the first time, were devised by the lecturers. The time and labor involved in working up elaborate demonstrations such as those shown in these lectures is often not realized when the experiments go off seemingly without difficulty.

The program for the year was as follows:

December 11, 12, 13.	LIGHT AND THE WORLD OF ATOMS. By George R. Harrison, Ph.D., Professor of Physics.
January 15, 16, 17.	AIRSHIPS — AMERICA STEPS AHEAD WITH THE AKRON. By Richard H. Smith, Ph.D., Professor of Aeronautical Engineering.
February 12, 13, 14.	LIGHT AND LIFE. By John W. M. Bunker, Ph.D., Professor of Biochemistry and Physiology.
March 11, 12, 13.	ELECTRONS AT WORK IN PURE AND APPLIED SCIENCE. By Wayne B. Nottingham, Ph.D., Assistant Professor of Physics.

H. M. GOODWIN, *Secretary.*

SCHOOL OF ENGINEERING

Aeronautical Engineering. Pending the completion of the work of the Committee on Junior and Senior Year Instruction, only minor changes and improvements have been made in the Aeronautical Engineering program. Briefly stated, these changes comprise a rearrangement of the program in aerodynamics, which brings the work on propellers into the junior year and a separation of the courses in structures from those in aerodynamics. At the same time, the structures courses have been slightly increased in scope and content. The work in power plants has been somewhat revised in the light of past experience. Owing to the untimely death of Professor Moore of the Mathematics Department, the graduate work in theoretical aeronautics has been taken over by this Department. The undergraduate work in theoretical aeronautics has been expanded to include a supervised study period. The undergraduate course remains under the Mathematics Department, although given by a member of the aeronautical staff. In the graduate program, courses in airship theory and in airship structures have been added, owing to a demand for this type of work, particularly from student naval officers.

In the field of aerodynamics the following are some of the more important additions to the equipment of the Department:

An apparatus for testing model airplanes with propellers in the five-foot tunnel; an experimental airspeed control for the smallest wind tunnel; and a small water basin for either visual or photographic demonstration of various types of fluid flow around aeronautic shapes and sections. In the field of engines the Department has designed and built a cylinder of the compression-ignition type for the testing of the performance of fuel sprays. In coöperation with the Electrical Engineering Department, a high speed motion picture apparatus has been developed to study the physical characteristics of sprays.

In the field of aerodynamic research, a two-year study of the effect of artificial turbulence of varying frequency and intensity on the total resistance of airship models and on thin boundary layer flows has been completed and is now being prepared for publication. The findings were very helpful in clearing up confusion in this difficult field.

A three-year study of the forces, moments, pressures and rotary derivatives of an airship in circular flight has been completed and is being prepared for publication. The results of this study contain important findings, chiefly on the forces and moments on an airship in a turn.

In structural research, considerable progress has been made toward correlation of our own test program with those of other universities and that of the National Advisory Committee for Aeronautics. Certain problems have been suggested to other institutions or they have been dissuaded from repeating work already being undertaken by others, or from undertaking work which could not be done by their organizations. At present, the Institute and some ten colleges are working on a reasonably well coördinated program in an effort to obtain engineering data for use in the design of all-metal airplanes — data which have been found to be of immediate benefit to the airplane industry. Several successful airplanes have been designed during the past year on the basis of data published in our progress reports and in the report of a year ago, and very favorable comments have been received from some of the designing engineers.

In the field of internal combustion engines, further work has been done on the fuel injection electric ignition system which was pioneered by this Department and is now being

taken up widely by the industry. Work is being done for the Detonation Subcommittee for the Society of Automotive Engineers in correlating the results of field tests with results of the Coöperative Fuel Research engine in the knock-rating of fuels. Some important results have been obtained and will be included in a report to the Detonation Subcommittee in the fall.

Coöperative work with the industry is still at a very low point, largely due to the depressed financial condition of the aeronautical industry. During the year, however, two interesting studies were made for industrial concerns; one on the effect of cowling shapes and openings on fuselage drag, and the other in regard to the drag and stability of an autogiro.

In the field of instruction we feel that the Institute should offer a basic course in fluid dynamics to serve as preparation for later specialization in aeronautics, hydraulics, naval architecture, etc.

Owing to financial limitations it has not as yet been possible to include any full-flight instruction for undergraduate students. This was recommended last year. We still feel that provision for it should be made as soon as funds are available.

The present wind tunnels take up a large amount of space, both inside and outside of Building 33. Substitution of more up-to-date types of tunnel for both the smallest and the largest unit would make more space available in the building, and would improve aerodynamic facilities generally. Such a change would be expensive, but should be definitely on the program for the future. If the old building which now houses the smallest tunnel should be razed, the situation would become acute, since three tunnels appear necessary to handle the work of the department.

In a rapidly changing and growing field such as Aeronautical Engineering, contact with other laboratories and with the industry seems essential. Boston is not favorably located in this respect, so that a program of this kind would involve considerable traveling expense. We strongly recommend, however, that provision be made for members of the Aeronautical Engineering staff to make inspection trips and to attend meetings to the maximum extent permitted by financial considerations.

C. F. TAYLOR.

Building Engineering and Construction. During the year, several changes have been made in Course XVII, heretofore known as "Building Construction." The name has been changed to "Building Engineering and Construction" and the curriculum, which, in its first two years, follows the basic engineering courses, has been further strengthened to fit its graduates more completely for the field which the course aims to serve.

Courses in heat engineering, elements of electrical engineering, materials, and structural analysis have been added and the requirement that courses in quantity surveying and surveying be given at the Civil Engineering summer camp during the summer, between the second and third year, has released regular school year time for these additional courses. The study of materials and the relation of structures and mechanics to field practice in building engineering, heretofore a part of the course in building construction, have been segregated into separate courses. The course in building construction now confines itself to the study of the use of materials, details and sequence of erection, time schedules and man power. It is felt that such changes will materially strengthen the course and make its graduates quickly useful to the industry and give them sufficient background to enable them to lead in their work.

During the year a Visiting Committee of six prominent builders from various sections of the country was asked to review the work of the course and to offer suggestions as to its betterment in a report to be submitted to the President and the Dean of Engineering. This committee, consisting of Gerhardt F. Meyne, Chicago, Frank H. Bowman, Providence, A. E. Horst, Philadelphia, T. W. Ryan, New York, L. C. Wason, Boston, and J. N. Willcutt, Boston, met at the Institute on May 10 and spent the day on this study. This committee has rendered its report to the President and to the Dean of Engineering and has generally approved of the course of study and the method of conducting the course. This report will be published in *The Technology Review.*

The course has been further endorsed by the Associated General Contractors of America through its New England branch, by the establishment of a scholarship for five years. This scholarship awards annually full tuition for the freshman

year, to one young man, a graduate of a secondary school, who by excellence of his preparatory school work, of his entrance examination and by personal interview shows that he merits such recognition. The scholarship also provides that a successful candidate, upon his graduation from the course, shall be given two years employment by members of the association.

During the year, the Associated General Contractors of America has also organized a junior chapter of the association among the undergraduate students of the course.

The program of research in brick masonry started last summer is being continued under the direction of Professor Voss. The cost of this work is being financed partially by the Trade Associations interested, and the establishment of a departmental research laboratory for this and other work in building materials is under consideration. Professor Voss and Mr. Peskin are pursuing advanced courses, with the view of interpreting the science of materials to the art of building; Professor Voss in the field of ceramics, cement and masonry materials, and Mr. Peskin in ferrous and non-ferrous metals and wood.

The Department has also undertaken the study of the economics of building, under the leadership of Mr. McSweeney, including appraisement, finance, and the many problems having to do with the small house, with land values, blighted areas, and the economic distribution of populations.

The enrollment has reflected the condition of the times and of the new cumulative rating system although the loss in numbers has been compensated by a higher average of scholastic standing. Because of conditions in the industry, the Horowitz prize was not awarded this year but its award will be resumed as soon as conditions permit.

R. F. TUCKER.

Business and Engineering Administration. Consolidation of position perhaps best summarizes the policy of this Department during the past year. In response to the general request for economy measures, the staff was lessened by one part-time and two full-time members. Other departmental expenses were reduced 10.5 per cent. These necessary retrenchments, coupled with a further increase of 9 per cent in student

registration in the Department, made the adoption of the foregoing policy essential.

The experiment in the training for administrative responsibilities of a limited number of Technology graduates of unusual promise, made possible through the generosity of six members of the Institute Corporation who contributed fellowships of $1,500 each, was carried forward under the general supervision of Professor Raymond, with satisfactory results. The Department is greatly indebted to its Advisory Committee and other business executives, as well as members of the Institute Faculty who coöperated in the special series of weekly evening seminars extending throughout the two school terms. Through the further generosity of the donors the continuation of the undertaking has been assured for the coming year.

The rapid growth of graduate work in this Department has emphasized certain problems confronting the student who has matriculated from an engineering course conducted in a non-industrial area. A series of evening dinner conferences with leading Boston executives was organized under the direction of Professor Eddy, which gave such students opportunity to become familiar with the manufacturing viewpoint.

An even more pressing problem has been that of enabling graduate students conveniently to study and confer with one another in the preparation of business cases. Suitable living facilities for married graduate students are not now available at Technology and the Department wishes strongly to support such housing plans as those proposed by Messrs. Kilham, Gilmore, Emerson and Brown, to meet this difficulty.

The conduct of the motion picture library has revealed new opportunities for visual methods in our educational work. Professor Fiske, in collaboration with Mr. MacBrayne, has carried forward an experiment in the presentation of accounting procedures used by representative industries, making use of newly developed photographic equipment. The results of these studies will be tested during the coming year.

The Thorne-Loomis Foundation, sponsored by Mr. Alfred L. Loomis, a member of the Institute Corporation, again extended to the Department the use of a specially designed and equipped motor bus by means of which a group of ten students undertook an industrial camping trip of six weeks' duration

into Mid-Western, Southern and Atlantic States. The manufacturing background gained through the visiting of industrial establishments over this wide area has proved of distinct value to the subsequent pursuit of business subjects. The Department is most appreciative of this significant contribution to its educational work.

A feature of unusual interest to the student body was a series of lectures and laboratory exercises in simplified methods of production analysis, presented by Mr. A. H. Mogensen, formerly a member of the Faculty of the University of Rochester and now assistant editor of *Factory and Industrial Management.* As a result of this introductory presentation, a more extended treatment is planned for the coming year.

The abnormal conditions existing in industry and their effect upon graduates and undergraduates appeared to justify certain extra-curricular activities on the part of the Department. During the final weeks of the senior year, a series of colloquia was inaugurated, at which coöperating management engineers, bankers and business men presented detailed problems confronted by individual establishments. By this means, the students were given an understanding of the nature of current industrial difficulties and of remedies now in process of application.

Early in the year it became clear that seniors would encounter more than usual difficulty in finding employment after graduation. Students were therefore directed to analyze their situation and to capitalize all available contacts offered by family, relatives or friends in accordance with methods outlined by the Department. Periodic reports on progress were requested. In addition, contacts between senior students and past graduates of the course were established through a departmental correspondence clearing-house. As a result of these and other allied activities, somewhat more than one-half of the senior students and three-quarters of the graduate students succeeded in finding employment prior to their graduation. The relative success of these measures has encouraged the Department to widen these activities with subsequent classes.

During the early spring, the Department, in collaboration with the Department of Economics, conducted at the Walker

Memorial a business conference for graduates residing in New England. Morning and afternoon sessions were devoted to the presentation of five papers dealing with significant trends in economics, finance, marketing, accounting and production. A similar conference, held at the Technology Club in New York, was opened to all Institute graduates residing in this area. The large attendance at both conferences seemed fully to justify their establishment, and to favor their continuance in future years.

The Department also issued a series of eight letters to all Course XV graduates, suggesting ways and means whereby they could prepare themselves effectively to capitalize the ultimate turn in business.

Continued attention has been given by members of the staff to teaching method and facilities, and to the responsibility of the Department as a contributor to the progress of professional societies in the management field.

Members of the Department have been active in the work of professional societies; Professor Elder having been elected Chairman of the New England Section of the American Marketing Society, and Professor Fiske having been elected President of the Boston Chapter of the National Association of Cost Accountants.

Professor O'Connor conducted a new graduate subject dealing with the measurement of human aptitudes. In collaboration with Professor Eddy, he conducted individual conferences with one hundred freshmen, from which work samples evidencing their natural aptitudes were obtained. His studies throw new and significant light upon the type of student best fitted for Course XV. During the coming year, his researches will be extended to cover selected groups of graduates living about Boston and New York.

A step in the direction of reciprocation with other departments has been the establishment, in collaboration with the Department of Economics, of a summer school schedule which includes a sufficient number of prerequisite undergraduate subjects to enable the graduate of another course to attain a Master's degree with specification in this Department, in a period of one subsequent graduate year. Prior to the close of the second term, this arrangement was outlined to the heads

of other Departments and their suggestions obtained regarding graduating seniors, for whom such an additional training in business subjects would seem especially desirable. Students so recommended were acquainted with the plan and a number have availed themselves of the opportunity specifically to fit themselves for managerial, as well as technical, activities.

A second possibility to which the Department is giving consideration is the offering for inclusion in part or in whole in the curricula of other Departments, of a group of subjects in production, marketing, accounting, business law, and similar business functions. Especially designed for the student who finds in science or engineering his major interest, these subjects would be treated somewhat more briefly but no less fundamentally than in the present Course XV curriculum.

The present demands upon the teaching staff may preclude the possibility of such service to other departments until additional teaching personnel is available, or until Faculty permission be gained for limiting the number of undergraduate students entering Course XV.

The Department wishes to take this opportunity to express a deep sense of gratitude to Mr. John R. Macomber, who, as Chairman of the Visiting and Advisory Committees and as personal donor of special grants of funds, has furthered and assured the carrying forward of many of the plans of the Department. The advice and assistance extended to the Department by members of the Visiting and Advisory Committees and of the Corporation have likewise been most sincerely appreciated.

E. H. SCHELL.

Chemical Engineering. The work of the Department has continued to progress satisfactorily, coördination of subjects being improved because of minor changes in the undergraduate program.

For the first time in its fifteen years of existence, the companies coöperating with the School of Chemical Engineering Practice have experienced a severe and prolonged curtailment of industrial operations. Fortunately, our work has not been affected seriously, chiefly because our students are not dependent upon employment with the coöperating companies,

but function as an engineering unit independent of the plant organization. Though operations may be curtailed, so long as they do not cease adequate opportunity is provided for engineering investigations.

For twenty-five years the Research Laboratory of Applied Chemistry has been an important phase of the Department's work. Established for the primary purpose of training graduate students for industrial research, it has provided a contact with chemical industry which has been invaluable in keeping our professional instruction abreast of industrial developments. The decision of the administration to coördinate and consolidate the industrial research of the Institute under the general supervision of the Division of Industrial Coöperation is a logical one and is gratifying to members of this department who have long advocated this policy of industrial coöperation. As the Division of Industrial Coöperation has delegated to the Department the duty of supervising the research activities of the Research Laboratory of Applied Chemistry, it will continue to be a vital part of the Department's work.

The return to the Department of the work formerly carried on in Fuel and Gas Engineering will necessitate some changes in the curriculum, but as the two departments have coöperated extensively in the past, this change will not affect materially the opportunities offered graduate students for instruction in fuel engineering.

W. P. RYAN.

Civil and Sanitary Engineering. The activities of the Department have been marked by the increase in the number of graduate students and by the parallel development of advanced courses. The number of graduate students taking the greater part of their work in the Department increased from thirty-eight in 1930–1931, which number was ten in excess of any previous year, to sixty-one in 1931–1932.

Advanced courses offered formally for the first time during the year included one in the Design of Harbor Works and one in the Design of High Masonry Dams. The former subject was given in the previous year by request of the Philippine Government to one student and was taken last year by ten students. The latter subject was based on the methods used

in the design of the unprecedentedly high Hoover Dam now under construction in Colorado, and was given under the general direction of J. L. Savage, Chief Designing Engineer of the United States Bureau of Reclamation, and the detailed supervision of R. S. Lieurance, Bureau Engineer on Design of Dams, the services of these engineers being made available by the kind permission of the Hon. Elwood Mead, Director of the Bureau. J. B. Wilbur, instructor in the Department, participated in the conduct of this subject and will offer it for graduate students during the coming year.

In the undergraduate curriculum, no changes of significance have been made, although a gradual development of undergraduate subjects to comply with the development of engineering and science in the various fields proceeds continually.

Research work has been continued in coöperation with the Bureau of Public Roads of the United States Department of Agriculture, the purpose of the investigation for the year, as stated in the agreement, being "to accumulate and digest the data required for a broader and more accurate determination of the results of the simplified soil tests; to carry out systematic investigations concerning the effect of frost on roads; and to study the factors which influence soil movements."

In accordance with the agreement between the Institute and the Bureau, the latter has maintained Mr. Arthur Casagrande as its active representative at the Institute since November 1926. Unfortunately, it is necessary to bring this agreement to a termination at the end of September 1932 in view of the resignation of Mr. Casagrande and the inability of the Government to furnish anyone to fill his place because of the economy measures adopted by the Federal Government. It is to be regretted that this arrangement has been terminated and it is hoped that it may be renewed when conditions permit.

The Committee on Earths and Foundations of the American Society of Civil Engineers also continued coöperative work at the Institute during the year, maintaining S. J. Buchanan as a Research Assistant in the Soil Mechanics Laboratory, where he has served since June 1930. This work has been conducted under a special appropriation, which has now been

exhausted, so that it also will be brought to a close this year. The Department wishes to acknowledge the coöperation of B. F. Smith & Company of Boston, for its loan of a drilling machine, with tools and accessories, and workmen to operate it in connection with this research work.

The work in the field of soil mechanics has included an analysis of the settlements of existing buildings founded on clay deposits, the development of a reliable method of taking large undisturbed clay samples from borings, a theoretical and experimental investigation of the seepage through earth dams and dikes, and an investigation of frost action in soils. A new apparatus has been developed for the testing of the shearing resistance of soils. A new apparatus for unconfined compression tests was designed and built. Designs were developed for replacing some of the soil testing equipment which has become inadequate.

Owing to the conditions in the railroad industry, the Boston and Maine Railroad found it impracticable to accept any students in the Coöperative Course in Railroad Operation who were not in attendance at the Institute in the year 1930–1931, but the course has been continued for those who were accepted prior to that time.

As a result of the authorization by the Executive Committee to establish a Seismological Laboratory at the Institute, space for such a laboratory has been provided in the basement of Building 1 and plans for its equipment are under way.

The most important article of equipment to be placed in this laboratory is a shaking table for which tentative designs have been made. The purpose of this table is to produce vibrations of a nature which can be easily analyzed, thus enabling the testing of models of buildings, bridges, dams and other structures; also to permit the calibration of instruments devised by the Institute, and others, for the purpose of testing vibrations.

Mr. Braunlich of the Department has also made much progress in the development of a new accelerometer of a very short period, but has not yet attained the desired degree of perfection for this instrument.

The contact accelerometer developed by him last year

for use as a self-starter in putting recording apparatus into motion when earthquakes of sufficient amplitude and velocity occur has been installed by the United States Coast and Geodetic Survey in a number of stations and apparently is the most satisfactory type of apparatus yet developed for this purpose.

Early in July, the Wenner seismograph, ordered two years ago, was installed at East Machias and is now being regularly operated. Records from this seismograph are sent regularly to Government officials in Washington, and already numerous earthquakes have been noted. This station is the most easterly seismological station in the United States and should furnish valuable seismological data.

In the River Hydraulic Laboratory, investigations have been continued upon the causes of bank erosion along the Connecticut River and upon the transportation of sand by running water. Among other investigations worthy of note may be mentioned an experimental investigation of the effect of a lock in the Cape Cod Canal by two members of the United States Army Engineer Corps taking undergraduate courses in the Department. Other researches of a somewhat more technical nature have also been made.

Two studies in sedimentation were undertaken under Professor Camp's supervision during the past year. One of these was entitled "A Study of the Distribution of Suspended and Dissolved Solids in the Sedimentation Basin of the Cambridge Filter Plant." This study gave valuable information as to the performance of the Cambridge sedimentation basin. The other study was entitled "An Experimental Study of the Distribution of the Velocities of Approach to the Effluent Weir of a Model Settling Tank." The experimental work was performed in the glass-sided tank in the River Hydraulic Laboratory which was built originally for the Hartford dike. Valuable information was accumulated as to the distribution of magnitude and direction of velocities of current approaching the effluent weir of a settling tank.

During the past year Professor Camp devoted much time to a study of the theory of filtration as applied to rapid sand filters. Based upon experimental work done at Detroit and by Professor Tyler and Professor Camp at the Cambridge filter plant, a mathematical theory has been developed for correlat-

ing the following factors: rate of application of suspended matter to the filter, depth of the filter, size of the sand grains, and the loss of head through the filter. This work has not yet been finally completed, but it is hoped to publish it within the next few months.

The attendance at the twenty-first session of the Surveying Camp at East Machias during the summer of 1932 consisted of 49 students as compared with 44 in 1931. The charge per student for meals and miscellaneous expenses necessary for the operation of the camp was $1.47 per day as compared with $1.90 in 1931. The total charge per student for these items was $74.97 per man.

This year, for the first time, students in the course in Building Construction attended the camp, taking a considerable portion of the regular courses in surveying and, in addition, a course in quantity surveying and estimating given by Thomas F. McSweeney, Special Lecturer in the Course in Building Construction.

No instruction was given in Limnological Fieldwork during the session since no students in the Public Health Engineering Option of Course VII attended the camp.

The Civil Engineering instructing staff consisted of Professors Hosmer, Babcock, Howard, Fife, Liddell and Mr. Mitsch. Dr. William Warren Babson served as Resident Physician.

The class in mining surveying, held at the Mining Camp at Dover, N. J., was attended by 13 students. The instruction was under the general direction of W. C. Eberhard of the Division of Drawing, assisted by Professor F. Leroy Foster of the Mining Department.

C. M. SPOFFORD.

Electrical Engineering. Toward the end of the academic year Professor Bush was promoted to the post of Vice-President of the Institute and to that of Dean of Engineering, Professor Laws retired as an Emeritus Professor after a period of forty-three years on the staff, Professor Hudson was made Chairman of the Committee on Course IX. These changes have made modifications necessary in our staff assignments and program. Professor Bush was holding a leading relation

to the continuation and further development of our graduate work and department research; Professor Laws had the principal direction of our work in electrical measurements; and Professor Hudson has direction of the Department's teaching of students in the professional courses other than electrical engineering.

Happily for our convenience in readjustment, Professor Dahl returned this autumn from a sabbatical leave, full of vigor and ideas resulting from months of observation abroad. He will take direction of work somewhat in accord with what has heretofore been directed by Professor Bush, and a considerable bulk of Professor Bush's work will go into his hands. The remainder of Professor Bush's work will be transferred to others, which gives opportunity for placing greater responsibility on several gifted and competent younger men.

Lately Professor Bush has had charge of substantially all the research carried on by candidates for Doctor's degrees in the Department. This has grown into an extraordinarily varied and diverse field and we will hereafter assign these important lines of research to different men who are individual specialists in the aspects of engineering to which the particular researches pertain.

With respect to electrical measurements we are fortunate in having secured Professor Bennett as an Associate Professor in that subject last year, as he has been afforded a year of contact, and opportunity for observation and participation in the work, before Professor Laws retired. He thus can readily take responsibility for this work, besides continuing the broadening of our electrical measurements laboratories and our electrical measurements ideas in the manner planned at the time of his appointment. He will be aided by staff members who are particularly interested in the electrical measurements and electric circuit aspects of electrical engineering.

This Department has been seriously cramped for office space for its staff, for consultation with students, and for laboratory development. The pause in the rate of increase of students helped somewhat last year. Now we have available, as a consequence of the move of the Physics Department, three additional office rooms in which we have seated six members of our staff. We have also in the same manner received the assign-

ment of a small additional laboratory room. The present addition is an expedience and is not of sufficient moment to allow the full development of the Department. The primary need is to have addition to space which will allow further modifications and additions to our instruction and research to be made in keeping with the knowledge that has come into electrical science and arts during the nearly twenty years since the present buildings were planned.

We have successfully continued our work with Honors Group students. The comprehensive examination of the Honors Group seniors last June brought out a better set of papers than we have heretofore secured. It is necessary to here define our use of the phrase "comprehensive examination" because it is now used in many colleges with a scope less comprehensive than in our meaning. In our usage we mean an examination that is comprehensive in the sense of being directed toward correlating all material that the students should be expected to have become conversant with and mastered in engineering studies or collateral studies up to the time of the examination.

In our manner of setting a comprehensive examination we select examiners comprising two men from industry, one from the staff of another engineering school, and two from our own department staff. Associated with these five examiners is an additional member of our staff who is Counsellor in the Honors Group work but not for the particular students concerned. These men set the written and oral examinations and grade the papers. By this means we secure in our examinations a thread of direct and constructive professional approach, and at the same time coördinate the examination questions into an effective, unitary whole.

We are indebted to Mr. F. W. Peek, Consulting Engineer of the General Electric Company, Pittsfield, Mass.; Mr. G. K. Manson, Chief Engineer of the New England Telephone and Telegraph Co., his associate, Mr. J. W. Kidder, M. I. T. '06, of that company; and Professor T. H. Morgan of the Worcester Polytechnic Institute, for accepting the duties of examiners and for the manner in which they dispatched them in June.

Our graduate work continues to gain in influence, and expanding experience enables us to improve the quality of the

lecture and research work year by year. One of the most important steps in our undergraduate situation is in the revision of the specific electrical engineering subjects in our programs which lead to the S.B. degree. This was put under way during the year.

The problem of coöperative education where the industries are involved, as they are in connection with our Coöperative Course, is a complex one during great industrial depressions. In a depression of the present nature it is manifestly unreasonable for students to be employed where long-time employees with families to support have to be discharged. This is equally a matter of moment to the educational institution and to the industries which are coöperating in the work. Consequently, we have made temporary changes in the schedule of interchange between the Institute work and the works employment, placing the latter at a later period in certain of the students' programs so as to relieve pressure on the present unemployment situation of the coöperating companies. The spirit with which the companies coöperated with the Institute in working out a solution in this unusual situation is gratifying. The students also are to be commended for the intelligent manner in which they have recognized the necessity of adaptations to meet economic conditions.

The senior Colloquia, in which various companies coöperate by having their engineers give us rather intimate statements on matters of special development, have gone on satisfactorily and apparently will go on this year in spite of the depression.

Turning now to research matters within the Department — a summary of the work carried on during the past year comprises twenty-eight different researches, each of sufficient importance to be given its own setting under the direction of a specified leader. The scope of these extends from the development of a very refined thermocouple for measuring the variation of temperature during the passage of a sound wave (for the purpose of determining the qualities of the wave), to the transmission of radiation through fogs, the correction of night errors in radio course beacons for airplanes, the synthesis of electrical networks, various matters relating to electronic devices, the theory of dielectric breakdown in glass and rock crystal, conduction in dielectrics, diffusivity of heat in electrical conductors,

precision power factor measurements carried to very minute power factors, theory of radiation from antennas, electrical properties of cylindrical coils, new integraph problems, stroboscopic photography, problems relating to the best pedagogical processes in electrical engineering. This enumeration outlines the scope without mentioning details. Broadening the scope of the Electrical Measurements Laboratory will be of assistance in carrying on such work.

We have been fortunate also in the fact that Colonel Green has provided additional quarters and facilities for us at Round Hill and has continued his appropriation of money for carrying on electrical engineering researches. The additional quarters will be applicable, among other things, to carrying on the high voltage development work of Dr. Van de Graaff who is on the staff of the Physics Department. High voltage problems of much interest are likely to arise in the Electrical Engineering Department work as consequences of this development.

The Differential Analyzer has made some rather important progress in the solution of equations in mathematical physics during the course of the year, some of which are represented in published articles and others in publications that are projected.

During the course of the year the Police Commissioner of the city of Boston requested that an examination be made of the electrical communications arrangements available for his department, and that recommendations be made of needs in respect thereto. The investigation was carried out with Professor C. E. Tucker in charge of the work. A detailed report was placed in the hands of the Commissioner. The expense was defrayed by the city of Boston.

It seemed likely that our alumni who are teaching elsewhere (of whom there are nearly sixty, mostly in the faculties of engineering schools) would find it serviceable if they were provided with duplicates of some of the special materials we have developed for our own teaching and research, as far as such materials could be inexpensively duplicated and transmitted. We therefore have sent out information and data from time to time to such alumni. There has been a cordial and appreciative response.

The members of the staff during the year have made

fifty-one published contributions within the field of electrical engineering in its various aspects, three of which publications are books.

Members of the staff continue activity in professional, scientific and industrial committees, and in other relations of creative character. An interesting example is the expedition headed by Associate Professor Bennett which last summer carried an original, double Geiger counter into the Rocky Mountains for the observation of cosmic rays, and also made further observations of these rays, by means of an ionization chamber, along the west coast of North America from southern California to northern Alaska.

DUGALD C. JACKSON.

Electrochemical Engineering. The changes in the curriculum of the course in Electrochemical Engineering, mentioned in the last report, have been in successful operation during the past year. A further change by which students in this course will hereafter take work in electronics in the Department of Electrical Engineering instead of in the Department of Physics will be introduced this coming year.

Owing to the greatly increased registration of students in Physics it was decided in the allocation of space resulting from the transfer of work to the new George Eastman Research Laboratories, to assign the graduate research laboratory in electrochemistry, which had been temporarily given over to glass blowing, to the work in spectroscopy. While this disposition of space seemed essential for the proper development of the newer work in Modern Physics, it is to be regretted from the standpoint of graduate work in electrochemistry as it will necessitate graduate students in this course carrying on their research work in the general electrochemical laboratory where undergraduate students are working at the same time. Such conditions are not suited to the best conduct of graduate work. It is therefore hoped that space may again be found for accommodating the graduate work of the Department in a special laboratory. The registration in Electrochemical Engineering, which has fallen off during the past few years, is again increasing.

With the resignation last year of Dr. Knobel the Depart-

ment lost one of its members, trained as an electrochemist, whose assistance in directing thesis work has been missed. Dr. Stockbarger's work in the field of radiation measurements now requires practically all of his time except the direction of the laboratory course in electrochemical measurements. No important additions to the equipment of the laboratory have been made during the past year as the General Electric vacuum furnace, installed in the spring of 1931, absorbed a large portion of the current appropriation.

H. M. GOODWIN.

Mechanical Engineering. In last year's report mention was made of the fact that the Department was gradually developing a laboratory for special work in Air Conditioning and Dehumidification. During the past year eleven graduate students specialized in this particular field.

The three hundred thousand pound Emery-Tatnall machine ordered a year ago was erected in the Strength of Materials Laboratory in December 1931; a machine of two hundred thousand pound capacity especially designed for the testing in compression of concrete bricks, stone and similar material has been erected in the basement of the Testing Materials Laboratory. As several thousand specimens of such material as this machine is designed to handle are tested every year, this particular machine fills a long-felt want and incidentally saves the larger and more expensive machines from the wear caused by flying fragments, grit, etc.

The laboratory for experimental work in Photoelasticity was transferred from the Physics Department to the Mechanical Engineering Department in the early fall. In the new location sufficient space has been provided so that fifteen or twenty students may be given instruction at one time. During the year the laboratory has been used a large part of the time for research work and for graduate work on theses. A special course was arranged at the request of the Ordnance Department of the United States Army for the Army Ordnance officers who were detailed to Technology for special instruction. Several graduate students who are coming up for their degree in June

1933 and who are specializing in this branch have been working in this laboratory throughout the summer.

A very accurate tensile machine is now being installed to replace the rather crude dynamometers which were used heretofore in this laboratory. A special apparatus for temperature control has been constructed for maintaining high yet constant temperatures on specimens under tensile or compressive test.

The Machine Tool Laboratory has received during the past year gifts of machines and instruments to the value of about $4,000.

Professor Wilhelm Spannhake, one of the leading hydraulic engineers in Germany, was attached to the staff as a visiting professor during the past year. He gave two advanced courses which were attended by members of the instructing staff and by advanced students specializing in hydraulics. During the year he designed a special apparatus for experimentation in Cavitation. This apparatus was erected in the Engineering Laboratory and was ready for use early in April. As Professor Spannhake was obliged to return to Germany about the middle of April he had little chance to carry out any experimental work himself. Fortunately Professor Spannhake is to return in September and be with us for another year. During the summer the experimental work on cavitation is being carried on under the direction of Dr. Peters of the Department of Aeronautical Engineering.

There has been added to the Steam Laboratory during the past year a gasometer approximately five feet in diameter with a ten foot length of counterweighted bell. This apparatus will make possible the measurement of small quantities of air abstracted from condensers by dry air pumps or other vacuum generating equipment. This gasometer was designed by two students in connection with their undergraduate theses.

As has been the custom during the past several years an intensive course covering technical textile analysis and textile microscopy was given by Professors Haven and Schwarz to a group of mill executives and research men. The instruction which amounted to about one hundred hours, was distributed over a period of six weeks. One of the staff, Mr. K. C. Biswas, has, through the Division of Industrial Coöperation, devoted a

considerable portion of his time during the past year or two to textile mills where he has installed special laboratories for the physical and optical study of textiles and where many of the constantly recurring mill problems on production may be solved.

Appropriations, granted from the Textile Foundation Fund, by the Corporation made possible the addition of a complete automatically controlled central station system of humidification and dehumidification at any desired constant temperature, and has further financed a full-time mechanician who has built a number of specially designed instruments for use in textile research. From this fund additional appropriations covered the purchase of a number of optical instruments. Complete facilities are now available for stereoscopic photomicrography; research in the application of polarised light to textiles; investigations up to and including the oil immersion lenses by incident rather than transmitted light (a very recent development); and for the study of the reflecting power of textile surfaces under an extremely wide range of conditions. These developments make the textile microscopy laboratory probably the best equipped of its kind in the country.

In the textile testing laboratory an autographic Mullen Bursting tester of the latest design has been added; the abrasion machine has been improved and rebuilt; a new and improved automatic motor-driven thickness tester has been built; and an attachment to the Scott vertical testing machine has been added in order to make repeated stress tests possible.

Through the courtesy of the Universal Winding Company two latest model multiple head winders have been installed together with a working model of the new continuous, high speed warper creel.

The Textile Foundation in May announced the appointment of G. Gordon Osborne as a Senior Fellow to devote his time to research in textile microscopy at Massachusetts Institute of Technology during the coming year under the direction of Professor Schwarz, who had earlier been appointed a member of the Textile Foundation's Advisory Committee.

For the benefit of the Institute files as well as for the United States Institute for Textile Research, much effort has been devoted, with the approval of the President, to abstracting current literature concerned with textile research. This ma-

terial is published monthly in the latter organization's *Textile Research Institute Bulletin.*

Professor Schwarz has been appointed editor in chief of the United States Institute for Textile Research *Annual Review of Textile Research* which is being published under the direction of the Technology Press.

Professor Buckingham has been continuing his research on the Strength of Gears and has found in connection with his study, five distinct manifestations of wear, only two of which may be traced to the failure of lubrication. There is a possibility that some of the larger manufacturing firms may be interested in financing a more complete investigation of the whole subject of wear.

About two years ago the subject of applied kinematics was substituted for what was formerly called mechanism. This lecture course is supplemented by periods of supervised study in the drawing room which makes it possible to place more emphasis on graphical and on analytical methods.

Last year a general study — Committee Reports — was made a regular part of the curriculum of the second term of the fourth year for the mechanical engineers. As many of the seniors had already carried an extra general study in the third year the number taking this subject was somewhat smaller than was anticipated. The students who were enrolled in this course were very enthusiastic and many of the reports contained engineering material of considerable value. It is expected that during the coming year the enrollment from the Mechanical Engineering Department for this general study will be in the neighborhood of sixty.

Professor J. R. Lambirth who began work at the Institute in September 1884, having reached the age of eighty-four years, and Professor Robert H. Smith who started work at the Institute in February 1885, and has reached the age of seventy years, have been retired, each with the title of Professor Emeritus. In their long years of service these men have endeared themselves not only to their associates, but also to those students who were fortunate enough to work under their direction.

EDWARD F. MILLER.

Meteorology. During the year advanced studies in meteorology were pursued by two Navy officers and four civilian students. At the end of the academic year the degree of Master of Science was conferred upon four students. Positions were found for the two civilian graduates. Dr. K. O. Lange, formally of the Technische Hochschule, Darmstadt, was added to the staff and Assistant Professor D. C. Sayre was transferred from Course XVI to the meteorological section.

A new laboratory course was offered in meteorological instruments and was given by Dr. Lange. The meteorological seminar was conducted as a joint undertaking with the Blue Hill Observatory of Harvard University.

The Department worked in close coöperation with the Woods Hole Oceanographic Institution. A theoretical and empirical study of the wind stress on the ocean surface is now being conducted jointly by the two institutions. One of the students in the Department took part in the winter cruise of the M. S. *Atlantis* to the north equatorial current, assisting in the meteorological and hydrographic observations. Arrangements have been made for joint publication by the two institutions of research reports in physical oceanography and meteorology.

Twice daily, well analyzed weather charts for North America have been prepared. These charts were reproduced and copies mailed, daily or monthly, to a few American and foreign institutions in exchange for their publications.

The study of American air masses was continued and a report on the theoretical phases of this work was published in January 1932. The final report will probably not be ready before the spring of 1933.

With the aid of special grants from the Corporation, the Joseph Henry Fund of the National Academy of Sciences, and the Daniel Guggenheim Fund for Meteorological Research a Cessna monoplane equipped with a seven cylinder Warner engine was purchased and daily aerological flights from the East Boston airport were inaugurated on November 17, 1931. The flights were continued for six months until May 16, 1932. All together one hundred seventy flights with meteorograph were made; the maximum altitude reached was 5,910 meters. The number of forced landings was very small and only one

major repair was required. This is a very satisfactory record considering the fact that every effort was made to maintain regularity in the flights in spite of adverse weather conditions.

The aerological work was directed by Dr. Lange. Most of the flying, which was often of a strenuous character, was done by Professor Sayre. The aerological data is now being used in connection with our synoptic investigations. It is also being utilized for an investigation of the depth and character of the turbulent layer next to the ground.

In the course of the flights a number of Petri dishes were exposed and turned over to Dr. Proctor of the Biology Department for a study of bacteria in the free atmosphere. Some data was also collected for the Gipsy Moth Laboratory of the United States Department of Agriculture.

C. G. A. ROSSBY.

Mining and Metallurgy. The outstanding activity in the Department during the year has been in development of instruction and research in the field of physical metallurgy. The work in heat treatment and radiology which have been hitherto housed in other buildings more or less remote from this Department, are now brought together so that practically all of the work in the field of physical metallurgy is centralized on the fourth floor of Building 8. The need of space for research has also been recognized by the provision of two rooms with appropriate laboratory facilities. Great convenience and advantages are gained by these changes which are made possible in consequence of the completion of the George Eastman Research Laboratories and the reallocation of space made available thereby.

The growing development of physical metallurgy, its multiplying applications in industry, and the need for specially trained men have made it desirable to introduce three new courses this year which are to be offered as electives available either to graduate or undergraduate students. The first of these is a course in Light Alloys in which the alloys of aluminum and magnesium are given particular attention. The extensive use of these alloys in aircraft has emphasized the need for instruction in this field. The second course is one in the Metal-

lography of Welding. Although the art of welding has been highly developed, there is much to be done with respect to the metallurgical aspects of this exceedingly important industrial operation. It is believed that the Institute is the first educational institution in the country to offer instruction in this subject. The third course is one in Corrosion and Heat-Resisting Alloys. Engineers find an increasing need for alloys resistant to various types of corrosion and for metal which may be used at high temperatures. An attempt is made to be of service in these fields through the introduction of a course of lectures on these subjects.

Professor Hutchinson conducted instruction in Mining Practice, carried on with the Summer Mining Camp as a base. This year for the first time a visit was made to the anthracite region in Pennsylvania, where two days were spent in studying mining methods, coal preparation practices and engineering procedure. The noted zinc mines at Franklin, N. J., and the iron mines contiguous to the Camp at Dover were also visited.

In view of the partial or complete idleness of many metallurgical plants in Pennsylvania and New Jersey which have been regularly thrown open to our classes, suggestion was made by one of the operating companies that plant visits be omitted this year. In place of the customary visits, Professor Hayward gave the instruction at Cambridge and adopted moving pictures as a means of successfully introducing to the students an understandable and vivid impression of the metallurgical industry.

The value of teaching geophysical prospecting field methods has been greatly enhanced by the acquisition of state land nearby, where ample space permits of full-scale practice. An increased amount of time, one hour weekly, has been allotted to undergraduate instruction in mining methods and the following subjects added to the work: lectures on deep borehole survey methods; exercises in determination of specific volume factor; and a summary of the results of experiments in mining by fire. These subjects are given by Professor Foster.

