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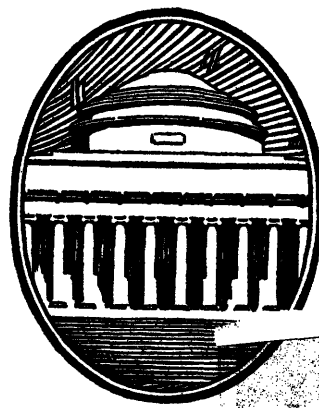

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President's Report

FOR THE YEAR ENDING JUNE 30, 1928

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[1]Address correspondence to Massachusetts Institute of Technology.

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REPORT OF THE PRESIDENT

TO THE MEMBERS OF THE CORPORATION:

In accordance with the by-laws of the Corporation, I have the honor to submit to you a report for the year ending June 30, 1928, covering changes in personnel, the more important points of progress in the work of the various departments, and reports of other administrative officers with reference to the work of their offices.

The Corporation has lost one member during the year. Mr. Howard Elliott died at his summer home in Dennis, Massachusetts, on July 8, 1928. He was elected a Life Member of the Corporation at its meeting on March 10, 1915. He served as a member of the Visiting Committee of the Department of Mechanical Engineering from the time of his election until October, 1926, and as a member of the Visiting Committee of the Department of Mathematics from October, 1918 until his death.

The term for which Messrs. Willis R. Whitney, Walter Humphreys and Charles R. Main were elected expired in June. In place of these retiring members, the Corporation elected Messrs. William E. Nickerson, Lammot duPont and Frank B. Jewett.

The following changes have taken place in the Faculty: George A. Osborne, Professor Emeritus since June, 1910, died on November 19, 1927. He came to the Institute in 1866 under President Rogers, the founder of the Institute. From 1868 until 1871 he served as Secretary of the Faculty, and in 1870 he was appointed Professor of Mathematics. Upon his death, he bequeathed to the Institute the sum of $10,000, of which the net income is to be used for the benefit of the Mathematical Library.

Other losses in the Faculty have been occasioned by the resignations of Assistant Professors A. R. Wood, C. H. Bandholtz, H. L. Milan, G. M. O'Connell and T. Phillips.

Additions to the Faculty have been made as follows: Dr.

Charles R. Gow has been appointed Professor of Humanics, in charge of that subject, mention of which is also made elsewhere in this report; C.-G. A. Rossby has been appointed Associate Professor of Meteorology, W. C. Voss Associate Professor of Building Construction and F. E. Raymond, Assistant Professor of Industrial Research in the Department of Economics and Statistics; Capt. G. S. Eyster, Capt. V. W. Hall, Capt. C. M. Kellogg and Maj. R. H. Somers have been appointed Assistant Professors of Military Science and Tactics; and Lt. R. D. Thomas has been appointed Assistant Professor of Naval Aviation to represent the Navy on the Naval Aviation Unit.

The following Associate Professors have been advanced to the grade of Professor: J. B. Babcock, J. W. M. Bunker, H. H. W. Keith, G. Owen, M. J. Shugrue, Charles Terzaghi and C. E. Turner.

The following Assistant Professors have been advanced to the grade of Associate Professor: S. A. Breed, W. M. Fife, A. C. Hardy, D. Peabody, T. Smith and H. C. Weber.

The following have been appointed Assistant Professors: R. G. Adams, J. C. Balsbaugh, M. R. Copithorne, H. G. deLaszlo, D. M. Fuller, H. C. Hottel, W. A. Liddell, E. Mirabelli, H. Muller, J. A. Stratton, D. J. Struik, K. L. Wildes and J. S. Newell.

Those who were foremost in the building up of the Institute as a School of Applied Science (Industrial Science) were keenly alive to the importance of instruction in the fields of the fundamental sciences involved — mathematics, physics, chemistry, and to a growing extent geology and biology. In the last decade or two, great advances have been made which must be taken into account when selecting or providing the material that is to be considered as fundamental to engineering training. There is so much more of the subject matter of science which now enters into engineering, that we must give much more attention to what are the essentials and provide more efficient methods of instruction in the sciences considered fundamental to the engineering courses.

Furthermore, there is a rapidly increasing demand in all fields of engineering for men well-grounded in science and the methods of research. This calls for graduate courses based upon a more thorough foundation of advanced mathematics,

physics and chemistry than can be given in the undergraduate courses. In fact, men of this type might well be termed physicists and chemists, applying such knowledge to the fundamental problems upon which advance in engineering fields depends. This alone would warrant putting our advanced science work on the very best possible foundation.

Every engineering or technical department in the Institute should look forward to taking first place as producers of new methods of construction or data upon which progress in engineering depends. Men are trained in this kind of work by doing it under leaders who not only are masters of it themselves, but possess the rare faculty of recognizing talent and who find the development of it the most attractive and, to a very large extent, the most important service to any profession. To foster and encourage this spirit is one of the most important steps we can take.

The importance of the best science instruction in our undergraduate work, of providing advanced courses as a foundation for graduate work in the fields of technology can not be overestimated, but the provision for graduate work in science and the recognition of the value of original investigations, especially in the fields of physics and chemistry, are most vital.

There never was a greater demand for research men, or as few leaders available in the fields of science, as at the present time. Industry is calling for many times the output. Educational institutions are severely handicapped by the exceedingly limited number of such men available.

Research in the fields of science and technology has become a profession and research men are trained in research laboratories. Many young men who have a distinct taste for technical work often prove to be the best for research work in the fields of science.

The Institute should be a leader in the production of the fundamental data in the fields of science and technology. Many of the most important scientific problems arise in engineering fields, in fact, the engineer is calling for data of the most difficult kind to produce in the fields of so-called pure science. Many of the problems in pure science, especially in the experimental field, call for the design, construction and operation of heavy equipment, as for example in the fields of refrigeration,

high temperature, high pressure and their applications in chemical research.

The adequate provision for graduate work in science at the Institute is a question of the utmost importance, and to which considerable attention is being given. How it can best be done is a subject for discussion. We might establish a School of Science and Research, a Graduate School of Chemistry and Physics, or an Institute of Science, perhaps even change the name of the institution to that of the Institute of Science and Technology. Perhaps the latter would have been chosen had the founders foreseen the development of science. They did recognize the important relation of science to technology.

Steps have been taken with success to create an interest in original work in all departments, and in each are to be found some men who are by nature fitted for it.

It must be admitted that the first requisite in establishing such work is able leaders, men who are essentially of the research or investigator type both in theoretical and experimental fields. This is especially true in physics and chemistry.

During the past four years, some of the best men of science in this country and abroad have been secured as lecturers in physics and chemistry. The result has been remarkable as an inspiration to graduate students and the Instructing Staff. Some of our exceptional men, members of the staff and students, have studied under these leaders in certain new fields of science. This year we have coming back to us several excellent men and in addition to these a number of young men now at the Institute, retained because of their promise as investigators, and now working on important problems.

While it must be admitted that the question of men is by far the most important in building up science at the Institute, that of facilities is of immediate importance for the reason already stated that it is essential in acquiring and holding good men on the staff or in securing graduate students or men to go into research work. Provision for these facilities would involve an addition to our present academic buildings of a wing to be devoted entirely to advanced work in physics and chemistry, a laboratory simple in design and construction with the flexibility and general facilities for such work. This question has already been presented to the Executive Committee.

Two years ago the Executive Committee authorized the establishment of a research fund and several contributions have been made to it but no general drive has been organized nor is it thought advisable. A definite fund is needed to provide facilities and personnel for rapidly growing work in advanced teaching and research in the fields of mathematics, physics, chemistry and to some extent, in geology and biology.

The best method of publishing the results of investigation has been considered from the point of view of the most efficient way of reaching the particular interests involved, the publicity that is due the author and what is sometimes overlooked, the interests of the Institute. Members of the staff are required to submit abstracts of all contributions to the scientific or technical press. These abstracts are published by the Institute as often as may be necessary (now twice a year) under the title "Abstracts of Scientific and Technical Publications." These are distributed to the particular press and public interested, scientific institutions and libraries, so that anyone interested may see what has been published and where to find it if more details are desired. This publication replaces the list formerly published with the report of the President.

It is no longer possible to distinguish between pure and applied science on the basis of practical applications. An investigation to ascertain the best material for a given purpose, for example, as an insulator in refrigeration or heating, might well be termed a problem in applied science, but a determination of the laws of conduction and other heat constants, needed in heat engineering, are problems in the domain of what has been called pure science; a great many examples of this kind could be given where the engineer or manufacturer calls for fundamental data in physics and chemistry. The fact that the need is foreseen is no reason for classing the work as applied science. They are as much problems in the field of pure science as they would be had some investigator conceived and conducted a research to find out these laws without knowing their applications. Industries are asking for information as to the structure of matter, knowing full well that when this question is settled it will have an important bearing upon problems of industry.

The fact that results may have a useful application always

adds greatly to the interest taken in their production. Certainly the progressive, creative engineer or technician should not be held back for want of fundamental data and it is very evident that if the Institute is to maintain a leading place in the application of science it must also take the same position in fundamental scientific work.

There is another question which should not be overlooked in both the scientific and technical work, namely facilities for unusual and extreme conditions.

The metallurgist, in determining the laws and properties of alloys or in teaching advanced metallurgy, must be provided with the furnaces, the rolls and much needed equipment necessary. It is often asked, "Why not try out these things in an actual plant?" The answer is that small units of almost all such equipment for experimental purposes can be had at low cost which give to the investigator the flexibility he must have to meet varying compositions or conditions. To do this on commercial equipment the cost would be prohibitive. When the laws or data are determined industry will be quick to try out those which appear promising on a commercial scale.

The chemist in working out reactions should never lack for facilities for the production of high or low pressure, temperatures, or mechanical appliances. They are as much of a necessity as test tubes or retorts. The remarkable results that have been attained recently in synthetic chemistry depend upon these facilities. The fundamental and underlying problems in connection with the fuel question are chemistry and physics of the most difficult sort, requiring very unusual facilities as to pressure and temperature.

The determination of the laws of constants needed in refrigeration or the liquefaction of gas, also the production of low temperatures, are other cases where unusual equipment is employed and under unusual conditions, so much so that it must be isolated for safety and efficiency in operation.

Fundamental work in connection with internal combustion engines involves the most complex physical and chemical problems requiring heavy equipment.

These are but a few of the cases illustrating the fact that the modern scientific laboratory must be provided with such facilities as well as suitable space for problems requiring its use.

Steps have already been taken toward the provision of additional laboratory space for heavy equipment needed in connection with such investigation.

Preliminary plans for a model towing tank have been prepared and estimates secured. The Institute is recognized as the central place for instruction in naval architecture and marine engineering. It should take first place in the production of the fundamental data needed in designing new ships and the solution of the problems which have arisen with the increased speed and more efficient use of power.

We cannot measure the value of such equipment in numbers of students; a few high-grade research men turned out each year would make of it a fine investment. The production of data or the solution of some important problem may be worth more to the country's interest than many times the cost.

It is certainly strange that this country with its vast problems in connection with river control, harbor improvements, water conservation and power development, has not seen the importance of working models on a small scale and the application of the law or principle of similitude in this field. We do not possess a single laboratory for that kind of work. Germany has several, Sweden, Italy and Austria are provided, while one of the very best and latest type is nearing completion at the Technische Hochschule in Zurich.

In visiting some of these laboratories one is greatly impressed by the wide range of problems handled, the accuracy of results and their economic importance.

The following statement regarding the activities of the various departments during the year 1927–28 deals with courses of instruction established or modified, lectures, investigations initiated or completed, and recommendations.

Civil Engineering. An event of particular interest during the year was the establishment by the Institute and the Boston & Maine Railroad of a five-year coöperative course in railroad operation, the purpose of which is to provide (*a*) fundamental training in engineering at the Institute and (*b*) practical operating experience in the various departments of the railroad. The course, as at present planned, consists of two years at the Institute followed by three years of coöperative

work in which the student alternates between the Institute and the railroad. The coöperative work starts in the summer following the second year, the student thereafter spending half of his time at the Institute and half in actual work with the railroad. The fifth year includes graduate study along the lines for which the individual student is best fitted. Students satisfactorily completing this course receive both the Bachelor's and the Master's degrees.

Students in the course receive practical experience as paid employees of the railroad for four terms of about seventeen weeks each, including work in the following departments: Maintenance of Way (including Signals), Maintenance of Equipment, Conducting Transportation and General (including Accounting, Stores, etc.). The practical work is carefully planned to give the student a fundamental training in the important operations of a railroad.

In last year's report, reference was made to the coöperative agreement between the Institute and the Miami Conservancy District relative to investigation of the condition of the core walls of earth dams. The work contemplated under this agreement has been completed and the results are given in a thesis by Glennon Gilboy, presented as a part of his requirements for the degree of Doctor of Science. An abstract of this thesis is published in "Abstracts of Scientific and Technical Publications from the Massachusetts Institute of Technology," July, 1928.

Coöperative investigations by the United States Bureau of Public Roads and the Institute, which were first established in October, 1926, have been continued during the year, and an agreement for their renewal for the year extending from July 1, 1928 has been made. The results of these investigations are published from time to time in *Public Roads*.

The number of degrees granted for advanced work in the Department of Civil and Sanitary Engineering in June, 1928 was nineteen, consisting of one Doctor of Science, eight Masters of Science in Civil Engineering, and ten Masters of Science without course classification, seven of whom majored in civil engineering and three in sanitary engineering subjects. The largest number hitherto granted in one year was ten in 1925.

K. C. Reynolds, Instructor in Civil Engineering, who was

awarded a Freeman Traveling Fellowship by the Boston Society of Civil Engineers last year, has had this fellowship renewed and J. B. Drisko '27, who was granted a traveling fellowship by the Institute for 1927, has had his fellowship continued. Both are remaining in Europe for another year to continue their studies in the field of hydraulics. Another graduate of the department, Samuel Shulits '24, who was awarded a Freeman Traveling Fellowship by the Boston Society of Civil Engineers in June, 1928, is also studying hydraulics in Europe.

A joint meeting of the Advisory Committee and Visiting Committee of the department was held at the Engineers' Club in New York City on December 6, 1927, at which the subject of Sanitary Engineering was discussed. There were present at this meeting, in addition to members of the Advisory and Visiting Committees, Dr. S. W. Stratton, President; Prof. C. M. Spofford, Head of the Department of Civil Engineering; Prof. R. G. Tyler, in charge of the Course in Sanitary Engineering, and Prof. S. C. Prescott, Head of the Department of Biology and Public Health.

A report of progress relative to this conference was made by Mr. Morris Knowles, Chairman, to the Corporation at its meeting on January 4, 1928 and a summary of the above report, at the meeting of the Corporation on June 1, 1928.

Charles E. Smith '00, Vice-President of the New York, New Haven & Hartford Railroad, was added to the Advisory Committee during the year.

A course of lectures on ice engineering was given during the second term under the auspices of the Civil and Sanitary Engineering Department by Dr. Howard T. Barnes of Montreal. This course was made possible by the generosity of John R. Freeman, Esq. '76. Five lectures were given at the Institute, one being of a popular character; in addition, Dr. Barnes conferred with members of the Aeronautical Engineering Staff on the subject of the prevention of the formation of ice on airplanes in flight. While in Boston he gave one lecture before the Affiliated Technical Societies of Boston.

Another course of two lectures upon "The Reclamation of the Zuiderzee" and "Holland's Fight with the Waters," was given by Dr. Cornelius Lely, formerly Minister for Public

Works of Holland, President of the Zuiderzee Board of Holland, and President of the Trustees of Delft University. These lectures were illustrated by lantern slides and motion pictures and clearly demonstrated the noteworthy work now under way by Holland in reclaiming and protecting its country.

The second conference of the Massachusetts State Association of Master Plumbers was held at the Institute on February 15 and 16. This conference was attended by approximately four hundred members and guests. The members were addressed by the President of the Institute, and numerous papers were given by various members of the instructing staff.

The attendance at the seventeenth session of the Surveying Camp at East Machias during the summer of 1928 was considerably larger than in the summer of 1927, the total being 65 as compared with 48. The charge per student for meals and miscellaneous expenses necessary for the operation of the camp was $1.88 per day as compared with $1.81 in 1927. The total charge for these items during the camp session was $95.88 per man.

The Summer Camp Loan Fund, which was established in 1927 by Lammot duPont, was doubled during the year by another gift from Mr. DuPont.

Mechanical Engineering. During the past year thirteen students qualified for the degree of Master of Science in mechanical engineering, fifty-seven for the Bachelor of Science degree.

The theses of two naval officers detailed to the Institute for special work on torpedoes were especially worthy of mention. An undergraduate thesis carried out for the Ordnance Department of the United States of America was much appreciated by Gen. C. C. Williams, Chief of Ordnance.

An undergraduate thesis on wire rope clips suggested by the National Safety Council is the first of a series of investigations which this council has asked for, and which we will probably carry out.

Two rather extended research problems undertaken for the Division of Industrial Coöperation and Research have been carried out in the laboratories — one in the Strength of Materials Laboratory and the other not yet finished in the Power

Measurement Laboratory. In addition there have been a number of industrial problems each requiring from two to three months for completion.

Two new Uniflow engines of latest design have been installed in the place of two old engines and a third engine is to be replaced by one of the same type but of recent design.

A Cowdrey brake testing equipment used for testing brakes on automobiles was presented by the makers. Some of the older machine tools used for purposes of instruction have been replaced by tools of the latest design.

The department had the following lecturers, not listed on the staff, during the past year:

Mr. Richard Soderberg of the Westinghouse Electric and Manufacturing Company on "Stresses and Theory of Elasticity."

Mr. George A. Pennock of the Western Electric Company on "Production."

Mr. R. W. Cook of the Wallace Barnes Company on "Production of Springs."

Mining and Metallurgy. The scope of the instructional activities of the department has been expanded by the creation of a new course of undergraduate study known as the option in physical metallurgy. This option differs from that in metallurgy in substituting subjects such as applied optics, industrial radiology, optical identification of crystalline compounds, physical crystallography and additional language for some of the engineering branches so necessary to the metallurgist expecting to engage in the production of metals from their ores. The new option is provided in recognition of the rapidly growing importance of the art of preparing metals for specific and new uses, for the creating of hitherto unknown properties or the enhancement of physical properties by alloying and treating. The option in physical metallurgy is particularly designed as preparation for research in metallurgy.

The department now offers four undergraduate options: mining engineering and petroleum production, each leading to the degree of Bachelor of Science in mining engineering; metallurgy and physical metallurgy, each leading to the degree of Bachelor of Science in metallurgy.

Certain branches of the science of geophysics have recently found application by the mining engineer and geologist as an aid in the discovery of mineral deposits, and a new subject, "Elements of Geophysical Prospecting," has now been introduced in the curriculum in order to give appropriate recognition to this art.

One of the members of the staff, F. L. Foster, has prepared to teach this branch. During the summer of 1927 he worked with a field party of the Geophysical Research Corporation in Oklahoma and Texas investigating the applications of the torsion balance and magnetic variometer as an aid in the discovery of salt domes and oil pools; the winter recess, January, 1928, was spent by him in Washington in a study of the work being done by the United States Coast and Geodetic Survey and the Terrestrial Magnetism Division of the Carnegie Institution; and the summer of 1928 was spent with a field party of the Swedish American Prospecting Corporation in Newfoundland gaining experience in the use of electrical devices for the determination of the probable location of metalliferous deposits.

The department has added to its equipment of geophysical instruments two torsion balances for the determination of gravity anomalies; one an Oertling instrument of British manufacture, the other a Hecker instrument of German make. Both instruments were the generous gift of the Geophysical Research Corporation through Mr. E. De Golyer, its president.

The Laboratory of Fire Metallurgy has added a muffle-type gas furnace with automatic pyrometric control for use in heat-treatment, for roasting ores or for other operations requiring close temperature regulation. Another new furnace is a rotating muffle-type electrically heated furnace with a cylindrical lining of carborundum. This furnace was given in part by Dr. C. S. Stephano and in part by the New Jersey Zinc Company.

The following research investigations illustrative of the work done in the department have been carried on during the year by students in coöperation with members of the staff.

The Valuation of a Bituminous Coal Property in the Cumberland Piedmont Field, West Virginia.

Magnetometric Survey of a Portion of the Richard Iron Mine Property, Dover, New Jersey.

An Estimate of the Cost of Producing Oil from a Shallow Sand in Mexico.

The Extraction of Tin from Bolivian Concentrates by Methods other than Fusion.

A Study of the Embrittlement of Chrome Iron Alloys.

A Laboratory Investigation of the Production and Properties of Low Oxygen Copper.

The Development and Testing of Certain Steels (with nitride case) for Airplane Engine Exhaust Valves.

A number of lectures are given each year by engineers and metallurgists engaged in the industry, and the following lecturers appeared before our students during the past year.

A. E. Crockett of the Bureau of Instruction, Jones & Laughlin Steel Corporation, Pittsburgh, Pa., gave an illustrated lecture on the manufacture and uses of seamless steel pipe such as is used extensively in the petroleum industry.

E. H. Guilford, Chief Engineer The Radiore Company; two lectures on electrical prospecting: The Radiore Process; A Review of Its Application in Canada.

H. T. F. Lundberg, Field Manager the Swedish American Prospecting Corporation; two lectures: Prospecting for Ores by Electricity.

L. W. Emerson, Construction Engineer for the United States Smelting, Refining and Mining Company, lectured again on "Construction and Equipment Costs in Mining and Milling."

The Boston Chapter of the American Society for Steel Treating offered an educational course in metallurgy to its members under the auspices of Massachusetts Institute of Technology. The course comprised twenty-five lectures during the winter of 1927–28. The signal success of the enterprise was attested to by an average attendance of more than one hundred throughout the course; the work was given by the following members of the staff: Professor Waterhouse, ten lectures on the "General Metallurgy of Iron and Steel"; Professor Williams, eight lectures on "The Alloys"; Professor Homerberg, three lectures on "Macroscopic Examination of Metals"; and Professor Cowdrey (Mechanical Engineering Department), four lectures on "Testing of Metals."

Professor Homerberg gave a number of lectures before chapters of the American Society for Steel Treating, including those at Moline, Ill.; Milwaukee, Wis.; Providence, R. I.; Springfield, Mass., and Philadelphia, Pa. The subject of these lectures was the case-hardening of special alloy steels by means

of ammonia gas to produce what is known as a "nitride case."

Professor Locke delivered a lecture in the students course at the 1927 Chemical Exposition in New York entitled "Disintegration, Crushing, Grinding and Grading."