Professor Hayward reports gratifying results in applying to undergraduate instruction some of the methods found successful with graduate groups. The new practice consists of assigning subjects in advance so that the members of the class

may come prepared to engage in informal round-table discussions.

New equipment added to the graduate laboratory of Metallography includes eight (8) Bausch and Lomb Metallurgical microscopes and a polishing machine. Additions to the laboratory of Radiology are one X-ray diffraction apparatus, built in Sweden for high precision work; a radiographic tube of 300,000 volts capacity and a 50,000 volt generator and rectifier. The laboratory of Ore Dressing has acquired a new super-high-intensity magnet and the laboratory of Fire-Assaying an electric muffle furnace.

During the year Professor Homerberg lectured on the subject of nitriding before Chapters of the American Society of Steel Treaters in New Haven, Newark and Philadelphia. Professor Homerberg received a most enthusiastic reception at these meetings. At the State Normal School at Fitchburg Professor Walsted delivered a lecture on the metallurgical aspects of Electric Welding to a group of one hundred teachers of vocational trades subjects in metals. He also spoke before the American Society of Steel Treaters in Worcester.

The members of the staff continued active research in their particular fields. The subjects of the researches undertaken by applicants for the Degree of Doctor of Science in Metallurgy are interesting and indicative of the opportunities for investigation in the science of Metallurgy.

W. SPENCER HUTCHINSON.

Naval Architecture and Marine Engineering. Although there have been no important changes in Course XIII, in XIII-A a new arrangement has been made with the United States Navy whereby the Construction Corps officers come to the Institute for three years training instead of two. This is a reversion to an earlier arrangement and is more satisfactory in that it allows opportunity for more thorough training in the technical work.

In the course in Ship Operation, it was felt that there was a considerable need for classes in economic geography, and these have now been arranged in coöperation with the departments of Biology, Geology, Economics, and Business Administration.

Work on the design of the hydrodynamic laboratory has been temporarily suspended until there seem to be more immediate prospects of its realization than there are at the present time.

J. R. JACK.

General Science and General Engineering. Professor C. L. E. Moore died on December 5, 1931 after serving for eleven years as Chairman of the course. The administration was continued by Professor R. G. Hudson as Acting Chairman. At the end of the year the responsibility for the course in Mathematics, IX-C, was transferred to the Mathematics Department. It is now designated as Course XVIII. The original divisions relating to General Science and General Engineering continue to attract students who prefer to pursue objectives not furnished by other courses at the Institute.

R. G. HUDSON.

SCHOOL OF SCIENCE

Biology and Public Health. The year has been one of successful development. The number of undergraduate students has remained at nearly the same level as during the preceding year, in which it was at a maximum in the history of the Department.

There has been a distinct upward trend both in the number and the quality of our graduate students. For the past two or three years the problem of space has been a pressing one, several of our laboratories are taxed almost to capacity, and the Department has been forced to utilize parts of storage rooms and other inconvenient places for laboratory space for graduate research. This condition has been happily remedied, at least for the coming year, by the allocation of space for three new research laboratories in the large drafting room contiguous to the departmental offices, and by space elsewhere in the Institute. The present crowded condition demonstrates anew the need for the projected Sedgwick Memorial Laboratories.

The changes in curriculum reported last year have worked advantageously. Special attention has been given to the presentation of the fundamental courses in biology, zoölogy and

botany, not only as the basis for the more advanced work of the undergraduate curriculum, but because of their broadly cultural and philosophic value. While biology was formerly looked upon as an inexact science, it is increasingly evident that its greatest significance and use as a discipline for logical thinking can be obtained when the phenomena of living matter are considered in relation to the underlying chemical and physical forces. This point of view is especially important when the problems of personal and industrial hygiene, public health, industrial microbiology and biochemistry are approached. Bacteriology and biochemistry continue to command the deep interest of our own students and also attract the graduate students of other departments, and these subjects are receiving the most careful thought by those in charge.

A new and comprehensive course in sanitation for fourth year men in Public Health Engineering was given for the first time during the year. In this, special attention was paid to the problems of city milk supply, housing, eradication of dangerous insect pests and the accidents and city nuisances such as impaired air supply, smoke and noise which have been increasing concurrently with advances in urban development and the use of motor transport.

The courses in food technology and industrial microbiology have been materially strengthened and more logically arranged. It is gratifying to find that some of the officials of important industries are taking a deep interest in this aspect of our work and have evinced a fine spirit of coöperation.

The Department suffered a great loss in the death of Professor Slack, whose thoroughness, professional standing, and nobility of character made the work under his direction of high repute. While unable to meet his classes or attend to his work in the Infirmary during the greater part of the year, he was throughout the whole period of his illness, invaluable in the help and wise suggestions which he gave to the junior members of the staff who conducted his work with unceasing care and praiseworthy loyalty to their former teacher.

Dr. John Webster Williams who comes to us as Assistant Professor after several years of successful teaching and research in the Tulane University Medical School, will assume responsibility for the courses in infection and immunity, public health

laboratory methods and pathology, and will conduct the laboratory of the Homberg Infirmary, which serves as a research laboratory for graduate work.

The increase and growing importance of our graduate work has been notable, and interest in this field remains unabated. The candidates for the higher degrees of Master of Science and Doctor of Philosophy form a considerable group of students of high grade and excellent scholastic influence.

While the Department has no separate division of research, the year has been characterized by an activity in this field in which all members of the staff have shared.

Professor Turner's studies on Intermittency of Growth in School Children have thrown new light on this phase of child development, and have been most favorably commented on in America and Europe. It is interesting to record that the leading English medical journal (*The Lancet*) has made his work the subject of editorial approval. He has also brought out during the year the first text on Health Education.

Professor Bunker and Mr. Harris have continued their important researches on the relation of nutrition and light to the control and cure of certain deficiency diseases.

Professor Horwood has prepared a text on the Sanitation of Water Supplies, and has contributed to the educational material presented in the publications of the White House conferences. In coöperation with Professor Prescott, he has shared in a new and complete revision of Sedgwick's Principles of Sanitary Science and Public Health which has for years been a classic.

Professor Proctor, also in coöperation with Professor Prescott, has nearly completed a text on Food Technology, a division of the departmental work which has grown rapidly and which will now be largely under his direction.

Professor Prescott, by invitation, presented papers before the American Public Health Association on the Training of Public Health Engineers, and before the American Society of Refrigerating Engineers on Bacteria in Relation to Low Temperatures.

Coöperative research programs have been carried on during the year with important industrial groups, especially the Frigidaire Corporation, and Frosted Foods, and fundamental

data have been thus secured and published for the information of those concerned with these industries.

The working equipment of the Department has been materially improved by extensive additions to the supply of high-grade microscopes, bacteriological apparatus, thermal couples for work in testing the efficiency of food sterilization, a high-speed centrifuge, a two-stage vacuum pump, and other special devices for class and research work. Thermostats of unusual sensitivity of control have been developed by staff members, and have made possible significant work on the thermal relations of microörganisms. Special apparatus has also been constructed for the prosecution of highly accurate work in biophysics and biochemistry, and for the study of special fermentations and other processes of possible industrial significance.

A stimulating conference on the work of the Department at which the Corporation Visiting Committee and the Advisory Committee on the Department met jointly, was held in March. The Department wishes to express its deep appreciation to these groups for their support and coöperative attitude.

The Sedgwick Memorial lectures and Delta Omega Lecture were given by distinguished and prominent men in the field of Public Health. These lectures were open to all who wished to attend and were of great service in bringing out the importance of the type of work represented by the Department.

S. C. PRESCOTT.

Chemistry. No single subject offered in the Department receives more thought and attention than that designed for the first-year students. No subject on the other hand receives, or is likely to receive, more criticism from students and staff-members alike. The reasons for this are numerous and interconnected but, apart from the difficulties of dealing with large numbers of students, are essentially related to the diverse educational and cultural background of the entering students. This condition must evidently continue for a long time, yet it is equally evident that the present difficulties could be partially eliminated if it were possible to perfect more fully the means of measuring the entering student's aptitude for intellectual pursuits.

The Department has continued during the year in the attempt to adjust the present course along lines which bear as directly as possible on the Institute's general problem of assimilating the students into its educational frame. From this point of view the study of Chemistry is used as a means of preparing and developing the student's mind to recognize the fundamental importance of principles and their use in dealing with natural phenomena. The degree to which this objective is realized is, at the same time, a measure of the utility of the course in differentiating unmistakably the intellectually gifted students from those who, however intelligent, are unsuited to continue further in attempting to prepare for careers in which success is only possible for those of more than average natural endowment.

The first term enrollment in the subject was 602, a reduction of nearly 14 per cent from the similar class of 1930–1931. A study was made at the end of both terms of the grades of the students in the examinations as related to the classroom grades, and the distribution of grades for each term was also investigated. The results indicate some interesting cases of deviations between average recitation grades for the different sections and average examination grades. A continuation of such statistical study may point the way to correcting or improving the organization and methods of conducting the course. It may be expected also to lead to more even and unified instruction.

Reference was made in last year's report to the plan of using analytical chemistry as a means of cultivating a generally valuable precision and facility in manipulative technique. The older objective was to train chemical analysts; a vocational rather than an educational objective. The consolidation of all the subjects into similar units has proved to be sound, and as like procedures are adopted in other departments it will be possible to effect further consolidation within the Department of Chemistry with resultant saving of the time of both students and instructors.

The most notable development of the year was the revision and reorganization of the basic course in organic chemistry for the third year. The experiment was tried of converting course 5·41, lectures, recitations and problem work, into a comprehensive general introductory course in organic chemistry

suitable, not alone for Course V, but for all other departments requiring the subject. For students specializing in chemistry the course is a precursor and foundation for the more advanced lectures and laboratory work of the second term.

There has been a considerable change in the laboratory space available for organic chemistry as a result of the transfer of laboratory 8–410 to the Mining Department. New laboratories have been created out of the space vacated by the Research Laboratory of Physical Chemistry. The capacity of the new organic laboratory is less than the combined capacity of the two old units, but there are very real advantages in the new arrangement, chief of which is an increase in economy of laboratory teaching.

With the increase in available space as a result of the new Eastman Laboratories, there will be more adequate facilities for carrying on fourth year theses. It is felt that the fourth year thesis work is of great importance; first, to the student in giving him the valuable experience of conducting a research in a field of his own choosing, and second, to afford the staff a measure of a student's aptitude and ability for graduate work.

The course in micro-chemical and optical methods has made steady progress through the year and is fulfilling a need long felt.

In mid-spring the new Eastman Laboratories approached the point in construction where equipment and installations could be transferred from the scattered quarters in other buildings. The period of transition and moving has been a difficult one and has naturally interrupted the even progress of study and research. The tearing out of numerous complex installations of apparatus, the result of years of patient effort, was heart breaking but endurable because of the knowledge that new and admirably suitable quarters were to permanently replace the inadequate, scattered and really unsuitable rooms in use since 1916. There can also be no question but that the union of the graduate divisions of Physics and Chemistry in the Eastman Laboratories is to mark a new era in the development of the Institute into a great institution of science and progressive scientific engineering.

It is a pleasure to refer to the devotion of students and staff to the business of transferring the equipment to the new

building. Time and convenience were alike sacrificed without stint until mid-August when it was insisted that rest and recreation be taken until the beginning of the term. Many problems relating to the accommodation of equipment and installations to the new environment will be encountered and solved during the semester and by the first of the year the hardships of transition will be but a rapidly fading memory under the evident enthusiasm inspired by the possibilities offered by vastly enlarged opportunities.

During the year there were fifty candidates for the degree of Doctor of Philosophy and twenty-four for the degree of Master of Science. It is quite evident that the question of numbers in the graduate school is entirely secondary to quality, and no inconsiderable amount of time and discussion has been spent during the year to improve the methods of selecting our graduate students. There has been a rapid development in the facilities for graduate research and investigation during the period since the war. The completion of the Eastman Laboratories makes possible growth unhampered by limitations of space. Administrative procedure has been adopted which relieves the staff of much of the burden of routine and detail involved in an increasing number of applications for admission to graduate study.

The search for a method of testing candidates for their fitness has been made by attempting a synthesis based on the procedures and methods employed by the chemistry departments of other institutions. Such a method of solving a problem has certain obvious weaknesses, but discussion has been stimulated, and with a clear recognition of the dangers of adaptation, certain changes in procedure have been made.

It is not too much to state that no single circumstance has been more helpful, stimulating and generally important during the year than the allotments of money received from the Rockefeller Fund for Scientific Equipment. The amounts for the latter purpose hitherto available from the regular budget of the Department have been sufficiently meagre to be seriously restrictive of the kinds and scopes of investigations which could be undertaken. Substantial amounts from the Rockefeller Fund have been expended by the Research Laboratories of Physical Chemistry, Organic Chemistry and Inorganic Chemistry.

The increasing importance of low temperature work and the large amounts of liquid air used in the Departments of Physics and Chemistry emphasize the pressing need for facilities and equipment for maintaining low temperatures and producing liquid air. The Institute possesses the talent to create a cryogenic laboratory of outstanding and international importance and it is urgently recommended that serious attention be given to a program which, beginning with the machinery required for adequate supplies of liquid nitrogen, will lead in a scheduled time to facilities for the lowest temperatures obtainable using liquid hydrogen and helium.

The Department takes this occasion to express its regret at the retirement of Professor H. Monmouth Smith. Professor Smith contributed without stint of his time and abilities to the success of the very difficult course of first-year chemistry. The Institute loses a loyal and devoted staff member; his colleagues a generous, helpful and unselfish friend.

As in preceding years the Visiting Committee has given the Department the benefit of its counsel, encouragement and support. The members of the staff appreciate deeply these unselfish services rendered by those whose time and energies are ever sorely taxed.

F. G. KEYES.

Geology. There has been a most valuable addition to the staff this year in the person of Professor Louis B. Slichter. Professor Slichter has given instruction during the year in introductory geophysics, seismology and theoretical geophysics. The Department has long desired to be in a position to give adequate instruction in the science and application of geophysics, a subject of continually increasing importance.

Two courses were given by Special Lecturers during the year, the first in deposits of coal and oil by Dr. W. L. Whitehead and the second in micropaleontology given by Dr. J. A. Cushman at his well-known laboratory in Sharon.

In graduate work in the Department there were ten candidates for the degree of Doctor of Philosophy or Doctor of Science, and four candidates for the degree of Master of Science. There were nine undergraduate and three special stu-

dents. Instruction was given to 370 students outside the Department.

The equipment of the Department has been increased by the acquisition of apparatus for polishing sections of ores, a camera for photomicrographs, a binocular microscope and apparatus for the separation of heavy minerals. The new X-ray Laboratory, which has been established from an appropriation of five thousand dollars from the Rockefeller Foundation Research Fund, is now in operation and Professor Buerger is undertaking extensive examinations using this equipment.

Professor Lindgren has continued the editing of the Annotated Bibliography of Economic Geology, issued under the auspices of the National Research Council. Four volumes have now appeared, 1928, 1929, 1930 and 1931. It is expected that the new edition of Professor Lindgren's book on Mineral Deposits will be published during the coming academic year. The other members of the staff have been active in research and the writing of scientific papers.

With respect to equipment and laboratories, the Department now has quite complete facilities. However, the question of space for expansion is still rather a serious one. A step in the solution of this problem is the proposed combination of the libraries of the Geological and Mining Departments. This will make available the space occupied by the Geological Library.

WALDEMAR LINDGREN.

Mathematics. There have been no outstanding developments in the work of the Department during the past year. The twofold task of giving all undergraduate students elementary instruction in mathematics as a tool for applied work, and of encouraging in a few undergraduates and in an increasing number of graduate students a deeper interest in advanced mathematics, has been carried on as in previous years. The scientific production of the Department is indicated by the list of publications, which appears later in this report.

A change which affects next year rather than this is the transfer of Course IX-C, Mathematics, to the charge of the Department, with the title of Course XVIII. This placing of the Mathematics course on a par with the other course in pure science will be of great advantage to the Department.

The Department suffered a severe loss early in the year in the death of Professor C. L. E. Moore. A fine scholar, an earnest teacher, eagerly interested in research both by himself and by his colleagues, his place will be hard to fill.

Professor Phillips returned to duty in September, after a year's leave of absence, and Professor Wiener has been in Europe during the year.

Professor Courant of the University of Göttingen visited the Institute and delivered a lecture on "Connections between Differential Equations and Calculus of Probability."

F. S. WOODS.

Military Science and Tactics. During the year, a survey of the instructional requirements of the R. O. T. C. has been made with a view to an improvement in the courses of instruction. No material changes are contemplated in the first, third, and fourth years, but the second year is not entirely satisfactory and will be made the subject of further study.

Approximately one hundred and thirty thousand rounds of caliber .22 ammunition were fired on the small-bore range by students under instruction, by the Varsity, R. O. T. C., and Freshman Rifle Teams, and by the Pistol Team. In intercollegiate and National Rifle Association matches the teams had a most successful year but were greatly handicapped by the small range, which was in almost continuous use during the season, but which is no longer adequate for the demands being made upon it. As soon as conditions permit the present range should be replaced by a range of twenty firing points.

The R. O. T. C. Band, under excellent leadership, showed a marked improvement over the preceding year and gives promise of becoming an excellent musical organization.

S. C. VESTAL.

Physics. Important additions both to staff and equipment have been made by the Department of Physics during the year, first in importance being the completion of the George Eastman Research Laboratories. The Spectroscopy Laboratory, adjoining the main laboratory and connected by a cor-

ridor, was finished early in the fall, and the extensive spectroscopic research was installed and in active progress by the middle of the year. The main building, however, was not completed until about the first of June, and while the Department moved into the new quarters during the summer, the real beginning of research activity in the laboratory will not come until the next academic year.

Professor P. Debye of the University of Leipzig, and Professor Linus Pauling of the California Institute of Technology, both lectured under the joint auspices of the Departments of Physics and Chemistry, Professor Debye speaking on the determination of molecular structure by X-ray scattering, and Professor Pauling on various problems of molecular structure. In addition, Professor R. B. Brode, of the University of California, was on the staff for the spring term, giving some of the regularly scheduled courses of the Department.

There has been considerable improvement in the teaching of the Department during the year. In the freshman course, the laboratory work has been rearranged so that the sections meet every week. This has meant a considerable increase in the number of experiments performed, and the laboratory is now better equipped than it has been previously. In the first part of the fall term experiments are not performed in the laboratory, the time being used for the supervised solution of problems, a particularly desirable thing just at that time, when the students are first meeting the difficult mathematical ideas of mechanics. The lecture, recitation, and problem work of this course have also been greatly improved. A set of notes and problems has been prepared which greatly facilitates the teaching, and continuous increase in the equipment of the lecture room has led to improvement in the demonstration lectures. In the sophomore course, the most notable change has come in the second term. This time, previously used for the work in heat, is in the new arrangement devoted to optics and modern physics. In connection with this change, a number of new experiments were developed for the laboratory work. In addition, during the last few weeks of the term, lectures on topics in modern physics were given by various members of the staff on subjects to which their researches had contributed.

The new program of advanced courses, worked out during

the previous year, was put into operation for the first time. Although a few minor modifications have proved desirable, in general the scheme has worked very well, both as to the undergraduate and graduate work. In this connection, it may be mentioned that the number of students showed a gratifying increase over preceding years.

In research, the progress during the year has been very satisfactory. Much of the work has been in the nature of developing and starting new experiments, so that although not many complete results have been obtained, the foundations of a number of new research programs have been laid. One difficulty in connection with the research which still persists in spite of the new laboratory is the lack of a suitable supply of liquid air. If the projected cryogenic laboratory were to be built, this would be taken care of, but in the meantime it might be worth considering whether a liquid air machine could not be obtained to take care of our needs in that line, with the idea of later transferring it to a cryogenic laboratory.

JOHN C. SLATER.

SCHOOL OF ARCHITECTURE

Architecture. The year 1931–32 saw the graduation of the first class to complete the five-year course. As the purpose of adding a year to the previous four-year course was to provide opportunity for more thorough study of essential subjects rather than the addition of new subjects to the curriculum, the performance of last year's graduates was of particular interest. The advantage gained by the extra year was apparent in the thesis performance of the graduating class. The last ten weeks of the year were devoted to the study of this thesis, the subject and program for which were in each instance prepared by the student and the final drawings developed and presented without assistance or criticism. A group of teachers representing all the essential elements in the curriculum supplemented by a practicing architect passed upon the problems in the course of an oral examination of each student. The results were thoroughly satisfactory, an unusually high average of performance was

attained, together with a unanimous expression of interest and approval by the students themselves.

Present and former students again evidenced the quality of their training by winning scholarships and prizes outside of the Department, J. A. Russell winning one of the two Fontainebleau Scholarships offered by the Beaux Arts Institute of Design, and B. L. Smith the A. W. Brown Traveling Fellowship, while F. M. Moss was awarded the medal and prize offered by the American Institute of Architects.

The graduate year continues to draw students of high quality from other architectural schools both in this country and Canada. Under Professor Carlu's inspiring criticism they respond enthusiastically and thus create a standard of performance that is a constant incentive to the other grades.

The effective teaching of design, particularly in the early years, continues to be one of our major problems. Satisfactory progress has been made in the basic teaching of abstract design as an approach to architectural design. Progress has also been made toward a simplification of our methods of design-marking to conform to procedure in other courses in an attempt to focus student attention upon results rather than upon details. A real effort is needed to convince the student of the value to him in his future career of the mathematics, languages and history that play so prominent a part in his first year's curriculum. This calls for a better correlation between these subjects and those more obviously related to design.

The library is the heart of our architectural activity and the increasing availability of its resources to aid the student in all branches of his work is one of the accomplishments of the past three years. A larger appropriation for the purchase of all sorts of library material, books, slides, photographs, would be of great advantage to the Department.

The Department is indebted to Mrs. Henry Bigelow, A. Farwell Bemis, J. Laurence Mauran, and Edwin S. Webster for their continued and loyal support on behalf of our Fontainebleau Scholarship. We are also indebted to the Fletcher Quarries for their generous gift of two masterly drawings by Ernest Born, and to the many instructors and officers of the Institute from whom we receive such unfailing support.

WILLIAM EMERSON.

Architectural Engineering. Since the report of last year there have been no changes of policy, of curriculum or of staff personnel in the course in Architectural Engineering.

The course schedule is still in a state of transition and the complete arrangement of studies approved by the Faculty in March 1931 will not become fully operative until 1932–33.

As would be expected, the results of the business depression with the consequent falling off of building projects, almost to the zero point, are being reflected in the enrollment of students in the course. This is especially true of the first and second years, the junior and senior years having retained an approximately normal registration. There are two candidates for the Master's degree.

Every effort was made last spring, through many letters sent to alumni in all parts of the country, to assist in obtaining positions for the students. The immediate outlook for such positions was discouraging. A small number of the graduates of last spring who could afford to do so gave their time without salaries for research work in engineering under the direction of one of the engineering firms, believing that the experience and the contacts thus made, would be of much value.

W. H. LAWRENCE.

Drawing. The reorganization of the methods in teaching drawing and descriptive geometry which was completed last year is being continued, and there is every reason to believe that the new plan is producing very satisfactory results. The courses are continually being studied with the aim of increasing their interest and efficiency. A new text covering very completely the underlying principles of descriptive geometry, as now being taught in the Division, has just been published by Professor Harry C. Bradley and is being used in the classes.

W. H. LAWRENCE.

DIVISION OF HUMANICS

Economics and Statistics. The principal changes in the work of this Department lie in the development of graduate courses, due in part to the building up of a graduate group in Course XV, and in part to the growing demand of engineering courses for specialized studies in the field of Economics. Two courses on the Financial Administration of Industry were added to the graduate curriculum under the direction of Professors Armstrong and Freeman. A graduate course in Current Economic Problems was also offered, in which nearly all the members of the staff participated. Professor Freeman gave an evening course during the first term in International Economic Problems to the Fellows in the course of Business and Engineering Administration.

Several members of the staff also took part in discussions, organized by graduates, relating to the present depression. Two meetings were held, one in Boston and another in New York, which were largely attended. Professor Dewey served during the summer of 1931 as a member of the Board of Arbitration appointed by the United States Board of Mediation to settle a wage dispute between the order of Railroad Telegraphers and the Illinois Central Railroad, and again in March, 1932, as a member of an Emergency Board to report to President Hoover the facts concerning a railway dispute, threatening a strike, on a road in Louisiana.

In the undergraduate course in elementary economics there has been a noticeable increase in student interest, due to the use of a new textbook and the continued effort to supply outside reading related to current economic policies.

DAVIS R. DEWEY.

English and History. In July, 1932, a summer session for teachers of English in Engineering Schools was held at Columbus, Ohio, under the auspices of the Society for the Promotion of Engineering Education. Professors Pearson and Robinson gave two lectures each during the session, and Mr. Frederick G. Fassett, Jr. attended as a regularly enrolled member throughout the period. The meetings proved extremely valuable, both as a demonstration of the important place which

English is now occupying in the programs of engineering schools, and as a source of suggestion for improving the fundamental training in oral and written work, and in reading. Special stress was laid on the need of continuing English in the upper years by means of courses in report writing, and in the oral presentation of technical papers. The members of the Department who attended had the satisfaction of learning that its work is in line with the best that is done elsewhere and feel that they can bring to their colleagues new resources for the work of the coming year, as well as new zeal.

It is to be noted with satisfaction that at the Institute during the last few years required courses in English for third-year and fourth-year students have been introduced by some of the departments. Other departments, through the members of their own staffs, give systematic attention to developing the ability of their students in oral and written expression. The result is that Institute graduates are attaining a higher standard of proficiency in English, and are more generally recognizing its importance to them as professional men.

In the death of Associate Professor Winward Prescott the Department has suffered a great loss. Since 1916, when he joined the staff, he has been an alert and effective teacher. The course in report writing was conducted by him with great success, and his contribution to other courses was no less distinctive. As a teacher and as a man he was highly regarded by both his colleagues and students.

HENRY G. PEARSON.

Modern Languages. In the language courses during the past year the total number of students increased from 515 (in 1930–31) to 555. In this number are included the graduate students in Course VI who took a new special course in Elementary German during the first term. Owing to the small total of students taking Spanish and Italian it has been decided to offer Italian henceforth only in alternate years, omitting it in 1932–33. The General Studies were taken by a larger number of students than in the past and the results obtained were unusually satisfactory.

In the Summer Session of 1932 there was a marked decrease in the number of students and in consequence it seems

advisable to offer fewer courses next summer. A larger number of students than before have been given special examinations at frequent intervals to meet the language requirements for higher degrees. More departments have coöperated with the Department of Modern Languages in this work and it seems perhaps desirable to adopt a regular policy in this matter, offering such examinations at regular and rather frequent intervals, announced in a definite schedule.

The departmental library has been reduced to the functions of a consulting library for the staff only. All books not needed for frequent consultation have been transferred to the branch library in Building 2 or to the central library. The branch library, as now organized, has a nucleus of attractive books, especially in French literature. It is to be hoped that such generous additions will be made to it as will create an attractive collection of consulting works and recreational literature in all the principal foreign languages.

It is with great sorrow that the Department records the death in June of Professor Vogel who had been so long connected with it and had been in charge of the Department for a number of years previous to his retirement in 1931.

E. F. LANGLEY.

The Treasurer

To the Corporation of the
Massachusetts Institute of Technology:

The statements submitted herewith show the financial condition of the Massachusetts Institute of Technology as of June 30, 1932, as well as the financial transactions during the fiscal year ended on that date.

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

Capital Gifts:

George Wigglesworth Fund for Endowment	$25,000.00	
William Lyman Underwood Fund for Biology	9,872.00	
J. A. Grimmons, Perpetual Loan Scholarship	3,203.78	
Horace T. Smith Fund, for Scholarships (additional)	30.65	
Coleman duPont Fund for Endowment	117,017.11	
Albert G. Boyden Fund, for Scholarships (add.)	491,054.45	
Fred L. and Florence L. Coburn Fund for Student Aid	5,000.00	
Anonymous, for Frank Hall Thorp Fund	10,000.00	
Contributions to Industrial Fund	11,500.00	
Sons and Daughters of N. E. Puritan Colony Scholarship	600.00	
Frick Fund, for Endowment (additional)	884,327.31	
George Blackburn Memorial Fund (additional)	24,750.00	
		$1,582,355.30

Miscellaneous Gifts:

Rockefeller Foundation, for Research (additional)	$36,250.00
Charles Hayden, for Poughkeepsie Crew Races	4,000.00
Charles Hayden, for Course XV Fellowship	1,500.00
Lammot duPont, for General Purposes	50,000.00
Lammot duPont, for Course XV Fellowship	1,500.00
American Tel. & Tel. Co., for Course VI-A	5,000.00
Redfield Proctor, for Graduate Scholarship	1,500.00
J. E. Aldred, for Hydraulics	2,500.00
J. E. Aldred, for Lectures	500.00
Contributions to Professors Fund	21,304.10
J. C. Slater, for Physics Department	1,000.00
Boston & Maine Railroad, for Course I-A	3,000.00
Contributions for Course XV Fund	45.00
E. I. duPont de Nemours Co., for Fellowship	1,500.00
Anonymous, for Special Salary	2,000.00
General Electric Company, for Courses VI and VIII	20,000.00
H. M. Crane, for Diesel Engine Research	2,800.00
H. P. Eddy, Jr., for Sedgwick Fund	10.00
F. W. Fabyan, for Course XV Fellowship	1,500.00
J. R. Macomber, for Course XV Fellowship	1,500.00
Anonymous, for Special Expenses	890.14
Charles A. Stone, for Course XV Fellowship	1,500.00
A. P. Sloan, Jr., for Course XV Fellowship	1,500.00
L. J. & Mary E. Horowitz, for Course in Building Construction	10,000.00
Anonymous, for Chemistry Department	1,000.00
Morris A. Parris, for Stratton Prizes	100.00

Contribution to Bursar's Fund	$25.00	
Eastman Kodak Company, for Biocinema Research	1,493.74	
J. R. Freeman, for Hydraulics	1,700.00	
J. R. Freeman, for Publication and Translation .	2,000.00	
Col. E. H. R. Green, for Research at Round Hill	20,000.00	
Anonymous for Scholarship in Biology	1,500.00	
		$199,117.98
Total Capital and Miscellaneous Gifts . . .		$1,781,473.28

The George Eastman Research Laboratory and the Spectroscopic Laboratory have been completed. An appropriation this year of $1,000,000 makes total appropriations of $1,225,000 from the George Eastman Building Fund to cover the cost of these buildings and their equipment.

Increase in tuition from $400 to $500 caused an increase of $268,000 in income from students. Income from investments and income from other sources each fell off $59,000, giving a net increase in operating income of $150,000. On account of reductions in dividends, a single default in bond interest and less income from real estate, income from funds existing at the beginning of the year fell off $97,000. Funds received during the year yielded an income of $38,000, resulting in a net reduction of $59,000 in income from investments.

Under the new plan of payment, salaries of members of the staff increased $257,000, and other academic expenses increased $6,000. All other costs were reduced — administration $17,000, plant and maintenance $39,000, and other expenses and appropriations $75,000. This makes a net increase in operating expenses of $132,000.

The deficit for the year is $15,575.22.

In 1930, thirteen securities in the General Investment Account were marked up a total of $1,740,000. All these securities have now been marked down to their original book value with a corresponding reduction in the total of each fund in the account. The book value of each security on our list is now either the price actually paid or the market value on the day received.

The grand total of all funds now stands $1,170,000 less than a year ago.

Due to economic conditions, the market value of all our securities as of July 7, 1932, is about one-third less than the book value.

Following is the second report of the Technology Loan Fund.

July 8, 1932.

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

Report of Technology Loan Fund Committee

Dear Sirs:

I desire to make the following report on the Technology Loan Fund Committee for the fiscal year ended June 30, 1932.

At the request of a large number of subscribers, a moratorium on subscriptions was declared for the current year. We have, however, received prior year delinquent subscriptions of $36,000 in cash and securities, income from securities and interest on uninvested cash amounts to $18,202.66, making a total of $54,202.66 received by the Fund this year.

At the request of the Institute, we have paid $173,484.01 to reimburse it for loans made to students during the year.

We enclose cumulative statement for the two fiscal years ended June 30, 1931 and June 30, 1932, together with statement showing how the balance in the Fund is now constituted.

STATEMENT OF RECEIPTS AND DISBURSEMENTS

	Fiscal Year Ended June 30, 1931	*Fiscal Year Ended June 30, 1932*	*Total*
Subscriptions received from Contributors in cash	$654,792.25	$25,000.00	$679,792.25
Subscriptions received from Contributors in securities in lieu of cash-value when received	73,093.75	11,000.00	84,093.75
TOTAL SUBSCRIPTIONS	$727,886.00	$36,000.00	$763,886.00
Income on securities and interest on cash on hand	$17,966.01	$18,202.66	$36,168.67
TOTAL RECEIPTS	$745,852.01	$54,202.66	$800,054.67
Advances to Institute for loans to students	53,848.00	173,484.01	227,332.01
BALANCE OF FUND	$692,004.01	$119,281.35	$572,722.66

STATUS OF FUND AS AT JUNE 30, 1932

Securities received from Contributors in lieu of cash and included herein at the value when received		
195	Consol. Gas Elec. Lt. & Power of Baltimore	$25,000.00
62 197/600	Electric Bond & Share	10,000.00
250	International Power Securities Pfd.	6,000.00
229 18/40	North American Co.	18,375.00
250	Stone & Webster	24,718.75
		$84,093.75
Securities Purchased		*Cost*
$27,000	Atl. Gulf & W. I. S/S 5s 1959	$14,580.00
50,000	Balt. & Ohio R. R. Conv. 4½s 1960	50,625.00
100,000	Bklyn. Man. Transit 6s 1968	97,250.00
75,000	Chicago N. W. Ry. Conv. 4¾s 1949	74,625.00
75,000	Chicago R. I. & Pacific Rwy. Conv. 4½s 1960	74,812.50
50,000	Int'l Cement Corp. 5s 1948	39,250.00
		$351,142.50
	TOTAL INVESTMENTS	$435,236.25
	Cash on hand	$137,486.41
	TOTAL FUND	$572,722.66

Respectfully submitted,

(Signed) CHARLES HAYDEN, *Chairman.*

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

BALANCE SHEET, JUNE 30, 1932

Assets

Investments (as listed below)	$535,744.25
Cash	50,195.56
Total	$585,939.81

Liabilities

Teachers' Annuity Fund (5% salary deduction, plus interest)	$329,272.88
M. I. T. Pension Fund (3% of salary deducted, plus interest)	219,873.71
Reserve Fund (and interest)	28,707.85
Special Reserves for Annuity Payments	8,085.37
Total	$585,939.81

Par	*Investments* (as above)			*Book Value*
$10,000	Dominion of Canada	4½%	1936	$9,825.00
10,000	City of Montreal	5%	1936	10,000.00
30,000	City of Montreal	5%	1942	29,750.00
35,000	Gov't of U. K., G. B. & Ireland	5½%	1937	35,974.00
35,000	Allis Chalmers Mfg. Co.	5%	1937	35,004.00
4,000	American Sugar Refining Co.	6%	1937	4,066.00
15,000	Chicago P. O. Service Bldg.	5½%	1936	15,000.00
10,000	Chile Copper Co.	5%	1947	9,587.50
35,000	Standard Oil Co. of N. Y.	4½%	1951	33,720.00
25,000	Texas Corp. Conv. Deb..	5%	1944	25,463.00
35,000	Am. Tel. & Tel. Co.	5%	1946	36,007.00
10,000	Cedars Rapids Mfg. & Power Co.	5%	1953	10,000.00
29,000	Mississippi River Power Co.	5%	1951	29,462.00
30,000	New York Edison Co.	5%	1951	29,025.00
30,000	New York Power & Light Corp.	4½%	1967	29,400.00
30,000	Tenn. Elec. Power Co.	5%	1956	29,900.00
10,000	Canadian National Railways	4½%	1957	9,775.00
25,000	Canadian Pacific Ry., Eq. Tr.	5%	1944	25,515.00
5,000	Chicago & N. W. Ry. Co., Eq. Tr.	5%	1933	5,000.00
5,000	Chicago & N. W. Ry. Co., Eq. Tr.	5%	1937	5,000.00
21,000	Cleveland Union Term. Co.	4½%	1977	21,402.00
16,000	Kans. City, Memphis & Birm. R. R.	5%	1934	16,000.00
25,000	Pere Marquette Rwy. Co.	4½%	1980	24,812.50
22,000	Southern Ry. Dev. & Gen. Mtge..	4%	1956	19,580.00
27,000	Union Pacific R. R.	4½%	1967	23,976.25
7,000	Central Mfg. District 1st Mtge. "B"	5½%	1937	7,000.00
5,000	General Electric Special Stock (500 shares)			5,500.00
$541,000				$535,744.25

Respectfully submitted,

EVERETT MORSS,
Treasurer.

September 15, 1932.

SCHEDULE A

FINANCIAL RESULT OF OPERATION FOR YEAR ENDED JUNE 30, 1932 COMPARED WITH THE PREVIOUS YEAR

	1930–31	*1931–32*
Current Operating Expense (Schedule C) . . .	$3,739,360.29	$3,938,801.20
Current Operating Income (Schedule B) . . .	3,554,410.73	3,702,184.89
Excess Expense	$184,949.56	$236,616.31
PROFIT AND LOSS		
Net Profit (Schedule S)	1,386.48	4,616.59
Net Loss	$183,563.08	$231,999.72
Excess Expense of Funds, charged to Funds .	147,042.79	216,424.50
Decrease of Current Surplus, 1930–31 . . .	$36,520.29	
Increase of Current Deficit, 1931–32, Schedule S		$15,575.22

SCHEDULE B

OPERATING INCOME FOR YEAR 1931-1932

	Regular Courses	*Research and Funds*	*Total*
INCOME FROM STUDENTS:			
(*a*) Tuition Fees	$1,520,682.75	.....	.....
Locker Fees	1,652.11	.....	.....
Entrance Examination Fees	4,330.00	.....	.....
Condition Examination Fees	8,920.00	.....	.....
Late Registration Fees	2,203.00	.....	.....
Net Dormitory Income (Schedule C-19)	51,880.71	.....	.....
	$1,589,668.57	.....	$1,589,668.57
INCOME FROM INVESTMENTS:			
Endowments, General Purposes, (Schedule P)	$1,060,994.59	$309,100.79	$1,370,095.38
(*b*) Endowments for Scholarships, applied	71,981.00	.....	71,981.00
Endowments, Designated Purposes (Schedule Q)	105,370.71	120,122.16	225,492.87
(*c*) Net (Schedule Q)	$1,238,346.30	$429,222.95	$1,667,569.25
INCOME FROM OTHER SOURCES:			
Federal Aid from Acts, 1862–90	$22,546.68	.....	.....
Lamont du Pont	50,000.00	.....	.....
American Telephone and Telegraph Co., Course VI-A	5,000.00	.....	.....
General Electric Co., Courses VI, VI-A and VIII	20,000.00	.....	.....
Boston & Maine R. R., Course I-A	3,000.00	.....	.....
Boston Elevated Railway	200.00	.....	.....
Horowitz Foundation	10,000.00	.....	.....
W. E. Nickerson Fund	5,168.76	.....	.....
Division of Laboratory Supplies	8,341.49	.....	.....
Trustees H. C. Frick Estate	32,705.20	.....	.....
E. A. Wyeth Fund	20,567.79	.....	.....
Bank Interest	9,298.65	.....	.....
Huntington Hall Rentals	3,500.00	.....	.....
Walker Building, Boston	10,000.00	.....	.....
U. S. N. Torpedo Research	1,537.49	.....	.....
	$201,866.06	.....	$201,866.06
MINOR FUND EARNINGS:			
Total (Schedule R)	.....	$243,081.01	$243,081.01
TOTAL OPERATING INCOME (Schedule A)	$3,029,880.93	$672,303.96	$3,702,184.89

(*a*) STATEMENT OF TUITION FEES AND SCHOLARSHIPS:

Received in Cash for year 1931–1932	$1,354,974.75
Appropriated for Scholarships from Current Income	9,330.00
Received in Cash for Summer Session 1931	156,378.00
	$1,520,682.75
(*b*) Add Appropriation for Scholarships from Funds	71,981.00
Total Tuitions and Scholarships	$1,592,663.75

(*c*) Additional Income offset by Accrued Interest, Expenses, etc. $34 117.37

SCHEDULE C

OPERATING EXPENSE FOR YEAR 1931–1932

	Regular Courses	*Research and Funds*	*Total*
ACADEMIC EXPENSES:			
Salaries of Teachers (C-1)	$1,716,211.26	.....	.....
Wages Accessory to Teaching (C-1)	49,185.41	.....	.....
Wages, Laboratory Service (C-1)	65,252.16	.....	.....
Department Expenses (C-2)	149,381.09	.....	.....
General Library (C-3)	59,487.78	.....	.....
	$2,039,517.70	.....	$2,039,517.70
ADMINISTRATION EXPENSES:			
Salaries, Officers	$90,750.00	.....	.....
Wages, Clerical Staff (C-4)	81,851.23	.....	.....
Printing and Advertising (C-5)	32,727.81	.....	.....
General Expense (C-6)	127,447.88	.....	.....
	$332,776.92	.....	$332,776.92
PLANT OPERATION AND MAINTENANCE:			
Wages, Building Service (C-7)	$128,391.36	.....	.....
Power Plant Operation (C-8)	97,712.98	.....	.....
Fire Insurance (Net)	7,174.66	.....	.....
Repairs and Alterations (C-9)	144,074.70	.....	.....
	$377,353.70	.....	$377,353.70
MISCELLANEOUS EXPENSES:			
Department of Hygiene (C-10)	$66,808.57	.....	.....
Summer Camps 1931 (C-11 and C-12)	8,435.08	.....	.....
Athletic Field, Boat House and Launches (C-13)	14,813.23	.....	.....
*Walker Memorial (C-16)	20,645.28	.....	.....
Special Appropriations (C-15)	189,722.26	.....	.....
	$300,424.42	.....	$300,424.42
EXPENSES OF MINOR FUNDS:			
Total, including Salaries (Schedule R)	.....	$467,232.00	$467,232.00
AWARDS (other than Und. Schol.):			
Total (Schedule C-17)	.....	$92,011.32	$92,011.32
PAYMENTS FROM SPECIAL FUNDS:			
Total (Schedule C-18)	.....	$329,485.14	$329,485.14
TOTAL OPERATING EXPENSE (Schedule A)	$3,050,072.74	$888,728.46	$3,938,801.20

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

SCHEDULE C-1

SALARIES OF TEACHERS, WAGES ACCESSORY TO TEACHING AND LABORATORY SERVICE

Department	*Teachers Salaries (Net)*	*Wages Accessory to Teaching (Net)*	*Wages Laboratory Service (Net)*
Summer Session	$104,207.91	.....	.....
Aeronautical Engineering	55,755.00	$1,925.00	.....
Aero. Eng. Power Plant	18,984.53	.....	.....
Architecture	81,150.00	3,837.32	$2,228.63
Biology and Public Health	47,165.00	1,376.67	1,855.00
Building Construction	19,020.25	1,260.00	.....
Business and Eng. Administration	58,385.00	1,509.85	.....
Chemistry	148,766.60	4,360.98	5,040.00
Chemistry, Res. Lab. of Physical	32,980.00	1,461.00	*.....
Chemical Engineering	51,800.00	1,620.00	1,820.00
Chemical Engineering Prac. School	17,700.00	*.....	*.....
Civil Engineering	98,007.17	3,006.00	.....
Division of Laboratory Supplies	.....	.....	17,630.19
Drawing	28,500.00	318.00	.....
Economics	40,740.00	3,046.00	.....
Electrical Engineering	156,185.06	5,679.36	10,002.92
Electrical Engineering Research	4,480.00	*.....	1,901.60
English and History	72,135.00	1,038.83	.....
Fuel and Gas Engineering	24,300.00	1,339.00	1,431.00
General Eng. and General Science	1,000.00	.....	.....
General Studies	2,600.00	.....	.....
Geology	39,300.00	1,573.73	.....
Humanics	5,000.00	.....	.....
Lantern Operation	.....	.....	667.90
Mathematics	77,200.00	1,200.00	.....
Mechanical Engineering	181,794.08	6,573.80	14,524.03
Meteorology	18,796.72	*.....	.....
Military Science	7,880.00	820.00	.....
Mining and Metallurgy	76,262.44	3,061.33	4,445.63
Modern Languages	21,985.00	476.00	.....
Naval Architecture	44,200.00	1,326.00	1,850.26
Physics	179,931.50	2,376.54	1,855.00
Totals (Schedule C)	$1,716,211.26	$49,185.41	$65,252.16

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

SCHEDULE C-2
*DEPARTMENT EXPENSES (Net)

Department	*Expense (Net)*	*Overdrafts*
Aeronautical Engineering	$2,262.26	.....
Aeronautical Engineering Power Plant	2,834.55	.....
Architecture	3,925.77	.....
Biology	3,965.02	.....
Building Construction	1,842.91	.....
Business and Eng. Administration	1,472.51	.....
Chemistry	16,432.94	.....
Chemistry, Research Laboratory of Physical	3,000,00	.....
Chemical Engineering	5,163.87	.....
Chemical Engineering Practice School	15,234.27	.....
Civil Engineering	1,692.95	.....
Drawing	717.77	.....
Economics	1,805.54	.....
Electrical Engineering	16,933.93	.....
Electrical Engineering, Research and Theses	5,877.95	.....
English and History	551.12	.....
Fuel and Gas Engineering (inc. Field Stations)	4,864.05	.....
General Engineering and General Science	819.98	.....
General Studies	145.63	.....
Geology	2,500.00	$5.91
Humanics	168.76	.....
Mathematics	151.86	.....
Mechanical Engineering	17,090.57	.....
Meteorology	4,000.00	68.86
Military Science	1,838.96	.....
Mining and Metallurgy	9,407.07	.....
Modern Languages	188.19	.....
Naval Architecture	1,096.22	.....
Physics	22,950.00	.....
United States Army and Navy Officers	446.44	.....
Totals	$149,381.09	$74.77

(Schedule C) (Schedule D-2)

SCHEDULE C-3
GENERAL LIBRARY

Salaries of Officers	$10,808.56
Wages, Clerical Staff	30,701.60
Expenses	17,977.62
Total (Schedule C)	$59,487.78

* Certain special appropriations not included (see Schedule C-15).

SCHEDULE C-4
WAGES, CLERICAL STAFF, ADMINISTRATION OFFICES

Offices of the Chairman and President	$9,491.81
Dean's Office	4,794.00
Registrar's Office	27,911.07
Secretary's Office	8,935.21
Bursar's Office	22,739.83
Superintendent's Office	7,979.31
Total (Schedule C)	$81,851.23

SCHEDULE C-5
PRINTING AND ADVERTISING

Printing, Bursar's Office	$1,123.02
Printing, Registrar's Office	8,014.58
Printing, Offices of Chairman, President, Dean, Secretary and Superintendent	1,738.68
Advertising in M. I. T. Publications	3,238.95
Bulletins: President's and Treasurer's Reports	777.60
Directory	1,332.00
Summer Session 1932	2,145.00
Course Pamphlets, etc.	901.60
Graduate Study and Research	1,121.00
General Catalogue	5,429.00
Examinations and Class Schedules	1,513.52
Maintenance of Catalogue of Former Students	2,581.44
Summer Session Advertising	285.75
Reprints and Binding, Abstracts of Staff Papers, etc.	2,525.67
Total (Schedule C)	$32,727.81

SCHEDULE C-6
GENERAL EXPENSE (Net)

Bursar's Office	$3,661.03
Registrar's Office	4,559.69
Superintendent's Office	1,913.51
Fees, Dues, Commissions, etc.	60,468.27
Secretary's Office, Admissions Office, New Student Publicity	3,105.63
Inauguration, Graduation, Receptions, etc.	8,875.35
Chairman's and President's Office	2,334.94
Ice and Ice Water	801.15
Dean's Office (Undergraduate Scholarships and Loans)	2,271.54
Trucking of Mail	1,567.60
News Service	7,016.49
370 Beacon Street	6,125.08
Travel	6,182.38
Telephone Service	20,255.13
Total	$129,137.79
Less Credits	1,689.91
Total (Schedule C)	$127,447.88

SCHEDULE C-7
WAGES, BUILDING SERVICE

Shop Foremen (net)	$4,281.51
Janitors: Supervisory and Staff	58,400.04
Night Cleaners	20,462.50
Watchmen (including Cambridge Police)	17,061.13
Window Cleaning	8,732.73
Heating and Ventilation	9,488.06
Messengers, Mail, Elevator, Shipper, Stock Room, Matron	9,965.39
Total (Schedule C)	$128,391.36

SCHEDULE C-8
POWER PLANT OPERATION (Net)

Coal	$76,123.49
Water	2,522.30
Supplies	2,636.79
Repairs	9,035.47
Trucking, etc.	577.59
Salaries	29,823.19
Electricity, Rogers Building	1,567.25
Expense, Rogers Building	1,808.41
Total	$124,094.49
Less Transfers and Credits	26,381.51
Total (Schedule C)	$97,712.98

SCHEDULE C-9
REPAIRS, ALTERATIONS AND MAINTENANCE

Buildings 1, 2, 3, 4, 5, 8, 10, 11	$53,200.48
Rogers Building, Boston	6,383.32
Buildings No. 30, 31, 33, 35, 36, 38, 46	6,227.48
Miscellaneous Wooden Buildings, etc.	958.37
Alterations	8,429.32
President's House	3,153.41
Furniture	3,837.19
Elevators	2,457.28
Mains and Conduits	6,875.22
Water	9,080.73
Gas	3,038.21
Grounds, Roads, Tennis Courts, etc.	35,107.54
Building Protection	997.03
Rubbish	3,154.57
Undistributed (net)	1,174.55
Total (Schedule C)	$144,074.70

SCHEDULE C-10
DEPARTMENT OF HYGIENE

Salaries, Medical Director, Assistants and Infirmary Staff		$31,015.55
Additional Medical Services		2,603.33
Physical Training and Coaching		21,215.50
Medical and Other Supplies		1,669.79
Physical Examinations		4,478.35
Nutrition Class		1,200.00
Equipment		788.00
Food Account, Cost	$3,436.37	
Less Income	2,678.29	
		758.08
Laundry		1,071.77
Miscellaneous		2,008.20
Total (Schedule C)		$66,808.57

SCHEDULE C-11
CIVIL ENGINEERING SUMMER CAMP (1931)
TECHNOLOGY, MAINE

Income:		
From Students and Staff	$5,435.91	
Miscellaneous	184.68	
Total Income		$5,620.59
Expenses:		
Travelling Expenses	$423.12	
Construction and Repairs	2,121.74	
Caretaker	1,440.00	
Taxes and Insurance	1,477.32	
Administration, Telephone, etc.	799.21	
Wages — Operating	1,719.27	
Provisions and Supplies	3,029.65	
Coal, Wood, Gas and Ice	806.02	
Express and Freight, Laundry	241.94	
Total Expense		12,058.27
Net Expense		$6,437.68

SCHEDULE C-12
MINING ENGINEERING SUMMER CAMP (1931) DOVER, N. J.

Income:		
From Students and Staff	$902.89	
Miscellaneous	10.73	
Total Income		$913.62
Expenses:		
Travelling Expenses	$160.70	
Repairs and Equipment	445.64	
Caretaker, Insurance, Tel. Adm., Light	1,438.30	
Wages — Operating	500.00	
Provisions and Supplies	366.38	
Total Expense		2,911.02
Net Expense		$1,997.40
Total Expense of Camps (Schedule C)		$8,435.08

SCHEDULE C-13
ATHLETIC FIELD, BOAT HOUSE, LAUNCHES

Athletic Field, Maintenance	$7,974.78
Boat House, Maintenance	4,580.32
Launches, Maintenance	2,258.13
Total (Schedule C)	$14,813.23

SCHEDULE C-14
DINING SERVICE (Net)

Inventory, July 1, 1931:		
Utensils	$8,144.76	
Stock	3,228.40	
		$11,373.16
Expenditures:		
Food	$55,239.46	
Salaries	44,180.85	
Light, Heat and Water	6,528.23	
Ice, Refrigeration	203.11	
Laundry	3,176.70	
Dining Room and Kitchen Equipment	1,414.01	
Repairs	831.83	
Printing and Advertising	1,173.60	
Administration Expense	1,046.79	
Insurance	656.25	
Occupancy (Schedule C-16)	5,000.00	
		119,450.83
Total		$130,823.99
Income:		
Coupon Books	$54,595.36	
Less Outstanding Coupons (Schedule D)	86.32	
	$54,509.04	
Cash	64,997.62	
Drawn from Dining Service, Reserve Fund	890.91	
		$120,397.57
Inventory, June 30, 1932:		
Utensils	$8,409.47	
Stock	2,016.95	
		10,426.42
Total		$130,823.99

SCHEDULE C-15
SPECIAL APPROPRIATIONS

Undergraduate Scholarships	$9,330.00
Undergraduate Dues	24,788.00
Pension and Insurance Plan — Staff	71,334.94
Insurance Plan — Employees	5,954.90
Chemicals and Apparatus furnished to Students	4,227.26
New Equipment	7,915.15
Research Laboratory of Applied Chemistry	8,500.00
Society of Arts	2,082.12

To DEPARTMENTS:

Aeronautical Engineering				Total	10,779.00
No. 844	$1,125.00	No. 868	$4,000.00		
No. 841	624.00	No. 881	2,280.00		
No. 829	2,000.00	No. 915	750.00		
Architecture				Total	2,000.00
No. 871	$2,000.00				
Biology and Public Health				Total	2,600.00
Health Education, $600.		Food and Fisheries, $2,000			
Business and Engineering Administration				Total	7,473.13
No. 857	$3,225.00				
No. 827	50.00				
No. 828	348.13				
No. 847	1,500.00				
No. 866	2,300.00				
No. 894	50.00				
Civil Engineering				Total	2,600.00
Soil Mech. Lab.	$600.00	No. 920	$500.00		
No. 850	1,500.00				
Electrical Engineering				Total	5,100.00
No. 867	$2,000.00				
No. 875	3,100.00				
Geology				Total	209.18
No. 869	$209.18				
Hygiene Department				Total	607.11
No. 856	$607.11				
Mechanical Engineering				Total	10,038.27
No. 862	$9,552.00	Textile School $486.27			
Physics				Total	9,837.40
No. 859	$555.50				
No. 892	7,000.00				
No. 896	141.90				
No. 897	140.00				
No. 908	2,000.00				
Miscellaneous					4,345.80
Total (Schedule C)					$189,722.26

SCHEDULE C-16
WALKER MEMORIAL (Net)

Income:		
Occupancy — Dining Service (Schedule C-14)	$5,000.00	$5,000.00
Expenses:		
Salaries	11,201.57	
Light, Heat, Power	5,169.59	
Water	759.94	
Repairs, Alterations, Maintenance	5,757.84	
Trucking, Administration, Equipment	1,073.64	
Supplies, Magazines and Papers	557.26	
Games Account — Deficit	1,120.44	
Total		25,645.28
Net Expense (Schedule C)		$20,645.28

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

Edward Austin Fund, for Graduate Scholarships	$22,516.15
Teachers' Fund, for Retiring Allowances	2,727.38
Robert A. Boit Fund, for Prizes	250.00
Arthur Rotch Prize Funds, for Prizes	400.00
Roger D. Hunneman Fund, for Prizes	100.00
John A. Grimmons Fund, for Student Loans	2,920.55
Frances and William Emerson Fund, for Student Aid	2,250.00
William Barton Rogers Fund, for Student Loans	10,116.77
Bursar's Fund, for Student Loans	6,239.97
Dean's Fund, for Student Loans	485.00
Summer Surveying Camp Fund, for Loans	475.00
Misc. Funds, for Graduate Scholarships and Fellowships	15,530.50
Jonathan Whitney Fund:	
Graduate Scholarships	26,500.00
Technology Christian Association	1,500.00
Total (Schedule C)	$92,011.32

SCHEDULE C-18
PAYMENTS FROM INCOME OF SPECIAL FUNDS

Edward Whitney, for Research	$1,775.00	
Walter S. Barker, for Books	470.78	
Frank Harvey Cilley, for Books, etc.	4,851.50	
Charles Lewis Flint, for Books	292.04	
William Hall Kerr, for Books	29.75	
George A. Osborne, for Books	2,802.47	
Technology Matrons' Fund, for Teas	330.00	
John Hume Tod, for Books	105.47	
Theodore N. Vail, for Vail Library	2,815.06	
Ednah Dow Cheney, for Margaret Cheney Room	227.49	
Crosby Honorary, for Geology	75.00	
F. Jewett Moore, for Chemical Department	4,204.51	
F. W. Boles Memorial, for Architecture Department	952.49	
Edmund K. Turner, for Annuity and Tax	2,039.63	
Pratt Naval Architectural, for Nautical Museum and Annuity	2,835.86	
Edward D. Peters, for Mineralogy	297.92	
Samuel Cabot, for Applied Chemistry Research	3,300.00	
C. B. Richardson, for Applied Chemistry Research	1,600.00	
Ellen H. Richards, for Research	480.17	
Eastman Contract, to George Eastman	300,000.00	
Total (Schedule C)		$329,485.14

SCHEDULE C-19
DORMITORY OPERATION (Net)

Income:			
From Rentals		$151,522.63	
Less Refunds		9,947.20	
Total			$141,575.43
Expenses:			
Salaries		$39,740.10	
Laundry		3,567.50	
Heat, Light, Power		16,175.35	
Water		2,451.95	
Repairs		10,341.53	
Supplies	$12,893.98		
Less Inventory (June 30, 1932) (Schedule D-2)	7,249.05	5,644.93	
Printing, Administration, Telephone		3,789.89	
New Equipment		483.47	
Interest on Mortgage Loan (Whitney Fund)		7,500.00	
Total			89,694.72
Net Income (Schedule B)			$51,880.71

SCHEDULE D
TREASURER'S BALANCE SHEET

1
ENDOWMENT ASSETS

Securities and Real Estate (Schedule H)	$32,315,781.23
Borrowed for Current Purposes (Contra)	25,257.04
Cash: For Investment (Schedule D-3)	310,370.51
Total June 30, 1932	$32,651,408.78

2
CURRENT ASSETS

Cash: For General Purposes (Schedule D-3)	$13,992.97
Accounts Receivable (Schedule D-1)	21,626.54
Students' Fees, Receivable	1,707.73
Students' Deposits, Receivable	1,417.53
Deposit on Fire Insurance Account	45,000.00
Inventories and Advances for 1932–33 (Schedule D-2)	102,509.77
Current Deficit (Schedule S)	29,699.55
Total June 30, 1932	$215,954.09

3
EDUCATIONAL PLANT ASSETS

Land, Buildings, and Equipment, June 30, 1931	$14,682,736.55
Additions during year	961,012.00
Cash (Schedule D-3)	62,591.95
Total June 30, 1932 (Schedule J)	$15,706,340.50
Total Assets June 30, 1932	$48,573,703.37

SCHEDULE D

JUNE 30, 1932

1

ENDOWMENT FUNDS

Funds (Schedule Q)	$32,651,408.78
Total June 30, 1932	$32,651,408.78

2

CURRENT LIABILITIES

Minor Funds (Schedule R)	$95,865.98
Accounts Payable	9,424.72
Students' Fees and Deposits Payable (Schedule D-4)	85,052,97
*Undergraduate Dues, Balance	267.06
Dining Room Coupons, Outstanding	86.32
Borrowed from Investment Assets (Contra)	25,257.04
Total June 30, 1932	$215,954.09

3

EDUCATIONAL PLANT CAPITAL

Endowment for Educational Plant, June 30, 1931	$14,702,840.50
Appropriated during year	1,003,500.00
Total June 30, 1932 (Schedule K)	$15,706,340.50
Total Liabilities June 30, 1932	$48,573,703.37

*See also Undergraduate Dues Reserve (Schedule Q, p. 174).

SCHEDULE D-1
DETAIL OF ACCOUNTS RECEIVABLE

City of Boston, Police Department	$6,498.81
T. C. A. Advisory Board Account	1,394.83
Theta Delta Chi	1,000.00
Division of Industrial Coöperation and Research	770.69
Investment Income (June, 1932)	1,169.78
R. L. A. C. Contracts	1,128.22
U. S. Navy, Torpedo Research	2,500.00
Miscellaneous Accounts	7,164.21
Total (Schedule D)	$21,626.54

SCHEDULE D-2
DETAIL OF INVENTORIES AND ADVANCES FOR 1932–1933

Department Overdrafts (Schedule C-2)	$74.77
Summer Session Salaries, Advanced	2,432.00
Civil Engineering Summer Camp 1932, Advanced	498.10
Mining Engineering Summer Camp 1932, Advanced	70.24
Premiums Paid on Unexpired Insurance	5,576.47
Inventories — Notes held by Coöperative Society and M.I.T.	6,553.15
Dormitory Supplies (including Rugs)	7,501.55
Dining Service, Food, Utensils, etc.	10,426.42
Coal	864.50
Walker Memorial Games, Candy, Cigars, etc.	473.13
Letter Shop Supplies	814.49
Stamps	522.16
Office Supplies	1,745.96
Building and Janitors' Supplies	2,660.37
Architectural Students' Supply Room, Stock	804.60
Stock Room: Pipe, Fittings, Lumber, Hardware, Paint, Oil, Glass and Miscellaneous Supplies	11,201.90
Photostat Service, Supplies, etc.	1,660.70
Photographic Service, Supplies and Equipment	7,300.00
Division of Laboratory Supplies: Chemicals, Glassware, Platinum, etc.	41,253.90
Liquid Soap	75.36
Total (Schedule D)	$102,509.77

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

Total Cash Receipts	$7,295,114.22
Total Cash Disbursements	7,353,556.58
Excess of Disbursements	$58,442.36
Cash, June 30, 1931	445,397.79
Cash, June 30, 1932	$386,955.43

CASH BALANCE

Cash for Investment — on Deposit (Schedule D)		$310,370.51
Cash for Buildings — on Deposit (Schedule D)		62,591.95
Cash for Current Purposes (Schedule D)		
On Deposit	$13,295.42	
In Office	697.55	
		13,992.97
Total Cash (Schedule D)		$386,955.43

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

Tuition Fees, Summer Session 1932	$72,254.80
Students' Deposits Payable	2,303.55
Students' Deposits, Summer Session 1932	3,775.46
Dormitory Deposits in Advance	2,020.00
Dormitory Rentals, Summer Session 1932	4,699.16
Total (Schedule D)	$85,052.97

SCHEDULE H

INVESTMENTS, BONDS, STOCKS,

Par Value	*Description of Securities*	*Rate*	*Maturity*	*Balance June 30, 1931*
	GOVERNMENT AND MUNICIPAL BONDS			
$500,000	Boston Met. Dist., Serial Gold	4¾%	1944–59	.....
250,000	Cambridge, City of, Tax Ant. Notes.	5½%	1932	.....
260,000	Canada, Dominion of, 30-Yr. Gold.	5%	1952	$258,511.88
1,000	Cincinnati, City of, Street Imp.	4½%	1933	1,002.00
500	Cincinnati, City of, Street Imp.	4½%	1935	505.00
1,000	Cincinnati, City of, Street Imp.	4½%	1935	1,018.00
25,000	German Govt. International Loan.	5½%	1965	22,437.50
18,000	Kansas City, Sewer, 2d Issue	4½%	1935	18,271.00
5,000	Kansas City, 23d St. Trafficway	4½%	1935	5,074.00
50,000	Los Angeles, City of, Water Works	4½%	1942	51,288.00
10,000	Los Angeles, City of, Water Works	4½%	1943	10,203.00
15,000	Los Angeles, City of, Water Works	4½%	1943	15,308.00
50,000	Maisonneuve, City of (Montreal)	5%	1954	49,000.00
30,000	Manitoba, Province of	4½%	1945	28,650.00
70,000	Manitoba, Province of	5%	1944	70,581.00
15,000	Montreal, City of	5%	1936	15,000.00
70,000	Montreal, City of	5%	1942	68,250.00
100,000	Montreal, City of	5%	1958	101,330.00
100,000	Montreal, City of	5%	1963	101,464.00
10,000	New York, City of, Corporate Stock.	4¼%	1964	10,301.00
5,000	New York, City of, Corporate Stock.	4½%	1967	4,625.00
50,000	Omaha, City of, Nebraska	4½%	1934	50,470.00
50,000	Omaha, City of, Water Works	4½%	1941	51,799.00
150,000	Ontario, Province of.	5%	1942	151,416.00
50,000	Ontario, Province of.	5½%	1937	50,246.00
50,000	Ontario, Province of.	6%	1943	52,698.00
100,000	Ontario, Province of.	5%	1952	99,970.00
25,000	Ontario, Province of.	5%	1959	24,875.00
1,000	Ottawa, City of, Ontario	4½%	1935	945.00
5,000	Ottawa, City of, Ontario	5%	1933	5,009.00
35,000	Ottawa, City of, Ontario	5%	1945	35,193.00
36,000	Ottawa, City of, Ontario	5%	1934	36,102.00
35,000	Ottawa, City of, Ontario	5%	1940	35,269.00
25,000	Ottawa, City of, Ontario	5%	1946	25,229.00
5,000	Ottawa, City of, Ontario	5%	1947	5,045.00
29,000	Ottawa, City of, Ontario	5%	1954	29,530.00
82,000	Ottawa, City of, Ontario	5½%	1932	82,175.00
60,000	Ottawa, City of, Ontario	5½%	1939	61,031.00
5,000	Ottawa, City of, Ontario	6%	1936	5,125.00

SCHEDULE H

REAL ESTATE AND MORTGAGES

Purchases and Charges during the year	*Sales and Credits during the year*	*Balance June 30, 1932*	*Accrued Interest, etc.*	*Income Received*
$483,534.60	.....	$483,534.60	$3,694.45	.....
250,000.00	.....	250,000.00	.....	$6,836.81
.....	.....	258,511.88	.....	13,000.00
.....	$1.00	1,001.00	.....	45.00
.....	2.00	503.00	.....	22.50
.....	6.00	1,012.00	.....	45.00
.....	.....	22,437.50	.....	1,375.00
.....	68.00	18,203.00	.....	810.00
.....	19.00	5,055.00	.....	225.00
.....	117.00	51,171.00	.....	2,250.00
.....	17.00	10,186.00	.....	450.00
.....	26.00	15,282.00	.....	675.00
.....	.....	49,000.00	.....	2,500.00
.....	.....	28,650.00	.....	1,350.00
.....	49.00	70,532.00	.....	3,500.00
.....	.....	15,000.00	.....	750.00
.....	.....	68,250.00	.....	3,500.00
.....	50.00	101,280.00	.....	5,000.00
.....	46.00	101,418.00	.....	5,000.00
.....	10.00	10,291.00	.....	425.00
.....	.....	4,625.00	.....	225.00
.....	235.00	50,235.00	.....	2,250.00
.....	180.00	51,619.00	.....	2,250.00
.....	142.00	151,274.00	.....	7,500.00
.....	49.00	50,197.00	.....	2,750.00
.....	225.00	52,473.00	.....	3,000.00
.....	36.00	99,934.00	.....	5,000.00
.....	.....	24,875.00	.....	1,250.00
.....	.....	945.00	.....	45.00
.....	5.00	5,004.00	.....	250.00
.....	17.00	35,176.00	.....	1,750.00
.....	34.00	36,068.00	.....	1,800.00
.....	30.00	35,239.00	.....	1,750.00
.....	16.00	25,213.00	.....	1,250.00
.....	3.00	5,042.00	.....	250.00
.....	23.00	29,507.00	.....	1,450.00
.....	175.00	82,000.00	.....	4,510.00
.....	129.00	60,902.00	.....	3,300.00
.....	25.00	5,100.00	.....	300.00

Schedule H (*Continued*)

Par Value	*Description of Securities*	*Rate*	*Maturity*	*Balance June 30, 1931*
	GOVERNMENT AND MUNICIPAL BONDS (*Continued*)			
$1,000	Ottawa, City of, Ontario	6%	1938	$1,037.00
8,000	Ottawa, City of, Ontario	6%	1939	8,316.00
8,000	Ottawa, City of, Ontario	6%	1940	8,351.00
1,000	Ottawa, City of, Ontario	6%	1948	1,064.00
10,000	Ottawa, City of, Ontario	6%	1951	10,678.00
100,000	Quebec, Province of	4½%	1950	97,000.00
50,000	Toronto, City of, Ontario, Gen. Loan	5%	1932	50,000.00
10,000	Toronto, City of, Ontario	5%	1935	9,845.00
35,000	Toronto, City of, Ontario	5%	1936	34,475.00
18,000	Toronto, City of, Ontario	5%	1937	17,721.00
23,000	Toronto, City of, Ontario	5%	1939	22,655.00
9,000	Toronto, City of, Ontario	5%	1942	8,830.80
5,000	Toronto, City of, Ontario	6%	1934	5,054.00
23,000	Toronto, City of, Consolidated Loan	6%	1944	23,804.00
18,000	Toronto, City of, Consolidated Loan	6%	1945	18,668.00
9,000	Toronto, City of, Consolidated Loan	6%	1946	9,349.00
200,000	Winnipeg, City of	4½%	1944	189,000.00
50,000	Winnipeg, City of, Debenture	5%	1943	48,750.00
7,000	Winnipeg, City of, Gr. Water Dist.	5%	1952	6,790.00
25,000	Winnipeg, City of	6%	1946	26,223.00
	Sold or matured during year			303,278.03
$2,988,500	*Total Government and Municipal Bonds*			$2,535,835.21
	INDUSTRIAL BONDS			
$15,000	Allis-Chalmers Mfg. Co., Gold Deb.	5%	1937	$14,812.50
9,000	American Sugar Ref. Co.	6%	1937	26,267.00
200,000	Armour & Co., Real Est. 1st Mtge.	4½%	1939	175,116.25
25,000	Armour & Co. of Del., 1st Mtge. "A"	5½%	1943	24,000.00
90,000	Chile Copper Co. Gold	5%	1947	87,080.00
300,000	Consolidation Coal Co., 1st & Ref. S.F.	5%	1950	268,806.25
25,000	Fruit Growers Ex. Co., Equip. Tr. "G"	4½%	1934	24,607.25
25,000	Fruit Growers Ex. Co., Equip. Tr. "G"	4½%	1935	24,573.75
5,000	General Motors Acceptance Corp.	5%	1934	.....
25,000	General Motors Acceptance Corp.	5%	1935	.....
100,000	Glidden Co. Gold	5½%	1935	99,750.00
100,000	Gulf Oil Corp. of Penn., 15-Yr. Gold	5%	1937	96,750.00
100,000	International Cement Corp.	5%	1948	99,500.00
110,000	Royal Dutch Co., Deb. "A"	4%	1945	102,675.00
100,000	Shell Union Oil Corp. S. F. Deb.	5%	1949	98,885.00

Schedule H (*Continued*)

Purchases and Charges during the year	*Sales and Credits during the year*	*Balance June 30, 1932*	*Accrued Interest, etc.*	*Income Received*
.....	$6.00	$1,031.00	.....	$60.00
.....	40.00	8,276.00	.....	480.00
.....	39.00	8,312.00	.....	480.00
.....	4.00	1,060.00	.....	60.00
.....	34.00	10,644.00	.....	600.00
.....	.....	97,000.00	.....	4,500.00
.....	.....	50,000.00	.....	2,500.00
.....	.....	9,845.00	.....	453.71
.....	.....	34,475.00	.....	1,588.17
.....	.....	17,721.00	.....	816.75
.....	.....	22,655.00	.....	1,043.64
.....	.....	8,830.80	.....	408.36
.....	18.00	5,036.00	.....	273.00
.....	62.00	23,742.00	.....	1,380.00
.....	48.00	18,620.00	.....	1,080.00
.....	25.00	9,324.00	.....	540.00
.....	.....	189,000.00	.....	9,000.00
.....	.....	48,750.00	.....	2,500.00
.....	.....	6,790.00	.....	350.00
.....	81.00	26,142.00	.....	1,500.00
$125,677.22	428,955.25	.....	.....	14,046.96
$859,211.82	$431,047.25	$2,963,999.78	$3,694.45	$132,299.90
.....	.....	$14,812.50	.....	$750.00
$250.42	$17,444.42	9,073.00	.....	1,290.00
.....	.....	175,116.25	.....	9,000.00
.....	.....	24,000.00	.....	1,375.00
.....	.....	87,080.00	.....	4,500.00
.....	.....	268,806.25	.....	7,500.00
.....	.....	24,607.25	.....	1,125.00
.....	.....	24,573.75	.....	1,125.00
4,950.00	.....	4,950.00	$76.25	.....
24,302.50	.....	24,302.50	390.00	.....
.....	.....	99,750.00	.....	5,500.00
.....	.....	96,750.00	.....	5,000.00
.....	.....	99,500.00	.....	5,000.00
.....	.....	102,675.00	.....	4,400.00
.....	.....	98,885.00	.....	5,000.00

Schedule H (*Continued*)

Par Value	*Description of Securities*	*Rate*	*Maturity*	*Balance June 30, 1931*
	INDUSTRIAL BONDS (*Continued*)			
$17,000	Smith & Wesson, Inc., 1st Mtge. S. F.	5½%	1938	$16,830.00
62,000	Owens-Illinois Glass Co. Deb.	5%	1939	.....
12,000	Standard Oil Co. of N. J.	5%	1946	15,055.00
65,000	Standard Oil Co. of N. Y.	4½%	1951	62,156.25
74,000	Swift & Co., 1st S. F.	5%	1944	69,883.13
50,000	Swift & Co., 10-Yr. Gold	5%	1940	51,014.00
75,000	Texas Corp. Conv. Deb.	5%	1944	75,687.00
100,000	United Drug Co.	5%	1953	100,000.00
50,000	Waltham Watch & Clock Co.	6%	1943	49,000.00
190,000	Western Electric Co. Deb.	5%	1944	188,288.75
50,000	Woodward Iron Co., 1st & Cons. Mtge	5%	1952	42,750.00
	Sold or matured during year			18,460.00
$1,974,000	*Total Industrial Bonds*			$1,831,947.13
	INDUSTRIAL STOCKS	*Div.*	*Shares*	
$25,000	Algonquin Printing Co.	12%	250	.....
12,500	American Can Co., Com.	4%	500	$71,312.50
*50,000	American Car & Foundry Co., Com.	..	500	25,875.00
13,750	American Pneumatic Serv. Co., 1st Pf.	..	275	13,750.00
700	American Thread Co., Pfd.	25c	140	.....
50,000	Amoskeag Mfg. Co., Pref.	4½%	500	41,395.00
51,000	Anaconda Copper Mining Co., Cap.	..	1,020	28,254.00
11,500	Charlton Mills, Capital	..	115	6,886.04
*50,000	Curtis Publishing Co., Pref.	7%	500	59,375.00
10,000	Devoe & Raynolds Co., Inc., 1st Pref.	7%	100	9,800.00
*.....	Eastern Mfg. Co., New Common	..	1,000	.....
25,000	Eastern Mfg. Co., Pref.	..	500	15,000.00
*3,125,000	Eastman Kodak Co., Common	5%	31,250	3,653,006.25
180,000	Eastman Kodak, Pref.	6%	1,800	198,000.00
*.....	Fall River Laundry Co.	..	12	.....
*400,000	General Electric Company, Common	40c	4,000	160,000.00
14,710	General Electric Co., Special	60c	1,471	14,850.00
13,500	General Motors Corp., Common	$1.00	1,350	49,958.75
*110,200	Gillette Safety Razor Co.	..	1,102	78,914.45
70,000	Int. Match Corp., Part. Pref.	..	2,000	129,753.80
*12,500	Lackawanna Securities Co., Common	4%	125	7,771.25
50,000	Nashua Mfg. Company, Common	..	500	15,000.00
*49,200	Pullman Incorporated, Capital	3%	492	36,751.83
*.....	Quebradas Company	..	2,249	.....

* No par value.

Schedule H (*Continued*)

Purchases and Charges during the year	*Sales and Credits during the year*	*Balance June 30, 1932*	*Accrued Interest, etc.*	*Income Received*
.....	.....	$16,830.00	.....	$935.00
$49,600.00	.....	49,600.00	.....	133.33
49.00	$3,069.00	12,035.00	.....	750.00
.....	.....	62,156.25	.....	2,925.00
.....	.....	69,883.13	.....	3,700.00
.....	113.00	50,901.00	.....	2,500.00
.....	53.00	75,634.00	.....	3,750.00
.....	.....	100,000.00	.....	5,000.00
.....	.....	49,000.00	.....	3,000.00
.....	.....	188,288.75	.....	9,500.00
.....	.....	42,750.00	.....	2,500.00
990.00	19,450.00	.....	.....	748.89
$80,141.92	$40,129.42	$1,871,959.63	$466.25	$87,007.22
$67,500.00	.....	$67,500.00	.....	$3,000.00
.....	.....	71,312.50	.....	2,500.00
.....	.....	25,875.00	.....	250.00
.....	.....	13,750.00	.....	.....
455.00	.....	455.00	.....	17.50
.....	.....	41,395.00	.....	2,250.00
490.00	.....	28,744.00	.....	375.00
.....	.....	6,886.04	.....	.....
.....	.....	59,375.00	.....	3,500.00
.....	.....	9,800.00	.....	700.00
.....	.....	.....	.....	.....
.....	.....	15,000.00	.....	.....
.....	$939,700.00	2,713,306.25	.....	226,562.50
.....	.....	198,000.00	.....	10,800.00
.....	.....	.....	.....	.....
.....	119,237.50	40,762.50	.....	5,800.00
.....	.....	14,850.00	.....	882.60
.....	.....	49,958.75	.....	3,037.50
.....	.....	78,914.45	.....	551.00
.....	.....	129,753.80	.....	6,000.00
.....	228.38	7,542.87	.....	271.62
.....	.....	15,000.00	.....	.....
.....	.....	36,751.83	.....	1,599.00
.....	.....	.....	.....	3,500.00

Schedule H (*Continued*)

Par Value	*Description of Securities*	*Div.*	*Shares*	*Balance June 30, 1931*
	INDUSTRIAL STOCKS (*Continued*)			
$6,500	Queen City Cotton Co., Capital		65	$1,300.00
600	Sagamore Mfg. Co.	4%	6	.....
*7,500	Samson Cordage Company	4%	75	5,000.00
100,000	Shell Union Oil Co., Conv. Pfd.		1,000	97,750.00
*2,800	Shell Union Oil Co., Common		28	140.00
*67,600	Standard Oil Co. of California, Capital	$2.00	676	29,149.25
4,500	Stevens Mfg. Corp., Pref.		90	.....
16,000	Union Cotton Mfg. Co., Capital		160	1.00
*530,500	United Fruit Company, Capital.		5,305	397,875.00
33,000	U. S. Steel Corp., Common.		330	.....
50,000	U. S. Steel Corp., Cum. Pref.	7%	500	70,000.00
32,100	Wamsutta Mills, Capital		321	3,638.00
5,000	Westinghouse Elec. & Mfg. Co., Pref.	3.50	100	6,393.90
51,100	Westinghouse Elec. & Mfg. Co., Com.	1%	1,022	102,200.00
	Sold or matured during year			.....
$5,231,760	*Total Industrial Stocks*			$5,329,101.02

	PUBLIC UTILITY BONDS	*Rate*	*Maturity*	
$200,000	Alabama Power Co., 1st Mtge. "A"	5%	1946	$191,501.25
24,000	American Railways Co.	7%	1940	.....
62,000	Am. Tel. & Tel. Co., Col. Trust.	5%	1946	60,902.09
200,000	Am. Tel. & Tel. Co., 35-Yr. Deb.	5%	1960	190,000.00
200,000	Appalachian Elec.P'r Co.,1st&Ref.Mt.	5%	1956	100,237.50
22,000	Birmingham Waterworks Co.,1stMtge.	5½%	1954	.....
50,000	Blackstone Valley Gas & El. Co., Mt.	5%	1939	50,074.00
46,000	Boston Elevated Ry. Co.	6%	1933	45,100.00
5,000	Boston Elevated Ry. Co.	4%	1935	4,600.00
100,000	Boston Elevated Ry. Co.	5%	1937	99,875.00
15,000	Brooklyn Edison Co., Gen. Mtge."E"	5%	1952	.....
285,000	Cedars Rapids Mfg.&P.Co.,1stMt.S.F.	5%	1953	272,778.85
25,000	Chesa. & Potomac Tel. Co., S.F. "A"	5%	1943	24,500.00
45,000	Chicago City Railway Co., 1st Mtge.	5%	1927	44,750.00
50,000	Chic.N.Sh.&Mil.R.R.Co.,1st&Ref."A"	6%	1955	49,000.00
4,250	Chicago Railways Co., 1st Mtge.	5%	1927	3,000.00
150,000	Cleveland Elec. Ill. Co., 1st Mtge.	5%	1939	150,587.00
25,000	Commonwealth Water Service, 1stMtg.	5½%	1947	.....
46,000	Conn. Lt. & Pr. Co., 1st Mt. S.F."A"	7%	1951	43,324.48
52,000	Conn. Lt. & Pr. Co., 1st Mtg. "C"	4½%	1956	49,465.00
75,000	Consolidated Gas Co., N. Y., Gold	4½%	1951	75,562.50
200,000	Consolidated Gas Co., N. Y., Deb.	5½%	1945	202,045.00
200,000	Consumers Pow. Co., 1st. & Ref.	5%	1936	199,000.00
250,000	Con. Gas, Elec. Lt. & Power Co., Mtg.	4½%	1935	237,975.00

*No par value.