Professor Hutchinson spent the summer of 1927 on a trip to South America where he was engaged in professional mining engineering in Peru. Professor Bugbee spent the months of February and March on a trip to the United States of Colombia in connection with a gold mine examination. Professor Mann visited the oil fields of Kansas, Oklahoma, Western Texas and New Mexico during the summer of 1927.

Aeronautical Engineering. The second year of the undergraduate course in aeronautical engineering was marked by an unexpectedly large enrollment in all classes. The number of students by classes was as follows:

Second Year	35
Third Year	40
Fourth Year	31
Graduate Year	24

The sophomore class was the first to enter under the revised program of studies, which places all of the shop work in the summer, allowing more time during the winter terms for languages and other fundamental subjects. This change has proved to be entirely successful, and will be retained as an integral part of the program.

The Daniel Guggenheim Aeronautical Laboratory, donated through the generosity of the Daniel Guggenheim Fund for the Promotion of Aeronautics, was completed and dedicated on June 4, 1928. A number of gentlemen prominent in the aircraft industry took part in the dedication exercises.

The Daniel Guggenheim Aeronautical Laboratory is a four-story building, approximately 60 x 150 feet, housing the 7½-foot open wind tunnel, which has been a well-known part of the equipment of this department for several years. Space is also provided for a 5-foot tunnel, construction of which has begun. Numerous research rooms are provided in this building, as well as a museum, library, offices, classrooms and drafting rooms. The building conforms with the style of architec-

ture of the main Technology buildings, and is in every way appropriate and adequate. All of the facilities of this department, with the exception of the Engine Laboratory, are now located in this building, so that the overcrowding of the previous year has been eliminated. A separate building to house the Engine Laboratory, together with all other internal combustion engine equipment of the Institute, is now under construction.

The year 1927–28 marked the establishment of a Naval Reserve Officer's Training Corps in Aviation, hence it is now possible for selected students in aeronautical engineering to prepare themselves to become commissioned officers in the Naval Reserve Flying Corps. In addition to the regular undergraduate course in aeronautical engineering, these men are required to complete a certain amount of extra work during the academic years, and take extensive summer training in schools of the United States Navy.

A number of changes have been made in the requirements for the Reserve Officer's Training Corps Air Corps course, which is now limited to students in electrical engineering, physics and aeronautical engineering. These men will receive more intensive training than heretofore, and the limitation to students in the courses mentioned will assure that the men who receive reserve commissions in the Air Corps have adequate training for the work.

Due to the large number of applications for admission to the course in aeronautical engineering, it was found necessary to limit the enrollment to approximately thirty men in each class. The present state of the aeronautical industry as well as facilities available made this limitation advisable. It is probable that a relatively small number of engineers can be absorbed each year, but these must be of exceptionally high quality. The application of the rules on limitation, details of which are to be found in the general catalogue, begins with the first term in the fall of 1928.

Research work in all branches of aeronautical engineering has been carried out during the entire calendar year. The following investigations, conducted by the staff, have been in progress:

Determination of Aerodynamic Characteristics of a Feathering Paddle Wheel to be Used for Propulsion and Sustentation of a Flying Machine.

Determination of Elevator Hinge Moments and Control Forces of a DH9B Model and Variations due to Slipstream.

Determination of Drag of an Air-Cooled Engine Cylinder including Effect of Various Parts and Cowlings.

Installation of equipment in a temporary building has been made pending construction of the laboratory for the purpose, and several important investigations are under way as follows:

Heat Dissipation Properties of Finned Metal Surfaces such as are Used on Air-cooled Cylinders.

Continuation of the Work on the Spectroscopy of Fuel Flames in an Engine Cylinder.

Continuation of Work on Various Phases of Supercharging.

In addition to the above, the following routine experimental work has been completed:

Comparative Tests of Open End Closed Type Small Flying Boats.

Study of Statical Longitudinal Stability of United States Army Bomber.

Experiments on Wing Flutter in Coöperation with Wright Field.

Study of Characteristics of Large Trimotor Commercial Flying Boat.

Several tests of Airfoils and Models have been completed.

Test of an Eighteen Horsepower Air-Cooled Cylinder.

Determination of the Effect of the Addition of Ethyl Fluid to Gasoline, on the CO Content of the Exhaust Gases.

In coöperation with the staff, the following important research work has been done by students, mostly graduate, and has been published in the form of theses:

The Effect of Sweepback on Autorotation of an Airfoil.

A Study of the Air Flow about a Model of the *U. S. S. Lexington.*

Dynamical Analysis of the Spinning of Airplanes.

Spectroscopy of Engine Fuel Flames, a preliminary survey.

The Effect of a High Speed Induction Blower on Distribution in an Internal Combustion Engine.

A Method for Detecting Detonation Waves in an Internal Combustion Engine Cylinder.

Heat Dissipation from Metal Surfaces at High Air Velocities.

An extensive program of research is planned for the year 1928–29, the most important projects in this program being as follows:

Study of Wind Pressure on Buildings.

On account of the large portion of the year during which the seven and one-half foot tunnel could not be operated because of its installation in the Daniel Guggenheim Aeronautical Laboratory, the research program outlined for 1927–28 could not be carried on and will therefore be continued in 1928–29. In addition, the design of a new five-foot tunnel will be completed, its construction supervised, balance equipment installed, and calibration work carried out.

Continuation of the work on heat dissipation from finned surfaces.

Continuation of the work on various phases of supercharging.

Continuation of the work on the spectroscopy of fuel flames.

Study of means for detecting and measuring various physical characteristics of the detonation phenomena.

Comparison of the performance of a water-cooled and air-cooled cylinder of otherwise identical design.

Study of piston friction and lubrication.

The following specialists have served as lecturers during the year:

G. J. Mead, Vice-President, Pratt & Whitney Aircraft Co., on the Transcontinental Air Routes.

W. F. Joachim, National Advisory Committee for Aeronautics, on the Fuel Injection Engine for Aircraft.

Dr. S. A. Moss, General Electric Company, on Superchargers for Aircraft Engines.

All branches of the department are now quite adequately housed, with the exception of the Engine and Power Plant Laboratory, whose quarters are entirely inadequate. As previously stated, however, a building for this purpose is now being erected, and this will make possible a more extensive research program in this very important branch of aeronautical engineering. Considerable new equipment for research work in both power plants aerodynamics is desirable.

Electrical Engineering. In the undergraduate educational plan the Electrical Department has placed further emphasis on dividing senior and junior classes into sections in accordance with the quickness of intellect of the individual students, and has applied the same practice in the second

term of the sophomore year. The arrangement provides several sections at the same hour and it is therefore practicable to transfer a student from section to section as his abilities develop. This use of the "sectioning for ability," as it is called in educational circles, is proving of importance in developing the resourcefulness and ambitions of students.

The Honors Group plan, whereby a small number of juniors and seniors are selected on merit and are given special privileges of self-education with the counsel of designated scholarly young men who are members of the staff, now has definite form, although it is still in the stage of development and improvement. The academic records and collateral achievements of Honors Group students during last year were gratifying. In addition to assisting the students with the work of a purely technical nature the special Counsellors have also given attention to the attitude of the students towards their methods of study and ambitions as well as to their habits and social qualities. Last June, at the request of the department, the seniors in the Honors Group voluntarily submitted themselves for a comprehensive examination in the field of electrical engineering and acquitted themselves very creditably. It is proposed that an informal department committee will hereafter administer the Honors Group work for the purpose of more definitely advancing the departmental policy and of arranging relations with other departments in which our electrical engineering students study. This committee will include the two special Counsellors designated respectively for the junior and senior Honors Group.

In connection with the undergraduate instruction, improvements have been made in the Electrical Measurements and Dynamo Laboratories by which the Honors Group students and resourceful men in the other sections may carry on their work with more individual responsibility.

That part of the instruction in electric circuit theory which is intended primarily for graduate students was extended by Professor Dahl who has published an important treatise on the theory. Other graduate work has also been enlarged and improved.

Associated with the foregoing have been the colloquia. The American Telephone and Telegraph Company were kind

enough to contribute three colloquia presented by five of their important men, one of the colloquia being on "Thermionic Filaments of Vacuum Tubes used in Wire Telephone," another on "The Economic Aspects of Communication Problems," and another on "Manufacturing Problems." The Westinghouse Electric and Manufacturing Company generously contributed three colloquia led by three important men. The general topic was "Scientific Aspects of Design Problems in Large Electric Power Apparatus" and this was subdivided into the three portions: "Mechanical Problems," "Communication Problems" and "Switching Problems." The General Electric Company also generously contributed three colloquia led by four important men, the subjects being "Characteristics of Transformers," "Power Stability Problems" and "Mercury Arc Rectifier Problems."

The American Telephone and Telegraph Company again conferred a great favor on the department by allowing one of their notable men to treat a subject (electric networks) for an entire term as one of the definite subjects offered for options to graduate students and seniors. Mr. T. E. Shea, assigned to this work, is a master of the subject and his work was carried on with the same success which had characterized similar work in preceding years.

A number of interesting additions have been made to the laboratories. A complete operating and experimental radio station unit was established on the Institute property west of Massachusetts Avenue, and it now is in use for experimental work in association with the Round Hills Station at South Dartmouth. At the latter place, through Colonel Green's interest, an admirable location has been established for quarters for the staff who are employed there in the short wave communications and aeronautics research. The amateur radio station of the students' radio society has been moved to more appropriate quarters on the Institute grounds.

In connection with the communications work there has been added to the staff a research associate who will apply himself to the development of an Acoustics Laboratory for further extending the communications laboratory work and developing the subject of acoustics as relating to electrical communications.

The addition of an Assistant Professor in theoretical electricity will also strengthen our capability in dealing with the problems of electromagnetic radiation and wave propagation in connection with the short wave communications research in addition to other problems in which the department is interested.

For a number of years the department has treated the subject of power stations and distribution systems developed for graduate students as a single subject under one instructor. The problems of systems for distributing electrical power, however, are so different from those of power generating plants, and their field is so important, that it has seemed desirable to separate the two subjects so that they can be dealt with on independent scientific bases. The return of Assistant Professor Balsbaugh to the department has enabled it to make this separation and hereafter the power distribution systems will be treated as an independent subject, to which their importance entitles them.

The Integraph developed in the Research Division of the department continues to be serviceable. In its present stage it will solve general forms of differential equations of the second order which have either fixed or variable coefficients, and it has proved a valuable aid in solving many of the equations relating to physical phenomena in which the department is particularly interested, such as transient situations in electric circuits and electrical machinery where the equations are either insoluble or difficult to solve with the usual philosophical methods. During the past year the Integraph has been utilized by students and others in a variety of investigations including those relating to transients in synchronous and non-synchronous machines, the stability of long power transmission lines carrying large amounts of energy, the effect of transients in circuits which are non-linear due to the presence of iron or of thermionic devices, the skin effect in iron pipes surrounding current-carrying conductors, the mechanical stresses in vibrating bus bars, the flight of projectiles and the equations of Schroedinger wave mechanics. It has been used by our staff and students, and also in special investigations, by invitation, by other engineers and physicists. Professor Bush and his five earliest collaborators in the development of the Integraph

have had conferred on them the Edward Levy Medal of the Franklin Institute in recognition of the contribution which the Integraph represents to the machine methods of computation.

The alternating current calculating table which is being developed in coöperation with the General Electric Company was delayed on account of difficulties that arose in the design of equipment suitable for representing the reactance parameters of transmission lines and power loads on the scale and in the refinements of such a laboratory device. These difficulties now have been overcome and the construction of the table is well in progress. Inquiries are being made by engineers of operating power companies and consulting engineers regarding this device, and it apparently will be welcomed as an instrumentality for the solution of some of the complicated problems of power flow and power system control for which adequate means of solution have not heretofore been available.

The nine-element oscillograph added to the Machine Transients Laboratory during the year improves the research possibilities there. In connection with the laboratories various interesting results were accomplished during the year. For example, it was discovered that the so-called Barkhausen effect at the time of magnetization and de-magnetization of iron is not strictly an electromagnetic phenomenon but depends upon the longitudinal elastic vibration of the magnetic bar under observation. This was the outcome of an investigation associated with one of the Doctor's theses.

An improvement of the usual form of cathode-ray oscillograph with a hot-cathode was made which enlarges the life of the cathode filament and increases the usefulness of this device in our work.

The investigation of the deterioration of cable paper due to heat which has been carried on in the department during the past five years for the Paper Cable Research Committee of the National Electric Light Association was completed, and the department's interest in heat effects in insulating material has been transferred to an exacting scientific study of thermal conductivity in dielectrics.

In connection with these laboratory and thesis investigations it is appropriate to note that the American Institute of Electrical Engineers awarded its national prize for the best

Student Branch Meeting paper to Mr. G. H. Rockwood, Jr. His paper was entitled "Calculation of Stray Load Losses," and was derived from his thesis for the Master's degree, which thesis related to the core losses in certain types of electrical machinery.

Mr. Frazier, Instructor, attended the convention of the Society for the Promotion of Engineering Education at Chapel Hill, North Carolina, in June, where he read a paper on behalf of himself and Professor Barker.

Assistant Professors Lansil and Wildes attended the Summer School for Teachers of Electrical Engineering relating to methods and material in the teaching of electrical engineering, held jointly at the University of Pittsburgh and the works of the Westinghouse Electric and Manufacturing Company in July.

Mr. Bangratz, Instructor, at the invitation of the Westinghouse Electric and Manufacturing Company has attended their school of Electrical Machinery Design through the summer months.

Dr. Guillemin, Instructor, at the invitation of the Western Electric Company spent the summer at the Hawthorne Works of that company in Chicago carrying out certain investigations suggested by the management of those works.

For the future, the department contemplates the extension of its work in connection with electric arcing through dielectrics, the fuller study of transients in electric circuits and machines, energy flows in electrical machinery and electric circuits, theoretical foundations relating to illumination, and thermal characteristics of dielectrics. As soon as more space is available for advanced laboratories certain of these things can be developed more fully than is practicable in the present space.

Naval Architecture and Marine Engineering. There has been a gratifying increase in the number of students.

Unfortunately Lloyd's Registry of Shipping found it necessary to suspend the scholarship which they have given for a number of years. This action is in line with that taken by the Committee of Lloyd's in Britain, but it is hoped that the scholarship may again be revived in a few years.

Fortunately the American Bureau of Shipping has founded a scholarship for the course in ship operation. It carries an annual stipend of five hundred dollars and is tenable for two years. It has been founded in memory of the late Stevenson Taylor and carries his name.

Professor Hovgaard presented a paper on the "Determination of the Stresses in a Beam by the Method of Variation" at the International Congress of Mathematics, held at Bologna. In this paper he takes up St. Venant's development of the theory of torsion and bending of beams, and produces a solution of the inverse problem which had not previously been done. Professor Keith contributed an important article to the jubilee number of the *Marine Review* on "The Vital Influence of Education in Ship Design and Construction." In this article an excellent description of the courses at the Institute is given. Mr. Magoun brought out a book entitled "The Frigate *Constitution* and Other Historic Ships" under the auspices of the Marine Research Association of Salem, in which he has collected all available data regarding several old ships of special interest to New England.

The museum has not received any specially important contributions during the year, but it has continued to interest a large number of visitors. A special exhibition of instruments of navigation, both old and modern, was arranged with the assistance of the Essex Society, the Peabody Museum of Salem, Harvard University and a number of private gentlemen. The exhibits ranged from the earliest examples of cross staff and back staff to the most recent developments of the art of navigation, including the earth inductor compass, the gyro compass, submarine signaller and radio director finder. A number of these exhibits have been allowed to remain in the museum indefinitely.

Architecture. Because of the rapid growth of the department it has seemed necessary to the Corporation to limit the total enrollment to three hundred, this to include both the course in architecture and that in architectural engineering. The effect of the five-year schedule in architecture has not in any way reduced the numbers registered in the freshman year, and the total registration is larger than ever before.

To accommodate ourselves to these increased numbers and to maintain the quality of our teaching in design, it was necessary to double the teaching staff for the sophomore and junior years. There is every likelihood that a larger staff will be necessary for the seniors and freshmen.

The policy initiated last year in regard to the publication of the *Architectural Bulletin* has received many favorable comments and will consequently be continued to the general satisfaction of our alumni.

The first steps were taken during the year toward the establishment of a course in architectural administration. Consultation was held with members of the course in engineering administration, and a thorough analysis of the needs of such a curriculum was discussed and outlined. At an early meeting of the faculty a schedule will be presented for consideration.

The work commented on in last year's report as being undertaken by Mr. Thomas Adams is making good progress, and the possible significance of it receives special emphasis through the initiative that has been taken by students of town planning toward the creation of a course leading to a degree in this subject and including work of a research nature. Such a course may with great advantage be placed at the Institute. No final decision has been reached, and such a decision is likely to be largely determined by the source of any endowment that may be forthcoming.

Last year mention was made of the success of one of our students in winning the Paris Prize, and we have now to comment on the quite remarkable accomplishment of students and graduates of the department in winning scholarships during the last two months of the past academic year. The Rotch Scholarship, the Guy Lowell Scholarship, the LeBrun Scholarship and the Municipal Art Society Prize — the three former sending students abroad for periods of from six months to two years, and the latter being a cash prize — were all won by recent graduates or students in the department, so that we can feel assured that Professor Carlu's inspiration continues to stimulate our most promising students.

The policy of encouraging graduates to take teaching positions as a supplement to their study here results in their

encouraging good students from other institutions to come to the Institute for advanced study, with the result that the department is having a steadily increasing number of applicants for admission to the senior and graduate years. There is need for more scholarship aid for these advanced students.

The policy of the department in the selection of the winner of the traveling scholarship has been changed from that of making the selection on the basis of competence in design alone to that of dependence on the general excellence of the student's performance. It was found that the former method developed so intense a rivalry between the students as to be detrimental to their health as well as to the attention that they gave to subjects other than design.

In further reference to advanced students and their need of scholarship aid, it is only fair to speak with appreciation of the support given to the department by generous friends in the creation of two Fontainebleau Scholarships, which continue to serve as a great incentive to our third and fourth year students.

The department continues to derive the greatest advantage from suggestions that come to it through our visiting and advisory committees.

Economics and Engineering Administration. An interesting development in instruction in the course in business management was made possible through the addition of Dr. Johnson O'Connor of the Department of Human Engineering of the General Electric Company at Lynn, as lecturer. In addition to his lectures he held individual conferences with three-fourths of the senior class in the course of engineering administration, with special reference to the determination of vocational aptitude. This opportunity was greatly welcomed by the students. It is hoped that there may be a further development in the field of investigation in which Dr. O'Connor is engaged, for his methods are based on principles recognized in the physical sciences.

The Institute was fortunate in securing as an associate professor in accounting, Mr. Charles H. Porter, a graduate of the electrical engineering course in 1903, who has had many years' experience in accounting as comptroller for the McEl-

wain Company and auditor for the Cambridge Gas Light Company.

During the year Professor Schell collaborated with the National Bureau of Economic Research in an investigation regarding changes in management during the past ten years. Professor Schell also conducted a research on trends in the functions and composition of boards of directors and with his class carried on a research on the management of small metal working industries in the vicinity of Greater Boston. This is a continuation of previous studies of a similar nature having to do with small establishments. The case method was introduced into the classroom work dealing with this subject.

Professor Tucker and Mr. Ingraham also made a special research for the National Bureau of Economic Research on the precision of predictions made by forecasting services during the past five years.

In the latter part of the year Professor Fernstrom gave assistance to Professor Bassett in an economic survey of the City of Bangor, Maine, devoting special attention to transportation facilities and rates.

Further plans were made to stimulate interest in research in our department by the appointment of Fairfield E. Raymond as assistant professor of industrial research. The department expects to give special attention to this field during the coming year and also to develop the work in the field of public utilities.

Biology and Public Health. Changes have been made in the undergraduate program so that the work of all regular students in the department is the same for the first two years.

A course in biological literature has been introduced for third-year students in the public health option, and the work in theoretical chemistry has been extended.

In the industrial biology option it was found desirable to increase the biological training and this has been accomplished by replacing the course in business management by a briefer course on business law and organization. The professional work of this division has been strengthened by the introduction of courses on essentials of anatomy, especially of food animals, physiology and plant diseases.

During the year the following investigations have been completed:

"An Investigation of Health Education Methods in the American School Health Program."

"A Critical Study of the Hydrolysis of Proteins with Enzymes and Inorganic Reagents."

"Factors Affecting the Growth of Surface Colonies of Bacteria."

Professor Horwood has completed a tuberculosis survey of Cambridge.

Investigations have also been made on the disinfectant action of colloidal iodine and on the sanitary aspects of public laundries.

Several minor investigations of technical interest have also been carried on.

In relation to the research activities of the department are the contacts with industry which have been made which have resulted in extensive programs of investigation.

These include a comprehensive and fundamental experimental study of dehydration as applied to foods; a study of the food value and utilization of by-products of the dairy industries; studies in special aspects of hygiene in the telephone industry, and an investigation of domestic electrical refrigeration.

The department has been very fortunate in the service which has been given by the special lecturers, and wishes to acknowledge particularly the services of Dr. T. F. Kenney as lecturer in health administration, Dr. E. H. Place in communicable disease control, Dr. N. Borodin on fisheries methods. Special acknowledgment should be made of the generosity of the Metropolitan Life Insurance Company which again made it possible to hold a Public Health Institute in the department during the summer, and of the coöperation given by a large staff of specialists in this work.

The growth of the department and the expansion of the research activities have necessitated an increase in space allotted to the department work. This immediate need has been met in the allocation of several rooms in the new infirmary building, but efforts are being made to secure a building in which the increasing work of the department may be developed. While research space has been temporarily obtained, equipment for

advanced work in bacteriology, biochemistry and food technology is greatly needed.

Physics. Minor changes in the teaching text, particularly as relates to the extension of the problem work, have been made during the current year, and some changes are also being made in the distribution of the time between lectures and recitations in general physics.

Extensive additions to the equipment of the Spectroscopic Laboratory have been made, and the equipment of the Acoustics Laboratory has been materially increased so as to enable accurate quantitative and qualitative sound analyses to be carried out by modern electrical methods. In the X-ray Laboratory considerable additions to the equipment for X-ray spectrum analysis and for the study of high speed cathode discharges have been made.