Schedule H (*Continued*)

Purchases and Charges during the year	*Sales and Credits during the year*	*Balance June 30, 1932*	*Accrued Interest, etc.*	*Income Received*
.....	.....	$1,300.00	.....	.....
$282.00	.....	282.00	.....	$18.00
.....	.....	5,000.00	.....	525.00
.....	.....	97,750.00	.....	1,375.00
.....	.....	140.00	.....	.....
.....	.....	29,149.25	.....	1,521.00
2,700.00	.....	2,700.00	.....	.....
320.00	$320.00	1.00	.....	.....
.....	179,807.50	218,067.50	.....	18,567.50
29,436.00	.....	29,436.00	.....	825.00
.....	14,837.50	55,162.50	.....	3,500.00
.....	.....	3,638.00	.....	.....
.....	.....	6,393.90	.....	337.50
.....	57,048.08	45,151.92	.....	2,555.00
420.00	420.00	.....	.....	.....
$101,603.00	$1,311,598.96	$4,119,105.06	.....	$300,820.72
.....	.....	$191,501.25	.....	$10,000.00
$24,000.00	.....	24,000.00	.....	1,680.00
.....	.....	60,902.09	.....	3,100.00
.....	.....	190,000.00	.....	10,000.00
103,687.50	$171.00	203,754.00	$1,100.70	10,000.00
19,360.00	.....	19,360.00	289.05	.....
.....	11.00	50,063.00	.....	2,500.00
.....	.....	45,100.00	.....	2,760.00
.....	.....	4,600.00	.....	200.00
.....	.....	99,875.00	.....	5,000.00
14,512.50	.....	14,512.50	114.57	.....
.....	.....	272,778.85	.....	14,250.00
.....	.....	24,500.00	.....	1,250.00
.....	.....	44,750.00	.....	2,250.00
.....	.....	49,000.00	.....	3,000.00
.....	.....	3,000.00	.....	212.50
.....	84.00	150,503.00	.....	7,500.00
22,750.00	.....	22,750.00	87.85	.....
.....	.....	43,324.48	.....	3,220.00
.....	.....	49,465.00	.....	2,340.00
.....	30.50	75,532.00	.....	3,375.00
.....	170.00	201,875.00	.....	11,000.00
.....	.....	199,000.00	.....	10,000.00
.....	.....	237,975.00	.....	11,250.00

Schedule H (*Continued*)

Par Value	*Description of Securities*	*Rate*	*Maturity*	*Balance June 30, 1931*
	PUBLIC UTILITY BONDS (*Continued*)			
$50,000	Cont. Gas & Elec. Corp., Deb. "A".	5%	1958	.....
55,000	Cumberland City Pow.&Lt.Co.,1st Mt.	4½%	1956	$51,837.50
50,000	Dallas Ry. & Terminal Co., 1st Mtge.	6%	1951	48,125.00
100,000	Detroit Edison Co.,Gen.&Ref.Mtg."D"	4½%	1961	100,000.00
25,000	Detroit Edison Co., 1st Mtge. . . .	5%	1933	25,033.00
100,000	Duquesne Lt. & Pr. Co., 1st Mt., Gold	4½%	1967	94,750.00
260,000	Edison Elec. Ill. Co. of Boston, Gold	4½%	1933	.....
175,000	Edison Elec. Ill. Co. of Boston, Gold	5%	1933	173,093.75
25,000	Em. Gas & El. Co. & Em. Coke Co., Jt.	5%	1941	18,250.00
50,000	Great Lakes Power Co., Ltd., 1st Mt.	6%	1943	43,187.50
50,000	Gulf States Util. Co.,1st & Ref.Mt."A"	5%	1956	46,875.00
173,000	HydraulicPr.Co.of Niag.F'lls,Ref.&Im.	5%	1951	165,142.00
59,000	Illinois Bell Tel. Co., 1st & Ref. "A"	5%	1956	56,712.50
50,000	Illinois Pow. & Lt. Corp.,1st&Ref. Mtge.	5½%	1954	48,500.00
50,000	Indianapolis Water Co., 1st Lien & Ref.	5½%	1953	24,000.00
100,000	Los Angeles Gas & El. Corp., Ref. "F"	5½%	1943	95,750.00
50,000	Los Angeles Gas & El.Corp.,Gen'l Mt.	5%	1961	49,125.00
200,000	Louisville Gas & El. Co., 1st & Ref. Mt.	5%	1952	184,546.25
50,000	Memphis Pow. & Lt. Co., 1st & Ref. "A"	5%	1948	.....
200,000	Massachusetts Gas Cos., S. F. Deb. .	5%	1955	195,500.00
50,000	Milwaukee El. Ry. & Lt. Co., 1st Mt..	5%	1961	46,125.00
50,000	Minneapolis Gen. Elec. Co., Mtge. .	5%	1934	50,065.00
110,000	Mississippi River Power Co., 1st Mt..	5%	1951	101,039.40
50,000	Nevada California Electric Co. . . .	5%	1956	47,750.00
75,000	Narragansett Elec. Co., 1st Mtg.Gold	5%	1957	.....
55,000	New England Tel. & Tel. Co., Deb. .	5%	1932	55,035.00
150,000	New Orleans Pub.Serv.,Inc.,1st Ref.Mt.	5%	1952	134,375.00
50,000	New York Edison Co., 1st&Ref. "C"	5%	1951	.....
100,000	New York Telephone Co., 1st Mtge.	4½%	1939	99,343.36
81,000	New York Pow. & Lt. Corp., 1st Mtg.	4½%	1967	78,456.66
5,000	New York & Queen Gas Co., 1st & G.M.	5%	1934	4,900.00
1,000	Nia., Lock & Ont. P. Co., 1st & Ref. Mt.	5%	1955	1,000.00
100,000	North American Co., Deb.	5%	1961	.....
50,000	Northern States Pow. Co., Ref. Gold	4½%	1961	49,625.00
50,000	North. States Pr. Co., 1st & Ref. Mt.	5%	1941	45,000.00
50,000	Ohio Power Co., 1st & Ref. Mtge. Gold	4½%	1956	49,812.50
100,000	Oklahoma Gas & Electric Co., 1st Mtg.	5%	1950	94,750.00
50,000	Ontario Power Co., 1st Mtge. S. F. .	5%	1943	49,312.50
100,000	Pacific Gas & El.Co.,1st & Ref.Mt.Gold.	4½%	1960	98,368.75
175,000	Pacific Gas & El. Co., 1st Ref. Mt."B"	6%	1941	179,902.00
75,000	Pacific Tel.&Tel.Co.,1st Mt.Col.Tr.S.F.	5%	1937	73,915.10
165,000	Penn.-Ohio Edison Co., Gold Deb. .	5½%	1959	169,294.75

Schedule H (*Continued*)

Purchases and Charges during the year	*Sales and Credits during the year*	*Balance June 30, 1932*	*Accrued Interest, etc.*	*Income Received*
$42,500.00	.....	$42,500.00	$298.61	$1,250.00
.....	.....	51,837.50	.....	2,475.00
.....	.....	48,125.00	.....	3,000.00
.....	.....	100,000.00	.....	4,500.00
.....	$33.00	25,000.00	.....	1,250.00
.....	.....	94,750.00	.....	4,500.00
259,376.00	.....	259,376.00	.....	.....
.....	.....	173,093.75	.....	8,750.00
.....	.....	18,250.00	.....	1,250.00
.....	.....	43,187.50	.....	3,000.00
.....	.....	46,875.00	.....	2,500.00
.....	3.00	165,139.00	.....	8,650.00
.....	.....	56,712.50	.....	2,950.00
.....	.....	48,500.00	.....	2,750.00
24,250.00	.....	48,250.00	$443.05	1,375.00
.....	.....	95,750.00	.....	5,500.00
.....	.....	49,125.00	.....	2,500.00
.....	.....	184,546.25	.....	10,000.00
47,000.00	.....	47,000.00	326.39	.....
.....	.....	195,500.00	.....	10,000.00
.....	.....	46,125.00	.....	2,500.00
.....	22.00	50,043.00	.....	2,500.00
15,865.44	14,490.00	102,414.84	250.82	5,691.64
.....	.....	47,750.00	.....	2,500.00
68,750.00	.....	68,750.00	1,687.50	.....
.....	35.00	55,000.00	.....	2,750.00
.....	.....	134,375.00	.....	7,500.00
48,375.00	.....	48,375.00	943.06	1,250.00
.....	.....	99,343.36	.....	4,500.00
38.21	995.00	77,499.87	.....	3,656.25
.....	.....	4,900.00	.....	250.00
.....	.....	1,000 00	.....	50.00
101,307.50	47.50	101,260.00	87.09	2,500.00
.....	.....	49,625.00	.....	2,250.00
.....	.....	45,000.00	.....	2,500.00
.....	.....	49,812.50	.....	2,250.00
.....	.....	94,750.00	.....	5,000.00
.....	.....	49,312.50	.....	2,500.00
.....	.....	98,368.75	.....	4,500.00
.....	521.00	179,381.00	.....	10,500.00
.....	.....	73,915.10	.....	3,750.00
.....	164.75	169,130.00	.....	9,075.00

Schedule H (*Continued*)

Par Value	*Description of Securities*	*Rate*	*Maturity*	*Balance June 30, 1931*
	PUBLIC UTILITY BONDS (*Continued*)			
$50,000	Penn. Power & Lt. Co., 1st Mtge. Gold	4½%	1981	$48,125.00
2,000	Philadelphia Co.	5%	1967	2,025.00
50,000	Philadelphia Elec. Co., 1st & Ref.	4%	1971	46,750.00
8,000	Philadelphia Sub. Water Co., 1st Mtge.	5%	1955	.....
25,000	Portland Gen. Electric Co., 1st Mtge.	5%	1935	25,081.00
95,000	Potomac Elec. Power Co., Mtge. "B"	6%	1953	97,471.00
80,000	Public Ser. Co. of No. Ill., 1st Mtge.	4½%	1980	88,393.75
50,000	Salmon River Power Co., 1st Mtge.	5%	1952	47,625.00
50,000	SanJoaquinL&PCo.,Gen&.Ref.Gold"D"	5%	1957	49,125.00
100,000	Shawinigan Water & Pow.Co.,1st Mtg.	5%	1970	101,353.00
100,000	Southern Bell Tel.&Tel.Co.,1stMt.S.F.	5%	1941	100,537.00
165,000	Southern Calif. Edison Co.,Gen. Mtge.	5%	1939	163,218.75
50,000	Syracuse Lt. Co., Inc., 1st & Ref.Mtge.	5½%	1954	50,568.00
20,000	Tennessee Elec.Pow.Co., 1st&Ref.Mtg.	5%	1956	39,450.00
50,000	Tennessee Power Co., 1st Mtge.	5%	1962	46,625.00
300,000	Texas Power & Light Co., 1st Mtge.	5%	1937	291,437.50
50,000	Virginia Elec. & Pow. Co., Sec. Conv.	5½%	1942	.....
50,000	Virginia Ry. & Pr. Co., 1st Mtge.	5%	1936	46,375.00
100,000	West Penn. Power Co., 1st Mtge. "E"	5%	1963	93,482.50
200,000	Western Union Tel. Co.	5%	1951	201,045.00
	Sold or matured during year			1,260,259.20
$7,490,250	*Total Public Utility Bonds*			$7,741,721.89
	PUBLIC UTILITY STOCKS	*Div.*	*Shares*	
$337,400	American Tel. & Tel. Co., Capital	9%	3,374	$592,201.75
*21,600	Brooklyn Union Gas Co., Capital	5%	216	11,887.50
*50,000	Central Illinois Pub. Ser. Co., Pfd.	6%	500	42,937.50
*50,000	Commonwealth & Southern Corp,Pfd.	6%	500	51,625.00
*2,200	Consolidated Gas Co. of N.Y., Com.	4%	22	.....
*200,000	Consolidated Gas Co. of N. Y., Pfd.	5%	2,000	194,975.00
*6,800	Eastern Gas & Fuel Asso., Com.		68	.....
3,400	Eastern Gas & Fuel Asso., Cum. Pref.	6%	34	2,960.13
5,000	Eastern Gas & Fuel Asso., Pr. Pref.	4½%	50	4,100.00
28,600	Edison Elec. Ill. Co., Capital	$13.60	286	57,802.50
*65,000	Electric Bond & Share Co. $5 Pfd.	5%	650	59,312.50
*150,000	Public Service Corp. of N. J., Pref.	5%	1500	148,665.88
*50,000	Memphis Pow. & Lt. Co., Pfd.	7%	500	49,375.00
25,000	Southern Cal. Edison Co. Com.	2%	1,000	.....
*50,000	Stone & Webster, Inc., Capital	50c	500	27,680.74
35,000	Western Union Tel. Co.	4%	350	49,400.00
	Sold during year			47,250.00
$1,080,000	*Total Public Utility Stocks*			$1,340,173.50

*No par value

Schedule H (*Continued*)

Purchases and Charges during the year	*Sales and Credits during the year*	*Balance June 30, 1932*	*Accrued Interest, etc.*	*Income Received*
.....	.....	$48,125.00	.....	$2,250.00
.....	$1.00	2,024.00	.....	100.00
.....	.....	46,750.00	.....	2,000.00
7,280.00	.....	7,280.00	$63.61	.....
.....	21.00	25,060.00	.....	1,250.00
.....	118.00	97,353.00	.....	5,700.00
78.47	9,900.00	78,572.22	.....	3,862.50
.....	.....	47,625.00	.....	2,500.00
.....	.....	49,125.00	.....	2,500.00
.....	36.00	101,317.00	.....	5,000.00
.....	60.00	100,477.00	.....	5,000.00
.....	.....	163,218.75	.....	8,250.00
.....	27.00	50,541.00	.....	2,750.00
50.00	19,725.00	19,775.00	.....	1,374.99
.....	.....	46,625.00	.....	2,500.00
.....	.....	291,437.50	.....	15,000.00
47,625.00	.....	47,625.00	122.22	.....
.....	.....	46,375.00	.....	2,500.00
.....	.....	93,482.50	.....	5,000.00
.....	53.00	200,992.00	.....	10,000.00
37,771.10	1,298,030.30	.....	.....	41,768.47
$884,576.72	$1,344,749.05	$7,281,549.56	$5,814.52	$388,366.35
.....	$203,969.83	$388,231.92	.....	$30,366.00
.....	.....	11,887.50	.....	1,080.00
.....	.....	42,937.50	.....	3,000.00
.....	.....	51,625.00	.....	3,000.00
$1,936.00	.....	1,936.00	.....	66.00
.....	.....	194,975.00	.....	10,000.00
.....	.....	.....	.....	.....
.....	.....	2,960.13	.....	204.00
.....	.....	4,100.00	.....	225.00
.....	.....	57,802.50	.....	3,889.60
.....	.....	59,312.50	.....	3,250.00
72,635.00	72,635.00	148,665.88	.....	7,500.00
.....	.....	49,375.00	.....	3,500.00
43,150.00	.....	43,150.00	.....	1,500.00
.....	.....	27,680.74	.....	812.50
.....	.....	49,400.00	.....	2,275.00
13,322.00	60,572.00	.....	.....	81.00
$131,043.00	$337,176.83	$1,134,039.67	.....	$70,749.10

Schedule H (*Continued*)

Par Value	*Description of Securities*	*Rate*	*Maturity*	*Balance June 30, 1931*
	RAILROAD BONDS			
$75,000	Atch. Top. & S. F., Cal. & Ariz. Lines	4½%	1962	$73,143.75
100,000	Atch. Top. & Santa Fe, Gen. Mtge. . .	4%	1995	96,470.00
10,000	Atch. Top. & Santa Fe, Gen.Mtg.(Reg.)	4%	1995	.....
13,000	Atch. Top & Santa Fe, 20-Yr.	4½%	1948	13,000.00
50,000	Atlantic Coast Line R.R. Co., Gen. Un.	4½%	1964	48,875.00
83,000	Baltimore & Ohio R.R. Co.	4½%	1933	.....
10,000	Boston & Albany Railroad Improvement	4%	1934	9,450.00
1,000	Boston & Maine Railroad	4½%	1944	850.00
150,000	Boston & Maine R.R., 1st Mt. Gold No. 2	5%	1955	150,690.00
50,000	Boston & Maine R. R., 1st Mtge. "AC"	5%	1967	46,500.00
90,000	Canadian Nat'l Railways Co.	4½%	1957	88,425.00
100,000	Canadian Nat'l Rwys. Co., 25-Yr.Gold	4½%	1956	98,000.00
25,000	Canadian Nat'l Rys. Equip. Tr. "J" .	4½%	1938	24,575.00
59,000	Canadian Pacific Ry. Co., Equip. Tr. .	5%	1944	60,143.00
75,000	Central New England Railways,1st Mtge.	4%	1961	56,281.25
50,000	Cen. Pacific Ry. Co., Short Line Mtge.	4%	1954	40,918.75
100,000	Ches. & Ohio Ry. Co., Cons'd. 1st Mtge.	5%	1939	102,646.00
51,000	Chicago, Burlington & Quincy, Mtge. .	4%	1958	50,307.00
100,000	Chic., Burl. & Quincy, 1st Ref. Mtge."B"	4½%	1977	96,750.00
2,000	C. B. & Q. R.R. Co., Ill. Div. Mtge. .	3½%	1949	.....
100,000	Chic.J.Rys.&Un.St.Yds.Mt.&Co.Tr. .	4%	1940	94,250.00
75,000	Chic.J.Rys.&Un.St.Yd.Ref.Mt.&Co.Tr.	5%	1940	74,143.75
17,000	C.M.St.P. & Pacific R.R. Co., Gold "A"	5%	1975	10,410.00
68,000	C.M.St.P. & Pac. R.R. Con. Gold "A".	5%	2000	41,640.00
50,000	Chic., Rock Is. & Pac., 1st & Ref. . .	4%	1934	42,406.25
65,000	Chicago Union Station, 1st Mtge. "A"	4½%	1963	65,328.00
100,000	Chicago Union Station, 1st Mtge. "C".	6½%	1963	111,978.00
100,000	Chic. & N. W. Ry. Co., Gen. Mtge. .	4%	1987	96,500.00
200,000	Chic. & N.W. Ry. Co., 1st & Ref. Mtge.	4½%	2037	189,500.00
100,000	Chic. & N. W. Ry. Co., 20-Yr. Gold. .	4¾%	1949	100,309.00
5,000	Chic. & N.W. Ry. Co., Equip.Tr. of 1922	5%	1934	4,907.10
5,000	Chic. & N.W.Ry.Co., Equip. Tr. of 1922	5%	1935	4,902.90
5,000	Chic. & N.W. Ry. Co., Equip. Tr. of 1922	5%	1936	4,899.30
100,000	Clev., Cinn., Chic. & St. Louis Ry. Co. .	4½%	1977	98,891.25
79,000	Cleveland Union Terminals Co., 1st Mtg.	4½%	1977	77,864.27
25,000	Cleveland & Pittsburg R.R. Co., Mtge.	4½%	1942	25,294.00
290,000	Delaware & Hudson Co., 1st & Ref.Mt.	4%	1943	262,285.00
100,000	Florida East Coast Ry.Co., 1st & Ref.	5%	1974	95,633.75
35,000	Fort St. Union Depot Co., 1st Mtge. .	4½%	1941	34,825.00
100,000	Grand Trunk & West. Ry., Eq. Tr. . .	5%	1942	99,495.70
150,000	Great Northern Railway Co., Gen. Mtge.	4½%	1976	144,344.25
50,000	Hudson & Man. R.R.Co., 1st&Ref.Mtge.	5%	1957	50,059.00

Schedule H (*Continued*)

Purchases and Charges during the year	*Sales and Credits during the year*	*Balance June 30, 1932*	*Accrued Interest, etc.*	*Income Received*
.....	.....	$73,143.75	.....	$3,375.00
.....	.....	96,470.00	.....	4,000.00
$8,900.00	.....	8,900.00	.....	.....
.....	.....	13,000.00	.....	585.00
.....	.....	48,875.00	.....	2,250.00
83,000.00	.....	83,000.00	$1,597.75	3,735.00
.....	.....	9,450.00	.....	400.00
.....	.....	850.00	.....	45.00
.....	$30.00	150,660.00	.....	7,500.00
.....	.....	46,500.00	.....	2,500.00
.....	.....	88,425.00	.....	4,050.00
.....	.....	98,000.00	.....	4,500.00
.....	.....	24,575.00	.....	1,125.00
.....	95.00	60,048.00	.....	2,950.00
.....	.....	56,281.25	.....	3,000.00
.....	.....	40,918.75	.....	2,000.00
.....	378.00	102,268.00	.....	5,000.00
.....	.....	50,307.00	.....	2,040.00
.....	.....	96,750.00	.....	4,500.00
1,600.00	.....	1,600.00	.....	.....
.....	.....	94,250.00	.....	4,000.00
.....	.....	74,143.75	.....	3,750.00
.....	.....	10,410.00	.....	850.00
.....	.....	41,640.00	.....	.....
.....	.....	42,406.25	.....	2,000.00
.....	11.00	65,317.00	.....	2,925.00
.....	386.00	111,592.00	.....	6,500.00
.....	.....	96,500.00	.....	4,000.00
.....	.....	189,500.00	.....	9,000.00
.....	18.00	100,291.00	.....	4,750.00
.....	.....	4,907.10	.....	250.00
.....	.....	4,902.90	.....	250.00
.....	.....	4,899.30	.....	250.00
.....	.....	98,891.25	.....	4,500.00
.....	.....	77,864.27	.....	3,555.00
.....	27.00	25,267.00	.....	1,125.00
.....	.....	262,285.00	.....	11,600.00
.....	.....	95,633.75	.....	.....
.....	.....	34,825.00	.....	1,575.00
.....	.....	99,495.70	.....	5,000.00
.....	.....	144,344.25	.....	6,750.00
.....	3.00	50,056.00	.....	2,500.00

Schedule H (*Continued*)

Par Value	*Description of Securities*	*Rate*	*Maturity*	*Balance June 30, 1931*
	RAILROAD BONDS (*Continued*)			
$4,000	Illinois Central R.R. Equip. Trust "K"	4½%	1932	$3,948.40
4,000	Illinois Central R.R. Equip. Trust "K"	4½%	1933	3,943.20
5,000	Illinois Central R.R. Equip. Trust "K"	4½%	1934	4,922.50
11,000	Illinois Central R.R. Equip. Trust "K"	4½%	1935	10,818.05
27,000	Illinois Central R.R. Equip. Trust "K"	4½%	1936	26,524.02
21,000	Illinois Central R.R. Equip. Trust "K"	4½%	1937	20,606.71
12,000	Illinois Central R.R. Equip. Trust "K"	4½%	1938	11,762.28
5,000	Illinois Central R.R. Equip. Trust "K"	4½%	1939	4,895.79
10,000	Illinois Central Equip. Trust "J"	5%	1935	9,825.00
10,000	Illinois Central Equip. Trust "J" . . .	5%	1936	9,825.00
10,000	Illinois Central Equip. Trust "J" . . .	5%	1937	9,825.00
5,000	Illinois Central R.R. Co., Ref. Mtge. . .	4%	1955	4,700.00
75,000	Illinois Central R.R. Co., Sec. Gold . .	4%	1952	67,875.00
59,000	Ill. Cen. R.R. Co., Wes. Lines Mtge. . .	4%	1951	54,526.25
9,000	Ill. Cen. R.R. Co., West. Lines Mt. (Reg.)	4%	1951	8,291.25
25,000	Ill. Cent. & Chic. & St. L. & New O.R.R.	4½%	1963	24,375.00
50,000	Indianapolis Un. Ry. Co., Gen. Mtge. .	5%	1965	49,468.75
50,000	Kan. City. Ft. Scott & Memphis Consol.	4%	1936	41,243.75
8,500	Kan. City, Mem. & Birm. R.R. Co., Mt.	4%	1934	8,287.50
37,000	Kan. City, Mem. & Birm. R.R. Co., In. Mt.	5%	1934	34,225.00
125,000	Kansas City Terminal Co., 1st Mtge. .	4%	1960	108,187.50
50,000	Long Island R.R. Co., Unified Mtge. . .	4%	1949	48,068.75
50,000	Long Island R.R. Co., Un. Mtge. (Reg.)	4%	1949	48,068.75
75,000	Maine Central R.R., 1st & Ref. Mtge. .	4½%	1935	73,500.00
300,000	Minn., St. Paul & S. St. Marie Ry. Co. .	4%	1938	269,135.00
10,000	Minn., St. Paul & S.St.Marie Ry.Co. Gold	5½%	1949	7,438.10
100,000	Missouri, Pacific R.R., 1st & Ref. "F" .	5%	1977	99,750.00
21,000	Miss. & Ill. Bridge & Belt R.R. Co., Mt.	4%	1951	13,650.00
100,000	Morris & Essex Ry. Co., Constr. "B" .	4½%	1955	96,250.00
43,000	N. Y. C. & H. R.R.R.	4%	1934	39,825.00
15,000	New York Central Lines Equip. Trust .	4½%	1932	14,439.21
14,000	New York Central Lines Equip. Trust .	4½%	1933	13,434.36
9,000	New York Central Lines Equip. Trust .	4½%	1937	8,536.50
25,000	New York Central R.R., Equip. Trust .	4½%	1936	24,702.50
6,000	New York Central R.R., Equip. Trust. .	7%	1933	6,084.00
11,000	New York Central R.R., Equip. Trust. .	7%	1934	11,300.00
52,000	New York Cen. R.R. Co., Cons. Mt. "A"	4%	1998	46,046.65
100,000	N. Y., Chic. & St. Louis R.R. Co., Gold "C"	4½%	1978	97,000.00
50,000	N. Y., Chic. & St. Louis R.R. Co. . . .	5½%	1974	47,350.00
100,000	New York Connect. R.R., 1st Mtge. . .	4½%	1953	98,625.00
4,000	N. Y., N. H. & H. R.R. Co., Deb. . . .	3½%	1947	. . . . .
8,000	N. Y., N. H. & H. R.R. Co., Deb. . . .	4%	1955	6,320.00

Schedule H (*Continued*)

Purchases and Charges during the year	*Sales and Credits during the year*	*Balance June 30, 1932*	*Accrued Interest, etc.*	*Income Received*
.....	.....	$3,948.40	.....	$180.00
.....	.....	3,943.20	.....	180.00
.....	.....	4,922.50	.....	225.00
.....	.....	10,818.05	.....	495.00
.....	.....	26,524.02	.....	1,215.00
.....	.....	20,606.71	.....	945.00
.....	.....	11,762.28	.....	540.00
.....	.....	4,895.79	.....	225.00
.....	.....	9,825.00	.....	500.00
.....	.....	9,825.00	.....	500.00
.....	.....	9,825.00	.....	500.00
.....	.....	4,700.00	.....	200.00
.....	.....	67,875.00	.....	3,000.00
.....	.....	54,526.25	.....	2,360.00
.....	.....	8,291.25	.....	360.00
.....	.....	24,375.00	.....	1,125.00
.....	.....	49,468.75	.....	2,500.00
.....	.....	41,243.75	.....	2,000.00
.....	.....	8,287.50	.....	340.00
.....	.....	34,225.00	.....	1,850.00
.....	.....	108,187.50	.....	5,000.00
.....	.....	48,068.75	.....	2,000.00
.....	.....	48,068.75	.....	2,000.00
.....	.....	73,500.00	.....	3,375.00
.....	.....	269,135.00	.....	12,000.00
.....	.....	7,438.10	.....	550.00
.....	.....	99,750.00	.....	5,000.00
.....	.....	13,650.00	.....	840.00
.....	.....	96,250.00	.....	4,500.00
$1,712.50	.....	41,537.50	.....	1,680.00
.....	.....	14,439.21	.....	675.00
.....	.....	13,434.36	.....	630.00
.....	.....	8,536.50	.....	405.00
.....	.....	24,702.50	.....	1,125.00
.....	$84.00	6,000.00	.....	420.00
.....	150.00	11,150.00	.....	770.00
.....	.....	46,046.65	.....	2,080.00
.....	.....	97,000.00	.....	4,500.00
.....	.....	47,350.00	.....	2,750.00
.....	.....	98,625.00	.....	4,500.00
2,145.00	.....	2,145.00	.....	70.00
.....	.....	6,320.00	.....	320.00

Schedule H (*Continued*)

Par Value	*Description of Securities*	*Rate*	*Maturity*	*Balance June 30, 1931*
	RAILROAD BONDS (*Continued*)			
$50,000	N. Y., N. H. & H. R.R. Co., Deb. . . .	4%	1957	$36,865.00
31,200	N.Y., N.H. & H. Co.,Con. Deb.(Reg.) .	6%	1948	33,104.00
75,000	No. Pacific R.R. Co., Prior Lien Ry. . .	4%	1997	67,875.00
532,000	No. Pacific Ry. Co., Ref. & Imp. "B" .	6%	2047	568,209.60
84,000	Oregon R.R. & Nav. Co., Cons. Mtge. .	4%	1946	82,668.25
14,500	Oregon Short Line R.R., Cons. Mtge.. .	5%	1946	14,912.00
18,000	Pennsylvania R.R. Co., Cons. Mtge. . .	4½%	1960	18,420.00
100,000	Pennsylvania R.R. Co., Gen. Mtge. . .	4½%	1965	100,768.00
125,000	Pere Marquette Ry., 1st Mtge. Gold . .	4½%	1980	120,987.50
117,900	Pere Marquette Ry., 1st Mtge. "A" . .	5%	1956	104,719.59
37,500	Pere Marquette Ry. Co., 1st Mtge. "B".	4%	1956	37,500.00
2,700	Reading Co., Gen. & Ref. "A"	4½%	1997	2,646.00
51,000	Rio Grande Western Ry. Co., Mtge. . .	4%	1939	49,935.00
83,000	St. Louis, Iron Mt. & So. Ry.	4%	1933	42,290.00
1,000	Somerset Ry. Co., 1st & Ref. Mtge. . .	4%	1955	850.00
5,000	Southern Pacific Co. Gold	4%	1949	4,575.00
212,000	Southern Pacific Co.	4½%	1969	192,280.00
70,000	So. Ry. Co., Dev. & Gen. Mtge.	4%	1956	54,873.47
25,000	So.Ry.Co., St.Louis Div., 1st Mt.(Reg.)	4%	1951	24,875.00
100,000	Southern Pac.Co. Oregon Lines, 1st Mtg.	4½%	1977	97,250.00
100,000	Term.R.R.Asso. of St. Louis, 1st Mtge. .	4½%	1939	100,120.00
100,000	Term.R.R.Asso.of St.Louis, Gen. Mtge.	4%	1953	83,860.00
100,000	Un. Pac. R.R. Co., 1st Mtge. & L. Gr. .	4%	1947	100,570.00
20,000	Union Pacific R.R. Co.	4½%	1967	19,400.00
100,000	Union Terminal Co. of Dallas,1st Mt.S.F.	5%	1942	99,673.75
10,000	Western Pacific R.R. Co., 1st Mtge. "A"	5%	1946	8,000.00
200,000	Virginian Ry. Co., 1st Mtge. "A" . . .	5%	1962	191,737.50
50,000	Winston Salem South. Ry. Co., Mtge. .	4%	1960	43,875.00
	Sold or matured during year			104,051.61
$7,133,300	*Total Railroad Bonds*			$6,781,382.31
	RAILROAD STOCKS	*Div.*	*Shares*	
$33,600	Atchison, Topeka & Santa Fe Co., Pref..	5%	336	$25,200.00
150,000	Atchison, Topeka & Santa Fe Co., Com.		1,500	270,000.00
50,000	Atlanta, Birmingham & Coast R.R., Pfd.	5%	500	50,000.00
40,500	Baltimore & Ohio R.R. Common . . .		405	32,400.00
8,800	Bangor & Aroostook R.R. Com.	2%	176	10,560.00
20,000	Bangor & Aroostook R.R. Pfd.	7%	200	19,000.00
51,000	Boston & Albany R.R. Co., Capital . .	8¾%	510	94,883.25
1,600	Boston & Maine R.R., 1st Pfd. "A" . .		16	.....
3,200	Boston & Maine R.R., Unst. Pfd. . . .		32	.....

Schedule H (*Continued*)

Purchases and Charges during the year	*Sales and Credits during the year*	*Balance June 30, 1932*	*Accrued Interest, etc.*	*Income Received*
.....	.....	$36,865.00	.....	$2,000.00
.....	$119.00	32,985.00	.....	1,872.00
.....	.....	67,875.00	.....	3,000.00
.....	312.00	567,897.60	.....	31,920.00
.....	.....	82,668.25	.....	3,360.00
.....	28.00	14,884.00	.....	725.00
.....	15.00	18,405.00	.....	810.00
.....	24.00	100,744.00	.....	4,500.00
.....	.....	120,987.50	.....	5,625.00
.....	.....	104,719.59	.....	5,895.00
.....	.....	37,500.00	.....	1,500.00
.....	.....	2,646.00	.....	121.50
.....	.....	49,935.00	.....	2,040.00
$30,252.50	.....	72,542.50	$399.67	3,320.00
.....	.....	850.00	.....	40.00
.....	.....	4,575.00	.....	200.00
.....	.....	192,280.00	.....	9,540.00
.....	.....	54,873.47	.....	2,800.00
.....	.....	24,875.00	.....	1,000.00
.....	.....	97,250.00	.....	4,500.00
.....	15.00	100,105.00	.....	4,500.00
.....	.....	83,860.00	.....	4,000.00
.....	36.00	100,534.00	.....	4,000.00
.....	.....	19,400.00	.....	900.00
.....	.....	99,673.75	.....	5000.00
.....	.....	8,000.00	.....	500.00
.....	.....	191,737.50	.....	10,000.00
.....	.....	43,875.00	.....	2,000.00
8,548.39	112,600.00	.....	.....	5,598.61
$136,158.39	$114,331.00	$6,803,209.70	$1,997.42	$324,382.11
.....	.....	$25,200.00	.....	$1,680.00
.....	$60,671.70	209,328.30	.....	11,250.00
.....	.....	50,000.00	.....	2,500.00
.....	11,676.05	20,723.95	.....	911.25
.....	.....	10,560.00	.....	549.12
.....	.....	19,000.00	.....	1,400.00
$1,432.00	.....	96,315.25	.....	4,462.50
800.00	.....	800.00	.....	20.00
1,920.00	.....	1,920.00	.....	48.00

Schedule H (*Continued*)

Par Value	*Description of Securities*	*Div.*	*Shares*	*Balance June 30, 1931*
	RAILROAD STOCKS (*Continued*)			
$13,300	Chic. Jct. Rwys. & Union St. Yds. Co.	6%	133	$12,718.13
20,000	Chicago & Northwestern Ry., Common		200	16,975.00
103,200	Delaware & Hudson R.R., Cap.	9%	1,032	126,604.00
12,500	Del., Lack. & Western R.R.		250	26,800.00
72,500	Great Northern Ry. Co., Preferred		725	62,815.00
8,400	Illinois Central R.R. Pref. "A"		84	8,400.00
44,000	Illinois Central R.R. Co., Com.		440	47,400.00
115,000	Louisville & Nashville R.R.		1,150	132,250.00
1,600	Maine Central R.R. Co., Com.		16	.....
201,500	New York Central R.R. Co., Capital		2,015	250,168.22
50,000	N. Y., N. H. & H. R.R. Co., Pref.		500	61,461.00
9,600	N. Y., N. H. & H. R.R. Co., Com.		96	2,190.00
33,500	Norfolk & Western Ry. Co., Common	8%	335	60,300.00
33,000	Northern Pacific Ry., Capital		330	26,523.75
33,800	Old Colony R.R. Co., Capital	7%	338	39,612.50
82,400	Pennsylvania R.R. Co.		1,648	125,312.50
100,000	Pere Marquette Ry. Pr. Pref. Cum.		1,000	80,024.40
65,000	Southern Pacific Co., Capital		650	58,500.00
100,000	Union Pacific R.R., Common	6%	1,000	180,000.00
30,000	Vicksburg, Shreveport & Pacific Rwy. Co.	5%	300	29,250.00
$1,488,000	*Total Railroad Stocks*			$1,849,347.75

		Rate	*Maturity*	
	REAL ESTATE BONDS			
$4,000	Cent. Mfg. Dist.,1st Mtge.R.E. Imp.	5½%	1940	$3,970.00
9,000	Cent.Mfg.Dist., 1st Mtge. R.E. Imp.	5½%	1941	8,955.00
14,000	Ellicott Sq. Co. of Buffalo, 1st Mtge.	5%	1935	13,580.00
406,000	Equitable Office Bldg.Corp.,35-Yr.Deb.	5%	1952	415,000.00
50,000	43 Exchange Pl. Bldg., 1st Mtge. S. F.	6%	1938	49,625.00
13,000	Jersey Mtge. & Title Guaranty Co.	5½%	1933	12,967.50
200,000	Lawyers Mtg. Invest. Corp. of Boston	5½%	1940	199,500.00
10,000	Prudence Co., Inc., Mtge.	5½%	1933	49,875.00
50,000	Steiger Bldg., 1st Mtge. Gold	5½%	1952	49,875.00
88,500	Trinity Bldg. Corp. of N.Y.,1st Mtge.	5½%	1939	85,533.33
	Matured during year			20,000.00
$844,500	*Total Real Estate Bonds*			$908,880.83

		Div.	*Shares*	
	REAL ESTATE STOCKS			
$58,800	Alaska Building Trust	1%	588	$58,251.22
20,000	Boston Cham.of Com.Realty Tr.,1st pf.		200	19,200.00
68,000	Boston Real Estate Trust Capital	5%	680	71,661.64
	Donated and sold during year			.....
$146,800	*Total Real Estate Stocks*			$149,112.86

Schedule H (*Continued*)

Purchases and Charges during the year	*Sales and Credits during the year*	*Balance June 30, 1932*	*Accrued Interest, etc.*	*Income Received*
.....	.....	$12,718.13	.....	$798.00
.....	.....	16,975.00	.....	.....
.....	.....	126,604.00	.....	9,288.00
.....	.....	26,800.00	.....	375.00
.....	.....	62,815.00	.....	1,812.50
.....	.....	8,400.00	.....	252.00
.....	.....	47,400.00	.....	440.00
.....	$32,998.96	99,251.04	.....	5,175.00
$480.00	.....	480.00	.....	.....
.....	.....	250,168.22	.....	5,037.50
.....	.....	61,461.00	.....	3,500.00
3,564.00	.....	5,754.00	.....	141.00
.....	21,440.00	38,860.00	.....	4,020.00
.....	.....	26,523.75	.....	907.50
.....	.....	39,612.50	.....	2,366.00
4,567.50	.....	129,880.00	.....	2,797.00
.....	.....	80,024.40	.....	1,250.00
.....	.....	58,500.00	.....	2,600.00
.....	37,426.87	142,573.13	.....	10,000.00
.....	.....	29,250.00	.....	1,500.00
$12,763.50	$164,213.58	$1,697,897.67	.....	$75,080.37
.....	.....	$3,970.00	.....	$220.00
.....	.....	8,955.00	.....	495.00
.....	.....	13,580.00	.....	700.00
.....	$9,000.00	406,000.00	.....	20,700.00
.....	.....	49,625.00	.....	3,000.00
.....	.....	12,967.50	.....	715.00
.....	.....	199,500.00	.....	11,000.00
.....	39,900.00	9,975.00	.....	3,198.40
.....	.....	49,875.00	.....	2,750.00
.....	.....	85,533.33	.....	4,867.50
.....	20,000.00	.....	.....	1,200.00
.....	$68,900.00	$839,980.83	.....	$48,845.90
.....	.....	$58,251.22	.....	$1,029.00
.....	.....	19,200.00	.....	200.00
.....	.....	71,661.64	.....	3,400.00
$21,580.00	$21,580.00	.....	.....	.....
$21,580.00	$21,580.00	$149,112.86	.....	$4,629.00

Schedule H (*Continued*)

Par Value	*Description of Securities*	*Div.*	*Shares*	*Balance June 30, 1931*
	BANK STOCKS			
$1,600	B. M. C. Durfee Trust Co.	8%	16	.....
104,160	First Nat'l Bank of Boston	2.00	5208	$335,078.76
4,000	First Natl. Bank of New York	100%	40	104,328.00
21,200	Guaranty Trust Co. of New York	20%	212	106,000.00
4,700	National Shawmut Bank of Boston	2.00	188	.....
10,000	New England Trust Co., Boston	20%	100	.....
$145,660	*Total Bank Stocks*			$545,406.76
	MORTGAGE NOTES	*Rate*	*Maturity*	
$7,500	Beta Nu House Corporation	5½%	1934	$9,500.00
4,500	E. V. and C. H. Bigelow	5%	....	4,500.00
38,000	F. J. Holderried (2 at $19,000 each)	3%	1935	38,000.00
7,000	N. & V. Lomusico	5%	....	7,000.00
75,000	Ella C. Martin	5%	1933	75,000.00
15,000	Theta Chi	5½%	1931	18,000.00
$147,000	*Total Mortgage Notes*			$152,000.00
	REAL ESTATE			
$205,632.55	Avon St. Land and Building (11–13)			$205,632.55
385,364.53	Franklin St. Land and Building(64–70)			385,364.53
100.00	Dorchester Land			100.00
40,000.00	Memorial Drive, Cambridge			40,000.00
15,000.00	No.7 Central St.,Winchester,Land and Building			15,000.00
$646,097.08	*Total Real Estate*			$646,097.08
	MISCELLANEOUS			
$100,000.00	Aldred Investment Trust Deb.	4½%	1967	$110,707.00
100,000.00	Solvay American Invest. Corp. Ser.Gold	5%	1942	99,500.00
*.....	Aldred Investment Trust Common		1,000†	.....
*60,000.00	Old Colony Trust Associates		600†	30,000.00
285,000.00	Gannett Co., Inc., Note	5%	....	300,000.00
	Sold during year			300,000.00
$545,000.00	*Total Miscellaneous*			$840,207.00

*No par value.
†Shares.

Schedule H (*Continued*)

Purchases and Charges during the year	*Sales and Credits during the year*	*Balance June 30, 1932*	*Accrued Interest, etc.*	*Income Received*
$3,040.00	.....	$3,040.00	.....	$96.00
14,824.00	31,000.00	318,902.76	.....	16,491.20
.....	.....	104,328.00	.....	4,000.00
.....	29,480.46	76,519.54	.....	4,240.00
9,400.00	.....	9,400.00	.....	376.00
40,000.00	.....	40,000.00	733.33	.....
$67,264.00	$60,480.46	$552,190.30	$733.33	$25,203.20
.....	$2,000.00	$7,500.00	.....	$467.50
.....	.....	4,500.00	.....	225.00
.....	.....	38,000.00	.....	2,090.00
.....	.....	7,000.00	.....	175.00
.....	.....	75,000.00	.....	3,750.00
.....	3,000.00	15,000.00	.....	907.50
.....	$5,000.00	$147,000.00	.....	$7,615.00
.....	.....	$205,632.55	$4,634.54	$11,721.31
.....	.....	385,364.53	12,872.16	27,053.56
.....	.....	100.00	81.90	.....
.....	.....	40,000.00	.....	.....
.....	.....	15,000.00	1,617.73	1,620.00
.....	.....	$646,097.08	$19,206.33	$40,394.87
.....	$298.00	$110,409.00	.....	$4,500.00
.....	.....	99,500.00	.....	5,000.00
.....	.....	.....	.....	.....
.....	.....	30,000.00	.....	1,050.00
.....	15,000.00	285,000.00	.....	15,000.00
.....	300,000.00	.....	.....	7,500.00
.....	$315,298.00	$524,909.00	.....	$33,050.00

Schedule H (*Continued*)

Par Value	*Description of Securities*	*Per cent of total 1932*	*Per cent of total 1931*	*Balance June 30, 1931*
	RECAPITULATION, GENERAL INVESTMENTS			
$2,988,500.00	Government and Municipal Bonds	9.70	8.30	$2,535,835.21
1,974,000.00	Industrial Bonds	6.50	6.70	1,831,947.13
5,231,760.00	Industrial Stocks	14.60	17.30	5,329,101.02
7,490,250.00	Public Utility Bonds	25.40	25.10	7,741,721.89
1,080,000.00	Public Utility Stocks	4.00	4.40	1,340,173.50
7,133,300.00	Railroad Bonds	23.70	22.10	6,781,382.31
1,488,000.00	Railroad Stocks	6.00	6.00	1,849,347.75
844,500.00	Real Estate Bonds	2.90	2.80	908,880.83
146,800.00	Real Estate Stocks	0.50	0.50	149,112.86
145,660.00	Bank Stocks	2.00	1.80	545,406.76
147,000.00	Mortgage Notes	0.50	0.50	152,000.00
646,097.08	Real Estate	2.30	2.10	646,097.08
545,000.00	Miscellaneous	1.90	2.40	840,207.00
$29,860,867.08	*Total General Investments*	100.00	100.00	$30,651,213.34

INVESTMENTS, GEORGE BLACKBURN MEMORIAL FUND

		Rate	*Maturity*	
$24,325	Toronto, City of, Consol. Loan Deb.	4%	1948	$22,622.25
25,000	Armour & Co., 1st Mtge. "A"	5½%	1943	17,125.00
20,000	Brown Co., 1st Mtge. "A"	5½%	1946	14,000.00
25,000	International Paper Co., Ref. Mtge. "A"	6%	1955	15,125.00
25,000	Sun Oil Co., Gold Deb.	5½%	1939	25,375.00
105,300	American Manufacturing Co., Pref.	5%	1053†	46,332.00
66,000	American Manufacturing Co., Com.	4%	660†	16,500.00
2,500	Corn Products Ref. Co., Com.	3%	100†	6,950.00
24,600	Harmony Mills, Com.		246†	246.00
*.....	International Paper & Pow. Co., "A" Com.		800†	4,800.00
*.....	International Paper & Pow. Co., "B" Com.		800†	3,200.00
*.....	International Paper & Pow. Co., "C" Com.		2,000†	4,000.00
*.....	Pan-American Foreign Corp. "A"		200†	.....
*.....	Pan-American Foreign Corp. "B"		100†	.....
1,000	Pan-American Pet. & Trans. Co., Com.	1.60	200†	6,000.00
500	Pan-American Pet. & Trans. Co., "B" Com.	1.60	100†	3,150.00
*12,500	Patchogue-Plymouth Mills Corp.		125†	1,250.00
*500	Pullman, Inc.	3%	5†	210.00
25,000	Rhode Island Malleable Iron Wks., Pref.	7%	250†	250.00
4,020	Royal Dutch Co. (N. Y. Shares)		300†	9,000.00
60,000	Stevens Linen Works	8%	600†	39,000.00
14,175	Texas Corp., Capital	1%	567†	14,175.00
*5,200	United Fruit Co.	2%	52†	2,912.00
25,000	American Tel. & Tel. Co., Gold Deb.	5%	1960	27,000.00

*No par value.
† Shares.

Schedule H (*Continued*)

Purchases and Charges during the year	*Sales and Credits during the year*	*Balance June 30, 1932*	*Accrued Interest, etc.*	*Income Received*
$859,211.82	$431,047.25	$2,963,999.78	$3,694.45	$132,299.90
80,141.92	40,129.42	1,871,959.63	466.25	87,007.22
101,603.00	1,311,598.96	4,119,105.06	.....	300,820.72
884,576.72	1,344,749.05	7,281,549.56	5,814.52	388,366.35
131,043.00	337,176.83	1,134,039.67	.....	70,749.10
136,158.39	114,331.00	6,803,209.70	1,997.42	324,382.11
12,763.50	164,213.58	1,697,897.67	.....	75,080.37
.....	68,900.00	839,980.83	.....	48,845.90
21,580.00	21,580.00	149,112.86	.....	4,629.00
67,264.00	60,480.46	552,190.30	733.33	25,203.20
.....	5,000.00	147,000.00	.....	7,615.00
.....	.....	646,097.08	19,206.33	40,394.87
.....	315,298.00	524,909.00	.....	33,050.00
$2,294,342.35	$4,214,504.55	$28,731,051.14	$31,912.30	$1,538,443.74
.....	.....	$22,622.25	.....	$973.34
.....	.....	17,125.00	.....	1,375.00
.....	.....	14,000.00	.....	1,100.00
.....	.....	15,125.00	.....	1,500.00
.....	$47.00	25,328.00	.....	1,375.00
.....	.....	46,332.00	.....	5,265.00
.....	.....	16,500.00	.....	330.00
.....	.....	6,950.00	.....	350.00
.....	.....	246.00	.....	.....
.....	.....	4,800.00	.....	.....
.....	.....	3,200.00	.....	.....
.....	.....	4,000.00	.....	.....
.....	.....	.....	.....	.....
.....	.....	.....	.....	.....
.....	.....	6,000.00	.....	320.00
.....	.....	3,150.00	.....	160.00
.....	.....	1,250.00	.....	.....
.....	.....	210.00	.....	16.25
$24,750.00	.....	25,000.00	.....	1,750.00
.....	.....	9,000.00	.....	281.55
.....	.....	39,000.00	.....	4,800.00
.....	.....	14,175.00	.....	992.25
.....	.....	2,912.00	.....	182.00
.....	72.00	26,928.00	.....	1,250.00

Schedule H (*Continued*)

Par Value	*Description of Securities*	*Rate*	*Maturity*	*Balance June 30, 1931*
	INVESTMENTS, GEORGE BLACKBURN MEMORIAL FUND (*Continued*)			
$20,000	Arkansas Pow. & Lt. Co.,1st & Ref.Gold	5%	1956	.....
25,000	Cities Service Co., Gold Deb.	5%	1958	$16,500.00
10,000	Dallas Pow. & Light Co., 1st Mtge."A"	6%	1949	10,500.00
25,000	Des Moines City Ry.Co.,Gen.&Ref.Mtge.	5%	1936	8,125.00
25,000	Illinois Pow.&LightCorp.,1st&Ref.Mtge.	6%	1953	26,125.00
25,000	Iowa Falls Elec. Co., 1st Mtge. "A" . .	6%	1937	24,625.00
50,000	Minnesota Pow. & Lt. Co., 1st Mtge. .	4½%	1978	48,500.00
25,000	Mississippi Pow.Co.,1st & Ref. Mtge. .	5%	1955	23,250.00
25,000	Narragansett Elec. Co., 1st Mtge. "A"	5%	1957	25,750.00
14,000	Public Ser. Co. of No. Ill., 1st Mtge. . .	4½%	1980	9,812.50
50,000	Shawinigan Wat.&Pow.Co.,1st Mtge. .	4½%	1967	49,000.00
30,000	Sierra & San Fran.Pow.Co., 1st Mtge. .	5%	1949	31,200.00
25,000	Utah Light&Trac.Co.,1st&Ref.Mtge."A"	5%	1944	24,750.00
25,000	Wis.-Minn. Lgt. & Pow., 1st & Ref. . .	5%	1944	25,250.00
1,000	American Tel. & Tel. Co., Capital . .	9%	10†	1,850.00
*33,200	Eastern Gas & Fuel Assoc., Com.		332†	6,972.00
12,000	Eastern Gas & Fuel Assoc., Pr. Pref. . .	4½%	120†	9,840.00
16,600	Eastern Gas & Fuel Assoc., Cum. Pref. .	6%	166†	15,272.00
20,000	Great Northern Ry.Co.,Gen.Mtge."C"	5%	1,973	20,400.00
50,000	Hudson & Man. R.R.Co.,1st & Ref."A"	5%	1,957	49,656.25
10,000	Great Northern Ry. Co., Pref.	2%	100†	5,800.00
5,500	Illinois Central R.R. Co., Pref. "A"		55†	5,500.00
19,300	Illinois Central R.R. Co., Com.		193†	11,001.00
12,100	New York Central R.R. Co., Capital		121†	12,100.00
50,000	N. Y., N. H. & H. R.R. Co., Com.		500†	36,000.00
20,000	Northern Pacific Ry. Co., Capital		200†	9,100.00
20,000	Amer.Fur.Mart Bldg.Corp.,1st Mtge. .	6%	1946	16,400.00
	Sold or matured during year			24,974.00
$1,109,320	*Total*			$827,475.00
	INVESTMENTS, MALCOLM COTTON BROWN FUND			
$15,000	Metro.West Side Elev. Ry. Co., Mtge. .	4%	1938	$6,750.00
10,000	Metro.West Side Elev.Ry.Co., Mtge. .	4%	1938	4,100.00
1,000	Public Ser. Co. Nor. Ill. 1st & Ref. "E"	4½%	1980	.....
2,000	Southern Ry. Co., Dev. & Gen. Mtge. .	4%	1956	1,795.00
$28,000	*Total*			$12,645.00

*No par value.
†Shares.

Schedule H (*Continued*)

Purchases and Charges during the year	*Sales and Credits during the year*	*Balance June 30, 1932*	*Accrued Interest, etc.*	*Income Received*
$20,250.00	$11.00	$20,239.00	$302.78	$1,000.00
.....	.....	16,500.00	.....	1,250.00
.....	27.00	10,473.00	.....	600.00
.....	.....	8,125.00	.....	1,250.00
.....	54.00	26,071.00	.....	1,500.00
.....	.....	24,625.00	.....	1,500.00
.....	.....	48,500.00	.....	2,250.00
.....	.....	23,250.00	.....	1,250.00
.....	30.00	25,720.00	.....	1,250.00
3,960.00	.....	13,772.50	15.00	540.00
.....	.....	49,000.00	.....	2,250.00
.....	67.00	31,133.00	.....	1,500.00
.....	.....	24,750.00	.....	1,250.00
.....	21.00	25,229.00	.....	1,250.00
.....	.....	1,850.00	.....	90.00
.....	.....	6,972.00	.....	.....
.....	.....	9,840.00	.....	540.00
.....	.....	15,272.00	.....	996.00
.....	10.00	20,390.00	.....	1,000.00
.....	.....	49,656.25	.....	2,500.00
.....	.....	5,800.00	.....	250.00
.....	.....	5,500.00	.....	165.00
.....	.....	11,001.00	.....	193.00
.....	.....	12,100.00	.....	302.50
.....	.....	36,000.00	.....	1,250.00
.....	.....	9,100.00	.....	550.00
.....	.....	16,400.00	.....	1,200.00
200.00	25,174.00	.....	.....	431.67
$49,160.00	$25,513.00	$851.122.00	$317.78	$50,128.56
.....	.....	$6,750.00	.....	$600.00
.....	.....	4,100.00	.....	400.00
$990.00	.....	990.00	$3.75	22.50
.....	.....	1,795.00	.....	80.00
$990.00	.....	$13,635.00	$3.75	$1,102.50

Schedule H (*Continued*)

Par Value	*Description of Securities*	*Rate*	*Maturity*	*Balance June 30, 1931*
	INVESTMENTS, FRANK HARVEY CILLEY FUND			
$10,000	New York, City of, Corp. Stock	4¼%	1964	$10,310.00
5,000	St. Louis Iron Mt.&So.R.R.Mtg.(Reg.)	4%	1933	4,812.50
11,000	New York Power & Lgt.Corp.,1stMtge.	4½%	1967	10,450.00
5,000	Public Ser. Co. No. Ill. 1st Ref. "E" . .	4½%	1980	.....
9,000	Southern Ry. Co., Dev. & Gen. Mtge. .	4%	1956	8,077.50
5,000	Chic. & Northwestern Ry. Co.,Equip.Tr.	5%	1938	5,000.00
5,900	Edison Electric Ill. Co., Capital . . .	13.60	59†	12,667.09
7,500	Eastern Gas & Fuel Assoc., Pr. Pr. . .	4½%	75†	6,825.00
1,250	Springfield Ry. Companies Pref. . . .	8%	25†	2,125.00
7,800	Boston & Albany R.R. Co., Capital .	8¾%	78†	12,589.50
1,000	Boston & Providence R. R. Corp. . .	8½%	10†	1,700.00
2,400	Mortgage Note, E. and A. Orlogski .	5%		2,400.00
	Sold or matured during year			2,600.00
$70,850	*Total*			$79,556.59
	INVESTMENTS, COFFIN MEMORIAL FUND			
$35,000	Light & Power Securities Co., Pref. . .	6%	350†	$35,000.00
*1,000	United Gas & Imp. Co., Pref.	5.00	10†	973.04
$36,000	*Total*			$35,973.04
	INVESTMENTS, EBEN S. DRAPER FUND			
$22,000	Province of Ontario Deb.	5%	1959	$21,890.00
4,000	Brooklyn Edison Co. Gen. Gold "E" .	5%	1952	.....
20,000	New York Tel. Co., 1st & Gen. Mtge. .	4½%	1939	19,395.00
14,000	Ohio Power Co., 1st & Ref. Mtge. Gold	4½%	1956	.....
4,000	Chic.Mil.,St. Paul & Pac.R.R.Gold"A"	5%	1975	4,063.00
16,000	C.M.,St.P.& Pac.R.R.Conv.Gold"A"	5%	2000	16,263.00
24,000	Indianapolis Un. Ry. Co., Gen. Mtge. .	5%	1965	23,880.00
	Sold or Matured during year			16,000.00
$104,000	*Total*			$101,491.00
	INVESTMENTS, FRANCES AND WILLIAM EMERSON FUND			
$86,000	Associated Gas & Elec. Co. (Reg.) . .	4½%	1949	$72,240.00
29,000	Southern Ry. Co. Dev. & Gen. Mtge. .	4%	1956	26,027.50
$115,000	*Total*			$98,267.50

*No par value.
†Shares

Schedule H (*Continued*)

Purchases and Charges during the year	*Sales and Credits during the year*	*Balance June 30, 1932*	*Accrued Interest, etc.*	*Income Received*
.....	$10.00	$10,300.00	.....	$425.00
.....	.....	4,812.50	.....	200.00
.....	.....	10,450.00	.....	495.00
$4,950.00	.....	4,950.00	$18.75	112.50
.....	.....	8,077.50	.....	360.00
.....	.....	5,000.00	.....	250.00
.....	.....	12,667.09	.....	802.40
.....	.....	6,825.00	.....	337.52
.....	.....	2,125.00	.....	137.50
.....	.....	12,589.50	.....	682.50
.....	.....	1,700.00	.....	85.00
.....	.....	2,400.00	.....	120.00
.....	2,600.00	.....	.....	60.75
$4,950.00	$2,610.00	$81,896.59	$18.75	$4,068.17
.....	.....	$35,000.00	.....	$2,100.00
.....	.....	973.04	.....	50.00
.....	.....	$35,973.04	.....	$2,150.00
.....	.....	$21,890.00	.....	$1,100.00
$3,870.00	.....	3,870.00	$30.56	.....
.....	.....	19,395.00	.....	900.00
12,202.50	.....	12,202.50	172.25	315.00
.....	$2.00	4,061.00	.....	200.00
.....	4.00	16,259.00	.....	.....
.....	.....	23,880.00	.....	1,200.00
.....	16,000.00	.....	.....	800.00
$16,072.50	$16,006.00	$101,557.50	$202.81	$4,515.00
.....	.....	$72,240.00	.....	$3,870.00
.....	.....	26,027.50	.....	1,160.00
.....	.....	$98,267.50	.....	$5,030.00

Schedule H (*Continued*)

Par Value	*Description of Securities*	*Rate*	*Maturity*	*Balance June 30, 1931*
	INVESTMENTS, HENRY C. FRICK FUND			
$5,000	Allegheny, County of,Penn. Ct. House	4¼%	1933	.....
23,000	Allegheny, County of, Penn. Road	4¼%	1933	.....
6,000	Allegheny, County of, Penn. Road	4¼%	1934	.....
50,000	British Columbia, Province of	4½%	1939	$48,325.00
26,000	Allegheny, County of, Penn. Road	4¼%	1935	.....
24,000	Denmark, Kingdom of, External	4½%	1962	.....
1,000	Erie, City of, Penn., Mill Creek	4½%	1932	.....
1,000	Erie, City of, Penn., Griswold	4¼%	1934	.....
3,000	Greensburg Borough, Penn., School	4%	1953–55	.....
1,000	Pittsburg, City of, Street	4¼%	1933	.....
50,000	Ontario, Province of Deb.	4½%	1934	48,314.30
50,000	Alabama Pow. Co., 1st & Ref. Mtge.	4½%	1967	49,125.00
50,000	Arkansas Pow.& Lt.Co.,1st& Ref.Mtge.	5%	1956	.....
51,000	Cumberland Tel. & Tel. Co.,1st Mtge.	5%	1937	50,305.75
50,000	JerseyCentral Pow.& Lt.Co.,1stMt."B"	5%	1947	50,943.75
10,000	Koppers Gas & Coke Co., Deb. S. F.	5½%	1950	.....
100,000	Northern StatesPow.Co.,Ref.Mtge.Gold	4½%	1961	97,500.00
36,000	Ohio Power Co.,1st & Ref.Mtge. Gold	4½%	1956	25,312.50
50,000	Penn. Pow. & Lt. Co., 1st Mtge. Gold	4½%	1981	48,125.00
50,000	Shaw.Wat.&Pow.Co.,1stMt.&Coll. Tr.	4½%	1967	48,218.75
6,000	Shaw.Wat.& Pow.Co.,1stMt.&Coll. Tr.	4½%	1968	.....
8,000	Aluminum Ltd., S. F. Deb.	5%	1948	.....
50,000	American Radiator Co. Gold Deb.	4½%	1947	48,000.00
23,000	Armstrong Cork Co., Conv. Gold	5%	1940	.....
35,000	Chicago Post Office Ser.Bldg.1stMtg."A"	5½%	1936	34,562.50
18,000	Midvale Steel & Ord. Co.	5%	1936	.....
587,000	Pocahontas Corp., Gold	6%	1943	.....
25,000	U.S. Cold Storage Co.,1st Mtge.R. E.	6%	1945	25,406.00
25,000	Canadian Nat. Rys. Equip. Tr. Gold "J"	4½%	1937	24,605.00
22,000	Canadian Nat. Rys. Eq. Trust "H"	4½%	1935	.....
26,000	Canadian Nat. Rys. Eq. Trust "H"	4½%	1937	.....
142,000	Canadian Pac. Ry. Eq. Trust "B"	4½%	1932	.....
13,000	Canadian Pac. Ry. Eq. Trust "C"	4½%	1932	.....
2,000	Canadian Pac. Ry. Eq. Trust "B"	4½%	1933	.....
4,000	Canadian Pac. Ry. Eq. Trust "B"	4½%	1938	.....
68,000	Chicago & No. West. Ry. Co. Gold	4¾%	1949	68,000.00
25,000	Ill.Cent & Chic.,St.L.&NewOrleansR.R.	4½%	1963	24,312.50
25,000	Mich.Cent.R.R.Co.,Ref.&Imp.Mtge."C"	4½%	1979	25,611.00
18,000	Penn. R.R. Co., Gold Deb.	4½%	1970	.....
25,000	Southern Ry.Co.Dev. & Gen.Mtge."A"	4%	1956	21,425.00
6,000	Texas & Pacific Ry. Co., Gen. & Ref.	5%	1979	.....
40,000	Union Pacific R. R. Co.	4½%	1967	38,800.00
*37,000	Cerro de Pasco Copper Corp.	.....	370†	18,870.00
50,000	Faraday Coal & Coke Co.	.....	500†	.....
170,000	Chic. & Northwestern Ry. Co. Com.	.....	1,700†	93,500.00
	Sold or matured during year			47,937.50
$2,087,000	*Total*			$937,199.55

*No par value.
†Shares

Schedule H (*Continued*)

Purchases and Charges during the year	*Sales and Credits during the year*	*Balance June 30, 1932*	*Accrued Interest, etc.*	*Income Received*
$5,000.00	.....	$5,000.00	.....	$106.25
23,000.00	.....	23,000.00	.....	488.75
6,000.00	.....	6,000.00	.....	127.50
.....	.....	48,325.00	.....	2,250.00
26,000.00	.....	26,000.00	.....	552.50
14,040.00	.....	14,040.00	.....	.....
1,000.00	.....	1,000.00	.....	22.50
1,000.00	.....	1,000.00	.....	21.25
2,795.67	.....	2,795.67	.....	60.00
1,000.00	.....	1,000.00	.....	21.25
.....	.....	48,314.30	.....	2,250.00
.....	.....	49,125.00	.....	2,250.00
50,562.50	$24.00	50,538.50	$756.94	2,500.00
.....	.....	50,305.75	.....	2,550.00
.....	63.00	50,880.75	.....	2,500.00
7,250.00	.....	7,250.00	.....	.....
.....	.....	97,500.00	.....	4,500.00
11,110.00	19.00	36,403.50	104.50	1,620.00
.....	.....	48,125.00	.....	2,250.00
.....	.....	48,218.75	.....	2,250.00
4,320.00	.....	4,320.00	.....	135.00
5,400.00	.....	5,400.00	.....	.....
.....	.....	48,000.00	.....	2,250.00
16,100.00	.....	16,100.00	.....	575.00
.....	.....	34,562.50	.....	1,925.00
16,200.00	.....	16,200.00	.....	.....
469,600.00	.....	469,600.00	.....	17,610.00
.....	34.00	25,372.00	.....	1,500.00
.....	.....	24,605.00	.....	1,125.00
18,535.00	.....	18,535.00	.....	.....
21,905.00	.....	21,905.00	.....	.....
127,622.50	.....	127,622.50	.....	3,195.00
9,100.00	.....	9,100.00	.....	292.50
1,797.50	.....	1,797.50	.....	45.00
3,595.00	.....	3,595.00	.....	90.00
.....	.....	68,000.00	.....	3,230.00
.....	.....	24,312.50	.....	1,125.00
.....	14.00	25,597.00	.....	1,125.00
11,880.00	.....	11,880.00	.....	.....
.....	.....	21,425.00	.....	1,000.00
3,900.00	.....	3,900.00	.....	.....
.....	.....	38,800.00	.....	1,800.00
.....	.....	18,870.00	.....	277.50
.....	.....	.....	.....	.....
.....	.....	93,500.00	.....	.....
20,280.00	68,217.50	.....	.....	1,250.28
$878,993.17	$68,371.50	$1,747,821.22	$861.44	$64,870.28

Schedule H (*Continued*)

Par Value	*Description of Securities*	*Rate*	*Maturity*	*Balance June 30, 1931*
	INVESTMENTS, JOY SCHOLARSHIP FUND			
$5,000	Cedars Rapids Mfg.&Pr.Co.1st Mt.S.F.	5%	1953	$4,075.00
5,000	Mass. Hospital Life Insurance Co. . .	4¼%	....	5,000.00
8,000	Southern Ry. Co. Dev. & Gen. Mtge. .	4%	1956	7,180.00
1,000	Trinity Bldgs. Corp. of N.Y.,1st Mtge.	5½%	1939	1,000.00
$19,000	*Total*			$17,255.00
	INVESTMENTS, RICHARD LEE RUSSELL FELLOWSHIP FUND			
$3,000	Trinity Bldgs. Corp. of N. Y., 1st Mtge.	5½%	1939	$3,000.00
	INVESTMENTS, SUSAN H. SWETT SCHOLARSHIP FUND			
$10,000	Mass. Hospital Life Insurance Co. . .	4¼%	....	$10,000.00
2,000	Trinity Bldgs. Corp. of N.Y.,1st Mtge. .	5½%	1939	2,000.00
$12,000	*Total*			$12,000.00
	INVESTMENTS, WILLIAM LYMAN UNDERWOOD FUND			
$4,000	Consolidated Gas of N. Y. Com. . . .	4%	40†	.....
3,400	Boston Woven Hose & Rubber Co. Com		34†	.....
2,000	Boston Woven Hose & Rubber Co. Pfd.		20†	.....
$9,400				
	INVESTMENTS, FRANCES E. WESTON FUND			
$10,000	Mortgage Note, Anna C. Bartlett . . .	4%	1936	$10,000.00
	INVESTMENTS, JONATHAN WHITNEY FUND			
$25,000	Montreal, City of, Canada	5%	1936	$25,000.00
25,000	New York, City of, Corporate Stock .	4¼%	1964	25,828.00
54,000	Canada, Dominion of, 10-Yr. Gold . .	4½%	1936	53,257.50
21,000	Standard Oil Co. of New York	4½%	1935	21,043.00
24,000	Swift & Co., 1st Sinking Fund	5%	1944	21,720.00
28,000	Western Electric Co., Deb.	5%	1944	27,720.00
27,000	Brooklyn Edison Co. Inc. Gen. "E" .	5%	1952	.....
25,000	Detroit Edison Co., 1st Mtge.	5%	1933	25,030.00
16,000	Memphis Pow.& Lt.Co.1st& Ref.Mt."A"	5%	1948	.....
25,000	N. Y. Tel Co., 1st & Gen. Mtge. . . .	4½%	1939	24,150.39
9,000	Sierra & San Fran. Pow. Co. 1st Mtge.	5%	1949	.....
25,000	Atch., Top.&S.F.,Cal.&Ar.Lines,1st Mt.	4½%	1962	24,381.25
35,000	Chicago Union Station, 1st Mtge."A" .	4½%	1963	35,177.00
25,000	Illinois Cen. R. R. Co., Sec. Gold . . .	4%	1952	22,625.00
50,000	Kansas City Terminal Ry. Co.,1st Mt. .	4%	1960	42,750.00
25,000	Maine Cen. R. R. Co., 1st &Ref. Mt. . .	4½%	1935	25,003.00
7,000	New York Central Equip. Tr.	4½%	1935	7,000.00
9,000	New York Central Lines, Eq. Tr. . . .	4½%	1936	8,558.10
5,000	Penn. R. R. Eq. Tr. "A"	5%	1936	4,950.00
10,000	Southern Ry. Co. Dev. & Gen. Mtge.. .	4%	1956	8,975.00
150,000	Mortgage Note, M. I. T. Dormitory . .	5%	....	150,000.00
	Sold or matured during year			50,000.00
$620,000	*Total*			$603,168.24
$34,084,437.08	Grand Total, All Investments (*Schedule D*)			$33,389,244.26

*No par value
†Shares

Schedule H (*Continued*)

Purchases and Charges during the year	*Sales and Credits during the year*	*Balance June 30, 1932*	*Accrued Interest, etc.*	*Income Received*
.....	.....	$4,075.00	.....	$250.00
.....	.....	5,000.00	.....	212.50
.....	.....	7,180.00	.....	320.00
.....	.....	1,000.00	.....	55.00
.....	.....	$17,255.00	.....	$837.50
.....	.....	$3,000.00	.....	$165.00
.....	.....	$10,000.00	.....	$425.00
.....	.....	2,000.00	.....	110.00
.....	.....	$12,000.00	.....	$535.00
$4,880.00	.....	$4,880.00	.....	$40.00
2,992.00	.....	2,992.00	.....	17.00
2,000.00	.....	2,000.00	.....	60.00
$9,872.00	.....	$9,872.00	.....	$117.00
.....	.....	$10,000.00	.....	$400.00
.....	.....	$25,000.00	.....	$1,250.00
.....	$26.00	25,802.00	.....	1,062.50
.....	.....	53,257.50	.....	2,430.00
.....	15.00	21,028.00	.....	945.00
.....	.....	21,720.00	.....	1,200.00
.....	.....	27,720.00	.....	1,400.00
$26,122.50	.....	26,122.50	$206.25	.....
.....	30.00	25,000.00	.....	1,250.00
15,040.00	.....	15,040.00	106.67	.....
.....	.....	24,150.39	.....	1,125.00
8,077.50	.....	8,077.50	21.25	.....
.....	.....	24,381.25	.....	1,125.00
.....	6.00	35,171.00	.....	1,575.00
.....	.....	22,625.00	.....	1,000.00
.....	.....	42,750.00	.....	2,000.00
.....	1.00	25,002.00	.....	1,125.00
.....	.....	7,000.00	.....	315.00
.....	.....	8,558.10	.....	405.00
.....	.....	4,950.00	.....	250.00
.....	.....	8,975.00	.....	400.00
.....	.....	150,000.00	.....	7,500.00
.....	50,000.00	.....	.....	2,500.00
$49,240.00	$50,078.00	$602,330.24	$334.17	$28,857.50
$3,303,620.02	$4,377,083.05	$32,315,781.23	$33,651.00	$1,701,220.25

Schedule H (*Continued*)

RECAPITULATION, ALL INVESTMENTS

	Per cent of total 1932	*Per cent of total 1931*	*Book Value June 30, 1932*
Government and Municipal Bonds	10.10	8.35	$3,299,346.50
Industrial Bonds	8.20	6.00	2,629,240.13
Industrial Stocks	13.40	16.50	4,325,692.06
Public Utility Bonds	25.80	26.30	8,327,867.70
Public Utility Stocks	3.80	4.30	1,230,443.80
Railroad Bonds	23.40	22.00	7,558,912.80
Railroad Stocks	5.90	6.10	1,885,188.17
Real Estate Bonds	2.60	2.85	862,380.83
Real Estate Stocks	.50	.45	149,112.86
Bank Stocks	1.70	1.65	552,190.30
Mortgage Notes	.90	.95	309,400.00
Real Estate	2.00	1.95	646,097.08
Miscellaneous	1.70	1.70	539,909.00
Cash Reserve	....	.90	.....
	100.00	100.00	$32,315,781.23

SCHEDULE J
EDUCATIONAL PLANT

Land, Buildings and Equipment

Land, Boylston, Clarendon and Newbury Streets, Boston	$1,500,000.00
Rogers Building, Boylston Street, Boston	204,534.76
Walker Building, Boylston Street, Boston	150,000.00
Land, east of Massachusetts Avenue, Cambridge	1,125,766.67
Land, west of Massachusetts Avenue	854,014.82
Main Educational Building Group	4,071,492.13
George Eastman Research Laboratories	1,165,588.58
Pratt School of Naval Architecture	674,971.70
Guggenheim Aeronautical Laboratory	293,637.46
Aeronautical Engine Testing Laboratory	121,101.92
Mechanic Arts Building	83,658.89
Power Plant (inc. Machinery and Equipment)	302,569.27
Homberg Memorial Infirmary	188,441.60
Educational Equipment, Cambridge	2,039.953.60
Steam and Electrical Distribution System, Cambridge	155,448.64
Gas Engine Laboratory	26,301.88
Hydraulic Laboratory	11,000.00
Compression Laboratory	31,000.00
Tractor Garage	6,400.00
Service Garage	5,981.54
Athletic Field	24,815.14
Walker Memorial Building	575,111.50
Walker Memorial Building, Equipment	139,475.52
Dormitories (1916) ($331,357.67 less mortgage $150,000)	181,357.67
Dormitories (1916) Equipment	26,967.85
Alumni Dormitories (1924)	185,718.91
Alumni Dormitories (1924) Equipment	9,518.04
Alumni Dormitories (1928)	291,274.49
Alumni Dormitories (1928) Equipment	18,971.05
Alumni Dormitories (1930)	562,485.62
Alumni Dormitories (1930) Equipment	32,630.16
Service Building	42,988.20
Boathouse	54,244.13
Squash Courts	29,042.54
Summer Camp, East Machias, Maine	120,558.00
Summer Camp, Dover, New Jersey	35,000.00
Miscellaneous	301,726.27
Total, June 30, 1932 (Schedule D)	$15,643,748.55

SCHEDULE K

PRINCIPAL GIFTS AND APPROPRIATIONS FOR EDUCATIONAL PLANT

George Eastman, for New Buildings	$4,725,000.00
Maria A. Evans, for Dormitories	161,192.55
Class of 1893, for Dormitory	100,000.00
Appropriation, Maria A. Evans Fund	169,080.60
T. C. du Pont, for Land	625,000.00
T. C. du Pont, for Dormitories	100,000.00
T. C. and P. S. du Pont, Charles Hayden, for Mining Building	215,000.00
Pratt Fund, for School of Naval Architecture	675,150.00
Alumni Fund, Equipment, Dormitories and Walker Memorial	622,119.38
Alumni Dormitory Fund	516,945.66
Appropriation, E. D. Barbour Fund, for Dormitories	258,279.93
Appropriation, K. F. Wood Fund, for Dormitories	28,750.00
Appropriation, F. S. Hodges Fund, for Dormitories	57,316.26
Appropriation, Russell Robb Fund, for Dormitories	28,750.00
Appropriation, S. H. Thorndike Fund, for Dormitories	15,000.00
Walker Memorial Fund, for Walker Memorial	167,303.96
Appropriation of Emma Rogers Fund, for Equipment	528,077.06
Daniel Guggenheim Fund, for Aeronautical Laboratory	230,000.00
Estate of F. W. Emery, for Equipment	126,423.80
Appropriation of Charles C. Drew Fund	305,171.52
Subscriptions to Homberg Memorial Infirmary	110,225.00
A. P. Sloan, Jr., for Aero Engine Laboratory	65,000.00
Appropriation of Frank E. Peabody Fund	52,238.89
Appropriation of French Fund, for Equipment	100,843.34
Appropriation of George B. Dorr Fund, for Equipment	49,573.47
Land in Boston, Grant of Commonwealth (estimated)	1,500,000.00
Appropriation of A. F. Estabrook Fund, for Land	85,000.00
Appropriation of Ida F. Estabrook Fund, for Land	20,000.00
Appropriation of Miscel. Unrestricted Funds, for Land	151,697.89
Subscriptions, for Land	125,525.00
Sale of Land and Buildings in Boston	656,919.45
Equipment from Buildings in Boston (estimated)	500,000.00
Other Funds, Donations, Appropriations, etc.	2,634,756.74
Total, June 30, 1932 (Schedule D)	$15,706,340.50

SCHEDULE P

[3]ENDOWMENT FUNDS FOR GENERAL PURPOSES

No.	Restricted Funds	Funds, June 30, 1931	Investment Income	Other Income	Expended or Transferred	Funds, June 30 1932
101	George Robert Armstrong	$5,750.00	$265.05	.....	$765.05	$5,250.00
102	George Blackburn Mem. .	830,046.28	49,810.78	$24,950.00	52,292.19	852,514.87
103	Charles Choate	41,108.15	1,911.15	.....	5,411.15	37,608.15
104	Eben S. Draper	102,400.00	4,312.19	.....	4,312.19	102,400.00
105	Coleman du Pont	.....	5,208.00	117,017.11	5,208.00	117,017.11
107	[1]Eastman Contract . . .	6,971,694.86	503,053.17	2,274,573.29	203,053.17	9,546,268.15
108	George Eastman(Building)	2,650,000.00	111,600.00	.....	1,339,600.00	1,422,000.00
109	Charles W. Eaton	275,869.11	12,824.70	.....	36,706.78	251,987.03
112	Educational Endowment .	8,709,264.60	404,977.80	.....	1,153,977.80	7,960,264.60
113	Martha Ann Edwards . .	34,500.00	1,604.25	.....	4,604.25	31,500.00
114	William Endicott	28,750.00	1,334.55	.....	3,834.55	26,250.00
117	Francis Appleton Foster .	1,150,000.00	53,475.00	.....	152,375.00	1,051,100.00
118	Alexis H. French	5,000.00	232.50	.....	232.50	5,000.00
119	Jonathan French	28,962.48	1,348.50	.....	3,848.50	26,462.48
121	Henry C. Frick	943,556.38	64,008.84	893,707.31	64,008.84	1,837,263.69
122	General Endowment . .	1,756,599.00	81,681.90	.....	232,781.90	1,605,499.00
123	James Fund	188,104.21	8,746.65	.....	24,946.65	171,904.21
125	Katherine B. Lowell . .	5,750.00	265.05	.....	765.05	5,250.00
126	Thomas McCammon. . .	15,000.00	697.50	.....	697.50	15,000.00
127	M. I. T. Alumni Fund(Bal.)	1,531.89	69.75	.....	.....	1,601.64
130	Kate M. Morse	28,750.00	1,334.55	.....	3,834.55	26,250.00
131	Richard Perkins	57,500.00	2,673.75	.....	7,623.75	52,550.00
132	J. W. and B. L. Randall .	95,902.36	4,459.35	.....	12,659.35	87,702.36
135	Wm. Barton Rogers Mem.	287,725.00	13,378.05	.....	38,128.05	262,975.00
136	[2]Saltonstall Fund	65,408.46	3,041.10	.....	7,880.81	60,568.75
137	Samuel E. Sawyer . . .	5,364.40	251.10	.....	701.10	4,914.40
139	Andrew Hastings Spring .	57,500.00	2,673.75	.....	7,623.75	52,550.00
140	Seth K. Sweetser	28,811.62	1,339.20	.....	3,839.20	26,311.62
141	William J. Walker . . .	27,113.59	1,260.15	.....	3,610.15	24,763.59
144	Horace Herbert Watson .	33,869.25	1,576.35	.....	1,576.35	33,869.25
145	Albion K. P. Welch . . .	5,750.00	265.05	.....	765.05	5,250.00
147	[4]George Wigglesworth . .	.....	678.90	25,000.00	611.00	25,067.90
		$24,437,581.64	$1,340,358.63	$3,335,247.71	$3,378,274.18	$25,734,913.80
	Unrestricted Funds					
151	Edmund D. Barbour. . .	$420,221.08	$19,539.30	.....	$55,739.30	$384,021.08
153	Henrietta G. Fitz	10,000.00	465.00	.....	465.00	10,000.00
155	Esther A. Hilton	1,626.67	74.40	.....	74.40	1,626.67
157	Industrial Fund	117,637.73	5,673.00	$11,500.00	26,793.36	108,017.37
159	Hiram F. Mills	11,675.00	544.05	.....	1,544.05	10,675.00
162	Moses W. Oliver	12,870.49	599.85	.....	1,699.85	11,770.49

[1] Income added to Fund. See also Special Deposit Fund.
[2] One-fourth of net income added to Fund.
[3] See alphabetical listing and description of Funds on pages 183–192.
[4] Ten per cent of gross income added to Fund.