The staff of the X-ray Laboratory has undertaken to coöperate with the American Welding Council in an exhaustive study of the value of X-ray examination of welded joints of all types. There have also been extensive additions to the equipment of the Radiation Laboratory, particularly such portions as are concerned with the work which is going on in connection with the study of ultra-violet light. The color analyser which has been the subject of research in the Optics Laboratory has now reached the point of commercial development, and will soon be available for use in all laboratories and factories where color analysis is important. The instrument makes it possible to accurately analyze in a few seconds the color of light reflected from a body. With the development of the instrument completed, the next step is to apply it to special problems, and this work is now well underway.

During the summer the Society for the Promotion of Engineering Education held a school for physics teachers in the department which was attended by teachers from thirty universities and colleges. The facilities of the department seem to be so especially adapted to work of this sort that it is hoped that a similar school may be held each year.

Prof. W. L. Bragg of the University of Manchester, England, was with the department for about one-third of the year, giving a most interesting course of lectures upon crystal phys-

ics, and also acting as advisor upon matters of research in crystal physics and X-ray phenomena.

The following investigations are in progress in the department:

Applications of Color Analysis.
Study of the Daily Variations in Intensity of the Ultra-Violet Rays in Sunlight.
Study of Electrolytic and Chemical Methods of Preventing Corrosion of Condenser Tubes.
Determination of the Physical Properties of Some New Alloy Steels at High Temperature.
Determination of the Thermal Conductivity of Light Alloys and New Alloy Steels at High Temperatures.
Further Study of Absorption Spectra of Organic Compounds.
Development of Apparatus for the Production of Doubly Ionized Lithium.
Crystal Structure of Certain of the Silicates.
Fluorescence and Phosphorescence of Crystals Excited by High Speed Cathode Rays.
An X-Ray Study of the Allotropic Change in Iron.
X-Ray Investigation of Welded Structures.
Amplifier for Ionization Currents.
Development and Calibration of Apparatus for the Graphical Analysis of Sound Waves.
Development of Thermal Insulating Materials to Withstand High Temperatures.
Investigation of the Joule Effect for Various Gases.
Anomalous Dispersion Absorption and Kerr Effect in Viscous Dielectrics.
A new Piezo Electric Effect in Ionic Crystals.

The members of the staff have published a larger number of papers than usual during the year, and, as heretofore, they are divided about equally between theoretical and industrial subjects.

The department finds itself under considerable pressure for room for the researches of the graduate students and staff.

Chemistry. The increase in numbers of the entering class of 1927 has accentuated the difficulties of maintaining the desired quality of first year laboratory instruction. The four laboratories available provide facilities for 560 students, whereas the number of students to be accommodated during 1928–1929 promises to be over 600. Another laboratory con-

taining 140 desks should be added if the numbers remain as at present.

Authorization of the Research Laboratory of Inorganic Chemistry was made during the year and Professor Schumb has taken charge of the work. The amount of investigative work being accomplished by the members of the department's Inorganic Chemical Division, in charge of Professor Smith, has increased steadily during the past eight years and it is highly desirable that this somewhat neglected branch of chemistry be encouraged. The unifying and coördinating benefits to be derived by the creation of the new laboratory are therefore necessary. The department has been somewhat surprised and gratified at the letters and observations received from outside the Institute commending recognition of the need of fostering inorganic investigations. Space for the new laboratory has been obtained temporarily by consolidating the work of the Analytical Division.

The organic instructional work for the United States Army officers has been rearranged whereby these older men constitute a special section, thereby enabling the department to meet particular individual needs. The modification in instruction procedure has been approved by the War Department and has proved distinctly beneficial.

It is of some interest to note that the introduction of the use of motion pictures representing industrial operations in chemistry has been continued from the prior year with much success.

The Research Laboratory of Organic Chemistry has had to be transferred to other quarters to provide space for the installation of the metallographic laboratories. The space formerly available put a restriction on the number of graduate students which the department could accept. The new quarters are even less in extent and less favorable for the work, with the result that a portion of the undergraduate organic laboratory has had to be adapted, leading to distressing working conditions for the graduate students, and an undesirable congestion in the undergraduate laboratory.

The desirability of permitting the growth of graduate work in the department is incontestable and the situation as regards proper space reached a point several years ago where

the total number of graduate students had to be restricted to not more than forty. At the present time the restriction in space for the organic work accentuates the difficulties of caring for a total of thirty-nine graduate students and the extension of the investigative work to the more fundamental problems. The matter has indeed now reached a point where the most serious attention should be given at once to a situation which can only get worse unless a drastic reduction is made in the number of graduate students accepted, together with a restriction in the fundamental character of the investigative work underway.

The Research Laboratory of Physical Chemistry has nearly completed its elaborate equipment for certain fundamental investigations relative to the properties of gases at low pressures and over a long range of temperature. This equipment exceeds in the possibilities for increased accuracy any similar equipment ever before assembled anywhere. The program of investigation will require about ten years for its completion, at the end of which time most of the more fundamental problems will be completed.

The development of a suitable laboratory for investigations in photo-chemistry or the relation of radiations to chemical changes has made excellent progress due in large part to better space for the work than was formerly available in the Research Laboratory of Physical Chemistry. The new quarters were made available by the physics department at considerable sacrifice.

It is not customary for one department to press the need for space of another department. The investigative work, however, in physics and chemistry touches so closely and promises to touch closely to an increasing extent, that the restricted space for graduate work in both physics and chemistry could be relieved if the combined graduate and research work of these two departments could be provided for in one building. While this may seem an innovation, it is one which will facilitate mutually the development of both fields. The broadening effect of such an association, particularly as concerns graduate students in physical chemistry, will be obvious to those who have followed the development of the latter subject during the last decade.

The investigations reported in progress last year are being continued. The total number of strictly scientific papers published by the staff during the year are as follows: inorganic chemistry 3, organic chemistry 18, physical chemistry 9, or a total of 30.

Gifts of chemicals have been received from the Dow Chemical Company, the Du Pont Company and the Semet-Solvay Company.

Chemical Engineering. The resignations of Professors Haslam and Russell to go into industrial research necessitated extensive readjustment of personnel. Professors Forrest and Frolich were placed in charge of the Research Laboratory, Professor Ryan was brought in from the Buffalo Station to take charge of the practice school and postgraduate activities and Professor Weber was transferred from the Boston Station to the Institute.

The outstanding instructional development of the year was the offering of a ten weeks' intensive summer course in colloidal chemistry, by Dr. E. A. Hauser of Frankfort, Germany, who was secured for the staff of the department as non-resident professor. The reputation of Dr. Hauser and the character of the work are attested by the registration of representatives from research laboratories of sixteen industrial concerns, including leading manufacturers of rubber and petroleum products, explosives, photographic materials, electrical equipment, plastics, pigments and the like.

During the past year the research and professional activities of the department have been unusually productive. The program on corrosion has been continued with especial emphasis on the mechanism of attack of the metal and the action of inhibitors. This has included the work of the Research Laboratory in coöperation with Sub-Committee 3a of the National Association of Cast-Iron Pipe Manufacturers and the technical societies affiliated with it and with the American Society of Refrigerating Engineers. The study of anti-catalysts in the oxidation of organic compounds has resulted in important publications on preventing the deterioration of petroleum oils. Papers on catalysts for the high pressure synthesis of methanol and higher alcohols have attracted widespread attention. The

work on heat transmission has been continued, focussing to a large degree on the condensation of vapors mixed with non-condensible gases. Results in fields hitherto undeveloped included a fundamental study of the mechanism of rectification and the development of the technique of design of equipment both for the rectification of complex mixtures of the type met in the petroleum industry and for the absorption of components of fluid mixtures and the stripping of the absorbed material from the absorbing agents. Also worthy of mention is the publication of the second edition of a textbook on chemical engineering written by members of the department, expanded to include these and other developments vitally important to the profession.

As emphasized constantly in recent years, the outstanding need of the department is facilities adequate for the conduct of its instructional and research work.

Fuel and Gas Engineering. The more important developments during the year include:

The strengthening of instructional work; organization of research on a project basis; work with the American Gas Association and American Society of Mechanical Engineers; the extension of service to industry on fuel problems; organization of advanced courses for students leading to the Doctor's degree, and publication of technical articles.

The loss of Professor Haslam as the active head of the course was a matter of deep regret. It is a source of gratification, however, that he continues as non-resident professor. The present policy as to the instructing staff is to develop as rapidly as possible a selected group of young men fully conversant with and enthusiastic about the program for expanding the work. Mr. Hottel, whose work in the application of laws of heat transfer to combustion equipment design has received wide notice, was promoted to the rank of assistant professor.

Nine students have carried on work leading to the Master's degree, and one has engaged in research leading to the doctorate. With two years' experience it has been possible by revision of the subject matter, to materially strengthen the subjects offered in the course. The methods of handling the field work previ-

ously employed were improved and our relations with the coöperating plants were further cemented.

It is planned to establish next year an additional station at one of the most modern of city gas plants.

Feeling strongly that effective progress will result only from operating according to an adequately conceived plan of research, covering the principal phases of fuel engineering, this branch of our work has been organized on a *project basis*. The research projects now underway may be summarized as follows:

1. Application of Heat Transfer Generalizations to Practical Furnace Design. This work comprises the quantitative application of the laws of radiation, kinetics of gases, and heat transfer to combustion equipment design. Two technical articles were published and three are now in preparation.

2. Study of Pre-Ignition Phenomena in Combustible Gas Mixtures. Work is being carried on under one of the Automotive Fellowships by a candidate for the degree of Doctor of Science.

3. The Synthesis of Hydrocarbons at Atmospheric Pressure. This problem is one line of attack on the economic utilization of off-peak gas capacity. Thesis work has been done and is being continued.

4. A Study of the Coking and Swelling Constituents of American Coals. Four coals have been examined and others are in process.

5. The Hydrogenation of Typical American Coals. Work was started a year ago and will be actively resumed this winter.

6. Flame Propagation in Gases. Several theses have carried out this work and two publications are in preparation.

7. Development of an Optical Pyrometer for True Temperature Measurement. One thesis has been carried out with distinct success and it is expected to conclude work on this problem this year.

8. Study of Cracking and Polymerization of Petroleum Hydrocarbons. This is one of the problems most important to the petroleum industry. Work is now underway.

9. Study of the Constituents of Lubricating Oils, particularly the Temperature — Viscosity — Gravity relationships.

10. Means for Calibrating Large Gas Meters. A problem that is of vital importance to all large distributors of gas.

Other problems worked on include: Study of Methane Decomposition in Flames, Test of Domestic Stoker using Bituminous Coal. These projects embrace the principal fields of fuel utilization and form a logical framework on which to expand and are problems of vital interest to industry as well as being of prime scientific importance.

Instructional work of the highest grade in a field such as fuels, which is rapidly changing, requires industrial contacts on the part of the instructional staff. One means of making these contacts is through work with associations having fuel activities. The staff is engaged in committee work with the Carbonization Committee of the American Gas Association and the Fuels and Instrument Committees of the American Society for Mechanical Engineers. The proper placing of our graduates also requires a detailed acquaintance with those industries using large quantities of fuel.

As a means of encouraging contact between the students and industry, the following lectures were given by men prominent in special fields of fuel utilization.

"Low Pressure Distribution of Gas," by H. S. Carter of the Malden and Melrose Gas Light Company.

"Coke Oven Construction and Operation," by D. W. Wilson of the Wilputte Coke Oven Corporation.

"The Dry Quenching of Coke and the Treatment of By-Products," by A. M. Beebe of the Rochester Gas and Electric Company.

"The Design of Modern Power Stations," by E. A. Norris of Stone & Webster, Inc.

"Engineers, Public Utilities and the Public," by B. J. Mullaney of Peoples Gas Company.

An important activity of the staff is the furnishing of advice on questions of important scientific character. During the year the following subjects have been considered: Study of Unaccounted-for Gas and Calibration of Meters, Radiation to Boiler Tubes, and the Manufacture of Carbon Black.

With the curriculum required for the Master's degree well organized, attention is being given to students pursuing further study leading to the degree of Doctor of Science in Fuel and Gas Engineering. Three advanced courses will be offered the coming year: constitution of fuels, radiation phenomena and kinetics of gases applied to combustion reactions, and a fuels seminar.

Building Construction. The course in building construction which now occupies the rooms vacated by the Aeronautical Department has an enrollment of 22 students in the

first year, 22 in the second year, 12 in the third year and 7 who are taking work in both the second and third years, making a total of 63. As the course has been in operation only two years, there are no fourth-year students.

While as yet no experience is available with which to check our judgment as to the value of the course to graduates, we are assured from the attitude and interest of the students themselves that the course is being well received. From reports of students who have been engaged in practical construction during the vacation period, and from the letters of their employers, we can judge that the instruction has been very helpful, although only a part of the course has been completed. Steps are being taken to establish active contacts with the building industry which will result in marked benefits to the students in later years.

Division of Industrial Co-operation and Research. The Division of Industrial Coöperation and Research as heretofore has continued to carry out with the assistance of the members of the staff various tests, researches, and investigations for industrial concerns. The number of such investigations has shown some increase during the year, and the tendency of the work to involve research and investigations rather than brief tests is marked. A systematic effort has been made to carry out the method adopted last year of making the charges for such work on the basis of cost plus a suitable overhead for each research or investigation rather than to attempt to assess a satisfactory annual charge for work done. This change seems to meet with the approval of most of those for whom work is done.

Division of Municipal and Industrial Research. The work of the Division of Municipal and Industrial Research during the past year may be summarized substantially as follows:

Three field projects have been completed, namely, the industrial survey of Metropolitan Providence; a limited community survey of Norwood, Massachusetts; and special service to the city of St. Louis, Missouri, in the matter of an investigation of gas rates prevailing in that community.

The Providence survey was completed and the report submitted to the Advisory Board having this matter in charge, early in March. Following the submission of the report, a series of conferences were held, at which the report was discussed in detail with the director, and in some cases these conferences included in addition to the members of the board, representatives from local industries and other interests. As a result of these conferences, the report was amended in some particulars before being released for publication. This arrangement, while somewhat expensive in time devoted to the work, proved generally advantageous and is noted as being probably a desirable one to follow in future work.

A brief survey of industrial and other community conditions in Norwood was made early this year, at the request of the Norwood Chamber of Commerce. The purpose of this work was to determine the relative suitability of that community for industrial or suburban residential development and to measure the local need for public improvements and various services furnished by government. The limited funds provided, and the resultant necessity for restricting the scope of the study, in our judgment, militated somewhat against securing satisfactory accomplishment.

At the request of the city solicitor of St. Louis, Mr. Dickerman of our staff represented that city in connection with an investigation of gas rates. Mr. Dickerman is one of the best qualified individuals in this country in matters of this kind and it seemed both appropriate and desirable that he should provide the service requested.

At the request of a joint committee representing the city government of Bangor and the Chamber of Commerce of that city a zoning and an economic and municipal survey of Bangor was started early in June. The service required in the matter of map preparation and collection of general zoning data was provided by the division forces. The zoning work is completed and the zoning map and ordinance are now before the City Council for action. It will be necessary to submit the matter of zoning to a vote of the people of Bangor at the municipal election in December.

Field work on the economic and municipal survey is completed and the report is being prepared. Professor Fernstrom

of the Institute staff has been identified with the latter work since it started. This arrangement has been particularly gratifying to the director, in that it has offered a practical demonstration of the opportunity for effective coöperation between another department of the Institute and this division in the field of work in which we are engaged.

Demands for service which, it is probable, the division will be requested to provide within the next few months, involve the following matters:

A comprehensive economic survey of the Island of Porto Rico.
A limited industrial survey of Woonsocket, Rhode Island.
An economic survey of the thirteen counties comprising the Yazoo Mississippi Delta.
A comprehensive industrial survey of Worcester, Massachusetts and environs.

The division has been requested by the Brookings Institution of Washington, which is to undertake a comprehensive economic survey of Porto Rico, to participate in the latter work by providing certain service which that institution is not in a position to furnish. Dr. Victor S. Clark will direct the work of the survey. A conference with Dr. Clark was held, at which tentative plans were outlined for coöperation in this matter.

The city government of Woonsocket, Rhode Island, has appropriated funds for a limited industrial survey of that city and has requested us to attend a conference for the purpose of discussing the conditions under which the division can undertake providing the service required.

A request has been received from the Chamber of Commerce of Clarksdale, Mississippi, representing the thirteen counties included in the Yazoo Mississippi Delta, for an outline of a comprehensive economic survey and an estimate of cost. The information requested has been furnished and we are informed that some action will be taken on the matter in the near future.

The matter of proceeding with a comprehensive industrial survey of Worcester, Massachusetts, has been under consideration for some months by a group of citizens of that community, and various conferences have been held with the director on

this proposed work. It is expected that some definite action on this matter will be taken within two months.

During the past year other requests for information concerning community industrial surveys have been received from the following cities: Westerly, Rhode Island; Haverhill and Lawrence, Massachusetts; Middletown and Norwich, Connecticut; Waterville, Maine; and Halifax, Nova Scotia. In the case of Haverhill and Lawrence, several conferences were held and estimates of cost of the work contemplated were submitted.

Two appointments to the staff of the division were made during 1928, namely, Mr. Judson C. Dickerman, '95, and Mr. Everett B. French, '20. Other service required has been met by employing individuals on a temporary basis for specific work. The experience of the past two years has disclosed serious disadvantages in this arrangement. It is believed that if any substantial amount of service is required from pending demands alone, it will be necessary to make two additional staff appointments.

Geology. During the present year the department has had comparatively few students who specialized in geology. There are indications, however, that a much larger attendance will be shown during the next year. The students registered in geology numbered 5 graduate, 4 special, and 4 undergraduate. The most important service of the department is to students of other courses. The total number of students in other departments to whom instruction was given amounted to 159 in the first term and 174 in the second. Besides this two courses in general study were given by the department. No important changes in courses were effected during the present year.

Dr. H. C. Boydell resigned on January 1, 1928, to take up professional work in Toronto under the name of Wright & Boydell. Prof. Frederick K. Morris has been added to the staff to teach structural and field geology. Before coming here he was assistant geologist on the Roy Chapman Andrews expedition into Mongolia.

Professor Lindgren was on leave of absence during the year acting as chairman of the Division of Geology of the National Research Council. During this time Professor Shimer

was acting head of the department. Professor Shimer completed his book on "Evolution and Man."

Studies in the genesis of alkaline rocks have been pursued by Professor Gillson. Professor Newhouse has been investigating the occurrence, properties and genesis of a brown variety of magnetite and has been carrying on research on the relation of ore deposits to igneous rocks, together with the cause of the succession of ore minerals.

Professor Newhouse and Mr. Buerger collaborated in a study of wood tin nodules. Mr. Buerger is beginning an investigation of the nature of the bond in sand-lime brick and is continuing his research on the mechanism of plastic deformation on crystals.

During the summer of 1927, Mr. Smitheringale visited for the Canada Geological Survey various localities in Nova Scotia and New Brunswick in which manganese has been reported as occurring, and gathered data relating to their occurrence and economic aspect.

W. F. Jones, formerly of this department, gave the course on the geology of coal and petroleum during the first term.

Mr. J. A. Cushman, as in the previous year, gave a course at his laboratory at Sharon, Mass., on micropaleontology.

A series of twelve lectures on the "Use of Geophysical Methods in the Location of Oil" was given by Dr. Donald C. Barton, Geologist and Geophysicist of Houston, Texas, the latter part of the second term.

The department plans to include the teaching of geophysics and it is hoped that in the near future a suitable instructor will be found. It is hoped to give also the course in petroleum geology.

Mathematics. In the fundamental general course in calculus, Professors Woods and Bailey have made a thorough revision of the "Elementary Calculus." The present text has been in use for five years. The revision involves both minor changes of order and a rather complete replacement of problem material.

The Department Library will be greatly benefited by the generous bequest for its maintenance by the late Professor Osborne, for many years Walker Professor of Mathematics.

The special appropriation for mathematical apparatus has been applied toward the purchase of a high-grade harmonic analyser.

Professor Wiener and Dr. Struik have collaborated in giving a course in theory of quanta and relativity, and Dr. Struik has given a course in probability for students in electrical engineering, following the general lines of the course introduced last year by Dr. Fry in the Department of Electrical Engineering.

In applied mathematics a new course in theory of elasticity has been introduced by Professor Hovgaard of the Department of Naval Architecture.

Assistant Professor Franklin has spent a year in Europe, mainly at Göttingen and Zürich, holding a Guggenheim Fellowship.

Dr. Struik has received honorable mention by the Council of the Physical-Mathematical Society of the University of Kazan for his book, "Grundzüge der mehrdimensionalen Differentialgeometrie in direkter Darstellung," in connection with the seventh award of the Lobatchevski prize.

English and History. During the year the department gave to a selected group of second-year students the opportunity to pursue work in English under the tutorial system. Men of high standing who presented an acceptable program of study along a definite line were accepted as members of this honors group; they were excused from attendance at regular classes and their work was supervised in individual conferences each week with their tutors. The subjects chosen for study showed a wide range of interest, and the progress made by the men in this group was on the whole satisfactory. The experience of the past year has shown, however, that this method of instruction is justified only in the case of men who possess exceptional ability and a genuine interest in some special field of work, as well as the power of study on their own initiative. In order to make this selection under the best conditions the honors group for the coming year will not be formed till the beginning of the second term, by which time the qualifications of the applicants will be well known.

Romance Languages. During the past year the head of the department has been on leave of absence for study and travel in France, Spain and Italy, among other things making a study of methods in use in various kinds of schools, and collecting data on the best recent materials for use in instruction. In his absence the work of directing the department was satisfactorily carried by Prof. W. C. Holbrook. During the year the work of the department was slightly reduced, the general study in practice in general and technical ideas in French being temporarily withdrawn. It will be reinstated next year.

The department has recommended to the chairman of the Committee on General Studies the following change in policy: "That all students who have already completely fulfilled entrance requirements in foreign language may count as a general study any other language course they may take, no matter of what grade." In the past a serious student who had met all our entrance requirements in, for example, French or German, could not begin the other language at the Institute and have it count as a general study. This discrimination against language seems quite indefensible and is contrary to the best interests of some of our most promising students who for research work feel after entering the Institute the need of a new language tool. One has only to examine our list of general studies to see that many of them do not excel in the least a good year of language study in both cultural and practical values.

German. The instruction during the past year has been given in three grades: Elementary, Intermediate and Advanced. But one elective course is given, and there should be an opportunity of offering an additional one in conversational practice. Inquiries are received each year for such a course.

The requirement of making up entrance examinations promptly as now enforced has a tendency to make the elementary classes somewhat larger than formerly; it is expected that the coming year may require an additional instructor.

Military Science. The results obtained last year showed a decided improvement over the previous year, but the Military Science Department is making an effort to still further improve this work during the coming year.