Schedule P (*Continued*)

	Unrestricted Funds (Continued)	*Funds, June 30, 1931*	*Investment Income*	*Other Income*	*Expended or Transferred*	*Funds, June 30, 1932*
165	Robert E. Rogers	$8,730.77	$404.55	.....	$1,154.55	$7,980.77
168	Ellen V. Smith	25,000.00	1,162.50	.....	1,162.50	25,000.00
171	Horace W. Wadleigh. . .	2,443.14	111.60	.....	311.60	2,243.14
173	Webster, Frank G. . . .	25,000.00	1,162.50	.....	1,162.50	25,000.00
		$635,204.88	$29,736.75	$11,500.00	$90,107.11	$586,334.52

SCHEDULE Q

[3]ENDOWMENT FUNDS FOR DESIGNATED PURPOSES

Special Deposit Funds

	[2]Geo. Eastman (due under contract)	$2,550,000.00	.....	.....	$2,550,000.00	.....
205	Endowment Reserve . .	606,725.20	$23,523.92	$36,809.96	85,891.27	$581,167.81
207	Albert Fund	5,232.00	186.00	.....	2,693.56	2,724.44
209	[1]Anonymous (1924) . . .	1,519.80	69.75	.....	.....	1,589.55
210	1923 Endowment	248.21	.....	38.57	.....	286.78
211	[1]1923 Endowment Reserve	5,500.23	311.55	3,439.83	479.87	8,771.74
212	[1]1924 Endowment . . .	1,476.88	65.10	.....	.....	1,541.98
213	[1]1924 Endowment Reserve	5,041.27	237.15	1,812.44	561.20	6,529.66
214	[1]1925 Endowment	1,182.49	55.80	253.83	.....	1,492.12
215	[1]1925 Endowment Reserve	2,822.74	134.85	1,199.19	605.66	3,551.12
216	1926 Endowment	258.56	.....	.....	.....	258.56
217	1926 Endowment Reserve	477.52	.....	1,263.27	1,312.56	428.23
218	1927 Endowment	3,355.17	162.75	1,565.56	42.33	5,041.15
220	[1]1928 Endowment	5,027.05	255.75	1,705.29	118.01	6,870.08
221	1929 Endowment	1,889.31	97.65	1,238.18	.....	3,225.14
222	[1]1930 Endowment	448.95	.....	26.32	.....	475.27
223	1930 Endowment Reserve	.....	.....	26.63	.....	26.63
225	M.I.T.Teachers' Insurance	3,162.62	.....	28,547.81	27,777.03	3,933.40
226	[1]M.I.T.Teachers' Insurance (Special)	38,136.65	2,236.65	15,709.55	.....	56,082.85
227	[1]M.I.T.Alumni Association Permanent Funds . . .	42,847.09	2,036.70	2,114.98	.....	46,998.77
230	[1]Class f '98 Loan	6,537.15	302.25	6.66	.....	6,846.06
231	Professors' Fund	.....	223.20	21,304.10	200.00	21,327.30
233	[1]Richards Portrait . . .	480.80	23.25	.....	.....	504.05
235	Rockefeller Found.Research	10,080.00	.....	36,250.00	53,833.00	*7,503.00
237	Sedgwick Memorial Lecture Fund	5,565.63	269.70	854.01	564.57	6,124.77
239	[1]Elihu Thomson	5,678.75	265.05	.....	.....	5,943.80
243	[1]Undergraduate Dues, Reserve	15,345.05	711.45	3,700.00	.....	19,756.50
		$3,319,039.12	$31,168.52	$157,866.18	$2,724,079.06	$783,994.76

[1] Income added to Fund.
[2] See also Funds for General Purposes (Eastman Contract)
[3] See alphabetical listing and description of Funds on pages 183–192.
* Overdraft.

[2]Schedule Q (*Continued*)

No.		Funds, June 30, 1931	Investment Income	Other Income	Expended or Transferred	Funds, June 30 1932
	FUNDS FOR SALARIES					
251	Samuel C. Cobb For General Salaries	$41,951.31	$1,948.35	.....	$5,548.35	$38,351.31
253	Sarah H. Forbes For General Salaries	500.00	23.25	.....	23.25	500.00
255	George A. Gardner For General Salaries	23,000.00	1,069.50	.....	3,069.50	21,000.00
259	James Hayward Professorship of Engineering	21,500.00	999.75	.....	2,249.75	20,250.00
261	William P. Mason Professorship of Geology . .	21,500.00	999.75	.....	2,249.75	20,250.00
263	Henry B. Rogers For General Salaries	28,750.00	1,334.55	.....	3,834.55	26,250.00
265	Nathaniel Thayer Professorship of Physics . .	28,750.00	1,334.55	.....	3,834.55	26,250.00
		$165,951.31	$7,709.70	.....	$20,809.70	$152,851.31
	FUNDS FOR LIBRARY, READING ROOMS AND GYMNASIUM					
271	Walter S. Barker	$11,984.99	$553.35	.....	$1,470.78	$11,067.56
273	Ednah Dow Cheney	16,969.74	790.50	$10.05	1,727.49	16,042.80
274	Frank Harvey Cilley	82,662.59	4,049.42	.....	4,911.50	81,800.51
277	Charles Lewis Flint.	6,075.66	283.65	.....	792.04	5,567.27
280	William Hall Kerr	3,283.12	153.45	.....	279.75	3,156.82
283	George A. Osborn	12,157.24	511.50	.....	3,802.47	8,866.27
286	Arthur Rotch Arch	6,628.70	306.90	.....	500.00	6,435.60
288	Technology Matrons' Teas . .	9,083.62	409.20	.....	330.00	9,162.82
289	John Hume Tod	3,122.05	144.15	.....	355.47	2,910.73
291	Theodore N. Vail.	46,185.29	2,143.65	.....	6,815.06	41,513.88
		$198,153.00	$9,345.77	$10 05	$20,984.56	$186,524.26
	FUNDS FOR DEPARTMENTS					
301	William Parsons Atkinson . .	$15,032.20	$697.50	.....	$1,997.50	$13,732.20
303	Frank Walter Boles Memorial .	28,679.63	1,334.55	.....	3,352.49	26,661.69
305	William E. Chamberlain . . .	8,359.77	390.60	.....	1,090.60	7,659.77
307	Chemical Engineering Practice	296,322.97	13,777.95	.....	39,277.95	270,822.97
309	Crosby Honorary Fund	1,576.51	69.75	.....	75.00	1,571.26
311	Susan E. Dorr	110,205.67	5,124.30	.....	14,624.30	100,705.67
312	George Eastman	460,000.00	21,390.00	.....	60,990.00	420,400.00
317	George Henry May	5,750.00	265.05	.....	765.05	5,250.00
319	Susan Minns.	40,000.00	.....	.....	.....	40,000.00
320	Forris Jewett Moore	39,718.66	1,813.50	.....	6,894.51	34,637.65
322	William E. Nickerson	45,468.83	2,111.10	.....	9,218.76	38,361.17
324	Edward D. Peters	6,202.56	288.30	.....	797.92	5,692.94
325	Pratt Naval Architectural . .	451,035.81	20,971.50	.....	59,607.36	412,399.95
327	Arthur Rotch	28,750.00	1,334.55	.....	3,834.55	26,250.00
329	W. T. Sedgwick	85,562.69	3,975.75	.....	.....	89,538.44
331	[1]Edmund K. Turner	277,867.16	12,917.70	.....	34,098.19	256,686.67
333	William Lyman Underwood . .	.....	117.00	9,872.00	.....	9,989.00
		$1,900,532.46	$86,579.10	$9,872.00	$236,624.18	$1,760,359.38

[1] One-fourth of net income added to Fund.
[2] See alphabetical listing and description of Funds on pages 183–192.

[1]Schedule Q (*Continued*)

No.		*Funds, June 30, 1931*	*Investment Income*	*Other Income*	*Expended or Transferred*	*Funds, June 30, 1932*
	FUNDS FOR RESEARCH					
341	John E. Aldred	$50,005.66	$2,325.00	.....	$25,232.46	$27,098.20
343	Samuel Cabot	86,085.27	3,999.00	.....	35,700.00	54,384.27
344	Crane Automotive Research	7,113.90	311.55	.....	795.00	6,630.45
347	Daniel Guggenheim	5,126.50	237.15	.....	3,600.00	1,763.65
349	Ellen H. Richards	22,081.15	1,023.00	.....	2,380.17	20,723.98
351	Charlotte B. Richardson	48,173.29	2,241.30	.....	5,800.00	44,614.59
354	Technology Plan Research	1,553.88	69.75	.....	.....	1,623.63
356	Textile Research Fund	44,286.24	1,804.20	.....	9,140.00	36,950.44
358	Edward Whitney	73,103.11	3,255.00	.....	16,575.00	59,783.11
		$337,529.00	$15,265.95	.....	$99,222.63	$253,572.32
	FUNDS FOR FELLOWSHIPS					
361	Arkwright Club	$2,818.80	$116.25	.....	$1,000.00	$1,935.05
363	William Sumner Bolles	31,011.59	1,441.50	.....	3,950.00	28,503.09
364	Malcolm Cotton Brown	13,641.59	1,098.75	.....	1,000.00	13,740.34
366	Collamore	16,407.11	762.60	.....	2,125.00	15,044.71
368	Dalton Graduate Chemical	8,041.00	372.00	.....	1,050.00	7,363.00
369	DuPont	.....	.....	$1,500.00	1,500.00	.....
372	Daniel Guggenheim	1,749.00	65.10	.....	570.00	1,244.10
374	Rebecca R. Joslin	2,583.22	120.90	.....	200.00	2,504.12
376	Wilfred Lewis	5,250.00	241.80	.....	250.00	5,241.80
378	Moore	31,828.56	1,478.70	.....	2,800.00	30,507.26
380	Willard B. Perkins	7,839.74	362.70	.....	650.00	7,552.44
382	Proctor	.....	.....	1,500.00	1,500.00	.....
384	Proprietors Locks and Canals	3,896.75	181.35	.....	250.00	3,828.10
386	Henry Bromfield Rogers	29,361.45	1,367.10	.....	3,835.50	26,893.05
388	Richard Lee Russell	3,024.07	165.00	.....	.....	3,189.07
390	Henry Saltonstall	12,445.79	576.60	.....	1,650.00	11,372.39
392	James Savage	14,062.36	651.00	.....	1,850.00	12,863.36
395	Susan H. Swett	12,180.45	535.00	.....	500.00	12,215.45
396	Gerard Swope	2,638.75	.....	.....	2,500.00	138.75
397	Frank Hall Thorp	.....	116.25	10,000.00	.....	10,116.25
398	Louis Francisco Verges	12,083.76	558.00	.....	1,550.00	11,091.76
		$210,863.99	$10,210.60	$13,000.00	$28,730.50	$205,344.09
	FUNDS FOR SCHOLARSHIPS					
401	Elisha Atkins	$6,056.77	$279.00	.....	$800.00	$5,535.77
403	Billings Student	59,202.16	2,752.80	.....	8,250.00	53,704.96
404	Jonathan Bourne	12,333.93	571.95	.....	1,650.00	11,255.88
405	Albert G. Boyden	40,000.00	16,275.00	$491,754.45	16,160.00	531,869.45
406	Harriet L. Brown	8,418.32	390.60	.....	1,000.00	7,808.92
408	Nino Tesher Catlin	1,219.00	55.80	.....	160.00	1,114.80
410	Chandler	3,854.47	176.70	.....	300.00	3,731.17
411	Lucius Clapp	5,892.86	274.35	.....	800 00	5,367.21
413	Class of 1896	6,772.27	316.20	.....	850.00	6,238.47
415	Lucretia Crocker	92,580.90	4,305.90	.....	12,456.00	84,430.80
417	Isaac W. Danforth	6,165.47	288.30	.....	800.00	5,653.77

[1]See alphabetical listing and description of Funds on pages 183-192.

[1]Schedule Q (*Continued*)

No.		*Funds, June 30, 1931*	*Investment Income*	*Other Income*	*Expended or Transferred*	*Funds, June 30, 1932*
420	Ann White Dickinson	$48,863.06	$2,273.85	.....	$6,800.00	$44,336.91
421	Thomas M. Drown	52,259.00	2,431.95	.....	2,600.00	52,090.95
424	Farnsworth	6,309.17	292.95	.....	800.00	5,802.12
426	Charles Lewis Flint	6,307.19	292.95	.....	800.00	5,800.14
427	Sarah S. Forbes	4,139.02	190.65	.....	550.00	3,779.67
429	Fuel and Gas Scholarship	350.00	.....	.....	.....	350.00
431	George Hollingsworth	5,938.62	274.35	.....	800.00	5,412.97
433	T. Sterry Hunt	3,728.61	172.05	.....	480.00	3,420.66
434	William F. Huntington	6,159.48	288.30	.....	800.00	5,647.78
436	Joy Scholarships	17,501.99	837.50	.....	1,000.00	17,339.49
438	William Litchfield	6,229.30	288.30	.....	800.00	5,717.60
439	Elisha T. Loring	6,239.09	288.30	.....	800.00	5,727.39
441	Lowell Inst. Scholarship	2,967.72	134.85	.....	400.00	2,702.57
443	George Henry May	8,517.73	395.25	.....	1,100.00	7,812.98
445	James H. Mirrlees	2,950.87	134.85	.....	390.00	2,695.72
447	Nichols Scholarship	6,169.21	288.30	.....	800.00	5,657.51
448	Charles C. Nichols	6,229.59	288.30	.....	800.00	5,717.89
450	John Felt Osgood	6,137.71	283.65	.....	800.00	5,621.36
451	George L. Parmelee	21,527.58	999.75	.....	2,800.00	19,727.33
453	Richard Perkins	62,229.57	2,892.30	.....	8,650.00	56,471.87
455	John P. Schenkl	24,745.96	1,148.55	.....	3,350.00	22,544.51
456	Thomas Sherwin	6,207.25	288.30	.....	800.00	5,695.55
458	Horace T. Smith	33,256.26	1,543.80	$30.65	1,500.00	33,330.71
459	Sons and Daughters New England Colony	.....	27.90	600.00	.....	627.90
460	Samuel E. Tinkham	2,715.78	125.55	.....	325.00	2,516.33
462	F. B. Tough	535.30	.....	.....	500.00	35.30
463	Susan Upham	1,349.45	60.45	.....	160.00	1,249.90
465	Vermont Scholarship	9,148.82	423.15	.....	1,150.00	8,421.97
467	Ann White Vose	71,795.21	3,338.70	.....	9,900.00	65,233.91
469	Arthur M. Waitt	11,954.48	558.00	.....	1,600.00	10,912.48
471	Louis Weissbein	5,014.13	232.50	.....	700.00	4,546.63
473	Frances Erving Weston	6,584.02	273.66	.....	300.00	6,557.68
474	Samuel Martin Weston	5,403.80	218.74	.....	200.00	5,422.54
476	Amasa J. Whiting	5,363.15	251.10	.....	700.00	4,914.25
		$707,324.27	$47,225.40	$492,385.10	$96,381.00	$1,150,553.77
	FUNDS FOR PRIZES					
481	Robert A. Boit	$5,891.76	$274.35	.....	$750.00	$5,416.11
483	Class of 1904	530.00	23.25	.....	.....	553.25
485	Roger D. Hunneman	1,222.50	55.80	.....	200.00	1,078.30
487	James Means	3,218.22	148.80	.....	200.00	3,167.02
489	Arthur Rotch	7,311.43	339.45	.....	800.00	6,850.88
491	Arthur Rotch, Special	9,697.81	451.05	.....	1,000.00	9,148.86
		$27,871.72	$1,292.70	.....	$2,950.00	$26,214.42

[1] See alphabetical listing and description of Funds on pages 183–192.

[2]Schedule Q (*Continued*)

No.		Funds, June 30, 1931	Investment Income	Other Income	Expended or Transferred	Funds, June 30, 1932
	FUNDS FOR RELIEF					
501	Edward Austin	$504,919.73	$23,482.50	$103.50	$67,016.15	$461,489.58
503	Thomas Wendell Bailey	2,907.65	134.85	.....	340.00	2,702.50
504	[1]Charles Tidd Baker	30,650.77	1,422.90	.....	3,200.00	28,873.67
506	Levi Boles	12,485.92	581.25	.....	1,650.00	11,417.17
508	Bursar's Fund	9,609.34	465.00	5,365.63	7,039.97	8,400.00
510	Mabel Blake Case	30,816.85	1,432.20	.....	4,100.00	28,149.05
512	Fred L. and Florence L. Coburn	.....	83.70	5,000.00	.....	5,083.70
514	Coffin Memorial	39,768.50	2,150.00	.....	.....	41,918.50
516	Dean's Fund	3,816.12	176.70	350.71	685.00	3,658.53
518	Carl P. Dennett	327.68	.....	.....	.....	327.68
520	Dormitory Fund	4,325.71	199.95	.....	500.00	4,025.66
521	Frances and William Emerson	97,897.10	5,030.00	50.00	2,250.00	100,727.10
523	Norman H. George	108,118.39	5,022.00	.....	14,700.00	98,440.39
525	John A. Grimmons	3,519.90	186.00	3,203.78	2,920.55	3,989.13
527	James H. Haste	148,935.63	6,928.50	.....	7,000.00	148,864.13
529	David L. Jewell	25,687.75	1,195.05	.....	1,200.00	25,682.80
531	William B. Rogers	23,333.93	990.45	4,742.97	10,116.77	18,950.58
532	Summer Surveying Camp	556.32	27.90	575.86	475.00	685.08
534	Teachers' Fund	145,071.46	6,742.50	.....	15,227.38	136,586.58
536	Samson R. Urbino	1,236.00	55.80	.....	160.00	1,131.80
537	Jonathan Whitney	604,897.20	28,523.33	.....	29,078.00	604,342.53
539	Morrill Wyman	82,654.44	3,845.55	.....	11,200.00	75,299.99
		$1,881,536.39	$88,676.13	$19,392.45	$178,858.82	$1,810,746.15

RECAPITULATION OF FUNDS

FOR GENERAL PURPOSES					
Restricted	$24,437,581.64	$1,340,358.63	$3,335,247.71	$3,378,274.18	$25,734,913.80
Unrestricted	635,204.88	29,736.75	11,500.00	90,107.11	586,334.52
FOR DESIGNATED PURPOSES					
Special Deposit Funds	$3,319,039.12	31,168.52	157,866.18	2,724,079.06	783,994.76
Salaries	165,951.31	7,709.70	.....	20,809.70	152,851.31
Libraries, etc.	198,153.00	9,345.77	10.05	20,984.56	186,524.26
Departments	1,900,532.46	86,579.10	9,872.00	236,624.18	1,760,359.38
Research	337,529.00	15,265.95	.....	99,222.63	253,572.32
Fellowships	210,863.99	10,210.60	13,000.00	28,730.50	205,344.09
Scholarships	707,324.27	47,225.40	492,385.10	96,381.00	1,150,553.77
Prizes	27,871.72	1,292.70	.....	2,950.00	26,214.42
Relief	1,881,536.39	88,676.13	19,392.45	178,858.82	1,810,746.15
Total (Schedule D)	$33,821,587.78	$1,667,569.25 (Schedule B)	$4,039,273.49	$6,877,021.74	$32,651,408.78 (Schedule D)

[1] One-half of the income added to the principal.
[2] See alphabetical listing and description of Funds on pages 183–192.

SCHEDULE R

MINOR FUNDS

Name	Balance June 30, 1931	Income	Other Increases	Salaries and Expenses	Balance June 30, 1932
Additional Group Ins. Fund	$71.68	$7,440.67	.....	$7,503.06	$9.29
Aeronautical Eng., Airplane Mat. Design	447.75	1,357.50	[1]$2,000.00	2,020.97	1,784.28
Aeronautical Eng., No. 640	3,403.58	.....	[2]2,336.42	2,905.60	2,834.40
No. 715	613.98	.....	.....	613.98	.....
Coasting Expts.	*18.73	35.23	[1,2]1,400.00	1,357.14	59.36
Wind Tunnels	1,720.43	417.00	.....	635.50	1,501.93
N. A. C. A. Acct.	*1,000.00	.....	.....	.....	*1,000.00
Crane Diesel Acct.	*463.58	2,800.00	.....	2,336.42	.....
No. 741	90.00	.....	.....	90.00	.....
No. 776	319.05	.....	.....	319.05	.....
No. 793	49.74	.....	[2]249.17	134.82	164.09
No. 832	130.82	.....	.....	130.82	.....
No. 837	36.08	.....	[2]200.00	204.83	31.25
No. 841	.....	265.23	[1]624.00	889.23	.....
No. 844	.....	.....	[1]1,125.00	1,125.00	.....
No. 868	.....	.....	[1]4,000.00	3,663.80	336.20
No. 881	.....	500.00	[1,2]5,480.00	5,031.84	948.16
No. 902	.....	243.78	[2]795.00	444.67	594.11
No. 915	.....	61.60	[1]750.00	614.68	196.92
Aldred Lecture Fund	104.41	500.00	.....	914.59	*310.18
American Academy Grant	51.91	.....	.....	51.91	.....
Architecture:					
No. 871	.....	.....	[2]2,000.00	2,000.00	.....
Special Scholarship	*350.00	.....	.....	.....	*350.00
Travel. Scholarships	300.00	.....	[2]1,500.00	800.00	1,000.00
Portrait Fund	.....	2,506.83	.....	2,506.83	.....
Biology — Food and Fisheries	7,506.22	.....	[2]2,000.00	4,010.04	5,496.18
No. 717 Limnology	713.40	.....	.....	713.40	.....
Biocinema Research	1,843.98	1,493.74	.....	754.20	2,583.52
Coffee Research	628.15	.....	.....	21.42	606.73
Frigidaire Research	1,210.38	4,500.00	.....	4 569.70	1,140.68
Health Education	852.48	17.50	[1,2]1,350.00	1,636.71	583.27
General Sea Foods	1,393.37	15,659.00	.....	11,495.26	5,557.11
Account L	.....	1,780.00	[2]85.97	1,558.83	307.14
Gelatin Research	.....	4,000.00	.....	2,337.71	1,662.29
Rockefeller Research	.....	.....	[2]9,500.00	4,768.82	4,731.18
Merck Research	1,242.45	1,850.00	.....	3,060.17	32.28
Boat House Equipment No. 346	2,009.11	553.70	.....	1,722.74	840.07
Bus. and Eng. Administration:					
XV Fund	313.40	45.00	.....	129.31	229.09
No. 736	3.00	.....	[2]400.00	183.69	219.31
Graduate Fellowship Fund	.....	9,133.13	.....	8,528.63	604.50
Spec. Exp.	.83	75.02	.....	75.85	.....
No. 785	265.15	397.26	.....	485.16	177.25
No. 786	52.40	.....	.....	52.40	.....
No. 789	73.85	.....	.....	73.85	.....
No. 791	822.07	.....	.....	682.93	139.14
No. 810	157.37	.....	.....	157.37	.....
No. 847	.....	.....	[1]1,500.00	1,157.73	342.27
No. 857	.....	356.62	[1]3,225.00	3,285.13	296.49
No. 866	.....	413.30	[1]2,300.00	2,453.66	259.64
No. 894	.....	1.35	[1]50.00	51.35	.....

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

Schedule R (*Continued*)

Name	*Balance June 30, 1931*	*Income*	*Other Increases*	*Salaries and Expenses*	*Balance June 30, 1932*
Chemistry, Special	$249.89	.....	.....	$249.89	.....
Rockefeller Research	*60.52	$77.02	[2]$15,823.00	[2]17,746.04	*$1,906.54
Res. Lab. App. Chemistry	*22,400.52	17,446.20	[1,2]38,400.00	35,440.44	*1,994.76
Res. Lab. Phys. Chem. Royalties	894.62	112.94	.....	.....	1,007.56
Special Research No. 13,101	1,370.92	.....	.....	1,370.92	.....
Steam Table Research	*338.66	3,770.02	.....	4,493.88	*1,062.52
Civil Engineering — No. 616	100.00	.....	.....	52.39	47.61
Soil Mech.	141.52	.....	[1]600.00	682.25	59.27
Spec. Fund	150.00	.....	.....	.....	150.00
No. 734	437.96	.....	[2]850.00	1,174.89	113.07
No. 635	2,000.00	.....	[2]250.00	2,208.09	41.91
No. 850	.....	.....	[1]1,500.00	1,500.00	.....
No. 889	.....	.....	[1]250.00	65.99	184.01
No. 890	.....	.....	[1]125.00	42.51	82.49
Master Plumbers Assoc.	*734.23	739.07	.....	4.84	.....
No. 869	.....	.....	[1]209.18	209.18	.....
No. 913	.....	.....	[2]8,500.00	1.25	8,498.75
D. I. C. & R. Special	.....	24,804.90	.....	24,804.90	.....
D. I. C. & R. No. 1	.....	.....	[2]31,908.92	31,908.92	.....
Dining Service Reserve	19,791.80	.....	.....	3,475.94	16,315.86
Div. of Mun. and Ind. Research	.....	2,385.62	[2]20,932.46	23,318.08	.....
Div. of Ind. Coöp. and Res. No. 2	4,576.13	.....	[2]3,780.92	8,357.05	.....
Dormitory Tax	295.95	1,810.00	.....	2,027.02	78.93
Curtain and Rug Account	.....	314.00	28.50	342.50	.....
Laundry Account	.....	1,587.00	.....	1,587.00	.....
Book Shelf	314.50	.....	.....	.....	314.50
Electrical Engineering					
No. 710	1,330.13	355.50	.....	1,638.66	46.97
VI-A Fund	209.10	.....	[1]2,000.00	1,558.91	650.19
No. 918	.....	.....	[2]500.00	1.60	498.40
Network Analyzer	1,490.04	906.55	.....	740.80	1,655.79
Integraph	972.51	.....	[1]3,100.00	4,062.93	9.58
Boston Police Dept. Survey	.....	8,203.85	.....	7,415.99	787.86
Round Hill	2,221.31	20,000.00	[2]65.58	19,104.16	3,182.73
Nat. Elec. Light Assoc.	323.68	4,035.00	.....	3,632.72	725.96
Machine Transients	.....	.....	[2]1,200.00	1,085.01	114.99
No. 822	65.30	.....	.....	65.30	.....
Aberdeen Proving Ground	.....	500.00	.....	37.00	463.00
Emergency Employment Fund	.....	7,279.34	.....	6,736.55	542.79
Employees Health & Acc. Ins.	.....	5,253.86	.....	5,253.86	.....
Freeman Publication Fund	.....	1,000.00	.....	1,000.00	.....
Freeman Translation Fund	.....	1,000.00	.....	.....	1,000.00
Fuel and Gas, Contractors' Acct.	7,247.52	5,431.36	.....	5,413.26	7,265.62
Geology, Rockefeller Research	*78.99	.....	[2]4,230.00	3,533.66	617.35
Historic Memorials	856.01	.....	.....	11.05	844.96
Historic Tablets No. 723	239.00	.....	.....	.....	239.00
Hydraulic Fund	939.50	4,030.97	.....	15,801.76	*10,831.29
Hygiene Department Special	4,940.89	301.83	.....	2,525.00	2,717.72
No. 856	.....	.....	[1]607.11	607.11	.....
Journal of Mathematics and Physics	4,112.37	262.25	.....	2,782.39	1,592.23
Letter Shop	1,778.03	22,790.06	.....	23,734.57	833.52

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

Schedule R (*Continued*)

Name	*Balance June 30, 1931*	*Income*	*Other Increases*	*Salaries and Expenses*	*Balance June 30, 1932*
Library, Special No. 1	$241.01	$696.85	[2]$647.67	$1,310.37	$275.16
No. 774	844.93	.....	.....	564.34	280.59
Mechanical Engineering — No. 482	1,779.00	.....	.....	1,000.00	779.00
No. 568	188.91	.....	.....	188.91	.....
Shop Account	84.99	.....	[2]500.00	319.67	265.32
No. 781	137.75	.....	.....	22.00	115.75
No. 862	.....	.....	[1]9,552.00	9,552.00	.....
No. 873	.....	.....	[2]5,415.00	5,065.11	349.89
No. 917	.....	.....	[2]625.00	496.63	128.37
Mining Engineering:					
Ore Dressing	962.62	.....	.....	800.07	162.55
Welding Research	.....	250.00	.....	62.56	187.44
No. 731	272.38	.....	.....	272.38	.....
No. 812	199.08	.....	.....	199.08	.....
Special Travel Fund	.....	.....	[2]500.00	.....	[1,2]500.00
Naval Architecture No. 760	119.23	.....	.....	119.23	.....
No. 777	71.05	.....	.....	71.05	.....
Photographic Service	557.92	19,471.65	.....	19,993.29	36.28
Photostat Service	1,443.82	5,412.19	.....	4,507.78	2,348.23
Physics Department, Special	.....	1,028.75	.....	340.00	688.75
R. L. Ind. Phys.	3,780.92	.....	.....	3,780.92	.....
Roentgen Ray	1,883.42	.....	.....	.....	1,883.42
Hale Spectroscopic Fund	2,707.10	.....	.....	1,220.90	1,486.20
Carnegie Spectroscopy Fund	.....	1,215.39	.....	1,719.39	*504.00
Rockefeller Research Fund	.....	.....	[2]24,280.00	14,658.57	9,621.43
Nat. Res. Council	908.25	.....	.....	852.92	55.33
Rumford Grant, A. A. of A. & S.	278.62	.....	.....	.....	278.62
No. 767	74.86	.....	.....	74.86	.....
No. 769	276.85	.....	.....	276.85	.....
No. 771	470.02	.....	[2]187.89	657.91	.....
No. 796	365.34	.....	.....	365.34	.....
Salary Account	.....	2,000.00	.....	.....	2,000.00
No. 908	.....	.....	[1]2,000.00	541.82	1,458.18
No. 914	.....	.....	[1]300.00	42.24	257.76
No. 916	.....	.....	[2]1,500.00	157.16	1,342.84
Special Rumford Fund	.....	500.00	.....	284.02	215.98
Poughkeepsie Race Account	*1,429.50	4,015.25	.....	2,064.49	521.26
President's Fund	157.50	1.50	.....	90.00	69.00
R. O. T. C. Uniform Accounts	637.71	472.98	.....	344.34	766.35
Safe Harbor Hydraulic Account	.....	7,574.85	.....	8,962.74	*1,387.89
Stratton Prize Fund	.....	100.00	.....	100.00	.....
Suspense Accounts	1,869.35	.....	[2]9,810.29	12,596.09	*916.45
Tech Song Book	*476.66	116.80	[2]371.86	12.00	.....
Tech Loan Fund — Interest	352.27	1,906.00	.....	1,909.99	348.28
Tech Loan Fund — Principal	.....	6,518.00	.....	4,758.00	1,760.00
Technology Press	.....	1,000.00	[1]500.00	1,322.89	177.11
Textile Research Progress	.....	.....	[2]1,000.00	.....	1,000.00
Textile School	.....	.....	[1]486.27	486.27	.....
Walker Memorial Library	788.03	.....	[2]4,851.50	4,819.76	819.77
Buildings and Grounds Accounts No. 906	.....	.....	[1]2,181.00	2,181.00	.....
Totals	$77,577.26	$243,081.01 (Schedule B)	$242,439.71	$467,232.00 (Schedule C)	$95,865.98 (Schedule D)

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

SCHEDULE S

Current Deficit

Deficit, June 30, 1931	$14,124.33
Net Increase (Schedule A)	15,575.22
Deficit, June 30, 1932 (Schedule D)	$29,699.55

Detail of Profit and Loss Account

Losses and Charges:

Students' Accounts (previous years), charged off	$1,598.10
Miscellaneous Charges	453.80
Total Losses	$2,051.90

Gains and Credits:

Premium Refund Account Employees' Insurance	$2,939.09
Miscellaneous Credits	3,729.49
Total Gains	$6,668.49
Profit and Loss. Net Profit (Schedule A)	$4,616.50

*THE ENDOWMENT FUNDS OF THE INSTITUTE

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

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

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

361 ARKWRIGHT CLUB FELLOWSHIP, 1926–27, $2,000. Gift. For graduate student in Industrial Chemistry or other textile activity.

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

* Alphabetically listed — see pages 173–178 for corresponding reference numbers.

405 ALBERT G. BOYDEN FUND, 1931, $530,000. Bequest. Estate of Elizabeth R. Stevens. Income for scholarships. Preference to students from Fall River and Swansea, Mass.

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

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

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

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

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

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

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

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

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

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

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

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

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

413 CLASS OF '96 FUND, 1923, $2,272. Gift. Award subject to approval of Class Secretaries. Preference to descendants of members of Class Scholarships to be considered a loan to be repaid when and if able.

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

210, 211, 212, 213, 214, 215, 216, 217, 218, 219, 220, 221, 222, 223. CLASS ENDOWMENT AND ENDOWMENT RESERVE FUNDS

Note: These funds are being accumulated for the several classes whose members took out life insurance toward a gift to the Institute on their Twenty-Fifth Reunions.

The Class Endowments are of funds permanently held toward the final sum.

The Class Endowment Reserves may be applied in accordance with the terms of the several plans toward keeping alive policies that might lapse on account of non-payment or as otherwise designated.

230 CLASS OF 1898 LOAN FUND, $5,535. By subscription of certain members of class from 1927–1931. Income only for scholarship loans, as authorized by committee of class.

251 SAMUEL C. COBB FUND, 1916, $30,000. Bequest. Income for salaries of President and professors.

512 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.

514 COFFIN MEMORIAL FUND, 1929, $35,000. Gift of the Estate of Charles A. Coffin. For loans or other aid to students as determined by Executive Committee.

366 COLLAMORE FUND, 1916, $10,000. Bequest of Helen Collamore. Income primarily to aid women students in post-graduate courses, secondarily, for purchase of instruments for Chemical Laboratory.

344 CRANE AUTOMOTIVE FUND, 1928, $5,000. Gift of Henry M. Crane. Reserved for purchase of further equipment for Aeronautical Laboratory when necessary.

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

309 CROSBY HONORARY FUND, 1916, $1,633. Contributions in honor of William Otis Crosby (Professor Emeritus). Income for upbuilding of the Geological Department, especially its collections.

368 DALTON GRADUATE CHEMICAL FUND, 1896, $5,000. Gift of Charles H. Dalton. Income for scholarships for American male graduates of M. I. T., for advanced chemical study and research — preference given to chemical research especially applicable to textile industries.

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

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

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

420 ANN WHITE DICKINSON FUND, 1898, $40,000. Bequest. Income used to establish free scholarships. Such persons enjoying benefit shall be worthy young men of American origin.

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

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

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

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

105 COLEMAN DU PONT FUND, 1931, $117,017.11. Bequest. Income for support and maintenance of the Institute.

369 DU PONT FUND, 1922. Annual gift of Chemical Department of E. I. du Pont de Nemours & Company to be granted to graduate student whose major subject is chemistry or chemical engineering. Company to be advised of name of appointee and a report of progress made semi-annually.

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

108 GEORGE EASTMAN BUILDING FUND, 1916–17, $2,500,000. Gift of George Eastman on condition that $1,500,000 be raised by alumni and others. Balance to be used eventually for new educational buildings.

312 GEORGE EASTMAN FUND, 1918, $400,000. Gift of George Eastman. Income for Chemistry and Physics.

109 CHARLES W. EATON FUND, 1929, $243,000. Bequest. Income for advancement of general purposes of Institute.

112 EDUCATIONAL ENDOWMENT FUND, 1920–21, $8,000,000. $4,000,000 gift from George Eastman and $4,000,000 from alumni and others. Income for current educational expenses.

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

521 FRANCES AND WILLIAM EMERSON FUND, 1930, $100,000. Gift. Income for aid of regular and special students in Department of Architecture.

114 WILLIAM ENDICOTT FUND, 1916, $25,000. Bequest. Income for general purposes.

205 ENDOWMENT RESERVE FUND, 1924, $600,000. Created by application annually of a small percentage of income of the General Investments to insure the annual income of the funds sharing. Increased otherwise by gains account of sales or maturities of investments and decreased by premium amortization of bonds and losses and charges from sales or maturities.

424 FARNSWORTH FUND, 1889, $5,000. Bequest of Mary E. Atkins. Income for scholarships

153 HENRIETTA G. FITZ FUND, 1930, $10,000. Bequest. Income for general purposes.

426 CHARLES LEWIS FLINT FUND, 1889, $5,000. Bequest. Income for support of worthy student, preference given graduate of English High School, Boston.

277 CHARLES LEWIS FLINT FUND, 1889, $5,000. Bequest. Income for purchase of books and scientific publications for library.

253 SARAH H. FORBES FUND, 1901, $500. Gift of Malcolm Forbes as memorial to mother. Income for salaries.

427 SARAH S. FORBES FUND, 1913, $3,400. Gift of Sarah S. Forbes, William B. Rogers and Henry S. Russell. Income for maintenance and education of scholar in M. I. T.

117 FRANCIS APPLETON FOSTER FUND, 1922, $1,000,000. Bequest. Income for purposes of Institute.

118 ALEXIS H. FRENCH FUND, 1930, $5,000. Bequest. Income for general purposes of Institute.

119 JONATHAN FRENCH FUND, 1915–16, $25,000. Bequest of Caroline L. W. French. Income for purposes of the Institute.

121 HENRY CLAY FRICK FUND, 1925–32, $1,830,000. Bequest. Institute received ten shares of a total of one hundred shares of his residuary estate. Income for general purposes.

429 FUEL AND GAS SCHOLARSHIP FUND, 1925–26, $700. Gift Boston Consolidated Gas Company and Massachusetts Gas Companies for scholarship in Gas Engineering.

255 GEORGE A. GARDNER FUND, 1898, $20,000. Gift. Income for salaries of instructors.

122 GENERAL ENDOWMENT FUND, 1921, $1,527,000. Contributions by alumni and others to meet George Eastman's condition relative to gift of $2,500,000, his building fund (No. 108).

523 NORMAN H. GEORGE FUND, 1919, $70,000. Bequest. Income for assistance of worthy and needy students.

525 JOHN A. GRIMMONS FUND, 1930–32, $6,648.68. Bequest of Lillian C Moore of Malden. Principal held by Atlantic National Bank, Boston. Income for loans to undergraduates in Electrical Engineering not to exceed $600 to any one student in any one year with interest at 5 per cent and to be repaid within ten years. Loans to be awarded to male, white, native-born citizens of United States and to be protected by life insurance.

347 DANIEL GUGGENHEIM FUND, 1928. Gift for Meteorology Department. Balance remaining from $34,000 of which $10,000 was available for equipment, $12,000 for salaries, $6,000 for three fellowships and $6,000 for research for three years.

527 JAMES H. HASTE FUND, 1930, $141,000. Bequest. Income for aid of deserving students of insufficient means.

259 JAMES HAYWARD FUND, 1866, $18,000. Bequest. Income for salaries.

155 ESTHER A. HILTON FUND, 1930, $1,600. Bequest. Income used for general purposes.

431 GEORGE HOLLINGSWORTH FUND, 1916, $5,000. Bequest of Rose Hollingsworth. Income used for scholarship.

485 ROGER D. HUNNEMAN FUND, 1927, $1,060. Gift of W. C. Hunneman in memory of Roger Defriez Hunneman, '23. Income paid as annual award to most meritorious student in Chemical Engineering who has shown most outstanding originality in his work as determined by that Department.

433 T. STERRY HUNT FUND, 1894, $3,000. Bequest. Income to a student in Chemistry.

434 WILLIAM F. HUNTINGTON FUND, 1892, $5,000. Gift of Susan E. Covell. Income to deserving students. Preference to be given to students in Civil Engineering.

157 INDUSTRIAL FUND, 1924–31. This fund succeeded "Tech Plan" Contracts, payments under which went to the Educational Endowment Fund. Payments on contracts which were renewed or new contracts are now turned over to this Fund.

123 JAMES FUND, 1898–99, $163,000. Bequest of Julia B. H. James. Income for development of M. I. T.

529 DAVID L. JEWELL FUND, 1928, $25,000. Bequest. Income for tuition of five young men who are worthy of assistance and who, were it not for such assistance, might be unable to pursue their studies at M. I. T.

374 REBECCA R. JOSLIN FUND, 1924, $1,540. Gift. Income awarded as a loan to advanced student in Chemical Engineering on recommendation of that Department — restricted to native and resident of Massachusetts. Beneficiary to abstain from using tobacco in any form.

436 JOY SCHOLARSHIPS, 1886, $7,500. Gift of Nabby Joy. Income for scholarships for one or more women studying natural science at M. I. T.

280 WILLIAM HALL KERR FUND, 1896, $2,000. Gift of Alice M. Kerr. Income for the annual purchase of books and drawings in machine design.

276 WILFRED LEWIS FUND, 1930, $5,000. Gift of Emily Sargent Lewis. Income for maintenance of graduate student in Mechanical Engineering.

438 WILLIAM LITCHFIELD FUND, 1910, $5,000. Bequest. Income for scholarship on competitive examination.

439 ELISHA T. LORING FUND, 1890, $5,000. Bequest. Income for assistance of needy and deserving pupils.

441 LOWELL INSTITUTE FUND, 1923, $2,300. Gift from alumni of Lowell Institute to establish scholarship for its graduates.

125 KATHARINE B. LOWELL FUND, 1895, $5,000. Gift of Augustus Lowell in honor of Mrs. Lowell. Income for purchase of books and apparatus for Department of Physics.

261 WILLIAM P. MASON FUND, 1868, $18,800. Bequest. Income to support a professorship in the Institute.

127 M. I. T. ALUMNI FUND, 1907. Total subscriptions of alumni to 1924, $632,500. $632,000 appropriated for New Equipment, Walker Memorial 1916 Reunion and Dormitories. Present small balance unappropriated.

227 M. I. T. ALUMNI ASSOCIATION PERMANENT FUND, 1929–32, $32,389.07. Deposited with M. I. T. for investment purposes only.

225 M. I. T. TEACHERS' INSURANCE FUND, 1926. Balance of 2 per cent salary deductions under M. I. T. Pension and Insurance Plan in excess of Group Insurance Premiums paid.

226 M. I. T. TEACHERS' INSURANCE FUND SPECIAL, 1928–32, $50,647.45. Refund of premiums paid on Group Insurance under M. I. T. Pension and Insurance Plan held at interest and accumulated. $50,000 appropriated for special pension purposes.

317 GEORGE HENRY MAY FUND, 1914, $4,250. Gift. Income for benefit of Chemical Department.

443 GEORGE HENRY MAY FUND, 1914, $5,000. Gift. Income to assist graduates of Newton High School recommended as eligible by superintendent and head masters of Newton High Schools. Beneficiary to issue a note payable without interest.

126 THOMAS MCCAMMON FUND, 1930, $15,000. Bequest in honor of father, James Elder McCammon. Income available for general purposes.

487 JAMES MEANS FUND, 1925, $2,700. Gift of Dr. James H. Means as a memorial to father. Income for annual prize for essay on an aeronautical subject.

159 HIRAM F. MILLS FUND, 1922, $5,000. Bequest. For general purposes.

319 SUSAN MINNS FUND, 1930. Gift of Miss Susan Minns — tract of land on Memorial Drive for use in any way deemed best for benefit of plan regarding construction and maintenance of an hydraulic laboratory.

445 JAMES H. MIRRLEES FUND, 1886, $2,500. Gift of James Buchanan Mirrlees. Income to such student in third or fourth year Mechanical Engineering most deserving pecuniary assistance.

320 FORRIS JEWETT MOORE FUND, 1927–31, $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.

378 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.

130 KATE M. MORSE FUND, 1925, $25,000. Bequest. Income for general purposes of M. I. T.

447 NICHOLS FUND, 1895, $5,000. Bequest of Betsy F. W. Nichols. Income for scholarship to student in Chemistry.

448 CHARLES C. NICHOLS FUND, 1904, $5,000. Bequest. Income for scholarship.

322 WILLIAM E. NICKERSON FUND, 1928, $50,000. Gift. Principal and income used to finance chair in Humanics.

162 MOSES W. OLIVER FUND, 1921, $11,000. Bequest. Principal or income for general purposes.

283 GEORGE A. OSBORNE FUND, 1928, $10,000. Bequest. Income for benefit of mathematical library.

450 JOHN FELT OSGOOD FUND, 1909, $5,000. Bequest of Elizabeth P. Osgood in memory of husband. Income for scholarship in Electricity.

451 GEORGE L. PARMELEE FUND, 1921, $17,000. Bequest. Income for tuition of either special or regular worthy students.

131 RICHARD PERKINS FUND, 1887, $50,000. Bequest. Income for general purposes.

453 RICHARD PERKINS FUND, 1887, $50,000. Bequest. Income for scholarships.

380 WILLARD B. PERKINS FUND, 1898, $6,000. Bequest. Income to be expended every fourth year for travelling scholarship in architecture.

324 EDWARD D. PETERS FUND, 1924, $5,000. Bequest of Elizabeth W. Peters. Income for the Department of Mineralogy.

325 PRATT NAVAL ARCHITECTURAL FUND, 1916, $1,071,000. Bequest of Charles H. Pratt to endow the Department of Naval Architecture and Marine Engineering to be called forever Pratt School of Naval Architecture and Marine Engineering — to erect a building — remainder held in trust. Income to support said school.

382 PROCTOR FUND, 1929–30. Gift of $1,000 per annum from Redfield Proctor for fellowship in Physics.

231 PROFESSORS' FUND, 1931, $21,304.10. Contributions of one half of outside income earned by members of staff during academic year. To be disbursed on recommendation of committee appointed by contributors.

384 PROPRIETORS LOCKS AND CANALS FUND, 1927, $4,000. Gift to finance post-graduate scholarship in Textile Research, mechanical or chemical, to American-born graduate of Lowell Textile School, nominated by the Trustees of that School and approved by Executive Committee of Locks and Canals.

132 J. W. & B. L. RANDALL FUND, 1897, $83,000. Bequest of Belinda L. Randall as a permanent fund or in erecting a building with those names.

233 RICHARDS PORTRAIT FUND. 1929. Subscriptions from friends of Prof. R. H. Richards for portrait.

349 ELLEN H. RICHARDS FUND, 1912, $15,000. Income for promotion of research in Sanitary Chemistry, for fellowships to advanced students, for employment of research assistants and in such other ways as will best promote investigation in that field.

351 CHARLOTTE B. RICHARDSON FUND, 1891, $30,000. Bequest. Income to support of Industrial Chemical School.

263 HENRY B. ROGERS FUND, 1873, $25,000. Gift. Income for salaries of one or more professors or instructors.

386 HENRY BROMFIELD ROGERS FUND, 1921, $20,000. Bequest of Anna Perkins Rogers. Income to establish fellowship or scholarship for women graduates of M. I. T. or other colleges whose graduate work is carried on at M. I. T.

165 ROBERT E. ROGERS FUND, 1886, $7,600. Bequest in memory of brother, William B. Rogers. For general purposes.

531 WILLIAM BARTON ROGERS FUND. Present, $20,000. Established by subscriptions of members of Alumni Association through Prof. R. H. Richards for loans to students.

135 WILLIAM BARTON ROGERS MEMORIAL FUND, 1883–4–5, $250,000. Contributions from 91 persons. Income for support of Institute.

286 ARTHUR ROTCH ARCHITECTURAL FUND, 1895, $5,000. Bequest. Income for Library or collection of Department of Architecture.

327 ARTHUR ROTCH FUND, 1895, $25,000. Bequest. Income for general purposes of Department of Architecture.

489 ARTHUR ROTCH FUND, 1895, $5,000. Bequest. Income for annual prize to student in regular course in Architecture graduating highest in class.

491 ARTHUR ROTCH SPECIAL FUND, 1895, $5,000. Bequest. Income for annual prize to student who shall be ranked highest at end of two years special course in Architecture.

388 RICHARD LEE RUSSEL FUND, 1904, $2,000. Gift of Theodore E. Russel. Income to assist worthy student of high standing in Department of Civil Engineering either undergraduate or post-graduate.

136 SALTONSTALL FUND, 1901, $40,000. Bequest of Henry Saltonstall. One-fourth income each year added to principal and remaining three-fourths expended for benefit of Institute.

390 HENRY SALTONSTALL FUND, 1901, $10,000. Bequest. Income to aid one or more needy students.

392 JAMES SAVAGE FUND, 1873, $10,000. Bequest. Income for scholarships in institution "where my son-in-law, William B. Rogers, is President."

137 SAMUEL E. SAWYER FUND, 1895, $4,000. Bequest. Income to be used in such manner as will best promote interests of M. I. T.

455 JOHN P. SCHENKL FUND, 1922, $20,000. Bequest of Johanna Pauline Schenkl in memory of father. Income for scholarships in Department of Mechanical Engineering.

237 SEDGWICK MEMORIAL LECTURE FUND, 1930, $3,900. Bequest of Mary Katrine Sedgwick in memory of husband. All copyrights and interest in copyrights and benefits from contracts with publishers for Department of Biology and Public Health.

329 W. T. SEDGWICK FUND, 1928, $69,500. Received from Trustees of the Estate of W. T. Sedgwick under Agreement and Declaration of Trust following decease of Mary Katrine Sedgwick, for Department of Biology and Public Health.

456 THOMAS SHERWIN FUND, 1871, $5,000. Gift of Committee on Sherwin Memorial Fund for free scholarship to graduate of English High School.

168 ELLEN VOSE SMITH FUND, 1930, $25,000. Bequest. For general purposes.

458 HORACE T. SMITH FUND, 1930, $32,988.76. Bequest. Income for scholarships. Preference to graduates of East Bridgewater (Mass.) and Bridgeport (Conn.) High Schools.

459 SONS AND DAUGHTERS OF NEW ENGLAND PURITAN COLONY SCHOLARSHIP FUND, 1931, $600. Gift. Income for scholarship aid to a boy of New England ancestry.

139 ANDREW HASTINGS SPRING FUND, 1921, $50,000. Bequest of Charlotte A. Spring in memory of nephew as a permanent fund. Income for general purposes.

532 SUMMER SURVEYING CAMP LOAN FUND, 1927, $500. Gift of Lammot du Pont as a revolving loan fund to help students in Civil Engineering attend summer surveying camp.

140 SETH K. SWEETSER FUND, 1915, $25,000. Bequest as a permanent fund. Income for general purposes.

395 SUSAN H. SWETT FUND, 1888, $10,000. Bequest. Income to support a graduate scholarship.

396 GERARD SWOPE FUND, 1926, $2,500. Annual gift for fellowships in Electrical Engineering.

534 TEACHERS' FUND, 1899–1900. Gifts of $50,000 each from Augustus Lowell and A. Lawrence Lowell to establish fund for use in case of retirement, disability or death of members of instructing staff.

288 TECHNOLOGY MATRONS TEAS FUND, 1916–22–31, $8,500. Gifts of Mrs. F. Jewett Moore. Income for social activities of Technology Matrons.

354 TECHNOLOGY PLAN RESEARCH FUND. Funds received by Division of Industrial Coöperation and Research from Industrial Companies under contract covering a five-year period paid in annual installments.

356 TEXTILE RESEARCH FUND, 1930, $42,000. Gift of Textile Alliance, Inc., for scientific and economic research for benefit of development of textile industry, its allied branches, including production of raw materials.

265 NATHANIEL THAYER FUND, 1868, $25,000. Gift. Income for professorship of Physics.

239 ELIHU THOMSON FUND, 1929, $5,000. Gift.

397 FRANK HALL THORP FUND, 1932, $10,000. Anonymous gift. Income for fellowship in Industrial Chemistry.

460 SAMUEL E. TINKHAM FUND, 1924, $2,400. Gift of Boston Society of Civil Engineers. Income to assist worthy student in Civil Engineering.

289 JOHN HUME TOD FUND, 1913, $2,500. Gift of Mrs. F. Jewett Moore. Income for purchase of books of a humanistic character for General Library.

462 F. B. TOUGH FUND, 1924, $465. Gift to extend financial assistance to worthy students in mining or oil production.

331 EDMUND K. TURNER FUND, 1915, $178,000. Bequest. Income for a certain annuity during the life of sister — three-quarters of balance of income for Department of Civil Engineering and one-quarter to be added annually to principal.

243 UNDERGRADUATE DUES RESERVE FUND, 1924. Transferred from Undergraduate Dues Reserve and Contingent to secure investment income.

333 WILLIAM LYMAN UNDERWOOD FUND, 1932, $9,872. Bequest. For benefit of Biological Department or otherwise for general purposes.

463 SUSAN UPHAM FUND, 1892, $1,000. Gift. Income to assist students deserving financial aid.

536 SAMSON R. URBINO FUND, 1927, $1,000. Bequest. Income for students who need assistance, Germans preferred.

291 THEODORE N. VAIL FUND, 1925, $24,000. Bequest. Income for benefit of Vail Library.

398 LUIS FRANCISCO VERGES FUND, 1924, $10,000. Gift from Caroline A. Verges. Income for graduate students doing research work in sugar industry or if no such candidate, undergraduate student in Civil Engineering.

465 VERMONT SCHOLARSHIP FUND, 1924, $8,000. Gift of Redfield Proctor, '02, in memory of Vermonters who, having received their education at the Institute, served as engineers in the armies of the Allies in the World War. Income to student preferably from Vermont. Mr. Proctor reserves right to designate recipient as long as he lives.

467 ANN WHITE VOSE FUND, 1896, $60,000. Bequest. Income for free scholarships for young men of American origin.

171 HORACE W. WADLEIGH FUND, 1920, $2,100. Bequest. For general purposes.

469 ARTHUR M. WAITT FUND, 1925, $9,700. Bequest. Income for deserving students in second, third and fourth year classes in Mechanical Engineering.

141 WILLIAM J. WALKER FUND, 1915–17, $23,000. Bequest. Income for general purposes.

144 HORACE HERBERT WATSON FUND, 1930, $31,000. Bequest of Elizabeth Watson Cutter as a permanent fund. Income for general purposes.

173 FRANK G. WEBSTER FUND, 1931, $25,000. Bequest. For general purposes.

471 LOUIS WEISBEIN FUND, 1915, $4,000. Bequest. Income for scholarship for student in Architectural Department, preference to be given to a Jewish boy.

145 ALBION B. K. WELCH FUND, 1871, $5,000. Bequest as a permanent fund. Income for general purposes.

473 FRANCES ERVING WESTON FUND, 1912, $200. Bequest. Received annually to aid a native-born American Protestant girl of Massachusetts. (Principal $5,000 turned over to M. I. T., 1931.)

474 SAMUEL MARTIN WESTON FUND, 1912. Bequest of Frances E. Weston in memory of husband. Two hundred dollars received annually to aid a native-born American Protestant boy; preference to be given one from Roxbury. (Principal $5,000 turned over to M. I. T. in 1931.)

476 AMASA J. WHITING FUND, 1927, $4,500. Bequest of Mary W. C. Whiting. Income as scholarship to deserving students; preference to students from the Town of Hingham, Massachusetts.

358 EDWARD WHITNEY FUND, 1910, $25,000. Bequest as a memorial to him and his wife, Caroline. Principal and interest for conduct of research or teaching in geophysics — to include investigations in seismology conducted with a view to the protection of human life and property.

537 JONATHAN WHITNEY FUND, 1912, $525,000. Bequest of Mrs. Francis B. Green. Income to assist poor and deserving young men and women in obtaining an education at M. I. T.

147 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.

539 MORRILL WYMAN FUND, 1915–16, $66,000. Bequest. Income to aid deserving and promising students upon understanding that if in after life the person receiving aid shall find it possible, he shall reimburse said fund — not a legal obligation.

PERIODICAL PUBLICATIONS, BOOKS AND REVIEWS BY MEMBERS OF THE STAFF

DEPARTMENT OF AERONAUTICAL ENGINEERING

1. LANGE, KARL O. *Ueber Vertikalbewegungen der Luft in der Atmosphaere.* (Veroeffentlichungen des Forschungsinstitutes der Rhoen-Rossitten-Gesellschaft e.v. No. 5, pp. 25–43, 1932.)

2. NEWELL, JOSEPH S. *The Rationalization of Load Factors for Airplanes in Flight.* (S. A. E. Journal, *30*, pp. 31–44, January 1932.)

3. NEWELL, JOSEPH S. *Data on the Strength of Aircraft Materials.* (Aviation Eng., *6*, pp. 11–14, March 1932.)

4. ROSSBY, CARL-GUSTAF. *Thermodynamics Applied to Air Mass Analysis.* (M. I. T. Meteorological Papers, *1*, No. 3, December 1931.)

5. SAYRE, DANIEL C. *Winged Words.* (Tech. Rev. *34*, p. 65, November 1931.)

6. TAYLOR, CHARLES F. and CHATFIELD, C. H. *The Airplane and Its Engine.* Second edition. (McGraw-Hill Book Company, January 1932.)

7. TAYLOR, EDWARD S. *Valve Timing of Engines Having Intake Pressures Higher than Exhaust.* (Nat. Advisory Com. for Aero. Technical Note No. 405.)

8. TAYLOR, EDWARD S. and WILLIAMS, GEORGE L. *Further Investigation of Fuel Injection in an Engine Having Spark Ignition.* (S. A. E. Jour., January 1932.)

9. WILLETT, HURD C. *Ground Plan of a Dynamic Climatology.* (Monthly Weather Rev. *59*, pp. 219–223, June 1931.)

DEPARTMENT OF ARCHITECTURE

10. BRADLEY, HARRY C. *Descriptive Geometry.* (By the Author, 1931.)

DEPARTMENT OF BIOLOGY AND PUBLIC HEALTH

11. BIGELOW, ROBERT P. *Stomatopoda of the Southern and Eastern Pacific Ocean and the Hawaiian Islands.* (Bull. Mus. Comp. Zool. *72*, pp. 105–191, 2 pts., September 1931.)

12. BLAKE, CHARLES H. *Two Freshwater Ostracods from North America.* (Bull. Mus. Comp. Zool. *72*, pp. 281–293, December 1931.)

13. HARRIS, ROBERT S. and BUNKER, JOHN W. M. and MILAS, NICHOLAS A. *The Germicidal Activity of Vapors from Irradiated Oils.* (Jour. of Bacteriology, *23*, pp. 429–435, June 1932.)

14. HARRIS, ROBERT S. and BUNKER, JOHN W. M. *Bacterial Detoxification* (Proc. Amer. Acad. Arts and Sci. *67*, pp. 147–168, June 1932.)

15. HORWOOD, MURRAY P. *Air in Relation to Health.* (Trans. Mass. Sanitary Club, pp. 134–150, 1931.)

16. HORWOOD, MURRAY P. *Principles of Sewage Disposal.* (Bull. prepared for the M. I. T. Division of Municipal and Industrial Research, 8 pages, October 1931.)

17. HORWOOD, MURRAY P. *An Outline of the Municipal Refuse Problem.* (Bull. prepared for the M. I. T. Division of Municipal and Industrial Research, 8 pages, October 1931.)

18. HORWOOD, MURRAY P. *Carbon Monoxide Poisoning.* (Trans. Mass. Sanitary Club, pp. 12–26, 1932.)

19. HORWOOD, MURRAY P. *Housing in Relation to Health* (Rep. on the President's Conference on Home Building and Home Ownership — Committee on Housing and the Community. September 1932.)

20. HORWOOD, MURRAY P. *Child Health — Some Public Health Aspects.* (The Commonhealth, published by the Mass. Dept. of Pub. Health, *18*, No. 4, pp. 198–205, October to December 1931.)

21. HUME, EDGAR E. *The United States Army Medical Department and its Relation to Public Health.* (Science, *74*, pp. 465–476, November 13, 1931.)

22. JENNISON, MARSHALL W. and BUNKER, J. W. M. *The Effect of Temperature upon the Rate of Growth of E. coli in Broth.* (Jour. of Bacteriology, *23*, p. 52, January 1932.)

23. PRESCOTT, SAMUEL C. *Training for the Public Health Engineer.* (Am. Jour. of Pub. Health, *21*, pp. 1091–1098, October 1931.)

24. PRESCOTT, SAMUEL C. and BATES, P. K. and HIGHLANDS, M. E. *Numbers of Bacteria in Frozen Food Stored at Several Temperatures.* (Am. Jour. of Pub. Health, *22*, pp. 257–262, March 1932.)

25. PRESCOTT, SAMUEL C. *Bacteria as Affected by Temperature.* (Refrig. Eng. *23*, No. 2, pp. 91–96.)

26. PRESCOTT, SAMUEL C. *Some Facts Concerning Communicable Diseases.* (Sixth Conf. of Mass. State Assoc. of Master Plumbers. 1932, pp. 27–46.)

27. PRESCOTT, SAMUEL C. and WINSLOW, C. E. A. *Elements of Water Bacteriology.* (219 pp. John Wiley and Sons, 1931.)

28. TURNER, C. E. and COLLINS, G. B. *Classroom Films or Visual Texts.* (Eastman Teaching Films, Inc., Rochester, 1931.)

29. TURNER, CLAIR E. and COLLINS, G. B. *Malden Outline in Health Education — Teachers' Manual.* (D. C. Heath & Co. 55 pages, July, 1931.)

30. TURNER, CLAIR E. and COLLINS, G. B. *Classroom Films or Visual Texts:* "Routine Procedures in Home Nursing," "Special Procedures in Home Nursing," "The Bed Bath," "Clean Face and Hands," "Bathing," "Keeping the Hair Clean," "Clean Clothes," "Life Saving and Resuscitation," "Carrying the Injured." (Eastman Teaching Films, Inc., Rochester, January 1932.)

31. TURNER, CLAIR E. *The Place of Health Teaching in a Progressive Program in Modern Education.* (Proc. of the 67th Convocation of the Univ. of the State of N. Y., pp. 30–39, January, 1932.)

32. TURNER, CLAIR E. and others. *Training and Personnel.* (Am. Public Health Assoc. Yearbook, pp. 182–200, February 1932.)

33. TURNER, CLAIR E. *The Work of the Health Section.* (Health Section Report, Chairman's Address, Denver Meeting — World Federation of Education Assn., pp. 1–6, April 1932.)

34. TURNER, CLAIR E. *Teaching Health in the Senior High School.* (Jour. of the Outdoor Life, *29*, pp. 215–217, April 1932.)

35. TURNER, CLAIR E. *The Training of Supervisors in Health Education.* (Health Section Report — Denver Meeting — World Federation of Education Assn., pp. 173–179, April 1932.)

36. TURNER, CLAIR E. and LYTLE, ELLEN and WINNEMORE, CHARLOTTE. *Intermittency in Growth as an Index of Health Status.* (Am. Jour. of Public Health, *14*, pp. 455–464, May 1932.)

37. TURNER, CLAIR E. *Principles of Health Education.* (D. C. Heath & Co., 317 pages, May 1932.)

38. TURNER, CLAIR E. *The Use of Motion Pictures in Health Instruction.* (Proc. 12th Ann. Meeting, Amer. Student Health Assn. *6*, pp. 62–64, June 1932.)

DEPARTMENT OF BUSINESS AND ENGINEERING ADMINISTRATION

39. ELDER, ROBERT F. *Scientific Management in Marketing. Notes and Cases.* (Spaulding-Moss, Boston, 256 pages, 1931.)

40. ELDER, ROBERT F. *Making and Selling Just Enough — at a Profit.* (Factory and Industrial Management, p. 64, July 1931.)

41. ELDER, ROBERT F. *Team Up Merchandizing and Production.* (Factory and Industrial Management, August 1931.)

42. ELDER, ROBERT F. *Bringing the Factory Closer to the Consumer.* (Factory and Industrial Management, September 1931.)

43. ELDER, ROBERT F. *Consumer Buying in Depression.* (Boston Conference on Retail Distribution, Retail Trade Board, Boston 1931.)

44. ELDER, ROBERT F. *Measuring Radio Advertising Sales Power.* (Broadcasting, November 1, 1931.)

45. ELDER, ROBERT F. *Product and Market Research.* (Industrial Marketing Series No. 14, Am. Management Assn., New York 1931.)

46. ELDER, ROBERT F. *Industrial Equilibrium. Its Restoration and the Part the Engineer Must Play.* (Tech. Rev., *34*, p. 246, March 1932.)

47. FISKE, WYMAN P. *Accounting for Unused Facilities.* (Bull. Nat. Assn. of Cost Accountants *13*, Sec. I p. 355, November 1931.)

48. FISKE, WYMAN P. *Watch Your Overhead.* (N. E. Plumbing and Heating Magazine, July 1931.)

49. FISKE, WYMAN P. *Budget Your Business.* (N. E. Plumbing and Heating Magazine, August 1931.)

50. FISKE, WYMAN P. *Material and Equipment Control in Construction Companies.* (Bull. Nat. Assn. of Cost Accountants, *13*, p. 1443, July 1932.)

51. PORTER, CHARLES H. *A Comparison of Public and Private Electric Utilities in Massachusetts.* (Journal of Land and Public Utility Economics 1, pp. 394–438: 18 tables, 3 charts, November 1931.)

52. PORTER, CHARLES H. and EDDY, ROBERT C. and FISKE, WYMAN P. *Materials in Industrial Accounting.* (Printed by Massachusetts Institute of Technology June 1932.)

53. RAYMOND, FAIRFIELD E. *Standards for the Economic Control of Quality for Manufactured Product.* (Industrial Standardization, *3*, pp. 209–214, July, 1932.)

54. SCHAEFER, ALBERT A. *Institutional Liability for Negligence.* (Minutes of the 12th Annual Meeting of the Association of University and College Business Officers of the Eastern States, Section C, p. 28, December 1931.)

55. SCHAEFER, ALBERT A. *Safeguarding Payment in the Sale of Goods.* (Proc. of the 6th Conference for the Mass. State Association of Master Plumbers and the Mass. Sanitary Club, p. 95, February 1932.)

56. SCHELL, ERWIN H. *Production Management.* (Technology Review, *34*, p. 207, February 1932.)

57. VORLANDER, HEINZ O. and RAYMOND, FAIRFIELD E. *Economic Life of Equipment.* (A. S. M. E. Trans. — Management Div., *54*, No. RP. 54.2, July 1932.)

58. WILDER, RICHARD F. *Coördination of Research, Sales and Production.* (A. S. M. E. Trans. — Management Div., *54*, pp. 25–39, July 1932.)

DEPARTMENT OF CHEMICAL ENGINEERING

59. COPE, J. Q. and LEWIS, W. K. and WEBER, H. C. *Generalized Thermodynamic Properties of Higher Hydrocarbon Vapors.* (Ind. Eng. Chem. *23*, p. 887, August 1931.)

60. COX, GILBERT L. *Effect of Temperature on the Corrosion of Zinc.* (Ind. Eng. Chem. *23*, p. 902, August 1931.)

61. COX, GILBERT L. and ROETHELI, B. E. *Effect of Oxygen Concentration on Corrosion Rates of Steel and Composition of Corrosion Products formed in Oxygenated Water.* (Ind. Eng. Chem. *23*, p. 1012, September 1931.)

62. CUMMINGS, LELAND W. T. *High-Pressure Rectification. I — Vapor-Liquid Equilibrium Relations at High Pressure.* (Ind. Eng. Chem. *23*, p. 900, August 1931.)

63. DREW, THOMAS B. and RYAN, W. P. *Mechanism of Heat Transmission.* (Ind. Eng. Chem. *23*, p. 945, 1931; Trans. Am. Inst. Chem. Engrs. *26*, p. 118, 1931.)

64. DREW, T. B. and HOGAN, J. J. and MCADAMS, W. H. *Heat Transfer in Stream-Line Flow.* (Ind. Eng. Chem. *23*, p. 936, 1931.)

65. DREW, THOMAS B. *Heat Transfer in Stream-line Flow — II: Experiments with Glycerine.* (Trans. Am. Inst. Chem. Engrs. *27*, pp. 171–189, July 1931.)

66. DREW, THOMAS B. *Mathematical Attacks on Forced Convection Problems: A Review.* (Trans. Am. Inst. Chem. Engrs. *26*, p. 26, July 1931.)

67. DREW, THOMAS B. *Heat Transfer in Stream-Line Flow.* Second Paper (Ind. Eng. Chem. *24*, pp. 152–157, February 1932.)

68. DREW THOMAS B. *Heat Transfer in Stream-Line Flow. II. Experiments with Glycerol.* (Ind. Eng. Chem. *24*, p. 152, February 1932.)

69. LEWIS, WARREN K. and CAREY, J. S. *Studies in Distillation.* (Ind. Eng. Chem. *24*, p. 882, August 1932.)

70. LEWIS, WARREN K. and LORD, R. H. W. *The Whys and Hows in Leather Manufacture.* (Chem. and Met. Eng. *38*, pp. 452–6; 592–7, 1931.)

71. LEWIS, WARREN K. and LORD, R. H. W. *The Manufacture of Leather.* (Trans. Am. Inst. Chem. Engrs. *26*, p. 208, 1931.)

72. LEWIS, WARREN K. *Distillation.* (Ind. Eng. Chem. *24*, p. 89, January, 1932.)

73. LEWIS, WARREN K. and MATHESON, G. L. *Studies in Distillation Design of Rectifying Columns for Natural and Refinery Gasoline.* (Ind. Eng. Chem. *24*, p. 494, May 1932.)

74. LEWIS, WARREN K. and COPE, J. Q., JR. *Studies in Distillation. Graphical Method of Computation for Rectifying Complex Hydrocarbon Mixtures.* (Ind. Eng. Chem. *24*, p. 498, May 1932.)

75. LEWIS, W. K. and MATHESON, G. L. *Studies in Distillation. Design of Rectifying Columns for Natural and Refinery Gasoline.* (Ind. Eng. Chem. *24*, p. 494, May 1932.)

76. MAREK, L. F. and MCCLUER, W. B. *Velocity Constants for the Thermal Dissociation of Ethane and Propane.* (Ind. Eng. Chem. *23*, p. 878, August 1931.)

77. NEUHAUS, MAX and MAREK, L. F. *Thermal Decomposition of n-Butane into Primary Products.* (Ind. Eng. Chem. *24*, p. 400, April 1932.)

78. NUSSBAUM, ROBERT, JR. and FROLICH, P. K. *Catalysts for Formation of Alcohols from Carbon Monoxide and Hydrogen. VII. Studies of Reduction of Methanol Catalyst.* (Ind. Eng. Chem. *23*, pp. 1386–1389, December 1931.)

79. ROETHELI, BRUNO E. and COX, G. L. *Prevention of Corrosion of Metals by Sodium Dichromate as Affected by Salt Concentrations and Temperature.* (Ind. Eng. Chem. *23*, p. 1084, October 1931.)

80. ROETHELI, BRUNO E. and BROWN, ROBERT H. *Corrosion Rates of Steel and Composition of Corrosion Products Formed in Oxygenated Water as Affected by Velocity.* (Ind. Eng. Chem. *23*, p. 1010, 1931.)

81. ROETHELI, BRUNO E. and COX, G. L. and LITTREAL, W. B. *Effect of pH on the Corrosion Products and Corrosion Rate of Zinc in Oxygenated Aqueous Solutions.* (Metals and Alloys, *3*, p. 73, March 1932.)

82. SCHNEIDER, V. and FROLICH, P. K. *Mechanism of Formation of Aromatics from Lower Paraffins.* (Ind. Eng. Chem. *23*, p. 1405, December 1931.)

83. SERRALLACH, J. A. and OWEN, R. J. *Determination of Phenolphthalein in Pharmaceutical Mineral Oil Emulsions.* (Jour. Am. Pharm. Assn. *20*, p. 648, 1931.

84. SHERWOOD, THOMAS K. *Heat Transmission to Oil Flowing in Pipes.* (Ind. Eng. Chem. *24*, p. 273, March 1932.)

85. SHERWOOD, THOMAS K. *The Drying of Solids — IV — Application of Diffusion Equations.* (Ind. Eng. Chem. *24*, p. 307, March 1932.)

DEPARTMENT OF CHEMISTRY

86. ASHDOWN, AVERY A., SCHUMB, WALTER C., IDDLES, HAROLD A. and NEWELL, LYMAN C. *The Life and Work of Charles James, 1880–1928.* (The Northeastern Section of the American Chemical Society, A. A. Ashdown, Custodian, 1932.)

87. ASHDOWN, AVERY A. *Arthur Amos Noyes, First Richards Medalist.* (The Nucleus, *9*, p. 183, May 1932.)

88. BEATTIE, JAMES A. *A Precision Thermostat for Temperatures from −25° to 500° C.* (Rev. Sci. Insts., *2*, pp. 458–465, August 1931.)

89. BEATTIE, JAMES A. and EDEL, W. L. *Uber Messungen mit der Kolbendruckwaage. I. Der Einfluss des Druckes auf die Waagenkonstante.* (Annalen der Physik 11, 633–644, December 1931.)

90. BEATTIE, JAMES A. and BRIDGEMAN, O. C. *Uber Messungen mit der Kolbendruckwaage. II. Einfluss von Alterung und Oliviskosität auf die Waagenkonstante; Beziehung zwischen dem wirksamen und dem wirklichen Durchmesser des Kolbens.* (Annalen der Physik *12*, pp. 827–836, April 1932.)

91. DAVIS, TENNEY L. *Boyle's Conception of Element Compared with that of Lavoisier.* (Isis, *16*, pp. 82–91, July 1931.)

92. DAVIS, TENNEY L. *The Mirror of Alchemy of Roger Bacon — translated into English.* (Jour. Chem. Education, *8*, pp. 1945–1953, October 1931.)

93. DAVIS, TENNEY L. *School — Go Slow.* (The Wiley Bulletin, December 1931.)

94. DAVIS, TENNEY L. *Science and the Purposes of Life.* (Tech. Rev., *34*, pp. 317–319, May 1932.)

95. DAVIS, TENNEY L. and ELDERFIELD, ROBERT C. *The Determination of the Ionization Constants of Guanidine and Some of its Alkylated Derivatives.* (J. Am. Chem. Soc. *54*, pp. 1499–1503, April 1932.)

96. DAVIS, TENNEY L. and WU, L-C. *T'ao Hung-ching.* (J. Chem. Education, *9*, pp. 859–862, May 1932.)

97. EISEMAN, BERNARD J., JR. *Absorption Spectra at High Pressures and at Low Temperatures; the Transparency of Argon and Methane.* (J. Am. Chem. Soc. *54*, pp. 1778–1782, May 1932.)

98. EISEMAN, BERNARD J., JR. and HARRIS, L. *The transmission of Liquid Carbon Dioxide.* (J. Am. Chem. Soc. *54*, pp. 1782–1784, May 1932.)

99. GILLESPIE, LOUIS J. and GERRY, H. T. *Densities, and Partial Molal Volumes of Ammonia, for the Ammines of Calcium and Barium Chlorides.* (J. Am. Chem. Soc. *53*, pp. 3962–3968, November 1931.)

100. GERRY, HAROLD T. and GILLESPIE, L. J. *The Calculation of Normal Vapor Pressures from the Data of the Gas Current Method, Particularly in the Case of Iodine.* (Phys. Rev. *40*, pp. 269–280, April 1932.)

101. GILL, AUGUSTUS H. and VAALA, G. T. *Do Peanut-Fed Hogs yield Lard containing Arachidic Acid.* (Science *74*, p. 548, September 1931.)

102. GILL, AUGUSTUS H. and EBERSOLE, F. *Action of Negative Catalysts with Red Oil.* (Ind. Eng. Chem. *23*, p. 1304, November 1931.)

103. GILLESPIE, LOUIS J. and AMBROSE, H. A. *The Heat of Absorption of Hydrogen by Palladium at 0°.* (J. Phys. Chem. *35*, pp. 3105–3110, November 1931.)

104. GILLESPIE, LOUIS J. and PERRY, J. H. *An Exceptional Isotherm at 0° of the System: Palladium Hydrogen.* (J. Phys. Chem. *35*, pp. 3367–3370, November 1931.)

105. GILLESPIE, LOUIS J. *Physical Chemistry. An Elementary Text. Primarily for Biological and Pre-Medical Students.* (McGraw-Hill Book Co., 287 pages, October 1931.)

106. GILLESPIE, LOUIS J. and LIU, T. H. *The Reputed Dehydrogenation of Hydroquinone by Palladium Black.* (J. Am. Chem. Soc. *53*, pp. 3969–3972, November 1931.)

107. GILLESPIE, LOUIS J. and LURIE, E. *Vapor Pressure and Latent Heats for the System: $BaCl_2$ 8 NH_3 — $BaCl_2$ — NH_3.* (J. Am. Chem. Soc. *53*, pp. 2978–2983, August 1931.)

108. HALL, WILLIAM T. *History of Chemistry. Second Edition. A revision of the text of the late F. J. Moore containing a biographical sketch of Dr. Moore.* (McGraw-Hill Book Company, Inc., N. Y.)

109. HALL, WILLIAM T. *Analytical Chemistry Vol. I. Quantitative Analysis Based on the German Text of F. P. Treadwell. Eighth Edition.* (John Wiley & Sons, New York, January 1932.)

110. HERSHBERG, E. B. and HUNTRESS, E. H. *A Precision Sodium Cutter.* (Ind. Eng. Chem., Anal. Ed. *4*, 100–101, January 1932.)

111. HUNTRESS, ERNEST H. and HERSHBERG, E. B. and CLIFF, I. S. *The Preparation of Fluorenone from Fluorene and from Diphenic Acid.* (J. Am. Chem. Soc. *53*, pp. 2720–2724, July 1931.)

112. HUNTRESS, ERNEST H. and CLIFF, I. S. *The Preparation of Substituted Fluorenones.* (J. Am. Chem. Soc. *54*, 826–828, February 1932.)

113. MULLIKEN, SAMUEL P. and HUNTRESS, E. H. *A Systematic Course of Instruction in Organic Qualitative Analysis.* (Copyrighted February 8, 1932 and privately printed. 183 pages.)

114. KEYES, FREDERICK G. *High Pressure Technic.* (Ind. and Eng. Chem. *23*, pp. 1375–1386, 1931.)

115. KEYES, FREDERICK G. *Note on the Kelvin Scale Temperature of Freezing Water.* (Proc. Am. Acad. Arts and Sci. *66*, pp. 349–355, 1931.)

116. KEYES, FREDERICK G. and SMITH, L. B. *Progress in Steam Research: Work at the Massachusetts Institute of Technology I.* (Mech. Eng. *54*, pp. 123–124, 1932.)

117. KEYES, FREDERICK G. and SMITH, L. B. *Progress in Steam Research: Work at the Massachusetts Institute of Technology II.* (Mech. Eng. *54*, pp. 125–126, 1932.)

118. KEYES, FREDERICK G. and KIRKWOOD, J. G. *The Second Virial Coefficient.* (Phys. Rev. *38*, pp. 576–577, August 1931.)

119. KEYES, F. G. and COLLINS, S. C. *The Pressure Variation of the Heat Function as a Direct Measure of the Van der Waals Forces.* (Proc. Nat. Acad. Sci. *18*, pp. 328–333, April 1932.)

120. KIRKWOOD, JOHN G. *Einfluss der Quantisierung auf die Berechnung von Virialkoeffizienten.* (Physikalische Zeitschrift, *33*, pp. 39–43, January 1932.)

121. KIRKWOOD, JOHN G. *Polarisierbarkeiten, Suszeptibilitäten und Van der Waalssche Kräfte der Atome mit mehreren Elektronen.* (Physikalische Zeitschrift *33*, pp. 57–60, February 1932.)

122. KIRKWOOD, JOHN G. *Quantenmechanische Berechnung der Konstanten einiger polarer Moleküle.* (Physikalische Zeitschrift *33*, pp. 259–265, April 1932.)

123. KIRKWOOD, JOHN G. and SCATCHARD, G. *Das Verhalten von Zwitterionen und von mehrwertigen Ionen mit weit entfernten Ladungen in Elektrolytlösungen.* (Physikalische Zeitschrift *33*, pp. 297–300, April 1932.)

124. LAMBERT, RAYMOND H. and GILLESPIE, L. J. *Heats of Neutralization at Constant Concentration and the Heat of Ionization of Water.* (J. Am. Chem. Soc. *53*, pp. 2632–2639, July 1931.)

125. MILAS, NICHOLAS A. *Auto-Oxidation.* (Chem. Reviews, *10*, pp. 295–364, April 1932.)

126. MILLARD, EARL B. *Physical Chemistry for Colleges. Third edition.* (McGraw-Hill Co., July 1931.)

127. MORTON, AVERY A. and STEVENS, JOSEPH R. *Condensations by Sodium instead of by the Grignard Reaction. I. Tertiary Carbinols.* (J. Am. Chem. Soc. *53*, p. 2244, June 1931.)