The uniform last year was a decided improvement over that of previous years and further changes are planned for the coming year. Posture is considered of vital importance. Military bearing is directly linked with physical culture, and this also provided a sub-conscious method of discipline. Discipline in ranks during drills has been, in the Military Science Department, the one great end and aim. This feature of this department renders it valuable to the Institution, for discipline with the first year men has a strong tendency to inspire a proper respect for the observance of rules and regulations, as well as law and order in general.

The Coast Artillery Unit of the department has varied its course so as to include more extensive training in anti-aircraft artillery and in railway artillery. These two technical arms of the service will undoubtedly be important factors in our country's general scheme of National Defense and it is gratifying to know that this department is keeping up to date in its activities.

Hygiene. The Department of Hygiene has made rapid progress during the year. Although the youngest department, it might well be called the largest, as it is responsible for the health of everyone connected with the Institute.

The following figures illustrate the work done by the department during the year.

Number of visits made by faculty	1,102
Number of visits made by students	14,373
Number of visits made by employees	1,471
Number of patients sent to outside doctors	250
Total for Fiscal Year	17,196

The above visits may be subdivided as follows:

Surgical cases	6,768
Medical Cases	6,319
Contagious cases	30
Examinations made	1,448
Excuses issued	2,631
Total	17,196

Of the group of 250 men sent to outside specialists, many of them were in such poor physical condition that it was necessary after their physical examination here to have a further study made of the defects found. These men were sent to:

Dentist	50	Laryngologist	48
Ophthalmologist	62	Psychiatrist	2
Otologist	16	Epidermologist	18
Urologist	6	Internist	2
Pulmonary Specialist	5	Roentgenologist	41
Total	250		

The contagious were:

Chicken Pox	3	Vincent's Angina	3
Measles	7	Tuberculosis	5
German Measles	1	Impetigo	1
Mumps	5	Infantile Paralysis	1
Pneumonia	2	Scarlet Fever	2
Total	30		

Thirty-nine men were sent to hospitals because of lack of hospital facilities here. The reasons were:

Otitis Media	1	Infected Arm	1
Acid Burns	4	Jaundice	1
Appendicitis	4	Mastoid	1
Fractured Shoulder	1	Observation	4
Epilepsy	1	Pneumonia	3
Fistula	1	Pleurisy	2
Fractured Femur	1	Sinusitis	2
Grippe	7	Tonsilitis	2
Hematoma of Leg	1	Tachycardia	1
Hernia	1		
Total	39		

The department introduced the policy of requiring the men with defects to report back for recheck on their physical condition. In this manner a closer watch was kept on all the men during the year. Even after graduation the men returned for advice.

The most urgent need of the department has been adequate facilities for examining men. A total of 1,448 men were examined last year. Out of this group 281 were found with

defects. Some of these men had two or more, making the total 327.

228 men were of the Class of '31
26 men were of the Class of '30
14 men were of the Class of '29
5 men were of the Class of '28
8 men were of the Graduate Class

One hundred sixty men were examined for the Reserve Officers Training Corps. One hundred seven of these men were vaccinated and 517 typhoid inoculations were given.

The number of deaths was 8.

3 deaths from heart trouble
1 from accident
3 from suicide
1 from tuberculosis

The new home of the Department of Hygiene, the Homberg Memorial Infirmary, is practically complete and is one of the most modern and best equipped of its type. It is now open and ready to handle the work of the coming year with all possible dispatch and efficiency.

Summer Session. The attendance for the year 1928 was 1,414, which is 34 less than the previous year. The net income for this year's session, that is to say, the tuition minus the cost of teaching was $46,934, which is some less than the preceding year. The decrease is due to the omitting of certain subjects.

The school, while showing a slight decrease from the previous year, has accomplished two very important contacts looking toward the establishment at the Institute of higher instruction in which teachers, engineers and industrial scientists may benefit during the vacation period.

The first of these contacts was a class of teachers of physics in engineering schools. At the suggestion of the Society for the Promotion of Engineering Education, the Institute conducted a course for teachers of physics at which instruction was given by the members of our own staff as well as by lecturers brought in from the outside. The attendance was very good for the first attempt. We have heard many complimentary statements from those who attended as to the way in which the work was

conducted. This contact is an exceedingly important one, since the Institute is conducting undergraduate and graduate courses which are not given at many other institutions. It is very desirable that the teachers should know what courses are given, as they often come in contact with promising students seeking more advanced work.

The other contact was with industrial chemists. The Institute secured as lecturer one of the ablest men in the field of colloid chemistry, a branch which is of great interest to industrial chemists today. The course was one of lectures and research work extending throughout the greater part of the summer, and was attended by industrial chemists from research laboratories of various concerns.

Here, again, the Institute can render a very great service to industry by making such opportunities available to chemists, engineers or scientists who wish to keep in touch with the latest developments in special scientific fields.

Dean of Graduate Students. The registration of graduate students pursuing courses leading to higher degrees was on November 1, 1927, 365, a slight increase over the registration of the preceding year. These students were distributed as follows:

Applicants for Doctor of Philosophy	34
Applicants for Doctor of Science	55
Applicants for Doctor of Public Health	1
Applicants for Master of Science	267
Applicants for Master in Architecture	8

In this group were graduates of 126 colleges and technical schools which were located in 36 states and 20 foreign countries.

A large proportion of the students coming to the Institute for advanced work are graduates of technical schools or colleges which offer courses leading to the degree of Bachelor of Science. Thus, outside of graduates of the Institute who constitute approximately one-third the total of our graduate students, 89 per cent entered with an S.B. degree and only 11 per cent with a Bachelor's degree in arts or philosophy. Students in the latter group require in general one year or often two years longer to complete the requirements for our Master's degree than those

in the former group. Students whose programs consist primarily of preparatory undergraduate work are classified as special graduate students until such time as they are ready to begin advanced work. Each Department Committee on Graduate Students, after a careful study of the credentials presented, and a personal interview with the student, reports to the Committee on Graduate Courses and Scholarships the standing upon which the student is admitted and this report, when approved by the Dean of Graduate Students, is recorded and a copy sent to the student. This procedure, inaugurated last year, tends to eliminate all misunderstanding between the student and his department, and assures the maintenance of a uniform standard of admission of graduate students in the various departments. The Committee on Graduate Courses and Scholarships endeavors to maintain a high standard of scholarship for all advanced degrees and upon its recommendation the Faculty raised the requirements for the Master's degree this past year. Any candidate whose records are not of a distinctly high grade may, at the discretion of his departmental committee, be required to pass a general examination at the end of his course before being recommended for a degree.

The number of higher degrees conferred during the year 1927–28 was 203, eleven more than were awarded in the preceding year. The number of different degrees awarded was as follows:

Doctor of Philosophy	8
Doctor of Science	10
Doctor of Public Health	1
Master of Science	176
Master in Architecture	8

The committee received 196 applications for graduate scholarships during the year and made 151 awards, totaling in amount nearly $40,000. Except for the special endowed fellowships carrying fixed stipends, varying from $500 to $1,500, the grants made were in general limited to tuition. How essential financial aid is to students who desire to continue their studies beyond the Bachelor's degree is indicated by the fact that over 41 per cent of the students working for higher degrees were recipients of scholarships. Of the 86 students working for the doctorate 48 were financially assisted. Thirty-one candidates

for the doctorate and 27 candidates for the Master's degree were on the Instructing Staff.

To discover the exceptional man and make it possible for him to continue his studies in the graduate school is one of the serious problems presented to the Committee on Graduate Courses and Scholarships and our endowed fellowships yielding about $500 are, with tuition now at $400, no longer sufficient to finance a student for a year's study as they were twenty-five years ago. The stipend carried by graduate scholarships and fellowships offered by many institutions is now $1,000 or more or when of lesser amount, $500–$750, tuition fees are remitted. The Institute is fortunate in having a number of larger fellowships now available. The $1,000 scholarships recently established by Mr. Swope, Mr. Crane and Mr. Sloane in the Departments of Electrical Engineering, Physics and Automotive Engineering have been of very great assistance to graduate students in these departments. It is hoped that similar scholarships in other departments may be established in the near future.

With the rapid development of graduate work in all departments in recent years the amount of research work undertaken has steadily increased. This has consisted not only of researches presented as Masters' and Doctors' theses but also of investigations carried on by members of the staff, who have been given every encouragement, both in time and laboratory facilities, to devote themselves to research problems. Research work at the Institute has been further aided by the annual visits of distinguished investigators from abroad who, upon invitation of the President, have spent some weeks in lecturing to graduate students and the staff and directing research. The establishment of research scholarships has also been a great aid in building up research in other departments. Special mention should be made here of the Crane and Sloane research fellowships in the field of automotive engineering established last year. Four fellows were appointed, of whom two have been reappointed to continue their investigations the coming year and a third appointment has just been made. These fellowships made possible certain investigations which could not otherwise have been undertaken and important results seem assured.

To bring together the results of laboratory investigations

and other original work published by members of the staff, a new publication has been established during the past year entitled "Abstracts of Scientific and Technical Publications from the Massachusetts Institute of Technology." The volumes are to be issued semi-annually in January and July, and each will contain abstracts of the publications of the staff during the preceding six months. The first volume issued in January, 1928, covered the work of the preceding year. The total number of publications abstracted was 261, including 18 doctor's theses. Volume two, issued in July, and covering publications from January 1 to July 1, 1928, contained 129 abstracts. It is hoped that this publication will serve to direct attention to the wide range of research work which is in progress at the Institute and to other original contributions of members of its staff.

Society of Arts. During the past year four popular science lectures were given under the auspices of the society. These were in each case twice repeated, as in previous years, to meet the large demand for admission. The attendance taxed the capacity of the large lecture hall at nearly every lecture, indicating the continued interest which pupils in the secondary schools and the general public take in these lectures. The subjects chosen were equally divided between pure and applied science, and all were new in the sense that they had never previously been presented before a Society of Arts audience.

The course was opened by Professor Shimer, who discussed with models, diagrams, slides and fossil specimens the geologic history of Boston and vicinity. The evolution of this locality with its changing flora and fauna was a subject which proved of great general interest.

Professor Hosmer of the Department of Civil Engineering gave a most interesting lecture on the effect which modern investigations have had on navigation, tracing the development of the art from the time of Columbus to the present. This lecture was illustrated by ancient and modern nautical instruments, and at the conclusion an opportunity was offered the audience to visit the nautical museum.

Professor Taylor of the Department of Aeronautical Engineering chose for his subject automobile and aircraft engines,

a topic of particular interest to young men at the present time. The underlying principles upon which these engines are designed were demonstrated by experiments on combustion and explosions. Various automobile and aircraft engines were exhibited. The lecture well illustrated how an engineering subject may be experimentally treated in the lecture room.

The last lecture of the series by Professor Sherrill of the Department of Chemistry was on modern conceptions of the structure of matter in which the lecturer differentiated with clearness between experimentally proved facts and the hypothetical conceptions of atomic structure, which have been proposed to explain these facts. This lecture was illustrated by novel and striking experiments with electrons and alpha particles, some of which were shown at the Institute for the first time.

Assistant Dean of Students. Three additions to the Institute's plant completed during 1927–28 will greatly enhance the general welfare of the student body. These are: four new dormitory units which make the total housing capacity about 430, an increase of nearly 50 per cent; the Richard Homberg Memorial Infirmary; two new wings on the boathouse.

Demands for dormitory accommodations will not be satisfied by these four units and it is hoped that another year will witness further dormitory construction. Following a resolution of the Corporation at its meeting of October 19, 1927, a committee of twelve was appointed to consider the Institute's dormitory problem in all phases, its membership being three representatives from the Corporation, alumni, faculty and undergraduates. Its conclusions and recommendations which were presented at the meeting of the Corporation on March 14, 1928, were published in *The Technology Review* for May, 1928. In general, the committee approved of the present dormitory policy "in aiming to provide a maximum of necessary comforts and livability without luxury," of the present stairway type of plan, of the present administrative policy. The committee was not in favor of segregating the classes by assigning special units for freshmen or other groups of undergraduates, but it did recommend that provision be made for the accommodation of graduate students and younger members of the

instructing staff and that such "provision might well be of a different character from the present undergraduate dormitory group and separately or differently located." It fixed upon 800 as the number of undergraduates for whom housing facilities ought to be provided.

To the Medical Director, who is charged with the care of student health, the meaning of the new infirmary is readily apparent. Its import to the administrative office charged with the responsibility of coöperating with the President in matters of general student welfare, while less obvious, cannot be overestimated. For the first time in its history the Institute now possesses facilities which students, parents, faculty and alumni may feel assured are adequate for the consummation of a program for the conservation of student health. The handicap of poor health, often due to neglect, is readily understandable to one who examines the records and consults with undergraduates whose lack of academic progress brings them to the Dean's office. It is to be hoped that in the near future it will be possible to provide for the complete physical examination of each student at least once a year.

Since the purchase of the boathouse six years ago student interest in the sport of rowing has steadily advanced. During 1927–28 over 250 students were actively engaged at one time or another in using its facilities. The new wings make possible the housing of twelve more standard eight-oared shells, thus providing for more than the present boating equipment. The need for the additional room, however, is a very real one and before many years have passed these racks will be filled.

In addition to providing this extra storage space it has been possible to revise the heating system, making it far more efficient than before, and providing much better bathing facilities for the men.

The boathouse as it stands today is a practical working unit capable of housing equipment for at least three hundred oarsmen, and susceptible to certain expansions within its present arrangement which, when necessity arises, will allow for a slight increase of this figure.

The general public, even the Institute's former students, do not realize the extent to which the Institute's present-day students engage in athletic activity. Being organized on the

basis of providing clean, healthy sport for as many students as can be interested rather than merely to develop winning teams, and since we do not operate Varsity football or baseball teams, Institute athletics do not figure heavily in the sporting columns of the press. Nevertheless, during 1927–28 the Institute was represented by Varsity teams in 14 sports, and there were about 100 intramural teams. Nearly 550 students participated in actual athletic competition, the squads from which they were drawn being several times larger.

It is apparent to one closely in touch with conditions that a gradual change has been taking place in the undergraduate social system during the past five years. Junior Week has been the climax of the year and into a period of less than a week in April there has occurred the Junior Prom, the *Technique* Rush, the Boston performances of Tech Show, the spring concert and dance of the Combined Musical Clubs and the spring Interclass Track Meet. This spring the show lost money for the second year and its plans for 1929 envision a vaudeville show, with three local performances and no road trip, instead of the traditional musical comedy. While the other Junior Week activities either made a profit or sustained but slight losses, it is obvious that many undergraduates view Junior Week with apathy rather than enthusiasm.

After a thorough consideration the Joint Committee of Faculty, Alumni and Undergraduates, which has dealt with the Junior Week calendar of recent years, voted to omit Junior Week in 1929. This does not mean that the events of Junior Week are to be abolished but that they will be distributed throughout the academic year instead of being concentrated into a brief period. The Institute Committee, as the governing body of the undergraduates, has appointed a sub-committee to canvass student opinion and formulate recommended procedure for the years after 1928–29.

During 1927–28 another sub-committee of the Institute Committee has been engaged upon the preparation of "A Report on the Undergraduate Curricula and the Student-Faculty Contact" at the Institute. Its report was formally presented to the Faculty on May 16, 1928, by its chairman, Elisha Gray, '28. The content of the report and its manner of presentation evoked much favorable comment.

During the academic year four students were required to withdraw by the Faculty for academic misdemeanors and eight were placed on probation by the Dean's office on account of misconduct.

Because of poor scholarship, 146 were dismissed by the Faculty during 1927–28 and 108 were advised to withdraw. Those dismissed in 1926–27, 1925–26, and 1924–25 numbered 145, 137, and 153, respectively.

Special effort has been made during this year to coördinate the work of this office with the Faculty Committee on Admissions. Of the 555 members of the Class of 1931 admitted, 33 were suspended for low scholarship at the midyears, but informed they might, under certain conditions, return with the Class of 1932 in the autumn of 1928. Five were advised to withdraw permanently from the Institute and two students, who had failed in previous years and were repeating the freshman work, were expelled because of continued low standing. In June ten freshmen were informed that their general record prevented their continuance but that they might petition for readmission as members of the Class of 1933 in the autumn of 1929; sixteen were advised to withdraw and four were expelled. Particular study was given to each of these cases by this office and the chairman of the Faculty Committee on Admissions, and this study will be continued in the future to the end that this freshman "mortality" may be reduced.

By faculty rule, the Dean of Students acts as chairman of the Committee on Provisional Students, to which questions of readmission of students who have been dropped for academic or disciplinary reasons are referred. A survey of the actions of the committee during the past six years shows that 151 petitions were denied and that 240 former students were readmitted. Of this latter group 27 per cent have graduated, 17 per cent are still in residence and the majority may reasonably be expected to complete the requirements for the degree, 34 per cent have been dropped again, and 22 per cent withdrew for various reasons, mostly on account of low records.

The administrative work of the Faculty Committee on Undergraduate Scholarships, which was made a duty of the Dean's office in December, 1926, has been carried out for the second year. Tentative awards for 1928–29 have been made

to 328 men and 12 women, the total amount of money available for these grants being $70,140 and $4,800 respectively. These latter figures exceed the amounts available during the year 1927–28, an extra appropriation having been made because of the raising of the tuition fee. The final report of the committee for 1927–28 shows that grants were made to 306 men and 14 women, totalling $57,555 and $3,450 respectively.

The Librarian. Material borrowed from the Institute Library for home use during the year 1927–28, including books, bound and unbound periodicals, maps and photographs, amounted to 46,319 items. This covers both the Central Library and branch or departmental libraries.

After allowing for books discarded or lost, the net increase in the library was as follows:

Volumes added to Central Library	5,002
Volumes added to branch libraries	2,606
Total	7,608

Total volumes in Institute Library and branches, June 30, 1928: 250,109.

The total contents of the Institute Library includes in addition to the Central Library, the following volumes in the branches:

Architecture	5,592
Civil and Sanitary Engineering	3,067
Economics	4,160
Geology	3,092
Mathematics	3,130
Mining and Metallurgy	7,501
Modern Languages	1,468
Naval Architecture	3,430
Walker Memorial	7,038
Others	2,830
Total	41,308

The cost of the year's accessions is shown in the following table:

	Books	Periodicals	Binding	Total
From Library Appropriation.....	$5,004.70	$4,305.86	$4,143.08	$13,453.64
From Endowment Funds.....	2,970.81	.....	.....	2,970.81
From Departmental Appropriations.	978.41	600.12	.....	1,578.53
Total.....	$8,953.92	$4,905.98	$4,143.08	$18,002.98

Increasing use has been made of the interlibrary loan service. There were borrowed from other libraries 338 volumes and lent to others 581. The publication of the Union List of Serials has undoubtedly stimulated the practice of interlibrary borrowing. It is a valuable privilege which libraries thus accord one another. By means of it the resources of many libraries are available to the patrons of each. Our own readers, particularly the members of the instructing staff and graduate students, obtain thus the use of books and periodicals which the library cannot afford to own. We pay for this privilege only by refunding postage and by rendering similar service to other libraries.

The most notable event of the year was the installation of the third tier of stacks. This had long been needed, because the stacks were becoming intolerably crowded, to the great detriment of the books and of the library service.

During the midyear period all books in the sciences were moved to the new floor, and the books in engineering subjects were spread out into the space thus vacated in the second tier floor. This involved the moving of about 100,000 books, which was accomplished in seven days by a corps of twelve students working under the direction of the Librarian, at a total cost of $267.13.

A four-page leaflet of information concerning the library, prepared especially for the purpose, was sent out, with a registration card, to new students, by courtesy of the Registrar, who enclosed them in his envelope of printed material. This circularizing of new men proved a most satisfactory method of obtaining the early registration of new readers, 630 registration slips having been turned in during the first week of the fall term.

At the beginning of the fall term a fine system was installed. The need of fines to correct the tendency of readers to keep books longer than necessary had long been felt, but there had been a natural reluctance to depart from our previous liberality. The fine system, however, soon justified itself. Borrowed material is now returned more promptly and the clerical work connected with recovering overdue books has been greatly reduced.

The need of systematic reconstruction work upon the main catalogue has long been recognized. The catalogue, like the library itself, was the result of the amalgamation of several departmental libraries which had had varying standards in cataloguing. As a result it contains thousands of poorly-made entries, inadequate and inconsistent, and the service to readers is correspondingly slowed up. A thoroughgoing revision must wait for a larger cataloguing staff. Early in the fall, however, Mr. William R. Brewster, formerly with the Boston Public Library, was engaged to revise subject headings. During the remainder of the year he revised 553 headings, largely in the fields of aeronautics, electrical engineering, electrochemistry and X-rays, and wrote many "definition cards," establishing permanent standards in these subjects for future cataloguers. In this undertaking he had valuable assistance from several members of the Instructing Staff. The importance of work of this sort is difficult to appreciate except in actual use of the catalogue. Eventually it should be continued, if a competent expert can again be found.

During the year also a beginning was made in the use of Library of Congress cards. The library subscribed for such series as could be paid for within our existing appropriation.

A special appropriation enabled us to undertake the repair of many rare books and the proper care of several hundred pamphlets, all belonging to the Vail Collection, many of them presentation copies bearing the handwriting of such eminent scientists as Faraday, Maxwell, Tyndall, Ampère and others. In this connection also should be mentioned two original letters of Ampère. This material has been put in excellent shape by Mr. Palmer of the Rose Bindery, who is an expert in such work. There remain a great many rare books and pamphlets not in the Vail Collection which should have similar treatment.

During the year the librarian served as editor of the Massachusetts Library Club *Bulletin;* the Vail librarian, as chairman of the Electrical Engineering Committee of the Commercial-Technical Group of the (national) Special Libraries Association; and the assistant librarian and a member of the staff as members of committees of the Special Libraries Association of Boston. The Vail librarian, in the capacity just referred to, edited "A Bibliography of Electrical Literature," which appeared as Special Libraries Association Information Bulletin No. 6, and was issued in the Department of Electrical Engineering Contributions series as Serial No. 62, June 1928. She also contributed an article entitled "Preconvention preparedness: a survey of recent literature" to the *American Gas Journal,* September, 1927, and an account of the material on early aeronautics in the Vail Collection to the *Technology Review,* April, 1928, which, though in English, appeared under the title "Description des expériences de la machine aérostatique."