128. MORTON, AVERY A. and STEVENS, JOSEPH R. *Condensations by Sodium instead of by the Grignard Reaction. II. Reactions with Benzonitrule. Preparation of Diphenylketazine.* (J. Am. Chem. Soc. *53*, p. 2769, July 8, 1931.)

129. MORTON, AVERY A. and STEVENS, JOSEPH R. *Condensations by Sodium instead of by the Grignard Reaction. III. Tertiary Carbinols and Acids.* (J. Am. Chem. Soc. *53*, p. 4028, November 5, 1931.)

130. MORTON, AVERY A. and STEVENS, JOSEPH R. *Condensations by Sodium instead of by the Grignard Reaction. IV. The Probable Existence of a New Intermediate, "Metal Halyl" in the Reaction.* (J. Am. Chem. Soc. *54*, p. 1919, May 7, 1932.)

131. NORRIS, JAMES F. and THOMSON, G. *Significant Temperatures in the Pyrolysis of Certain Pentanes and Pentenes.* (J. Am. Chem. Soc. *53*, p. 3108, September, 1931.)

132. NORRIS, JAMES F. *Research and Industrial Organic Chemistry. Address of the Retiring Chairman of Section C, American Association for the Advancement of Science.* (Science, *75*, No. 1931, January 1932.)

133. NORRIS, JAMES F. *The Principles of Organic Chemistry, Third Edition.* (McGraw-Hill Book Company, Inc., N. Y., 1931.)

134. NORRIS, JAMES F. and RIGBY, G. W. *The Reactivity of Atoms and Groups in Organic Compounds. XII. The Preparation and Properties of Mixed Aliphatic Ethers with Special Reference to Those Containing the Tert.-Butyl Radical.* (J. Am. Chem. Soc. *54*, p. 2088, May 1932.)

135. SALSTROM, EDWARD J. *Thermodynamic Properties of Fused Salt Solutions. IV. Potassium Bromide in Silver Bromide.* (J. Am. Chem. Soc. *53*, p. 3385, September 1931.)

136. SCATCHARD, GEORGE. *Interatomic Forces in Binary Alloys.* (J. Am. Chem. Soc. *53*, pp. 3186–3187, August 1931.)

137. SCATCHARD, GEORGE. *Die Anwendung der Debyeschen Elektrolyttheorie auf konzentrierte Lösungen.* (Physikalische Zeitschrift *33*, pp. 22–32, January 1932.)

138. SCATCHARD, GEORGE. *The Effect of the Forces between Solvent Molecules on the Properties of Electrolyte Solutions.* ([Part of book "Chemistry at the Centenary Meeting of the British Association for the Advancement of Science.") (W. Heffer and Sons, Ltd., Cambridge, England, pp. 70–72, January 1932.)

139. SCATCHARD, GEORGE. *Statistical Mechanics and Reaction Rates in Liquid Solutions.* (Chem. Reviews, *10*, pp. 229–240, February 1932.)

140. SCHUMB, WALTER C. and GAMBLE, E. LEE. *Hexaflurodisilane.* (J. Am. Chem. Soc. *53*, p. 3191, August 1931.)

141. SCHUMB, WALTER C. *Hexafluorodisilane.* (J. Am. Chem. Soc. *54*, p. 583, February 1932.)

142. SEWARD, RALPH P. and HAMBLET, CLEMENT H. *Activity Coefficients of Salts in Acetic Acid Solutions from Solubility Measurements.* (J. Am. Chem. Soc. *54*, p. 554, February 1932.)

143. SHERRILL, MILES S. and LYONS, E. H., Jr. *The Comparative Ionization of Selenic and Sulfuric Acids.* (J. Am. Chem. Soc. *54*, pp. 979–984, March 1932.)

144. TEETER, CHARLES E., JR. *Free Energies of Formation and Heats of Formation of Thallium Amalgams.* (J. Am. Chem. Soc. *53*, pp. 3917–3927, 1931.)

145. TEETER, CHARLES E., JR. *Heats of Solution, Heats of Formation, and Free Energies of Formation of Cadmium Amalgams.* (J. Am. Chem. Soc. *53*, pp. 3927–3940, 1931.)

146. THOMSON, GEORGE and DAVIS, H. S. and CRANDALL, G. S. *The Role of Liquid Stationary Films in Batch Absorption of Gases. III. Rates of Hydrogen Absorption and Relative Rates of Catalytic Hydrogenation in Alcohol.* (J. Am. Chem. Soc. *54*, p. 2340, June 6, 1932.)

147. UNDERWOOD, HENRY W., JR. *Recent Uses of Catalysis.* (The Tech. Eng. News, *12*, p. 228, January 1932.)

148. YOUNG, RALPH C. *A Complex Cyanide of Trivalent Molybdenum.* (J. Am. Chem. Soc. *54*, p. 1402, April 6, 1932.)

DEPARTMENT OF CIVIL AND SANITARY ENGINEERING

149. BABCOCK, JOHN B. 3D. *Brief History of the Boston Society of Civil Engineers.* (J. Boston Soc. C. E. *18*, p. 301, October 1931.

150. BABCOCK, JOHN B. 3D. *Traffic and Operation of New England Railroads.* (Street Railway Bull. The N. E. Street Railway Club, *32*, p. 15, January 1932.)

151. BABCOCK, JOHN B. 3D. *Traffic and Operation of New England Railroads.* (J. Boston Soc. C. E. *19*, p. 28, February 1932.)

152. BARROWS, HAROLD K. *Discussion of "the Law of Interstate Waters and its application to the case of the Delaware River,"* by *Thaddeus Merriman.* (J., N. E. W. W. Assn. *45*, p. 245, September 1931.)

153. BARROWS, HAROLD K. *Velocity of Flow in Natural Streams.* (Trans. Am. Geophysical Union, p. 339, June, 1932.)

154. BARROWS, HAROLD K. *Desmond Fitzgerald.* (Dictionary of Am. Biography, *6*, p. 434, 1931.)

155. BREED, CHARLES B. *Railway Consolidation in New England.* (Street Railway Bulletin *32*, pp. 17–25, January 1932.)

156. BREED, CHARLES B. *Railway Consolidation in New England.* (J. Boston Soc. C. E. *19*, pp. 42–59, February 1932.)

157. BREED, CHARLES B. *Biographical Sketch of Professor C. Frank Allen.* (J. Boston Soc. C. E. *19*, pp. 348–351, June 1932.)

158. BREED, CHARLES B. and HOSMER, GEORGE L. *The Principles and Practice of Surveying, Vol. I, Elementary.* (Sixth Edition, 716 pp., John Wiley & Sons, Inc., New York, 1931.)

159. CAMP, THOMAS R. *Water Treatment.* (Proceedings — Sixth Conference Mass. State Assn. Master Plumbers, M. I. T., pp. 119–43, February 1932.)

160. CAMP, THOMAS R. *Hydraulics of Sewer Transitions.* (J. Boston Soc. C. E. *19*, pp. 325–44, June 1932.)

161. DRISKO, JOHN B. *Model Research in the River Hydraulic Laboratory of the Massachusetts Institute of Technology.* (Nat. Res. Council Trans. Am. Geophysical Union — Thirteenth Annual Meeting — 1932, p. 384, June 1932.)

162. GILBOY, GLENNON. *Soil Mechanics Research.* (Proc. Am. Soc. C. E. *57*, pp. 1165–1188, October 1931.)

163. ROCHE, EDWARD C. *Plumbing Research at the Massachusetts Institute of Technology.* (Proceedings — Sixth Conference Mass. State Assn. Master Plumbers, M. I. T. pp. 56–76, February 1932.)

164. ROUSE, HUNTER. *Research Institute for Hydraulic Engineering and Water Power.* (Trans. A. S. M. E. Hydraulics, *54*, p. 27, May 15, 1932.)

165. SPOFFORD, CHARLES M. *Lake Champlain Bridge.* (Proc., Am. Soc. C. E. *57*, pp. 1467–1499, December 1931.)

166. SPOFFORD, CHARLES M. *"Economic Proportions and Weights of Modern Highway. Cantilever Bridges," by J. A. L. Waddell.* (Proc., Am. Soc. C. E. *58*, pp. 887–889, May 1932.)

DEPARTMENT OF ECONOMICS

167. DEWEY, DAVIS R. *Financial History of the United States. Eleventh edition.* (Longmans, Green, pp. xxxvii, 581, 1931.)

168. DEWEY, DAVIS R. *William M. Gouge.* (Dictionary of American Biography *7*, pp. 444–5, 1931.)

169. DEWEY, DAVIS R. *Wildcat Banks.* (Encyclopedia of the Social Sciences, *2*, pp. 454–455, September 1930.)

170. DEWEY, DAVIS R. *Bills of Credit.* (Encyclopedia of the Social Sciences, *2*, pp. 542–544, September 1930.)

171. DEWEY, DAVIS R. *George Gunton.* (Dictionary of American Biography, *8*, pp. 55–56, 1932.)

DEPARTMENT OF ELECTRICAL ENGINEERING

172. BARROW, W. L. *Untersuchungen ueber den Heulsummer.* (Annalen der Physik, *11*, pp. 147–176, September 1931.)

173. BARROW, W. L. *On Interference Elimination with the Warble Tone.* (J. Acous. Soc. of Am. *3*, pp. 562–578, April 1932.)

174. BENNETT, RALPH D. and COMPTON, A. H. and STEARNS, J. C. *Ionization as Function of Pressure and Temperature.* (Phys. Rev. *38*, p. 1565, October 15, 1931.)

175. BENNETT, RALPH D. and COMPTON, A. H. and STEARNS, J. C. *The Constancy of Cosmic Rays.* (Phys. Rev. *38*, p. 1566, October 1931.)

176. BENNETT, RALPH D. and COMPTON, A. H. and STEARNS, J. C. *Ionization by Penetrating Radiation as a Function of Pressure and Temperature.* (Phys. Rev. *39*, p. 873, March 1932.)

177. BENNETT, RALPH D. *Prospecting for the Cosmic Ray.* (The Tech. Eng. News, *13*, p. 73, May 1932.)

178. BRUNE, OTTO. *Synthesis of a Finite Two-Terminal Network whose Driving-Point Impedance is a Prescribed Function of Frequency.* (J. Math. and Phys. *10*, p. 191, August 1931.)

179. BUSH, VANNEVAR. *The Differential Analyzer. A New Machine for Solving Differential Equations.* (J. Franklin Inst. *212*, pp. 447–488, October 1931.)

180. BUSH, VANNEVAR and CALDWELL, SAMUEL H. *Thomas-Fermi Equation Solution by the Differential Analyzer.* (Phys. Rev. *38*, p. 1898, November 1931.)

181. CALDWELL, SAMUEL H. and HAZEN, H. L. *Miniature Power Systems, How Vast Electrical Transmission Networks are Duplicated and Studied in a Laboratory.* (Tech. Rev. *33*, p. 452, July 1931.)

182. CALDWELL, SAMUEL H. and OLER, C. B. and PETERS, J. C., JR. *An Improved Form of Electrocardiograph.* (The Rev. Sci. Inst. *3*, pp. 277–286, June 1932.)

183. CHINN, HOWARD A. *Standard Frequency Station WIXP.* (QST, *15*, pp. 27–36, January 1931.)

184. CHINN, HOWARD A. *A New Type of Peaked Audio Amplifier.* (QST, *15*, pp. 21–23, February 1931.)

185. CHINN, HOWARD A. *A High Frequency Converter with Single Dial Control.* (QST, *15*, pp. 9–15, June 1931.)

186. DAHL, GUSTAV C. *Samkjring av Kraftanlegg. Nogen bemerkninger angaende stabilitetsproblemet. Parallel Operation of Power Systems. Some remarks on the stability problem.* (Elektroteknisk Tidsskrift *45*, pp. 133–139; 147–152, April and May 1932.) (Teknisk Ukeblad, *79*, pp. 131–132, March 1932.)

187. DWIGHT, HERBERT B. *Proximity Effect in Cable Sheaths.* (Trans. A. I. E. E. *50*, p. 993, September 1931.)

188. DWIGHT, HERBERT B. *Ground Rods and Antennae.* (The Electrician, London, *107*, p. 426, September 1931.)

189. DWIGHT, HERBERT B. *Group Resistances of Ground Rods.* (Electrical World, *98*, p. 421, September 1931.)

190. FAY, RICHARD D. *Plane Sound Waves of Finite Amplitude.* (J. Acous. Soc. of Am. *3*, p. 222, October 1931.)

191. FRAZIER, RICHARD H. *A Precision Method for Determining the Thermal Diffusivity of Solids.* (Phys. Rev. *39*, p. 515, February 1932.)

192. FRAZIER, RICHARD H. *Further Data on the Thermal Diffusivity of Nickel.* (Phys. Rev. *40*, p. 592, May 1932.)

193. GRAY, T. S. *A Photo-Electric Integraph.* (J. Franklin Inst. *212*, July 1931.)

194. HOUGHTON, H. G. *The Transmission of Visible Light Through Fog.* (Phys. Rev. *38*, July 1, 1931.)

195. HOWITT, NATHAN. *Group Theory and the Electric Circuit.* (The Phys. Rev. *37*, p. 1583, June 1931.)

196. KEAR, F. G. and WINTERMUTE, G. H. *A Simultaneous Radiotelephone and Visual Range Beacon for the Airways.* (Bureau of Standards Jour. of Res. *7*, August 1931.)

197. HALL, WILLIAM M. *Comments on the Theory of Horns.* (J. Acous. Soc. of Am. *3*, pp. 552–561, April 1932.)

198. HAZEN, HAROLD L. *Working Mathematics by Machinery.* (Tech. Rev. *34*, p. 323, May 1932.)

199. HENDRICKS, PAUL S. *The Standard Frequency Transmitter at WlXP.* (QST, *15*, pp. 19–25; 29–33, August and September 1931.)

200. HOUGHTON, H. G. *The Size and Size Distribution of Fog Particles.* (Physics *2*, pp. 467–475, June 1932.)

201. JACKSON, DUGALD C. *University Stepping-Stones.* (Sigma Xi Quarterly *19*, pp. 92–98, April 1931.)

202. JACKSON, DUGALD C. *The Function of Research in Engineering Education.* (Science, *74*, pp. 183–187, August 1931.)

203. JACKSON, DUGALD C. *To Promote Research.* (Res. Lab. Record, November 1931.)

204. JACKSON, DUGALD C. *Our Debt to Faraday's Epoch.* (Science, *75*, pp. 230–232, February 26, 1932.)

205. JACKSON, DUGALD C. *The University Laboratory as Partner of Industry.* (Ch. IX of book "Profitable Practice in Industrial Research," Harper's, publishers. 269 pp. 173–181, April 1932.)

206. JACKSON, DUGALD C. and MORELAND, EDW. L. *Major Features of the Lackawanna Electrification.* (General Electric Review, *34*, pp. 597–598, November 1931.

MAYNARD, KATHARINE. (See under *Institute Library.*)

207. STRATTON, J. A. and HOUGHTON, H. G. *A Theoretical Investigation of the Transmission of Light Through Fog.* (Phys. Rev., *38*, pp. 159–165, July 1, 1931.) July 1, 1931.)

208. TIMBIE, WILLIAM H. and MOON, PARRY H. *Illumination of Buildings and Electric Wiring. Revision of Chapters 33 and 34.* (Kidder-Parkers' Architects and Builders' Handbook, 18th Edition, July 1931.)

209. TIMBIE, WILLIAM H. *Essentials of Electricity, Second Edition.* (John Wiley & Sons, 302 pages, September 1931.)

210. TIMBIE, W. H. *Il Grande Problema Dell'Instruzione Tecnica.* (L'Elettrotecnica, Gionale ed Atti Dell'Associazione Ellettrotecnica Italiana, *18*, p. 347, Maggio 1931.)

211. TIMBIE, WILLIAM H. *Selection and Admission of Applicants for Entrance to Engineering Colleges.* (J. Eng. Education, *22*, p. 448, February 1932.)

212. TUCKER, CARLTON E. *Sect. 28 "Electrical Measurements," pp. 757–791 of O'Rourke "General Engineering Handbook."* (McGraw-Hill Book Co., March 1932.)

213. WILDES, KARL L. *Coördination between College Work and Industry.* (J. Eng. Education, *22*, p. 660, April 1932.)

DEPARTMENT OF ENGLISH

214. FASSETT, FREDERICK G., JR. and EATON, PAUL C. *Practical Writing.* (Houghton, Mifflin Co., Boston 1931.)

215. FASSETT, FREDERICK G., JR. and EATON, PAUL C. *Studies in Reading.* (Houghton, Mifflin Co., Boston.)

216. WATSON, ARTHUR C. *A Voyage on the Sealer Emeline.* (N. Y. Zoölogical Soc., September 1931.)

DEPARTMENT OF FUEL AND GAS ENGINEERING

217. HOTTEL, H. C. and BROUGHTON, F. P. *Determination of True Temperature and Total Radiation from Luminous Gas Flames.* (Ind. Eng. Chem. Anal., Edition *4*, p. 166, April 1932.)

218. HOTTEL, H. C. and LOBO, W. E. and WILSON, D. W. *Heat Transmission in Radiant Sections of Tube Stills.* (Ind. Eng. Chem. *24*, p. 486, May 1932.)

219. MANGELSDORF, T. A. and DICKINSON, A. H. *Fuels and Fuel Utilization.* (Mech. Eng. *53*, pp. 892–3, December 1931.)

220. POOLE, J. W., FAHENSTOCK, F. C., KRALL, E. L., MURRAY, W. C. and WILSON, R. M. *Solubilities of Oils and Waxes in Organic Solvents II.* (Ind. Eng. Chem., *23*, p. 170.)

DEPARTMENT OF GEOLOGY

221. BUERGER, MARTIN J. *The Chemical Identification of Solids by Crystallography.* (The Tech. Eng. News, p. 154, October 1931.)

222. BUERGER, MARTIN J. *The Crystal Structure of Marcasite.* (Am. Mineralogist, *16*, 9, pp. 361–395, September 1931.)

223. BUERGER, MARTIN J. *The Significance of "Block Structure" in Crystals.* (Am. Mineralogist *17*, 5, pp. 177–191, May 1932.)

224. BUERGER, MARTIN J. *The Negative Crystal Cavities of Certain Galena and their Brine Content.* (Am. Mineralogist *17*, 6 pp. 228–233, June 1932.)

225. BUERGER, MARTIN J. *The Crystal Structure of Löllingite, $FeAs_2$.* (Zeitschrift für Kristallographie (A), Bd. 82, Heft 3/4, May 1932.)

226. LINDGREN, W. and ABBOTT, A. C. *The Silver Tin Deposits of Oruro, Bolivia.* (Econ. Geology *26*, 5, pp. 453–479, August 1931.)

227. LINDGREN, W. and NEWHOUSE, W. H. and others. *Criteria of Age Relations of Minerals.* (Econ. Geology *26*, 6, pp. 561–610, September 1931.)

228. LINDGREN, WALDEMAR. *Annotated Bibliography of Economic Geology for 1930.* (Econ. Geol. Pub. Co. *3*, 2, 194 pp. July 1931.)

229. LINDGREN, WALDEMAR. *Annotated Bibliography of Economic Geology for 1931.* (Econ. Geol. Pub. Co. *4*, 1, 189 pp. January 1932.)

230. MORRIS, FREDERICK K. *The Manchurian Triangle — Its Physical Background.* (The Tech. Eng. News, pp. 205–206, December 1931.)

231. MORRIS, FREDERICK K. and BERKEY, CHARLES P. *Relations of the Jisu Honguer Formation to the General Geology of Mongolia.* (Natural History of Mongolia, *4*, pp. 12–34, Putnam, 1931.)

232. NEWHOUSE, W. H. *A Pyrrhotite — Cubanite — Chalcopyrite Intergrowth from the Frood Mine, Sudbury, Ontario.* (Am.Mineralogist *16*, pp. 334–337, 1931.

HUMANICS

233. MAGOUN, F. ALEXANDER and HODGINS, ERIC F. *A History of Aircraft.* (McGraw-Hill Book Co., 467 pages, August 1931.)

234. MAGOUN, F. ALEXANDER and HODGINS, ERIC F. *Behemoth: The Story of Power.* (Doubleday, Doran and Co., 338 pages, March 1932.)

235. MAGOUN, F. ALEXANDER. *Man as an Engineer.* (Shuman, Chicago — The New Wonder World, *4*, April 1932.)

236. MAGOUN, F. ALEXANDER. *Elements of Human Engineering.* (Macmillan, April 1932.)

DEPARTMENT OF MATHEMATICS

237. DOUGLAS, JESSE. *The Mapping Theorem of Koebe and the Problem of Plateau.* (J. Math. and Phys. *10*, pp. 106–130, July 1931.)

238. DOUGLAS, JESSE. *The Problem of Plateau for Two Contours.* (J. Math. and Phys. *10*, pp. 315–359, December 1931.)

239. DOUGLAS, JESSE. *Systems of K-Dimensional Manifolds in an N-Dimensional Space.* (Mathematische Annalen 105, pp. 707–733, December 1931.)

240. DOUGLAS, JESSE. *Seven Theorems in the Problem of Plateau.* (Proceedings of the National Academy of Sciences, *18*, pp. 83–85, January 1932.)

241. DOUGLASS, RAYMOND D. *Stirling Expansions Derived by Means of Finite de la Vallée-Poussin Summation.* (J. Math. and Phys. *10*, 2, pp. 131, July 1931.)

242. FRANKLIN, PHILIP and MOORE, C. L. E. *Geodesics of Pfaffians.* (J. Math. and Phys. *10*, pp. 157–190, October 1931.)

243. FRANKLIN, PHILIP. *Algebraic Matric Equations.* (J. Math. and Phys. *10*, pp. 289–314, March 1932.)

244. FRANKLIN, PHILIP and MOORE, C. L. E. *Dual Pfaffians.* (J. Math. and Phys., *11*, pp. 12–26, March 1932.)

245. MOORE, C. L. E. and FRANKLIN, PHILIP. *Pfaffians in Parametric Form.* (J. Math. and Phys. *10*, pp. 95–105, September 1931.)

246. RICE, LEPINE H. *The rank of a matrix, the value of a determinant, and the solution of a system of linear equations.* (J. Math. and Phys. *11*, p. 146, June 1932.)

247. RUTLEDGE, GEORGE. *Reliable Method of Obtaining the Derivative Function from Smoothed Data of Observation.* (Phys. Rev. *40*, pp. 262–268, April 1932.)

248. RUTLEDGE, GEORGE. *The Inverse Matrix for de la Vallée-Poussin Summation.* (J. Math. and Phys. *11*, pp. 73–82, March 1932.)

249. STRUIK, D. J. *Het Woord "Millioen" in oude Nederlandsche Rekenboeken.* (Tijdschrift voor Nederlandsche Taal — en Letterkunde, *50*, pp. 173–180, 1930.)

250. STRUIK, D. J. *Kepler as a Mathematician.* (Hist. of Sci. Soc. with the Am. Assoc. Adv. of Sci., Baltimore, Williams and Wilkins, 1931.)

DEPARTMENT OF MECHANICAL ENGINEERING

251. BERRY, CHARLES W. *Temperature of Formation of an Epi-thermal Ore Deposit.* (Bull. Inst. Min. and Met. *333*, pp. 13–18, June 1932.)

252. BUCKINGHAM, EARLE. *Dynamic Loads on Gear Teeth.* (A. S. M. E. Research Publication, 72 pp., October 1931.)

253. BUCKINGHAM, EARLE. *How much Power should Gears Transmit?* (Machinery, October 1931.)

254. BUCKINGHAM, EARLE. *Stirnrader Mit Geraden Zahnen.* (Translated by Georg Olah.) (Julius Springer, Berlin, 456 pp., 1932.)

255. HAVEN, GEORGE B. *Mechanical Fabrics. Textbook.* (John Wiley & Sons, N. Y., 903 pages, January 1932.)

256. HAYWARD, HARRISON W. *Mills, Materials of Construction.* (Edited by H. W. Hayward.)

257. HENCKY, HEINRICH. *On a Simple Model Explaining the Hardening Effect in Poly-Crystalline Metals.* (Jour. of Rheology, *3*, 1, pp. 30–36, January 1932.)

258. HOLT, JAMES. *Warm Air Heating.* (Proc. Fifth Two-Day Conference Mass. State Assoc. Master Plumbers and the Mass. Sanitary Club, February 1931.)

259. HOLT, JAMES. *Ventilation for Comfort.* (The Fog Horn, pub. by Parks-Cramer Co., October 1931.)

260. JAMES, WALTER H. and MACKENZIE, MALCOLM C. and SLOANE, ALVIN. *Working Drawings of Machinery* (1931.)

261. SCHWARZ, EDWARD R. *Micro-analysis of Fabrics.* (Textile World, July 1931.)

262. SCHWARZ, EDWARD R. *Wool, Woolens, and Worsteds Through the Microscope.* (Melliand Textile Monthly, *3*, *4*, p. 289, July 1931.)

263. SCHWARZ, EDWARD R. *Simplified Technique for the Preparation of Stereoscopic Photomicrographs.* (Am. Dyestuff Reporter, July 1931.)

264. SCHWARZ, EDWARD R. *The Microscope as a Valuable Asset to the Textile Manufacturer and Finisher.* (Textile World, August 1931.)

265. SCHWARZ, EDWARD R. *Engineering the Fire Alarm.* (The Tech. Eng. News, November 1931.)

266. SCHWARZ, EDWARD R. *Textile Research Abstracts.* (Bull. U. S. Inst. Textile Res. *1*, *2*, 6, July 1931–June 1932 incl.)

267. SCHWARZ, EDWARD R. *Stretch in Test Specimens.* (Fiber and Fabric, June 1931.)

268. SCHWARZ, EDWARD R. *Mill Control Laboratories.* (The Fog Horn, Parks-Cramer Co., pp. 1–10, December 1931.)

269. SCHWARZ, EDWARD R. *The Mill Laboratory — A Production Tool.* (The Fog Horn, Parks-Cramer Co., February 1932.)

270. SCHWARZ, Edward R. *Micro-analysis of Fibers.* (Textile World, January and May 1932.)

271. SCHWARZ, EDWARD R. *Studying Twist in Yarn.* (Cotton, pp. 34–36, March 1932.)

272. SCHWARZ, EDWARD R. *The Microscope and Fundamental Textile Research.* (Am. Dyestuff Reporter, January 1932.)

273. SCHWARZ, EDWARD R. *Industrial Safety Engineering.* (Proc. Sixth Annual Conf. Mass. State Assoc. Master Plumbers, pp. 47–55, February 1932.)

274. SPANNHAKE, WILHELM. *Cavitation and Its Influence on Hydraulic Turbine Design.* (N. E. L. A. Publication 222, June 1932.)

275. SPANNHAKE, WILHELM. *Mitteilungen des Instituts für Strömungs maschinen der Technischen Hochschule Karlsruhe II. Heft.* (Kommissions-Verlag des V. D. I. — Verlag, Berlin 1932.)

DEPARTMENT OF MILITARY SCIENCE AND TACTICS

276. HARWOOD, EDWARD C. *The Disposition Board.* (The Military Engineer, *23*, p. 424, September-October 1931.)

277. HARWOOD, EDWARD C. *A New Opportunity in the Automotive Field.* (Auto. Industries, p. 1, October 1931.)

278. HARWOOD, EDWARD C. *The Real Estate Problem from the Banker's Point of View.* (The Bankers Magazine, *123*, p. 583, November 1931.)

279. HARWOOD, EDWARD C. *Is Deflation Nearly Completed?* (Barron's, p. 3, December 1931.)

280. HARWOOD, EDWARD C. *Effects of Currency Hoarding.* (Barron's, p. 3, February 1932.)

281. HARWOOD, EDWARD C. *The Mechanism of the Deflation and Recovery Phases of the Business Cycle.* (The Annalist, *40*, p. 707, April 1932.)

282. HARWOOD, EDWARD C. *Trade and Credit Inflation, Cyclical Crisis and Recovery after Deflation.* (The Annalist, *40*, p. 739, April 1932.)

283. HARWOOD, EDWARD C. *Bold Action Justified.* (Barron's, p. 3, April 1932.)

284. OTTOSEN, PETER H. *Trench Artillery, A. E. F.* (Lothrop, Lee and Shepard Co., Boston.)

DEPARTMENT OF MINING AND METALLURGY

285. LOCKE, CHARLES E. and RICHARDS, ROBERT H. *Progress in Ore Dressing and Coal Preparation in 1930.* (The Min. Ind. during 1930, *39*, pp. 671–724, 1931.)

286. LOCKE, CHARLES E. *Report of Milling Sessions.* (Min. and Met. *13*, pp. 119–120, March 1932.)

287. LOCKE, CHARLES E. *Mineral Dressing.* (Min. and Met. *13*, pp. 25–27, January 1932.)

288. LOCKE, CHARLES E. *Mining and Ore Dressing.* (The Am. Year Book, Record of the year 1931, pp. 430–433, 1932.)

289. NORTON, JOHN T. and HILLER, ROBERT E. *Structure of Cold Drawn Tubing.* (Trans. of Am. Inst. Min. and Met. Eng., Inst. of Metals Div. *99*, p. 190, 1932.)

290. WATERHOUSE, GEORGE B. *The Bessemer Process.* (Year Book, Am. Iron and Steel Inst. 1931, pp. 378–381, also Iron Age, *128*, pp. 1308, 1309. 1931.)

DEPARTMENT OF NAVAL ARCHITECTURE AND MARINE ENGINEERING

291. HOVGAARD, WILLIAM. *Die Spannungsverteilung in Schweissungen.* (Zeitschrift für Angewandte Mathematik und Mechanik, *2*, pp. 341–348, October 1931.)

292. HOVGAARD, WILLIAM. *Determination of Stresses in Plating from Strain Measurements.* (Trans. Soc. Naval Architects and Marine Engineers, N. Y. *39*, pp. 25–34, 1931.)

DEPARTMENT OF PHYSICS

293. ALBERTSON, WALTER EDWARD. *On the Classification of Certain Lines of Radium.* (Phys. Rev. *39*, p. 385, January 1932.)

294. ALLIS, W. P. and MORSE, PHILIP M. *Theory of Scattering of Slow Electrons by Atoms.* (Zeitschrift für Physik, *70*, p. 567, 1931.)

295. BRYDEN, SAMUEL D., JR. *The Structure of the Nucleus and its Total Moment of Momentum.* (Phys. Rev., *38*, p. 1989, 1931.)

296. BRYDEN, SAMUEL D., JR. *Allowed Levels for Equivalent (s, p, d, f) Electrons with (jj) Coupling.* (Physical Review, *38*, pp. 1145–1147, 1931.)

297. BRYDEN, SAMUEL D., JR. *An Improved McLeod Gauge.* (Rev. of Scient, Inst. *2*, pp. 514–518, 1931.)

298. COMPTON, K. T. and VAN VOORHIS, C. C. *Accommodation Coefficients of Positive Ions of Argon, Neon and Helium.* (Phys. Rev. *37*, p. 1596, June 1931.)

299. COMPTON, KARL T. *Emission of Electrons from Metals.* (Jour. Western Soc. of Engrs. *36*, June 1931.)

300. DEBYE, P. and SEARS, FRANCIS W. *On the Scattering of Light by Supersonic Waves.* (Proc. Nat. Acad. Sci. *18*, pp. 409–414, June 1932.)

301. FRANK, NATHANIEL H. and YOUNG, L. A. *Transmission of Electrons through Potential Barriers.* (Phys. Rev. *38*, p. 80, July 1931.)

302. FRANK, NATHANIEL H. *Thermionic Emission and Space Charge.* (Phys. Rev. *39*, p. 226, January 1932.)

303. GINGRICH, NEWELL S. *Note on the New Effect Produced by Action of X-Rays on Matter.* (Phys. Rev. *39*, pp. 748–749, February 1932.)

304. HARDY, ARTHUR C. and PINEO, O. W. *A Simple Cine-Photomicrographic Apparatus.* (Jour. Soc. Motion Picture Engrs. *17*, 2 pp. 216–222, 1931.)

305. HARDY, ARTHUR C. and PINEO, O. W. *The Errors Due to the Finite Size of Holes and Sample in Integratin Spheres.* (Jour. Opt. Soc. of Am. *21*, 8, pp. 502–506, 1931.)

306. HARRISON, GEORGE R. *A Twenty-one Foot Vacuum Spectrograph for the Extreme Ultra-violet.* (Rev. Sci. Insts., *2*, 600, October 1931.)

307. HARRISON, GEORGE R. and JOHNSON, M. H., JR. *Intensity, Summation, Rules and Perturbation Effects in Complex Spectra.* (Phys. Rev. *38*, 757, August 1931.)

308. HARRISON, GEORGE R. and LEIGHTON, P. A. *Spectral Fluorescence Efficiencies of Certain Substances with Applications to Hetero-chromatic Photographic Photometry.* (Phys. Rev. *38*, p. 899, September 1931.)

309. IKEHARA, SHIKAO. *On Tauberian Theorems of Hardy and Littlewood and a Note on Wintner's Paper.* (J. Math. and Phys. *10*, No. 2, pp. 75–83, 1931.)

310. IKEHARA, SHIKAO. *On the Integral Functions with Real Negative Zeros.* (J. Math. and Phys. *10*, No. 2, pp. 84–91, 1931.)

311. IKEHARA, SHIKAO. *A Note on Infinite Products.* (Jour. Math. and Phys. *10*, 2, pp. 92–94, 1931.)

312. LUHR, OVERTON. *Mass of Positive Ions in a Glow Discharge.* (Phys. Rev. *38*, 1730, November 1931.)

313. MORSE, PHILIP M. and STUECKELBERG, E. C. G. *Lösung des Eigenwert problems eines Potential feldes mit zwei Minima.* (Helvetica Physica Acta, *4*, p. 337, August 1931.)

314. MORSE, PHILIP M. *Unelastische Streuung von Kathodenstrahlen.* (Physikalische Zeitschrift, *33*, p. 443, May 1932.)

315. MORSE, PHILIP M. *Quantum Mechanics of Collision Processes.* (Rev. Mod. Phys. *4*, p. 577, July 1932.)

316. MORTON, G. A. *Atomic Scattering Power of Copper and Oxygen in Cuprous Oxide.* (Phys. Rev. *38*, p. 41, 1931.)

317. PATTON, TEMPLE C. *Method and Charts for Determining Economical Thickness of Insulation.* (Heating, Piping and Air Conditioning, *4*, 1, p. 6, January 1932.)

318. PATTON, TEMPLE C. *Temperature Comparison Chart.* (Jour. Chem. Education, *9*, 6, June 1932.)

319. SERDUKE, JAMES T. *The Hall Effect in Solid Mercury.* (Phys. Rev. *39*, p. 831, March 1932.)

320. ROSEN, NATHAN. *Calculation of Interaction between Atoms with s-Electrons.* (Phys. Rev. *38*, p. 255, 1931.)

321. ROSEN, NATHAN. *The Normal State of the Hydrogen Molecule.* (Phys. Rev. *38*, p. 2099, 1931.)

322. SLATER, JOHN C. *The Quantum Theory of the Equation of State.* (Phys. Rev. *38*, pp. 237–242, July 1931.)

323. SLATER, JOHN C. *Note on the Structure of the Groups XO_3.* (Phys. Rev. *38*, pp. 325–329, July 1931.)

324. SLATER, JOHN C. *Molecular Energy Levels and Valence Bonds.* (Phys. Rev. *38*, pp. 1109–1144, September 1931.)

325. THOMPSON, M. DEKAY and CHARLES, W. E. *On the Effect of Mercury in Zinc Cyanide Plating Solutions.* (Trans. Electrochem. Soc. *60*, 123, September 1931.)

326. THOMPSON, M. DEKAY and KAYE, ALBERT L. *Hydrogen and Oxygen Overvoltages on Nickel-Iron Alloys.* (Trans. Electrochem. Soc. *60*, 229, September 1931.)

327. THOMPSON, M. DEKAY and MORRISSEY, R. B. *The Potentials of Ferromanganese and Ferrochromium Anodes at Different Current Densities and Hydrate Concentrations.* (Trans. Electrochem. Soc. *61*, p. 131, April 1932.)

328. THOMPSON, M. DEKAY. *Recent Developments in Nickel Plating.* (Metal Cleaning and Finishing, *3*, p. 625, August 1931.)

329. THOMPSON, M. DEKAY. *Electrochemistry.* (Nat. Res. Council Annual Rev. of Am. Chem. *6*, p. 134, May 1932.)

330. VALLARTA, MANUEL S. and ROSEN, N. *Relativity and the Uncertainty Principle.* (Phys. Rev. *40*, p. 569, May 1932.)

331. VAN DE GRAAFF, ROBERT J. *1,500,000 Volt Electrostatic Generator.* (Phys. Rev. *38*, p. 1919, November 1931.)

332. WARREN, BERTRAM E. and BISCOE, J. *The Crystal Structure of the Monoclinic Pyroxenes.* (Zeitschrift für Kristallographie, *30*, 5–6, p. 391, November 1931.)

333. WARREN, BERTRAM E. *Structure of Asbestos. An X-Ray Study.* (Ind. Eng. Chem. *24*, p. 419, April 1932.)

334. WILKES, GORDON B. *The Specific Heat of Magnesium and Aluminum Oxides at High Temperatures.* (J. Am. Chem. Soc., *15*, 1, pp. 72–77, January 1932.)

335. WULFF, JOHN C. and GREEN, J. B. *Hyperfine Structure in the Spectrum of Copper.* (Nature, *127*, 891, 1931.)

336. WULFF, JOHN C. and GREEN, J. B. *Der Paschen-Back Effekt der Hyperfernstruktin des Tl II.* (Zt. f. Physik, *9*, 10, p. 593, 1931.)

337. WULFF, JOHN C. and GREEN, J. B. *Hyperfine Structure of Tl II.* (Nature, September 1931.)

338. WULFF, JOHN C. and GREEN, J. B. *Paschen — Back Effect of Tl II and Tl III.* (Phys. Rev. *38*, 12, pp. 2176–2185, December 1931.)

339. WULFF, JOHN C. and GREEN, J. B. *Paschen — Back Effect of Hyperfine Structure of Bi II and Bi III.* (Phys. Rev. *38*, 12, pp. 2186–2192, December 1931.)

340. FRANK, NATHANIEL H. and YOUNG, L. A. *Temperature Dependance of Photoelectric Effect in Metals.* (Phys. Rev. *38*, p. 838, August 1931.)

DIVISION OF INDUSTRIAL COOPERATION

341. NORTON, FREDERICK H. and SHAW, D. T. H. *Absorption Spectra of Rare Earth Glazes.* (J. of Phys. Chem. XXXV, pp. 3480–3485, December 1931.)

342. NORTON, FREDERICK H. *The Use of Small Quick-Acting Kilns for Instruction and Research.* (J. Am. Cer. Soc. October 1931.)

343. NORTON, FREDERICK H. *Refractories.* (McGraw-Hill Book Co. 1931.)

344. NORTON, FREDERICK H. and ROMER, J. B. *New Creep Testing Apparatus at the Massachusetts Institute of Technology.* (Proc. A. S. T. M. *31*, p. 129.)

345. NORTON, FREDERICK H. and HODGDON, F. B. *Some Notes on the Nature of Clay.* (J. Am. Cer. Soc. p. 191, March 1932.)

346. NORTON, FREDERICK H. and DUPLIN, V. J., JR. *Color Formation in Vitreous Bodies.* (J. Am. Cer. Soc., p. 206, March 1932.)

347. NORTON, FREDERICK H. *New Insulating Firebrick.* (Tech. Rev. April 1932.)

348. NORTON, FREDERICK H. *Structural Materials for Modern Heat Technology.* (Chem. and Met. Eng. *39*, 4.)

349. NORTON, FREDERICK H. *Classification of Refractories.* (Fuels and Furnaces, June 1932.)

350. NORTON, FREDERICK H. *The Exeter Pottery.* (Antiques, July 1932.)

ADMINISTRATION

351. LOBDELL, H. E. *The Fastest Trains.* (Tech. Rev. *33*, pp. 235–237, February 1931.)

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353. MACKINNON, JOSEPH C. *Graduate Engineering Instruction.* (Tech. Rev. XXXIV, pp. 204–205, February 1932.)

THE INSTITUTE LIBRARY

354. MAYNARD, KATHARINE. *Some problems in bibliography.* (Special Libraries, *22*, pp. 397–402, November 1931.)

355. MAYNARD, KATHARINE. *Subject Headings for Technical Literature. Discussion of paper by Joshua E. Hannum.* (Special Libraries, *22*, pp. 368–369, October 1931.)

356. MAYNARD, KATHARINE. *Science in Early English Literature, 1550–1650.* (Isis, *17*, pp. 94–126, January 1932.)

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