Shortly after the lamented death of Dean Talbot, Mrs. Talbot expressed the wish that the Department of Chemistry should have as many of his books as it desired, and a selection was made by members of the department staff. These books have been located in various offices of the department. Of the remainder of Dr. Talbot's library, about 150 volumes came to the Institute library, a large number of which have been placed in the chemistry reading room. Other noteworthy gifts were:

Rear Admiral Elliot Snow, formerly associated with the Department of Naval Architecture and Marine Engineering: 25 volumes and many drawings and papers relating to the electric propulsion of ships.

Dr. A. H. Gill: 105 volumes upon miscellaneous subjects.

Prof. C. E. Turner: 70 volumes on public health education, donated by eleven publishers.

Mrs. George U. G. Holman (Mary C. Lovering, of the Class of 1892): 70 volumes upon various subjects.

Mr. Franklin P. Kurt: files of several chemical journals.

The library of Yale University: three publications of the Brady Memorial Foundation, namely, Underhill's "Lethal War Gases," Williams's "Social Aspects of Mental Hygiene," and Winternitz' "Collected Studies on the Pathology of War Gas Poisoning."

Miss A. A. Holt: A bibliography of the writings of General Francis A. Walker.

Mr. John R. Freeman: "Regulation of Elevation and Discharge of the Great Lakes," two copies.

Mr. Oliver Hawes: Tredgold's "Steam Engine," edition of 1838.

Dr. Ing. L. Wendemuth: "The Port of Hamburg," in English.

Carnegie Peace Foundation: "Las Bibliotecas en los Estados Unidos," by Ernesto Nelson of Buenos Aires; also "Classics of International Law," volume 10.

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

To several members of the Faculty the library is indebted annually for the regularly renewed gift of various periodicals and society publications; among such donors are Professors Bigelow, Gill, Waterhouse, Locke, Richards and Dewey.

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

Prof. Earle Buckingham: Principles of Interchangeable Manufacturing.
Prof. Earle Buckingham: Spur Gears.
Prof. W. J. Drisko: Mechanics and Light.
Prof. W. T. Hall: Analytical Chemistry (Treadwell). Volume 1. 6th English edition.
Prof. Waldemar Lindgren: Mineral Deposits. 3d edition.
Prof. C. M. Spofford: The Theory of Structures. 3d edition.
Prof. C. E. Turner: Cleanliness and Health. (In collaboration with G. B. Collins.)
Prof. C. E. Turner: Community Health. (In collaboration with G. B. Collins.)
Prof. C. E. Turner: Health. (In collaboration with G. B. Collins.)
Prof. C. E. Turner: Edward Jenner. (In collaboration with G. T. Hallock.)
Prof. C. E. Turner: Louis Pasteur. (In collaboration with G. T. Hallock.)
Prof. C. E. Turner: The Voyage of Growing Up. (In collaboration with G. T. Hallock.)
Former Prof. A. E. Kennelly: Vestiges of Pre-Metric Weights and Measures.

Other gifts were received also from members of the Instructing Staff and from alumni and undergraduates.

The Registrar. Registration in 1927–28 increased for the first time since the year 1921–1922. The increase was the result of a larger entering class, and it is anticipated that the registration will increase for at least a few years.

The changes in registration from last year are as follows:

	1926–27	*1927–28*	*Change*
First Year	495	592	+97
Second Year	547	559	+12
Third Year	603	590	−13
Fourth Year	631	572	−59
Graduate Year	362	374	+12
Unclassified	33	25	− 8
	2,671	2,712	+41

The Science group of Courses, as well as Architecture, continue to grow, while the Engineering group has been decreasing. With the addition of Aeronautical Engineering and Building Construction, it is felt that the Engineering group will probably increase in the future.

The largest increase in any course was in Aeronautical Engineering. It has the unique distinction of growing to full size in one year.

Each year the number of Graduate students increases, and the Graduate Year shows a larger proportion of the total registration.

Statistics for the year 1927-1928 follow:

THE CORPS OF INSTRUCTORS (November 1)

	'09	'10	'11	'12	'13	'14	'15	'16	'17	'18	'19	'20	'21	'22	'23	'24	'25	'26	'27
Professors: Emeriti	1	1	3	3	3	4	4	4	5	5	5	6	5	8	8	7	7	6	6
Retired	1	1	3	3	3	4	5	7	7	6	6	6	7	6	5	5	7	5	4
Non-Resident	3	3	3	3	3	3	3	2	2	2	2	2	2	2	3	3	3	3	3
Research (Not counted elsewhere)	—	—	4	3	1	1	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	5	5	13	12	10	12	12	13	14	13	13	14	14	16	16	15	17	14	13
Professors	43	43	40	47	46	59	63	61	59	58	52	56	56	56	61	64	63	68	73
Associate Professors	14	18	17	16	23	23	23	30	32	29	33	34	35	40	43	42	49	55	58
Assistant Professors	31	30	33	35	33	36	31	36	38	33	39	49	54	48	46	51	53	51	58
Instructors (Members of Faculty)	—	—	—	—	—	—	—	—	—	—	—	—	25	30	25	17	14	11	10
Active Faculty	88	91	90	98	102	118	117	127	129	120	124	139	170	174	175	174	179	185	199
Instructors (Not members of Faculty)	69	66	64	67	74	70	79	90	70	67	99	109	84	80	92	98	112	116	115
Assistants	51	55	50	49	54	52	58	54	38	35	39	79	93	87	60	59	53	63	55
Faculty Instructors and Assistants	208	212	204	214	230	240	254	271	237	222	262	327	347	341	327	331	344	364	369
Research Associates	12	8	5	3	1	3	3	5	4	1	8	19	19	19	25	26	21	24	29
Research Assistants	1	5	6	7	8	15	11	14	7	5	10	15	13	16	17	21	29	38	39
Lecturers	18	21	25	16	19	23	28	31	29	13	13	14	15	15	6	16	21	23	30
Total Active Members	239	246	240	240	258	281	296	321	277	241	293	375	394	391	375	394	415	449	467

REGISTRATION SINCE THE FOUNDATION OF THE INSTITUTE
(As of November 1)

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

Classification of Students by Courses and Years

Course Name and Number	1925–26						1926–27						1927–28					
	YEAR						YEAR						YEAR					
	1	2	3	4	G	Total	1	2	3	4	G	Total	1	2	3	4	G	Total
Aeronautical Engineering XVI	—	—	—	—	15	15	28	21	7	2	14	72	60	45	38	12	15	170
Architectural Engineering IV-A	33	30	16	13	—	92	22	42	29	17	—	110	17	18	35	20	—	90
Architecture IV	29	31	24	43	6	133	36	38	33	38	5	150	42	56	50	32	9	189
Army Ordnance	—	—	—	9	—	9	—	—	—	8	—	8	—	—	—	10	—	10
Biology and Public Health VII	1	5	9	13	13	41	2	2	6	12	14	36	4	14	12	13	8	51
Building Construction XVII	—	—	—	—	—	—	—	—	—	—	—	—	20	25	21	—	—	66
Chemical Engineering X	45	66	42	61	21	235	53	53	61	42	30	239	61	63	54	49	31	258
Chemical Engineering Practice X-A	—	—	—	—	46	46	—	—	—	—	42	42	—	—	—	—	36	36
Chemical Engineering Practice X-B	—	—	—	13	—	13	—	—	—	5	—	5	—	—	—	6	—	6
Chemistry V	16	14	15	21	44	110	22	19	21	15	45	122	13	20	19	16	40	108
Civil Engineering I	47	65	82	91	13	298	56	51	65	84	17	273	63	38	45	63	24	233
Electrical Engineering VI	123	99	131	83	60	496	97	71	92	106	68	434	75	48	70	77	81	351
Electrical Engineering VI-A	33	63	40	36	43	215	21	49	49	33	36	188	51	41	39	44	28	203
Electrochemical Engineering XIV	15	12	11	16	4	58	9	11	16	8	6	50	16	10	11	13	5	55
Engineering Administration XV	58	97	108	101	1	365	63	73	100	97	1	334	61	86	76	83	1	307
Fuel and Gas Engineering	—	—	—	—	3	3	—	—	—	—	8	8	—	—	—	—	14	14
General Engineering IX-B	16	7	25	33	—	81	3	9	10	22	—	44	5	4	9	14	—	32
General Science IX-A	1	4	2	3	—	10	2	1	1	2	—	6	2	4	2	2	—	10
Geology XII	1	—	4	6	10	21	1	1	1	3	9	15	1	1	2	2	8	14
Mathematics IX-C	5	—	4	2	2	13	2	2	3	4	6	17	3	—	6	3	6	18
Mechanical Engineering II	65	92	87	92	29	365	55	70	76	94	34	316	66	58	64	77	32	297
Metallurgy III$_2$	3	5	5	11	10	34	1	7	9	5	9	31	3	1	8	9	6	27
Military Engineering	—	—	—	—	—	—	—	—	—	1	—	1	—	—	—	—	—	—
Mining Engineering III$_1$	7	7	10	10	—	34	5	4	7	7	3	26	6	7	2	7	2	24
Naval Architecture and Marine Engineering XIII	8	7	8	14	2	39	9	7	8	9	2	35	15	7	11	5	1	39
Naval Construction XIII-A	—	—	—	7	12	19	—	—	—	9	6	15	—	—	—	6	9	15
Physics VIII	2	4	5	1	12	24	6	10	4	4	7	31	5	11	10	3	18	47
Sanitary and Municipal Engineering XI	3	3	5	2	2	15	2	6	5	4	—	17	3	2	6	6	—	17
Unclassified	—	—	—	—	—	29	—	—	—	—	—	33	—	—	—	—	—	25
Totals	511	611	633	681	348	2,813	495	547	603	631	362	2,671	592	559	590	572	374	2,712

Classification by Courses of Students Since 1919

	1919–20	1920–21	1921–22	1922–23	1923–24	1924–25	1925–26	1926–27	1927–28
Engineering Courses . . . . . *Total*	2,154	3,117	3,069	2,767	2,599	2,548	2,423	2,253	2,240
Aeronautical Engineering XVI	2	7	10	15	12	14	15	72	170
Architectural Engineering IV-A	46	47	54	38	67	68	92	110	90
Building Construction XVII									66
Chemical Engineering (Inc. X-A, X-B)	381	526	492	430	370	313	294	286	300
Civil Engineering I	255	377	312	319	326	322	298	273	233
Electrical Engineering VI, VI-A, VI-C	305	561	657	658	627	676	711	622	554
Electrochemical Engineering XIV	74	105	98	74	79	61	58	50	55
Engineering Administration XV	375	529	572	484	417	421	365	334	307
Fuel and Gas Engineering							3	8	14
General Engineering IX-B	33	34	47	75	115	99	81	44	32
Mechanical Engineering II	472	651	580	471	417	397	365	329	297
Military Engineering								1	
Mining Engineering and Metallurgy III	103	140	121	94	85	96	68	57	51
Naval Architecture and Marine Engineering XIII	66	95	78	59	46	40	39	35	39
Naval Construction (Grad. U. S. N. A.) XIII-A	18	30	32	41	12	12	19	15	15
Naval Construction (Not Grad. U. S. N. A.) XIII-A Sp.					17	17			
Sanitary and Municipal Engineering XI	24	15	16	9	9	12	15	17	17
Science Courses . . . . . *Total*	153	188	208	231	226	220	219	227	248
Biology and Public Health VII	56	24	30	26	34	32	41	36	51
Chemistry V	66	93	106	128	130	127	110	122	108
General Science IX-A		8	8	11	13	10	10	6	10
Geology XII	15	19	22	20	17	20	21	15	14
Mathematics IX-C	1	2	1	8	10	10	13	17	18
Physics VIII	15	42	41	38	22	21	24	31	47
Architecture IV . . . . . *Total*	73	83	87	117	88	126	133	150	189
Army Ordnance			26	25	18	12	9	8	10
School of Public Health . . . . . *Total*		25	20						
Unclassified . . . . . *Total*		23	95	40	18	32	29	33	25
First Year (Course not indicated) . . . . . *Total*	698*								
Grand Total	3,078	3,436	3,505	3,180	2,949	2,938	2,813	2,671	2,712

* Previous to 1920–21 the election of Courses by first-year students was not recorded.

GEOGRAPHICAL CLASSIFICATION OF STUDENTS, 1927

UNITED STATES

North Atlantic . . . . Total	1,965
Connecticut	71
Maine	53
Massachusetts	1,349
New Hampshire	40
New Jersey	79
New York	241
Pennsylvania	88
Rhode Island	24
Vermont	20
South Atlantic . . . . Total	132
Delaware	8
District of Columbia	58
Florida	15
Georgia	4
Maryland	13
North Carolina	9
South Carolina	7
Virginia	10
West Virginia	8
South Carolina . . . . Total	71
Alabama	7
Arkansas	4
Kentucky	14
Louisiana	7
Mississippi	2
Tennessee	4
Texas	33

North Central . . . . Total	265
Illinois	71
Indiana	19
Iowa	13
Kansas	12
Michigan	25
Minnesota	13
Missouri	38
Nebraska	7
North Dakota	3
Ohio	46
South Dakota	—
Wisconsin	18
Western . . . . Total	82
Arizona	6
California	26
Colorado	23
Idaho	1
Montana	8
Nevada	—
New Mexico	2
Oklahoma	6
Oregon	3
Utah	5
Washington	11
Wyoming	1
Territories and Dependencies Total	29
Alaska	—
Canal Zone	8
Hawaii	6
Philippine Islands	7
Porto Rico	8

Foreign Countries	168
Grand Total	2,712

Distribution of Students in Attendance 1927–28 who have Received Degrees from American Institutions

College		College		College	
Alabama	1	Harvard	12	Rockhurst	1
Albion	1	Haverford	2	Rose Polytechnic Inst.	3
Allegheny	1	Hillsdale	1	Rutgers	1
Amherst	3	Hiram	1	St. Olaf	1
Antioch	1	Hobart	1	St. Paul	1
Armour Institute of Tech.	2	Holy Cross	2	Simmons	1
Assumption	1	Idaho	1	Simmons (Texas)	1
Barnard	1	Illinois	6	Simpson	1
Bates	3	Iowa State	4	Smith	2
Baylor	3	Iowa University	1	South Carolina	1
Boston College	5	Kansas State Agric.	2	Southwestern	2
Boston University	1	Kansas University	1	Stanford	4
Bowdoin	3	Kentucky	5	Stetson	1
Brigham Young	2	Kenyon	1	Stevens Inst. of Tech.	1
Brooklyn Polytechnic In.	1	Lafayette	1	Swarthmore	1
Brown	3	Lake Forest	1	Syracuse	4
Bucknell	2	Lehigh	4	Texas	5
Buffalo	1	Louisiana State	3	Tufts	4
California	5	Louisville	1	Tulane	1
California Inst. of Tech.	3	Lowell Textile Inst.	2	U. S. Military Acad.	13
Campion	1	Loyola	1	U. S. Naval Acad.	24
Carleton	2	Maine	3	Utah	2
Carnegie Inst. of Tech.	2	Manhattan	1	Vanderbilt	1
Central Mo. State Teach.	1	Maryland	3	Vassar	1
Centre	3	Massachusetts Agric.	1	Vermont	1
Chicago	4	Mass. Inst. of Tech.	110	Virginia	1
Cincinnati	1	Michigan	2	Virginia Military Inst.	7
City of New York	2	Middlebury	1	Virginia Polytechnic Inst.	1
Clark	1	Mississippi	1	Virginia Union	1
Colby	1	Mississippi Agri. & Mech.	2	Washington	5
Colgate	1	Mount Holyoke	1	Wellesley	5
Colorado Agricultural	2	Nebraska	4	Wesleyan	3
Colorado School of Mines	1	New Hampshire	2	West Virginia	6
Columbia	4	New Rochelle	1	Willamette	2
Cornell University	6	North Carolina	2	William Jewell	1
Dartmouth	8	North Carolina State	1	William and Mary	1
Davidson	1	Northeastern	5	Williams	5
Delaware	1	Northwestern	1	Wisconsin	7
Denver	1	Norwich	1	Wittenberg	1
De Pauw	3	Notre Dame	7	Worcester Polytechni In.	2
Detroit	2	Ohio State	1	Yale	7
Drexel Institute	1	Ohio Wesleyan	1		
Duke	2	Oklahoma University	1	Grand Total	483
Elon	1	Oregon Agricultural	1		
Emporia	2	Pennsylvania State	4	No. Reg. for Advanced Degree	361
Franklin and Marshall	1	Pennsylvania University	3	No. Reg. for Bachelor's Degree	156
Furman	1	Pomona	1		
Geneva	1	Princeton	6	Total	517
Georgetown	1	Providence	3		
Georgetown Univ.	3	Purdue	5	No. of Colleges Represented:	
George Washington	1	Radcliffe	2	American	153
Georgia	2	Randolph-Macon	2	Foreign	56
Georgia School of Tech.	1	Rensselaer Polytech. Inst.	2		
Grinnell	1	Rhode Island State	1	Total	209
Hamilton	2	Rice Institute	1		
Hampden-Sidney	1	Rochester	2		

Summary of Degrees Awarded

	Total
Bachelor of Science	11,912
Master of Science	1,577
Master in Architecture	47
Doctor of Engineering (Discontinued after 1918)	4
Doctor of Public Health	3
Doctor of Science	53
Doctor of Philosophy	103
Grand Total	13,699

A. F. Bemis, for Rowing	$250.00	
Contributions to Bursar's Fund, for Loans	650.00	
Miscellaneous	450.00	
		$88,469.12
		$956,191.16

The past year has been marked by notable additions to our buildings and equipment aggregating $800,000 in cost. Of this the four new Dormitory Halls and their equipment, provided for by contributions from Alumni and others, total $310,000, the Daniel Guggenheim Laboratory of Aeronautical Engineering $250,000, the Homberg Memorial Infirmary $170,000, additions to the Boat House $30,000, and a new turbo-generator in the Power Plant $40,000.

Also since May 1, grading, tree planting and seeding has been going on in the Great Court of the Institute which, though long deferred, is now nearly completed, and is a long step forward toward the ultimate horticultural development of the Institute's frontage on the river.

The General Funds of the Institute totaling $29,800,000 have for the past fiscal year yielded a net income of 5.55% plus a small balance which has been carried to the Endowment Reserve Fund. This protective fund now totals $592,000, or 2% of the total of all investments held by the Institute.

A statement of the Trustees of the Massachusetts Institute of Technology Pension Association is included herewith:

BALANCE SHEET, JUNE 30, 1928

Assets

Investments (listed below)	$164,228.00
Cash	8,502.90
Total	$172,730.90

Liabilities

Teachers' Annuity Fund (5% deduction plus interest)	$90,788.33
M. I. T. Pension Fund (3% of salary deducted, plus interest)	56,343.04
Reserve Fund	25,599.53
	$172,730.90

Investments (as above)

$5,000	Dominion of Canada	5½%	1929	$5,000.00
10,000	City of Montreal	5%	1936	10,000.00
10,000	United Kingdom, G. B. & Ireland	5½%	1937	10,306.00
8,000	Allis Chalmers Mfg. Co.	5	1937	8,018.00
10,000	American Sugar Refinery Co.	6%	1937	10,330.00
15,000	Chicago P. O. Service Bldg.	5½	1936	15,000.00
500	(Shares) General Elec. Spec. Stock			5,500.00
5,000	American Tel. & Tel. Co.	5	1946	5,134.00
10,000	Cedars Rapids Mfg. & Power Co.	5	1953	10,000.00
10,000	Detroit Edison Co.	5	1940	10,000.00
5,000	Mass. Gas Co.	4½	1929	5,000.00
7,000	Mississippi River Power Co.	5	1951	7,000.00
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
16,000	Kansas City, Memphis & Birmingham	5	1934	16,000.00
15,000	Pennsylvania R. R., Eq. Tr.	5	1930	15,000.00
15,000	Union Pacific R. R.	4½	1967	14,940.00
7,000	Cent. Dist. Mfg. Co.	5½	1937	7,000.00
				$164,228.00

Respectfully submitted,
EVERETT MORSS,
Treasurer.

SCHEDULE A

FINANCIAL RESULT OF OPERATION FOR YEAR ENDED JUNE 30, 1928 COMPARED WITH THE PREVIOUS YEAR

	1926–27	*1927–28*
Current Operating Expense (Schedule C) . . .	$3,084,883.62	$3,112,921.22
Current Operating Income (Schedule B) . . .	3,010,357.81	3,050,865.03
Excess Expense, 1926–1927	74,525.81	62,056.19
PROFIT AND LOSS		
Net Loss 1926–1927	981.17	.....
Net Profit 1927–1928 (Schedule S)	.....	119.63
Net Loss	$75,506.98	$61,936.56
Excess Expense of Funds, charged to Funds .	97,803.51	48,290.59
Increase of Current Surplus 1926–1927	$22,296.53	.....
Decrease of Current Surplus 1927–1928 (Schedule S)	.....	$13,645.97

SCHEDULE B
OPERATING INCOME FOR YEAR 1927-1928

	Regular Courses	*Research and Funds*	*Total*
INCOME FROM STUDENTS:			
(*a*) Tuition Fees, Regular	$690,153.00	.....	.....
Tuition Fees, Summer Session	136,492.77	.....	.....
Laboratory Fees	38,832.00	.....	.....
Locker Fees	1,529.12	.....	.....
Entrance Examination Fees.	3,985.00	.....	.....
Condition Examination Fees	12,807.58	.....	.....
Registration Fees	2,118.00	.....	.....
Sale of Lecture Notes (Net)	407.81	.....	.....
Net Dormitory Income (Schedule C–17)	10,936.76	.....	.....
	$897,262.04	.....	$897,262.04
INCOME FROM INVESTMENTS:			
Endowments, General Purposes, (Schedule P)	$1,089,566.71	$300,869.85	$1,390,436.56
(*a*) Endowment for Scholarships, applied	61,005.00	.....	61,005.00
Endowments, Designated Purposes (Schedule Q)	71,176.62	136,068.55	207,245.17
(*b*) Net (Schedule Q)	$1,221,748.33	$436,938.40	$1,658,686.73
INCOME FROM NATIONAL GRANTS:			
Federal Aid from Act 1862	$5,306.68	.....	.....
Act 1890	16,666.67	.....	.....
	$21,973.35	.....	$21,973.35
INCOME FROM OTHER SOURCES:			
American Telephone and Telegraph Co., Course VI-A	$5,000.00	.....	.....
General Electric Co., Course VI-A	5,000.00	.....	.....
General Electric Co., Courses VI and VIII	15,000.00	.....	.....
Boston & Maine R. R., Course I-A	3,000.00	.....	.....
Horowitz Foundation	7,146.55	.....	.....
Division of Laboratory Supplies	5,988.62	.....	.....
Trustees H. C. Frick Estate	64,845.19	.....	.....
E. A. Wyeth Fund	23,611.05	.....	.....
Bank Interest	9,317.41	.....	.....
Huntington Hall Rentals.	3,956.00	.....	.....
Walker Building, Boston	10,000.00	.....	.....
United States Navy, Torpedo Research	1,551.44		
	$154,416.26	.....	$154,416.26
MINOR FUND EARNINGS:			
Total (Schedule R)	.....	$318,526.65	$318,526.65
TOTAL OPERATING INCOME (Schedule A)	$2,295,399.98	$755,465.05	$3,050,865.03

(*a*) Total Tuitions and Scholarships, $887,650.77.
(*b*) Additional Income offset by Accrued Interest, Expenses, etc.

SCHEDULE C
OPERATING EXPENSE FOR YEAR 1927–1928

	Regular Courses	*Research and Funds*	*Total*
ACADEMIC EXPENSES:			
Salaries of Teachers (C–1)	$1,162,287.34	.....	.....
Wages Accessory to Teaching (C–1)	45,866.17	.....	.....
Wages, Laboratory Service (C–1)	57,905.38	.....	.....
Department Expenses (C–2)	134,496.74	.....	.....
General Library (Schedule C–3)	44,747.99	.....	.....
	$1,445,303.62	.....	$1,445,303.62
ADMINISTRATION EXPENSES:			
Salaries, Officers	$65,841.65	.....	.....
Wages, Clerical Staff (C–4)	64,342.76	.....	.....
Printing and Advertising (C–5)	35,911.33	.....	.....
General Expense (C–6)	96,185.20	.....	.....
	262,280.94	.....	262,280.94
PLANT OPERATION AND MAINTENANCE:			
Wages, Building Service (C–7)	$112,950.28	.....	.....
Power Plant Operation (C–8)	134,237.72	.....	.....
Fire Insurance (Net)	6,954.34	.....	.....
Repairs and Alterations (C–9)	154,501.32	.....	.....
	$408,643.66	.....	$408,643.66
SPECIAL APPROPRIATIONS:			
Total (C–10)	$77,360.33	.....	$77,360.33
MISCELLANEOUS EXPENSES:			
Pension and Insurance Plan	$47,007.07	.....	.....
Division of I. C. and Research	12,923.83	.....	.....
Summer Camps 1927 (C–11 and C–12)	18,100.50	.....	.....
Athletic Field, Boat House and Launches	17,141.09	.....	.....
*Walker Memorial (Schedule C–14)	20,404.54	.....	.....
	$115,577.03	.....	$115,577.03
EXPENSES OF MINOR FUNDS:			
Total, including Salaries (Schedule R)	.....	$388,603.50	$388,603.50
AWARDS (other than Und. Schol.):			
Total (Schedule C–15)	.....	57,274.41	57,274.41
PAYMENTS FROM SPECIAL FUNDS:			
Total (Schedule C–16)	.....	357,877.73	357,877.73
TOTAL OPERATING EXPENSE (Schedule A)	$2,309,165.58	$803,755.64	$3,112,921.22

*Not including Dining Service (see Schedule C-13).

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	$76,934.46	.....	.....
Aeronautics	27,915.00	$1,075.99	.....
Architecture	62,600.00	3,693.83	$1,788.58
Biology	30,687.78	1,103.75	1,664.00
Building Construction	9,385.30	.....	.....
Chemistry	117,512.65	3,900.00	2,346.00
Chemistry, Res. Lab. of Physical	21,969.70	1,248.00	*.....
Chemical Engineering	21,825.85	1,428.00	1,820.00
Chemical Engineering, Prac. School	19,444.50	*.....	.....
Civil Engineering	68,209.12	2,379.00	.....
Division of Laboratory Supplies	.....	.....	17,073.97
Drawing	24,800.00	170.77	.....
Economics	54,425.00	4,239.00	.....
Electrical Engineering	114,675.00	5,600.00	9,082.73
Electrical Engineering Research	4,020.00	*.....	1,820.00
English and History	48,109.16	2,297.25	.....
Fuel and Gas Engineering	12,272.00	1,262.30	.....
General Eng. and General Science	1,000.00	*.....	.....
General Studies	2,800.00	.....	.....
Geology	20,379.64	1,401.66	.....
German	8,900.00	*.....	.....
Hygiene	21,700.00	3,737.00	1,790.83
Lantern Operation	.....	.....	867.00
Mathematics	59,950.00	*.....	.....
Mechanical Engineering	147,921.90	4,895.63	12,345.96
Military Science	6,380.00	1,104.00	.....
Mining and Metallurgy	43,884.98	2,439.00	4,243.25
Naval Architecture	30,900.00	1,205.66	1,623.06
Physics	96,885.30	2,685.33	1,440.00
Romance Languages	6,800.00	*.....	.....
Totals (Schedule C)	$1,162,287.34	$45,866.17	$57,905.38

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

Number of Degrees Awarded in January and June, 1928

Name of Course	S.B.		S.M.		M. Arch.		Ph.D.		Sc.D.		Dr.P.H.		Totals	
	Jan.	June	Jan.	June	Jan.	June	Jan.	June	Jan.	June	Jan.	June	Jan.	June
Aeronautical Engineering	1	7	1	8	—	—	—	—	—	1	—	—	2	16
Architectural Engineering	—	16	—	—	—	—	—	—	—	—	—	—	—	16
Architecture	2	12	—	—	—	6	—	—	—	—	—	—	2	18
Biology and Public Health	—	5	—	—	—	—	—	1	—	—	—	1	—	7
Civil Engineering	12	48	—	8	—	—	—	—	—	1	—	—	12	57
Chemical Engineering	6	34	—	5	—	—	—	—	2	3	—	—	8	42
Chemical Engineering Practice	2	7	1	13	—	—	—	—	—	—	—	—	3	20
Chemistry	—	13	1	1	—	—	1	4	—	—	—	—	2	18
Electrical Engineering (Inc. VI-A)	19	93	10	53	—	—	—	—	—	2	—	—	29	148
Electrochemical Engineering	2	9	—	3	—	—	—	—	—	—	—	—	2	12
Engineering Administration	13	63	—	—	—	—	—	—	—	—	—	—	13	63
Fuel and Gas Engineering	—	—	—	7	—	—	—	—	—	—	—	—	—	7
Geology	—	1	—	—	—	—	—	1	—	—	—	—	—	2
General Engineering	4	10	—	—	—	—	—	—	—	—	—	—	4	10
General Science	1	1	—	—	—	—	—	—	—	—	—	—	1	1
Mathematics	—	3	—	2	—	—	1	—	—	—	—	—	1	5
Mechanical Engineering	15	59	—	13	—	—	—	—	—	—	—	—	15	72
Mining Engineering	1	3	—	—	—	—	—	—	—	—	—	—	1	3
Metallurgy	—	5	—	—	—	—	—	—	—	1	—	—	—	6
Naval Architecture and Marine Engineering	—	3	—	—	—	—	—	—	—	—	—	—	—	3
Naval Construction	—	—	—	9	—	—	—	—	—	—	—	—	—	9
Physics	1	2	—	1	—	—	—	—	—	—	—	—	1	3
Sanitary and Municipal Engineering	1	5	—	—	—	—	—	—	—	—	—	—	1	5
Without Course Classification	—	—	6	37	—	—	—	—	—	—	—	—	6	37
Totals	80	399	19	160	—	6	2	6	2	8	—	1	103	580

The Treasurer

The statements submitted herewith show the financial condition of the Massachusetts Institute of Technology as of June 30, 1928, as well as the financial transactions during the fiscal year ended on the date.

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

Capital Gifts:

Alumni Dormitory Fund Payments	$236,694.54	
Daniel Guggenheim Fund for Aeronautics	230,000.00	
Relatives of Richard M. Homberg, '23 (deceased), for Memorial Infirmary	75,075.00	
Estate of Frederick S. Hodges	49,966.26	
Estate of Charles W. Eaton (additional)	45,266.60	
William E. Nickerson, for Humanics Course	50,000.00	
Estate of Edmund D. Barbour (additional)	91,778.13	
Estate of Russell Robb	25,000.00	
Anonymous, for Boat House Additions	25,000.00	
Arthur W. Stevens, for Boat House Additions	5,000.00	
Estate of F. J. Moore (additional)	5,000.00	
Estate of S. C. Cobb (additional)	236.31	
Educational Endowment Fund Payments	3,653.55	
Class of 1904 Prize Fund (additional)	10.00	
Class of 1898 Loan Fund (additional)	845.00	
Industrial Fund Payments	19,681.00	
Amasa J. Whiting Scholarship Fund	4,515.65	
		$867,722.04

Miscellaneous Gifts:

H. M. Crane, for Fellowships	$3,000.00
A. P. Sloan, Jr., for Fellowships	2,000.00
Gerard Swope, for Fellowships	2,500.00
Massachusetts Gas Co., for Scholarship	350.00
Boston Consolidated Gas Co., for Scholarship	350.00
John E. Aldred, for Lectures	2,500.00
Carl P. Dennett, for Student Loans	500.00
Proprietors of the Locks and Canals Fellowship	2,000.00
Louis J. and Mary E. Horowitz, for Course in Building Construction	5,000.00
John R. Freeman, for Lecture	500.00
Contributions to Course XV Fund	40.00
Contributions for Burton Portrait	741.75
Contributions to Chandler Scholarship Fund	737.37
Carnegie Corporation, for Music Fund	6,000.00
Boston & Maine Railroad for Coöperative Course	3,000.00
Col. E. H. Greene, for Short Wave Research	30,000.00
General Electric Co. for Courses VI and VIII	20,000.00
American Telephone and Telegraph Co., for Course VI	5,000.00
S. M. Weston Scholarship	200.00
F. E. Weston Scholarship	200.00
Lammot du Pont, for Summer Camp Loans	500.00
Lammot du Pont, for Rowing	2,000.00

SCHEDULE C-2
*DEPARTMENT EXPENSES (Net)

Department	*Expense (Net)*	*Overdrafts*
Aeronautics	$5,500.00	.....
Architecture	2,950.00	$169.42
Biology	2,500.00	179.20
Building Construction	1,000.00	316.76
Chemistry	15,300.00	.....
Chemistry, Research Laboratory of Physical	2,500.00	.....
Chemical Engineering	4,100.00	170.37
Chemical Engineering Practice School	14,500.00	755.05
Civil Engineering	1,883.22	.....
Drawing	600.00	105.39
Economics	2,000.00	10.93
Economics, Special	600.00	24.75
Electrical Engineering	7,500.00	541.35
Electrical Engineering, Communications Laboratory	3,500.00	467.46
Electrical Engineering, Research and Theses	8,000.00	351.83
English and History	500.00	.....
Fuel and Gas Engineering (inc. Field Stations)	6,370.91	.....
General Engineering and General Science	852.23	.....
General Studies	250.00	.....
Geology	3,000.00	.....
German	300.11	.....
Hygiene	4,300.00	340.99
Mathematics	1,650.00	.....
Mechanical Engineering	19,344.25	.....
Military Science	1,575.00	465.14
Mining and Metallurgy	4,900.00	.....
Naval Architecture	1,112.86	.....
Physics	17,200.00	122.08
Romance Languages	30.37	.....
United States Army and Navy Officers	660.03	.....
Naval R. O. T. C.	17.76	.....
	$134,496.74	$4,020.72
	(Schedule C)	(Schedule D-2)

SCHEDULE C-3
GENERAL LIBRARY

Salaries of Officers	$6,200.00
Wages, Clerical Staff	23,653.10
Expenses	14,894.89
Total (Schedule C)	$44,747.99

*Certain special appropriations not included (see Schedule C-10).

SCHEDULE C-4
WAGES, CLERICAL STAFF, ADMINISTRATION OFFICES

Offices of the President and Dean	$8,451.89
Registrar's Office	22,805.69
Secretary's Office	6,907.09
Bursar's Office	18,230.25
Superintendent's Office	7,947.84
Total (Schedule C)	$64,342.76

SCHEDULE C-5
PRINTING AND ADVERTISING

Printing, Bursar's Office	$1,226.15
Printing, Registrar's Office	6,070.77
Printing, Offices of President, Dean, Secretary and Superintendent	1,719.01
Advertising in M. I. T. Publications	2,245.92
Bulletins: President's and Treasurer's Reports	1,001.00
General Catalogue	5,110.50
Directory	1,146.00
Concerning M. I. T.	2,222.37
Summer Session 1928	2,887.25
Course Pamphlets, etc.	3,988.61
Graduate Study and Research	724.50
Examinations	1,553.09
Class Schedules	386.00
Maintenance of Catalogue of Former Students	2,244.70
Class Cards and Registration Material	985.00
1927 Summer Session Advertising	1,348.71
Reprints and Binding	267.75
Abstracts of Staff Papers	784.00
Total (Schedule C)	$35,911.33

SCHEDULE C-6
GENERAL EXPENSE (Net)

Bursar's Office		$2,401.60
Registrar's Office		3,723.49
Superintendent's Office		3,095.46
Fees, Dues, Commissions, etc.		49,286.60
Secretary's Office		969.64
Graduation, Receptions, etc.		8,388.08
President's Office		2,697.54
Ice and Ice Water		801.41
Dean's Office		563.77
Endowment Fund Expenses		8.85
Trucking of Mail		2,015.70
News Service		5,375.04
New Student Publicity		1,711.30
Undergraduate Scholarship Committee		433.97
Traveling Expenses		2,526.80
Telephone Service		15,999.10
Miscellaneous		1,384.79
Total		$101,383.14
Less Credits, Janitor's Supplies	$861.10	
Office Supplies	679.87	
Laundry	825.23	
Postage	74.46	
Blue Printing	241.46	
Trucking	2,454.28	
Towel Supply	61.54	
		5,197.94
Total (Schedule C)		$96,185.20

SCHEDULE C-7
WAGES, BUILDING SERVICE

Shop Foremen (net)	$3,208.68
Janitors: Supervisory	2,520.00
Staff	46,926.74
Night Cleaners	18,709.02
Watchmen (including Cambridge Police)	16,079.27
Window Cleaning	7,350.83
Heating and Ventilation	9,149.68
Messengers	872.79
Mail Service	2,909.52
Elevator, Shipper, Stockroom and Matron	5,223.75
Total (Schedule C)	$112,950.28

SCHEDULE C-8
POWER PLANT OPERATION (Net)

Coal		$93,074.90
Water		4,682.80
Supplies		3,637.32
Repairs		19,275.91
Ashes and Trucking		506.36
Salaries		32,034.05
Electricity (Rogers Building)		3,400.12
Total		$156,611.46
Less Transfers to Dormitories, Dining Service, Walker Memorial	$18,408.49	
Ashes sold	340.25	
Inventory, Coal (Schedule D–2)	3,625.00	
		22,373.74
Total (Schedule C)		$134,237.72

SCHEDULE C-9
REPAIRS, ALTERATIONS AND MAINTENANCE

	Supplies and Repairs	*Alterations*	*Total*
Buildings, etc.			
Group No. 1	$3,712.26	$382.03	$4,094.29
Group No. 2	11,813.79	1,363.49	13,177.28
Group No. 3	7,381.15	1,219.28	8,600.43
Group No. 4	10,134.10	.....	10,134.10
Group No. 5	1,844.27	.....	1,844.27
Group No. 8	2,976.70	241.17	3,217.87
Group No. 10	6,441.20	.....	6,441.20
Rogers Building, Boston	6,210.00	.....	6,210.00
Building 30, Service Building	443.51	.....	443.51
Building 35, Mechanic Arts	599.65	.....	599.65
Building 46, Compression Lab.	1,507.47	.....	1,507.47
Miscellaneous Buildings	6,205.96	.....	6,205.96
President's House	3,208.44	.....	3,208.44
Furniture	1,761.45	.....	1,761.45
Elevators	1,851.48	.....	1,851.48
Water	6,671.57	.....	6,671.57
Gas	2,335.32	.....	2,335.32
Grounds	37,367.47	.....	37,367.47
Great Court	.....	30,403.36	30,403.36
Tennis Courts	2,927.53	.....	2,927.53
Building Protection	2,539.77	.....	2,539.77
Rubbish	2,056.16	.....	2,056.16
Undistributed (net)	902.74	.....	902.74
Total (Schedule C)	$120,891.99	$33,609.33	$154,501.32

SCHEDULE C-10
SPECIAL APPROPRIATIONS

*Journal of Mathematics and Physics	$3,000.00
Society of Arts	2,141.56
Reprints — Purchases and Binding	600.00
New Equipment Purchases	8,459.82
Chemicals furnished to Laboratories	5,786.50
*Aeronautical Engineering, Nos. 548, 560, 561, 589	7,631.87
New Dynamometer	1,750.00
*Civil Eng. Dept., Nos. 549, 556, 567	1,700.00
Dept. of Military Science, No. 550	400.00
*New Dormitory Plans, No. 551	4,000.00
Dept. of Biology and Public Health for Health Education	400.00
Dept. of Biology and Public Health for Food and Fisheries	1,000.00
*Model of Danish Warship, No. 564	1,700.00
Moving Wind Tunnel to new Laboratory, No. 565	2,943.89
New Cables and Conduits to Aero. Lab., No. 574	2,114.80
Removal of Pier, No. 562	1,298.00
*Dormitory Telephone Installation, No. 569	11,462.00
*Summer School of Physics, S. P. E. E., No. 582	2,500.00
Metallography, No. 590	1,597.00
Additional Work in Library	4,819.31
*Elec. Eng. Dept., Nos. 593, 594	4,500.00
Employees' Group Life Insurance	4,341.97
*Miscellaneous, Nos. 566, 568, 583, 585, 586, 587 598	3,213.61
	$77,360.33

SCHEDULE C-11
CIVIL ENGINEERING SUMMER CAMP (1927)
TECHNOLOGY, MAINE

Income:		
From Students and Staff	$5,171.46	
Miscellaneous	279.20	
Total Income		$5,450.66
Expenses:		
Teachers' Salaries and Expenses	$7,155.45	
Construction and Repairs	2,784.72	
Caretaker	1,440.00	
Taxes and Insurance	1,533.43	
Administration, Telephone, etc.	466.68	
Wages — Operating	1,855.00	
Provisions and Supplies	3,057.44	
Coal, Wood, Gas and Ice	1,059.94	
Express and Freight	600.55	
Laundry, etc.	143.48	
Total Expense		20,096.69
Net Expense		$14,646.03

*See Minor Funds, pp. 134 and 135.

SCHEDULE C-12
MINING ENGINEERING SUMMER CAMP (1927) DOVER, N. J.

Income:		
From Students and Staff	$721.41	
Miscellaneous	26.94	
Total Income		$748.35
Expenses:		
Teachers' Salaries and Expenses	$1,910.40	
Repairs and Equipment	587.85	
Caretaker	360.00	
Insurance	326.07	
Administration, Telephone, etc.	220.01	
Wages — Operating	333.00	
Provisions and Supplies	393.46	
Light and Power	72.03	
Total Expense		4,202.82
Net Expense		$3,454.47
Total Expense of Camps (Schedule C)		$18,100.50

SCHEDULE C-13
DINING SERVICE (Net)

Inventory July 1, 1927		
Utensils	$11,565.27	
Stock	3,048.26	
		$14,613.53
Expenditures:		
Food	$62,519.77	
Salaries	43,859.99	
Light, Heat and Water	5,609.61	
Ice, Refrigeration	269.51	
Laundry	2,803.01	
Dining Room and Kitchen Equipment	1,480.51	
Repairs	2,277.80	
Printing and Advertising	842.03	
Administration Expense	839.39	
Express, Freight, etc.	209.73	
Insurance	752.35	
Dining Service, Reserve Fund (Schedule R)	4,422.88	
		125,886.58
Total		$140,500.11
Income:		
Coupon Books	$61,161.67	
Less Outstanding Coupons (Schedule D)	86.25	
	$61,075.42	
Cash	67,484.31	
		$128,559.73
Inventory, June 30, 1928:		
Utensils	$8,898.17	
Stock	3,042.21	
		11,940.38
Total		$140,500.11

SCHEDULE C-14
WALKER MEMORIAL (Net)

Income:		
Undergraduate Dues	$2,181.00	
Games	1,844.81	
Total		$4,025.81
Expenses:		
Salaries	$9,171.52	
Light, Heat, Power	4,666.72	
Water	643.98	
Repairs, Alterations, Maintenance	7,457.71	
New Equipment	811.77	
Trucking and Administration	528.36	
Supplies	587.22	
Insurance	367.80	
Magazines and Papers	195.27	
Net Expense		24,430.35
Net Loss (Schedule C)		$20,404.54

SCHEDULE C-15
AWARDS FROM FUNDS (Other than Undergraduate Scholarships)

Edward Austin Fund for Travelling Fellowship	$1,500.00
Edward Austin Fund for Graduate Scholarships	22,422.00
Teachers' Fund, Retiring Allowances	3,495.02
Robert A. Boit Fund, Prizes	375.00
James Means Prize Fund	64.14
William C. Hunneman Fund, for Prizes	100.00
Arthur Rotch Prize Fund, Prizes	200.00
Arthur Rotch "Special" Prize Fund, Prizes	200.00
Bursar's Fund, for Student Loans	6,520.75
Dean's Fund, for Student Loans	1,555.00
Carl P. Dennett Fund, for Loans	550.00
Summer Surveying Camp Fund, for Loans	500.00
Misc. Funds, for Graduate Scholarships and Fellowships	12,755.00
Jonathan Whitney Fund:	
Graduate Scholarships	2,000.00
Technology Christian Association	1,500.00
Undergraduate Dues	3,537.50
Total (Schedule C)	$57,274.41

SCHEDULE C-16
PAYMENTS FROM SPECIAL FUNDS

Walter S. Barker, for Books	$469.25
Frank Harvey Cilley, for Books	2,771.64
Class Endowment Reserve Funds, for Premium Payments	3,877.71
Charles Lewis Flint Library, for Books	270.98
William Hall Kerr Fund, for Books	14.89
M. I. T. Teachers' Insurance Fund, for Premium Payments	20,037.30
John Hume Tod, for Books	106.90
Technology Matrons' Teas, for Teas	363.00
Ednah Dow Cheney, for Salaries	579.35
F. Jewett Moore, for Chemical Department	126.35
F. W. Boles Memorial, for Architecture Department	644.46
Edmund K. Turner, for Annuity and Tax	2,037.00
Pratt Naval Architectural, for Annuity and Nautical Museum.	13,117.56
John A. Aldred, for Division of Municipal and Industrial Research	5,661.00
Edward D. Peters, for Geology Department	182.36
Samuel Cabot, for Applied Chemistry Research	3,874.30
C. B. Richardson, for Applied Chemistry Research	1,600.00
Technology Plan, for Equipment	822.65
Ellen H. Richards, for Research	567.88
Edward Whitney, for Volcanic Research	753.15
Eastman Contract Fund, to George Eastman	300,000.00
Total (Schedule C)	$357,877.73

SCHEDULE C-17
DORMITORY OPERATION (Net)

Income:			
From Rentals		$74,801.50	
Fee Refunds		3,657.95	
Total			$71,143.55
Expenses:			
Salaries		$17,836.44	
Laundry		2,490.50	
Heat, Light, Power		9,050.24	
Water		1,240.40	
Repairs		15,862.65	
Supplies	$8,148.15		
Less Inventory (June 30, 1928) (Schedule D–2)	4,199.21	3,948.94	
Insurance		680.04	
Trucking		100.15	
Printing, Administration, Telephone		1,233.38	
New Equipment		264.05	
Interest on Mortgage Loan (Whitney Fund)		7,500.00	
Total			60,206.79
Net Income (Schedule B)			$10,936.76

SCHEDULE D
TREASURER'S BALANCE SHEET

1
ENDOWMENT ASSETS

Securities and Real Estate (Schedule H)	$29,204,184.28
Borrowed for Educational Plant (*contra*)	119,639.34
Cash: For Investment (Schedule D-3)	494,550.06
Total June 30, 1928	$29,818,373.68

2
CURRENT ASSETS

Cash: For General Purposes (Schedule D-3)	$103,090.96
Accounts Receivable (Schedule D-1)	60,700.79
Students' Fees, Receivable	654.13
Students' Deposits, Receivable	269.45
Premiums Paid on Unexpired Insurance	19,737.77
Inventories and Advances for 1928–29 (Schedule D-2)	100,135.24
Total June 30, 1928	$284,588.34

3
EDUCATIONAL PLANT ASSETS

Land, Buildings, and Equipment, June 30, 1927	$12,654,203.72
Additions during year	799,750.29
Total, June 30, 1928 (Schedule J)	$13,453,954.01

SCHEDULE D

JUNE 30, 1928

1

ENDOWMENT FUNDS

Funds (Schedule Q)	$29,818,373.68
Total, June 30, 1928	$29,818,373.68

2

CURRENT LIABILITIES

Minor Funds (Schedule R)	$128,088.35
Accounts Payable	15,565.06
Students' Fees and Deposits Payable (Schedule D-4)	98,511.18
*Undergraduate Dues, Balance	1,565.78
Dining Room Coupons, Outstanding	86.25
Total	$243,816.62
Surplus, Available for Current Expenses (Schedule S)	40,771.72
Total June 30, 1928	$284,588.34

3

EDUCATIONAL PLANT CAPITAL

Endowment for Educational Plant, June 30, 1927	$12,657,012.38
Appropriated During Year	677,302.29
Borrowed from Investment Cash (*contra*)	119,639.34
Total, June 30, 1928 (Schedule K)	$13,453,954.01

*See also Undergraduate Dues Reserve (Schedule R).

SCHEDULE D-1
DETAIL OF ACCOUNTS RECEIVABLE

Division of I. C. & R.	$7,332.95
Division of M. & I. Research Contracts	16,261.51
R. L. A. C. Contracts	8,516.85
Harvard Coöperative Society, Inc. (Notes)	971.00
Thorp & Martin, Inc. (June rental)	2,984.00
Miscellaneous Accounts	24,634.48
Total (Schedule D)	$60,700.79

SCHEDULE D-2
DETAIL OF INVENTORIES AND ADVANCES FOR 1928-1929

Department Overdrafts (Schedule C-2)		$4,020.72
Summer Session Salaries, Advanced		3,198.50
Civil Engineering Summer Camp 1928, Advanced		1,904.97
Mining Engineering Summer Camp 1928, Advanced		208.06
Inventories —	Notes held by Cooperative Society and M. I. T.	3,453.80
	Dormitory Supplies	4,199.21
	Dining Service, Food, Utensils, etc.	11,940.38
	Walker Memorial Games, Candy, Cigars, etc.	467.02
	Stamps and Envelopes	316.44
	Office Supplies	1,651.08
	Building and Janitors' Supplies	2,995.15
	Architectural Students' Supply Room, Stock	1,103.25
	Stock Room: Pipe, Fittings, Lumber, Hardware, Paint, Oil, Glass and Miscellaneous Supplies	13,314.84
	Division of Laboratory Supplies: Chemicals, Glassware, Platinum, etc.	47,579.06
	Liquid Soap	157.76
	Coal	3,625.00
Total (Schedule D)		$100,135.24

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

Total Cash Receipts	$6,594,548.08
Total Cash Disbursements	6,365,748.42
Excess of Receipts	$228,799.66
Cash, June 30, 1927	368,841.36
Cash, June 30, 1928	$597,641.02

CASH BALANCE

Cash for Investment — on Deposit (Schedule D)		$494,550.06
Cash for Current Purposes (Schedule D)		
On Deposit	$99,282.80	
In Office	3,808.16	
		103,090.96
Total Cash (Schedule D)		$597,641.02

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

Registration Fees, Summer Session 1928	$4,050.00
Tuition Fees, Summer Session 1928	73,802.80
Students' Deposits Payable	9,996.74
Students' Deposits, Summer Session 1928	3,746.51
Students' Deposits 1928–1929	25.00
Dormitory Deposits in Advance	1,880.00
Dormitory Rentals 1928–1929	105.00
Dormitory Rentals, Summer Session 1928	4,291.00
Deposits, Civil Engineering Camp 1928	614.13
Total (Schedule D)	$98,511.18

SCHEDULE H

INVESTMENTS, BONDS, STOCKS,

Par Value	*Description of Securities*	*Rate*	*Maturity*	*Balance June 30, 1927*
	GOVERNMENT AND MUNICIPAL BONDS			
$64,000	Canada, Dominion of, 10-Year Gold.	4½%	1936	$63,120.00
260,000	Canada, Dominion of, 30-Year Gold.	5%	1952	258,511.88
20,000	Canada, Dominion of, 10-Year Gold.	5½%	1929	20,200.00
1,000	Cincinnati, City of, Street Imp.. . .	4½%	1933	1,009.00
500	Cincinnati, City of, Street Imp.. . .	4½%	1935	516.00
1,000	Cincinnati, City of, Street Imp.. .	4½%	1935	1,038.00
6,500	Cincinnati, City of, Condemnation .	4½%	1945	7,010.00
100,000	Columbus, City of, Water Ext. No. 2	4½%	1944	105,462.00
75,000	Great Britain and Ireland	5½%	1937	80,666.00
18,000	Kansas City, Sewer, 2d Issue . . .	4½%	1935	18,597.00
5,000	Kansas City, 23d St. Trafficway . .	4½%	1935	5,165.00
50,000	Los Angeles, City of, Water Works .	4½%	1942	51,789.00
10,000	Los Angeles, City of, Water Works .	4½%	1943	10,277.00
15,000	Los Angeles, City of, Water Works .	4½%	1943	15,418.00
50,000	Maisonneuve, City of (Montreal) . .	5%	1954	49,000.00
5,000	Mass., Comlth. of, Met. Park Loan .	3½%	1936	4,900.00
15,000	Montreal, City of	5%	1936	18,000.00
100,000	Montreal, City of	5%	1942	97,500.00
10,000	New York, City of, Corporate Stock.	4¼%	1964	10,341.00
5,000	New York, City of, Corporate Stock.	4½%	1967	4,625.00
33,000	Norfolk, City of, Va., Appropriation.	4%	1954	33,000.00
50,000	Omaha, City of, Nebraska	4½%	1934	51,416.00
50,000	Omaha, City of, Water Works . . .	4½%	1941	52,573.00
149,000	Ontario, Province of, Debenture . .	4%	1932	.....
50,000	Ontario, Province of, Debenture . .	5½%	1937	50,442.00
50,000	Ontario, Province of, Debenture . .	6%	1943	53,655.00
50,000	Ontario, Province of, Debenture . .	5%	1952	49,250.00
41,000	Ottawa, City of, Ontario	4½%	1930	39,003.30
1,000	Ottawa, City of, Ontario	4½%	1935	945.00
2,000	Ottawa, City of, Ontario	5%	1930	1,995.00
10,000	Ottawa, City of, Ontario	5%	1945	9,975.00
5,000	Ottawa, City of, Ontario	5%	1947	5,057.00
7,000	Ottawa, City of, Ontario	5½%	1931	7,054.00
42,000	Ottawa, City of, Ontario	5½%	1932	42,420.00
60,000	Ottawa, City of, Ontario	5½%	1939	61,598.00
1,000	Ottawa, City of, Ontario	6%	1929	1,008.00
1,000	Ottawa, City of, Ontario	6%	1931	1,020.00
5,000	Ottawa, City of, Ontario	6%	1936	5,240.00
1,000	Ottawa, City of, Ontario	6%	1938	1,061.00

SCHEDULE H

REAL ESTATE AND MORTGAGES

Purchases and Charges during the year	*Sales and Credits during the year*	*Balance June 30, 1928*	*Accrued Interest, etc.*	*Income Received*
.....	.....	$63,120.00	.....	$2,880.00
.....	.....	258,511.88	.....	13,000.00
.....	$200.00	20,000.00	.....	1,100.00
.....	2.00	1,007.00	.....	45.00
.....	3.00	513.00	.....	22.50
.....	5.00	1,033.00	.....	45.00
.....	30.00	6,980.00	.....	292.50
.....	342.00	105,120.00	.....	4,500.00
.....	5,341.00	75,325.00	.....	4,468.75
.....	86.00	18,511.00	.....	810.00
.....	24.00	5,141.00	.....	225.00
.....	128.00	51,661.00	.....	2,250.00
.....	19.00	10,258.00	.....	450.00
.....	28.00	15,390.00	.....	675.00
.....	.....	49,000.00	.....	2,500.00
.....	.....	4,900.00	.....	175.00
$15,000.00	18,000.00	15,000.00	.....	450.00
.....	.....	97,500.00	.....	5,000.00
.....	10.00	10,331.00	.....	425.00
.....	.....	4,625.00	.....	225.00
.....	.....	33,000.00	.....	1,320.00
.....	237.00	51,179.00	.....	2,250.00
.....	198.00	52,375.00	.....	2,250.00
146,394.03	.....	146,394.03	$132.45	.....
.....	49.00	50,393.00	.....	2,750.00
.....	244.00	53,411.00	.....	3,000.00
.....	.....	49,250.00	.....	2,500.00
.....	.....	39,003.30	.....	1,845.00
.....	.....	945.00	.....	45.00
.....	.....	1,995.00	.....	100.00
.....	.....	9,975.00	.....	500.00
.....	3.00	5,054.00	.....	250.00
.....	18.00	7,036.00	.....	385.00
.....	105.00	42,315.00	.....	2,310.00
.....	146.00	61,452.00	.....	3,300.00
.....	8.00	1,000.00	.....	60.00
.....	7.00	1,013.00	.....	60.00
.....	30.00	5,210.00	.....	300.00
.....	6.00	1,055.00	.....	60.00

Schedule H (*Continued*)

Par Value	*Description of Securities*	*Rate*	*Maturity*	*Balance June 30, 1927*
	GOVERNMENT AND MUNICIPAL BONDS (*Continued*)			
$8,000	Ottawa, City of, Ontario	6%	1939	$8,491.00
8,000	Ottawa, City of, Ontario	6%	1940	8,522.00
1,000	Ottawa, City of, Ontario	6%	1948	1,080.00
10,000	Ottawa, City of, Ontario	6%	1951	10,820.00
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	5,142.00
23,000	Toronto, City of, Consolidated Loan	6%	1944	24,067.00
18,000	Toronto, City of, Consolidated Loan	6%	1945	18,869.00
9,000	Toronto, City of, Consolidated Loan	6%	1946	9,449.00
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	26,565.00
2,000	Worcester, City of	3½%	1929	2,000.00
	Sold or matured during year			100,325.00
$1,730,000	*Total Government and Municipal Bonds*			$1,704,253.98
	INDUSTRIAL BONDS			
$42,000	Allis-Chalmers Mfg. Co., Gold Deb.	5%	1937	$49,375.00
31,000	Am. Agri. Chem. Co., 1st Ref. S. F.	7½%	1941	41,710.00
76,000	American Sugar Ref. Co.	6%	1937	80,470.78
100,000	American Thread Co., 1st Mtge.	6%	1928	99,500.00
50,000	Anaconda Cop. Min. Co., 1st Con. "A"	6%	1953	49,125.00
25,000	Armour & Co. of Del., 1st Mtge. "A"	5½%	1943	24,000.00
35,000	Chicago P. O. Serv. Bldg. 1st Mtg. "A"	5½%	1936	49,375.00
50,000	Chile Copper Co. Gold	5%	1947	48,225.00
1,250	Eastern States Exposition Gold (Reg.)	4%	1963	312.50
25,000	Fruit Growers Ex. Co., Equip. Tr. "G"	4½%	1934	24,607.25
25,000	Fruit Growers Ex. Co., Equip. Tr. "G"	4½%	1935	24,573.75
100,000	Gulf Oil Corp. of Pennsylvania Gold	5%	1937	96,750.00
15,000	Harvard Coöperative Society, Gold	6%	1931	15,000.00
100,000	International Cement Corp.	5%	1948	.....
1,000	Inter. Paper Co., 1st & Ref. Gold "B"	5%	1947	1,000.00
7,000	New England Oil Refining Co., 1st Mtg.	8%	1931	2,800.00
1,300	Phila. & Reading Coal & Iron Ref. Mtg.	5%	1973	1,300.00
50,000	Prudence Co., Inc., Mtg.	5½%	1933	49,875.00
2,700	Reading Co., Gen. & Ref. Mtge. "A"	4½%	1997	2,646.00
25,000	Simonds Saw & Steel Co., Deb. "F".	5½%	1929	24,687.50
25,000	Simonds Saw & Steel Co., Deb. "G".	5½%	1930	24,645.00

*No par value.

Schedule H (*Continued*)

Purchases and Charges during the year	*Sales and Credits during the year*	*Balance June 30, 1928*	*Accrued Interest, etc.*	*Income Received*
.....	$45.00	$8,446.00	.....	$480.00
.....	44.00	8,478.00	.....	480.00
.....	4.00	1,076.00	.....	60.00
.....	36.00	10,784.00	.....	600.00
.....	.....	50,000.00	.....	2,500.00
.....	.....	9,845.00	.....	500.00
.....	.....	34,475.00	.....	1,750.00
.....	.....	17,721.00	.....	900.00
.....	.....	22,655.00	.....	1,150.00
.....	.....	8,830.80	.....	450.00
.....	23.00	5,119.00	.....	300.00
.....	67.00	24,000.00	.....	1,380.00
.....	51.00	18,818.00	.....	1,080.00
.....	25.00	9,424.00	.....	540.00
.....	.....	48,750.00	.....	2,500.00
.....	.....	6,790.00	.....	350.00
.....	87.00	26,478.00	.....	1,500.00
.....	.....	2,000.00	.....	70.00
.....	100,325.00	.....	.....	2,655.04
$161,394.03	$125,976.00	$1,739,672.01	$132.45	$82,068.79
$120.00	$8,020.00	$41,475.00	.....	$2,533.33
780.00	12,420.00	30,070.00	.....	3,225.00
64.14	3,277.92	77,257.00	.....	4,916.00
.....	.....	99,500.00	.....	6,000.00
.....	.....	49,125.00	.....	3,000.00
.....	.....	24,000.00	.....	1,375.00
187.50	15,000.00	34,562.50	.....	2,548.32
.....	.....	48,225.00	.....	2,500.00
.....	.....	312.50	.....	.....
.....	.....	24,607.25	.....	1,125.00
.....	.....	24,573.75	.....	1,125.00
.....	.....	96,750.00	.....	5,000.00
.....	.....	15,000.00	.....	900.00
96,750.00	.....	96,750.00	.....	.....
.....	.....	1,000.00	.....	50.00
.....	.....	2,800.00	.....	.....
.....	.....	1,300.00	.....	65.00
.....	.....	49,875.00	.....	2,750.00
.....	.....	2,646.00	.....	121.50
.....	.....	24,687.50	.....	1,375.00
.....	.....	24,645.00	.....	1,375.00

Schedule H (*Continued*)

Par Value	*Description of Securities*	*Rate*	*Maturity*	*Balance June 30, 1927*
	INDUSTRIAL BONDS (*Continued*)			
$50,000	Smith & Wesson, Inc., 1st Mtge. S. F.	5½%	1938	$49,500.00
100,000	Solvay Am.Inv.Corp., Sec.Gold Notes	5%	1942	99,500.00
15,000	Standard Oil Co. of N. J.	5%	1946	15,071.00
100,000	Standard Oil Co. of N. Y.	4½%	1951	95,625.00
75,000	Swift & Co., 1st S. F.	5%	1944	70,827.50
100,000	United Drug Co.	5%	1953	.....
207,000	U. S. Steel, 10–60 Yr. S. F..	5%	1963	220,332.50
50,000	Waltham Watch & Clock Co.. . . .	6%	1943	49,000.00
5,000	Winchester Repeat.Arms Co.,1st Mtg.	7½%	1941	5,232.00
	Sold or matured during year			305,566.00
$1,489,250	*Total Industrial Bonds*			$1,620,631.78

	INDUSTRIAL STOCKS	*Div.*	*Shares*	
*$50,000	American Car & Foundry Co., Com..	6%	500	$50,875.00
13,750	American Pneumatic Serv. Co., 1st Pf.	7%	275	13,750.00
50,000	Amoskeag Mfg. Co., Pref.	4½%	500	41,395.00
50,000	Anaconda Copper Mining Co., Cap. .	6%	1,000	47,500.00
16,000	Brill Corporation, Class A	..	160	8,183.00
8,000	Brill Corporation, Class B	..	80	1,636.60
25,000	Century Ribbon Mills, Inc., Pref. .	7%	250	24,500.00
11,500	Charlton Mills, Capital	8%	115	11,486.04
10,000	Devoe & Raynolds Co., Inc., 1st Pref.	7%	100	9,800.00
50,000	Eastern Mfg., Pref.	..	500	15,000.00
*1,250,000	Eastman Kodak Co., Common . . .	8%	12,500	1,000,000.00
72,000	Eng'rs. Public Service Co., Common.	..	720	.....
14,700	Fairhaven Mills, Pref.	..	147	.....
*300,000	General Electric Company, Capital .	4%	3,000	122,287.50
14,710	General Electric Co., Special	6%	1,471	14,850.00
*100,000	Gillette Safety Razor Co.	4%	1,000	130,287.25
*12,500	Lackawanna Securities Co., Common	4%	125	.....
14,300	Lancaster Mills, Capital	..	143	2,145.00
29,000	Merchants' Mfg. Co., Capital . . .	..	290	49,300.00
50,000	Nashua Mfg. Company, Common .	..	500	20,000.00
*8,700	Phila.Reading Coal & Iron Corp.Com.	..	87	872.93
49,200	Pullman Incorporated, Capital . . .	4%	492	36,789.75
0,000	Quebradas Company	..	2,249	.....
6,500	Queen City Cotton Co., Capital. . .	..	65	5,850.00
*7,500	Samson Cordage Company	8%	75	5,000.00
*65,000	Standard Oil Co. of California, Capital	$2.50	650	29,981.25
16,000	Union Cotton Mfg. Co., Capital . .	6%	160	24,000.00

*No par value.

Schedule H (*Continued*)

Purchases and Charges during the year	*Sales and Credits during the year*	*Balance June 30, 1928*	*Accrued Interest, etc.*	*Income Received*
.....	.....	$49,500.00	.....	$2,750.00
.....	.....	99,500.00	.....	5,000.00
.....	$4.00	15,067.00	.....	750.00
.....	.....	95,625.00	.....	4,500.00
.....	.....	70,827.50	.....	3,750.00
$98,750.00	.....	98,750.00	$13.89	.....
393.48	6,804.98	213,921.00	.....	10,650.00
.....	.....	49,000.00	.....	3,000.00
.....	18.00	5,214.00	.....	375.00
.....	305,566.00	.....	.....	14,202.99
$197,045.12	$351,110.90	$1,466,566.00	$13.89	$84,962.14
.....	.....	$50,875.00	.....	$3,000.00
.....	.....	13,750.00	.....	962.48
.....	.....	41,395.00	.....	2,250.00
.....	.....	47,500.00	.....	3,000.00
.....	.....	8,183.00	.....	200.00
.....	.....	1,636.60	.....	.....
.....	.....	24,500.00	.....	1,750.00
.....	.....	11,486.04	.....	920.00
.....	.....	9,800.00	.....	700.00
.....	.....	15,000.00	.....	.....
.....	.....	1,000,000.00	.....	100,000.00
$24,930.00	.....	24,930.00	.....	.....
735.00	.....	735.00	.....	.....
.....	.....	122,287.50	.....	15,000.00
.....	.....	14,850.00	.....	882.60
50,000.00	$121,530.25	58,757.00		7,850.00
8,250.00	.....	8,250.00	.....	500.00
.....	.....	2,145.00	.....	.....
.....	41,470.00	7,830.00	.....	580.00
.....	.....	20,000.00	.....	.....
.....	.....	872.93	.....	.....
.....	37.92	36,751.83	.....	1,870.00
.....	.....	.....	.....	2,000.00
.....	4,550.00	1,300.00	.....	.....
.....	.....	5,000.00	.....	750.00
.....	.....	29,981.25	.....	1,625.00
.....	15,360.00	8,640.00	.....	960.00

Schedule H (*Continued*)

Par Value	*Description of Securities*	*Div.*	*Shares*	*Balance June 30, 1927*
	INDUSTRIAL STOCKS (*Continued*)			
*$500,000	United Fruit Company, Capital. . .	4%	5,000	$212,870.00
50,000	U. S. Steel Corp., Cum. Pref. . . .	7%	500	55,162.50
32,100	Wamsutta Mills, Capital	4%	321	32,528.00
5,000	Westinghouse Elec. & Mfg. Co., Pref.	8%	100	6,393.90
51,100	Westinghouse Elec. & Mfg. Co., Com.	8%	1,022	50,338.35
	Sold or matured during year			186,508.37
$2,932,560	*Total Industrial Stocks*			$2,209,290.44
	PUBLIC UTILITY BONDS	*Rate*	*Maturity*	
$151,000	Am. Tel. & Tel. Co., Col. Trust. . .	4%	1929	$147,875.00
82,000	Am. Tel. & Tel. Co., Col. Trust. . .	5%	1946	80,547.90
50,000	Appalachian Elec.P'r Co.,1st&Ref.Mt.	5%	1956	48,375.00
50,000	Blackstone Valley Gas & El. Co., Mt.	5%	1939	50,118.00
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
3,300	Brooklyn Union Gas Co., Conv. Deb.	5½%	1936	3,300.00
185,000	Cedars Rapids Mfg.&P.Co.,1stMt.S.F.	5%	1953	172,903.85
25,000	Central Illinois Pub. Ser. Co. . . .	4½%	1929	.....
25,000	Central Illinois Pub. Ser. Co. . . .	4½%	1930	.....
25,000	Central Illinois Pub. Ser. Co. . . .	4½%	1931	.....
25,000	Chesa. & Potomac Tel. Co., S.F."A"	5%	1943	24,500.00
50,000	Chicago City Railway Co., 1st Mtge.	5%	1927	49,750.00
5,000	Chicago Railways Co., 1st Mtge. . .	5%	1927	3,750.00
101,000	Cleveland Elec. Ill. Co., 1st Mtge. .	5%	1939	101,564.00
120,000	Commonwealth Edison Co., 1st Mtg.	5%	1943	119,400.00
46,000	Conn. Lt. & Pr. Co., 1st Mt. S.F."A"	7%	1951	43,324.48
52,000	Conn. Lt. & Pr. Co., 1st Mtg. "C" .	4½%	1956	49,465.00
150,000	Con. Gas, Elec. Lt. & Power Co., Mtg.	4½%	1935	141,475.00
50,000	Dallas Ry. & Terminal Co., 1st Mtge.	6%	1951	48,125.00
25,000	Detroit Edison Co., 1st Mtge. . . .	5%	1933	25,165.00
141,000	Detroit Edison Co., 1st & Ref.Mt."A"	5%	1940	138,544.80
100,000	Duquesne Lt. & Pr. Co., 1st Mt., Gold	4½%	1967	94,750.00
35,000	East. Mass. St. Ry. Co., Ref. Mt. "A"	4½%	1948	35,000.00
100,000	Edison Elec. Ill. Co. of Boston, Gold	4½%	1930	.....
25,000	Em. Gas & El. Co. & Em. Coke Co., Jt.	5%	1941	18,250.00
41,000	Georgia Ry. & El. Co., 1st Cons. Mt.	5%	1932	41,086.00
1,000	Georgia & Southern Utilities Co. . .	8%	1922	1,000.00
50,000	Great Lakes Power Co., Ltd., 1st Mt.	6%	1943	43,187.50
163,000	Hydraulic Pr.Co.of Niag.F'lls,Ref.&Im.	5%	1951	155,095.00
50,000	Illinois Bell Tel. Co., 1st & Ref. "A"	5%	1956	47,375.00
25,000	Indianapolis Water Co., 1st Lien&Ref.	5½%	1953	24,000.00

*No par value.

Schedule H (*Continued*)

Purchases and Charges during the year	*Sales and Credits during the year*	*Balance June 30, 1928*	*Accrued Interest, etc.*	*Income Received*
.....	.....	$212,870.00	.....	$27.500.00
.....	.....	55,162.50	.....	3,500.00
.....	.....	32,528.00	.....	1,284.00
.....	.....	6,393.90	.....	400.00
.....	.....	50,338.35	.....	4,088.00
.....	$186,508.37	.....	$295.60	13,349.25
$83,915.00	$369,456.54	$1,923,748.90	$295.60	$194,921.33
.....	.....	$147,875..00	.....	$6,040.00
.....	.....	80,547.90	.....	4,100.00
.....	.....	48,375.00	.....	2,500.00
.....	$11.00	50,107.00	.....	2,500.00
.....	.....	45,100.00	.....	2,760.00
.....	.....	4,600.00	.....	200.00
.....	.....	99,875.00	.....	5,000.00
.....	.....	3,300.00	.....	181.50
.....	.....	172,903.85	.....	9,250.00
$25,044.38	44.38	25,000.00	$9.37	.....
24,984.38	.....	24,984.38	9.38	.....
24,796.25	.....	24,796.25	9.38	.....
.....	.....	24,500.00	.....	1,250.00
.....	.....	49,750.00	.....	2,500.00
.....	.....	3,750.00	.....	250.00
.....	52.00	101,512.00	.....	5,050.00
.....	.....	119,400.00	.....	6,000.00
.....	.....	43,324.48	.....	3,220.00
.....	.....	49,465.00	.....	2,340.00
.....	.....	141,475.00	.....	6,750.00
.....	.....	48,125.00	.....	3,000.00
.....	33.00	25,132.00	.....	1,250.00
.....	.....	138,544.80	.....	7,050.00
.....	.....	94,750.00	.....	4,500.00
.....	.....	35,000.00	.....	1,575.00
100,125.00	42.00	100,083.00	387.50	2,250.00
.....	.....	18,250.00	.....	1,250.00
.....	22.00	41,064.00	.....	2,050.00
.....	.....	1,000.00	.....	.....
.....	.....	43,187.50	.....	3,000.00
.....	.....	155,095.00	.....	8,150.00
.....	.....	47,375.00	.....	2,500.00
.....	.....	24,000.00	.....	1,375.00

Schedule H (*Continued*)

Par Value	*Description of Securities*	*Rate*	*Maturity*	*Balance June 30, 1927*
	PUBLIC UTILITY BONDS (*Continued*)			
$100,000	Laclede Gas Lt. Co., 1st Mt. Col.&Ref.	5½%	1953	$96,122.50
200,000	Laurentide Pr. Co., Ltd., 1st Mt. S. F.	5%	1946	190,730.00
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
3,000	Lynn & Boston R. R., 1st Mtge. . .	6%	1929	3,000.00
200,000	Massachusetts Gas Co., Consolidated	4½%	1931	192,312.50
5,000	Massachusetts Gas Companies . . .	4½%	1929	5,000.00
50,000	Milwaukee El. Ry. & Lt. Co., 1st Mt.	5%	1961	46,125.00
50,000	Minneapolis Gen. Elec. Co., Mtge. .	5%	1934	50,175.00
118,000	Mississippi River Power Co., 1st Mt.	5%	1951	108,387.72
100,000	Montreal Light, Heat & Power Co. .	4½%	1932	93,812.50
50,000	Nevada California Electric Co. . . .	5%	1956	47,750.00
200,000	New Bedford Gas & Edison Lt. Co. .	5%	1933	.....
50,000	New England Tel. & Tel. Co., Deb. .	4%	1930	50,044.00
50,000	New England Tel. & Tel. Co., Deb. .	5%	1932	50,264.00
150,000	NewOrleansPub.Serv.,Inc.,1stRef.Mt.	5%	1952	134,375.00
60,000	New York Telephone Co., 1st Mtge..	4½%	1939	58,043.36
1,000	Nia., Lock. & Ont. P. Co., 1st&Ref. Mt.	5%	1955	1,000.00
50,000	North. States Pr. Co., 1st & Ref. Mt.	5%	1941	45,000.00
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
75,000	Pacific Gas & El. Co., 1st Ref. Mt. "B"	6%	1941	78,110.00
75,000	Pacific Tel.&Tel.Co.,1st Mt.Col.Tr.S.F.	5%	1937	73,915.10
50,000	Pennsylvania Pr. & Lt. Co., 1stMt."D"	5%	1953	49,250.00
25,000	Portland Gen. Electric Co., 1st Mtge.	5%	1935	25,189.00
98,000	Potomac Elec. Power Co., Mtge. "B"	6%	1953	103,103.00
50,000	Salmon River Power Co., 1st Mtge. .	5%	1952	47,625.00
19,000	Seattle Electric Co., Cons. Mtge. . .	5%	1929	18,430.00
100,000	Southern Bell Tel.&Tel.Co.,1stMt.S.F.	5	1941	100,777.00
160,000	Southern Calif. Edison Co., Gen. Mtge.	5%	1939	158,125.00
300,000	Texas Power & Light Co., 1st Mtge..	5%	1937	291,437.50
50,000	Virginia Ry. & Pr. Co., 1st Mtge. .	5%	1936	46,375.00
100,000	West Penn. Power Co., 1st Mtge. "E"	5%	1963	93,482.50
50,000	West Penn. Power Co., 1st Mtge. .	5½%	1953	51,151.00
75,000	Western Tel. & Tel. Co., Col. Tr. . .	5%	1932	75,280.00
75,000	Western Union Tel. Co.	5%	1951	75,256.00
	Sold or matured during year			520,226.97
$5,341,300	*Total Public Utility Bonds*			$5,310,859.93

Schedule H (*Continued*)

Purchases and Charges during the year	*Sales and Credits during the year*	*Balance Jun 30, 1928*	*Accrued Interest, etc.*	*Income Received*
.....	.....	$96,122.50	.....	$5,500.00
.....	.....	190,730.00	.....	10,000.00
.....	.....	95,750.00	.....	5,500.00
.....	.....	49,125.00	.....	2,500.00
.....	.....	184,546.25	.....	10,000.00
.....	.....	3,000.00	.....	180.00
.....	.....	192,312.50	.....	9,000.00
.....	.....	5,000.00	.....	225.00
.....	.....	46,125.00	.....	2,500.00
.....	$30.00	50,145.00	.....	2,500.00
.....	.....	108,387.72	.....	5,900.00
.....	.....	93,812.50	.....	4,500.00
.....	.....	47,750.00	.....	2,500.00
$204,500.00	900.00	203,600.00	$55.56	.....
.....	22.00	50,022.00	.....	2,000.00
.....	66.00	50,198.00	.....	2,500.00
.....	.....	134,375.00	.....	7,500.00
.....	.....	58,043.36	.....	2,700.00
.....	.....	1,000.00	.....	50.00
.....	.....	45,000.00	.....	2,500.00
.....	.....	94,750.00	.....	5,000.00
.....	.....	49,312.50	.....	2,500.00
.....	239.00	77,871.00	.....	4,500.00
.....	.....	73,915.10	.....	3,750.00
.....	.....	49,250.00	.....	2,500.00
.....	27.00	25,162.00	.....	1,250.00
87.94	2,276.94	100,914.00	.....	5,970.00
.....	.....	47,625.00	.....	2,500.00
.....	.....	18,430.00	.....	950.00
.....	60.00	100,717.00	.....	5,000.00
.....	.....	158,125.00	.....	8,000.00
.....	.....	291,437.50	.....	15,000.00
.....	.....	46,375.00	.....	2,500.00
.....	.....	93,482.50	.....	5,000.00
.....	46.00	51,105.00	.....	2,750.00
.....	70.00	75,210.00	.....	3,750.00
.....	12.00	75,244.00	.....	3,750.00
.....	520,226.97	.....	.....	23,144.00
$379,537.95	$524,180.29	$5,166,217.59	$471.19	$273,710.50

Schedule H (*Continued*)

Par Value	*Description of Securities*	*Div.*	*Shares*	*Balance June 30, 1927*
	PUBLIC UTILITY STOCKS			
$281,100	American Tel. & Tel. Co., Capital. .	9%	2,811	$360,316.81
*15,000	Brooklyn Union Gas Co., Capital . .	5%	150	8,587.50
50,000	Consolidated Gas Co. of N. Y., Pfd..	5%	1,000	92,950.00
66,700	Electric Bond & Share Sec. Corp. Com.	1%	667	22,833.10
2,000	Mass. Gas Companies, Common . .	5%	20	1,540.00
5,000	Mass. Gas Companies, Preferred . .	4%	50	4,100.00
	Sold or matured during year			16,636.00
$419,800	*Total Public Utility Stocks*			$506,963.41

	RAILROAD BONDS	*Rate*	*Maturity*	
$75,000	Atch. Top. & S. F., Cal. & Ariz. Lines	4½%	1962	$73,143.75
100,000	Atch. Top. & Santa Fe, Gen. Mtge. . .	4%	1995	96,470.00
10,000	Boston & Albany Railroad Improvement	4%	1934	9,450.00
1,000	Boston & Maine Railroad	4½%	1944	850.00
50,000	Boston & Maine R. R., 1st Mtge. "AC"	5%	1967	.....
100,000	Canadian Nat'l Railway Co.	4½%	1957	.....
25,000	Canadian Nat'l Rys. Equip. Tr. "J" .	4½%	1938	24,575.00
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	104,158.00
51,000	Chicago, Burlington & Quincy, Mtge. .	4%	1958	50,307.00
100,000	Chic., Burl. & Quincy, 1st Ref. Mtge. "B"	4½%	1977	96,750.00
100,000	Chic. J. Rys. & Un. St. Yds. Mt. & Co. Tr.	4%	1940	94,250.00
75,000	Chic. J. Rys. & Un. St. Yd. Ref. Mt. & Co. Tr.	5%	1940	74,143.75
17,000	C. M. St. P. & Pacific R.R.Co., Gold "A"	5%	1975	.....
68,000	C. M. St. P. & Pac. R.R.Con. Gold "A"	5%	2000	.....
65,000	Chicago Union Station, 1st Mtge. "A".	4½%	1963	65,372.00
100,000	Chicago Union Station, 1st Mtge. "C".	6½%	1963	113,511.15
80,000	Chicago & Northwestern Ry. Co. . . .	4½%	1930	.....
120,000	Chicago & Northwestern Ry. Co. . . .	4½%	1931	.....
5,000	Chic. & N.W. Ry. Co., Equip. Tr. of 1922	5%	1929	4,931.10
5,000	Chic. & N.W. Ry. Co., Equip. Tr. of 1922	5%	1930	4,925.70
5,000	Chic. & N.W. Ry. Co., Equip. Tr. of 1922	5%	1931	4,920.60
5,000	Chic. & N.W. Ry. Co., Equip. Tr. of 1922	5%	1932	4,916.10
5,000	Chic. & N.W. Ry. Co., Equip. Tr. of 1922	5%	1934	4,907.10
5,000	Chic. & N.W. Ry. Co., Equip. Tr. of 1922	5%	1935	4,902.90
5,000	Chic. & N.W. Ry. Co., Equip. Tr. of 1922	5%	1936	4,899.30
200,000	Chic. & N. W. Ry. Co., 1st & Ref. Mtge.	4½%	2037	189,500.00
25,000	Cleveland & Pittsburg R. R. Co., Mtge.	4½%	1942	25,414.00
190,000	Delaware & Hudson Co., 1st & Ref. Mt.	4%	1943	172,785.00

*No par value.

Schedule H (*Continued*)

Purchases and Charges during the year	*Sales and Credits during the year*	*Balance June 30, 1928*	*Accrued Interest, etc.*	*Income Received*
$32,757.00	$39,625.70	$353,448.11	.....	$24,063.75
.....	.....	8,587.50	.....	750.00
.....	.....	92,950.00	.....	5,000.00
13,373.13	.....	36,206.23	.....	500.00
.....	.....	1,540.00	.....	100.00
.....	.....	4,100.00	.....	200.00
.....	16,636.00	.....	.....	1,188.00
$46,130.13	$56,261.70	$496,831.84	.....	$31,801.75
.....	.....	$73,143.75	.....	$3,375.00
.....	.....	96,470.00	.....	4,000.00
.....	.....	9,450.00	.....	400.00
.....	.....	850.00	.....	45.00
$46,500.00	.....	46,500.00	$76.39	1,250.00
98,250.00	.....	98,250.00	31.25	2,250.00
.....	.....	24,575.00	.....	1,125.00
.....	.....	56,281.25	.....	3,000.00
.....	.....	40,918.75	.....	2,000.00
.....	$378.00	103,780.00	.....	5,000.00
.....	.....	50,307.00	.....	2,040.00
.....	.....	96,750.00	.....	4,500.00
.....	.....	94,250.00	.....	4,000.00
.....	.....	74,143.75	.....	3,750.00
10,410.00	.....	10,410.00	.....	.....
41,640.00	.....	41,640.00	.....	1,360.00
.....	11.00	65,361.00	.....	2,925.00
.....	386.15	113,125.00	.....	6,500.00
80,552.00	276.00	80,276.00	210.00	1,800.00
121,152.00	384.00	120,768.00	315.00	2,700.00
.....	.....	4,931.10	.....	250.00
.....	.....	4,925.70	.....	250.00
.....	.....	4,920.60	.....	250.00
.....	.....	4,916.10	.....	250.00
.....	.....	4,907.10	.....	250.00
.....	.....	4,902.90	.....	250.00
.....	.....	4,899.30	.....	250.00
.....	.....	189,500.00	.....	9,000.00
.....	30.00	25,384.00	.....	1,125.00
.....	.....	172,785.00	.....	7,600.00

Schedule H (*Continued*)

Par Value	*Description of Securities*	*Rate*	*Maturity*	*Balance June 30, 1927*
	RAILROAD BONDS (*Continued*)			
$35,000	Fort St. Union Depot Co., 1st Mtge.. .	4½%	1941	$34,825.00
50,000	Great Northern Railway Co. Gen. Mtge.	4½%	1976	46,273.00
10,000	Illinois Central Equip. Trust "J" . . .	5%	1929	9,825.00
10,000	Illinois Central Equip. Trust "J" . . .	5%	1930	9,825.00
10,000	Illinois Central Equip. Trust "J" . . .	5%	1931	9,825.00
10,000	Illinois Central Equip. Trust "J" . . .	5%	1932	9,825.00
10,000	Illinois Central Equip. Trust "J" . . .	5%	1935	9,825.00
10,000	Illinois Central Equip. Trust "J" . . .	5%	1936	9,825.00
10,000	Illinois Central Equip. Trust "J" . . .	5%	1937	9,825.00
5,000	Illinois Central R. R. Co., Ref. Mtge. .	4%	1955	4,700.00
75,000	Illinois Central R. R. Co., Sec. Gold. .	4%	1952	67,875.00
59,000	Ill. Cen. R. R. Co., Wes. Lines Mtge. .	4%	1951	54,526.25
9,000	Ill.Cen.R.R.Co., West.Lines Mt.(Reg.)	4%	1951	8,291.25
50,000	Indianapolis Un. Ry. Co., Gen. Mtge. .	5%	1965	49,468.75
8,500	Kan. City, Mem. & Birm. R. R. Co., Mt.	4%	1934	8,287.50
37,000	Kan.City, Mem.&Birm.R.R.Co.,In.Mt.	5%	1934	34,225.00
75,000	Kansas City Terminal Co., 1st Mtge. .	4%	1960	65,437.50
90,000	Lake Shore & Michigan South. R. R. Co.	4%	1931	88,950.00
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. Co., 1st Mtge. .	4½%	1935	75,035.00
100,000	Minn., St. Paul & S. St. Marie Ry. Co.	4%	1938	93,425.00
10,000	Minn.,St.Paul & S.St.Marie Ry.Co.Gold	5½%	1949	7,438.10
21,000	Miss. & Ill. Bridge & Belt R. R. Co., Mt.	4%	1951	13,650.00
10,000	New London Northern R. R. Co., 1st Mt.	4%	1940	8,600.00
41,000	N. Y. C. & H. R. R. R.	4%	1934	39,825.00
22,000	New York Central Lines Equip. Trust .	4½%	1928	21,478.36
43,000	New York Central Lines Equip. Trust .	4½%	1929	41,822.36
42,000	New York Central Lines Equip. Trust .	4½%	1930	40,702.79
15,000	New York Central Lines Equip. Trust .	4½%	1932	14,439.21
14,000	New York Central Lines Equip. Trust .	4½%	1933	13,434.36
9,000	New York Central Lines Equip. Trust .	4½%	1937	8,536.50
18,000	New York Central R. R., Equip. Trust.	7%	1932	19,034.00
6,000	New York Central R. R., Equip. Trust.	7%	1933	6,420.00
11,000	New York Central R. R., Equip. Trust.	7%	1934	11,900.00
25,000	New York Central R. R., Equip. Trust.	4½%	1936	24,702.50
52,000	New York Cen. R.R. Co., Cons. Mt. "A"	4%	1998	46,046.65
100,000	New York Connect. R. R., 1st Mtge. .	4½%	1953	98,625.00
31,200	N.Y., N.H. & H. Co., Con. Deb. (Reg.)	6%	1948	33,576.00

Schedule H (*Continued*)

Purchases and Charges during the year	*Sales and Credits during the year*	*Balance June 30, 1928*	*Accrued Interest, etc.*	*Income Received*
.....	.....	$34,825.00	.....	$1,575.00
.....	.....	46,273.00	.....	2,250.00
.....	.....	9,825.00	.....	500.00
.....	.....	9,825.00	.....	500.00
.....	.....	9,825.00	.....	500.00
.....	.....	9,825.00	.....	500.00
.....	.....	9,825.00	.....	500.00
.....	.....	9,825.00	.....	500.00
.....	.....	4,700.00	.....	200.00
.....	.....	67,875.00	.....	3,000.00
.....	.....	54,526.25	.....	2,360.00
.....	.....	8,291.25	.....	360.00
.....	.....	49,468.75	.....	2,500.00
.....	.....	8,287.50	.....	340.00
$16,279.25	$16,000.00	34,504.25	.....	2,683.33
.....	.....	65,437.50	.....	3,000.00
.....	.....	88,950.00	.....	3,600.00
.....	.....	48,068.75	.....	2,000.00
.....	.....	48,068.75	.....	2,000.00
.....	5.00	75,030.00	.....	3,375.00
.....	.....	93,425.00	.....	4,000.00
.....	.....	7,438.10	.....	550.00
.....	.....	13,650.00	.....	840.00
.....	.....	8,600.00	.....	400.00
.....	.....	39,825.00	.....	1,640.00
.....	.....	21,478.36	.....	990.00
.....	.....	41,822.36	.....	1,935.00
.....	.....	40,702.79	.....	1,890.00
.....	.....	14,439.21	.....	675.00
.....	.....	13,434.36	.....	630.00
.....	.....	8,536.50	.....	405.00
.....	258.00	18,776.00	.....	1,260.00
.....	84.00	6,336.00	.....	420.00
.....	150.00	11,750.00	.....	770.00
.....	.....	24,702.50	.....	1,125.00
.....	.....	46,046.65	.....	2,080.00
.....	.....	98,625.00	.....	4,500.00
.....	119.00	33,457.00	.....	1,872.00

Schedule H (*Continued*)

Par Value	*Description of Securities*	*Rate*	*Maturity*	*Balance June 30, 1927*
	RAILROAD BONDS (*Continued*)			
$8,000	N. Y., N.H. & H. R.R. Co., Deb. . .	4%	1955	$6,320.00
75,000	No. Pacific R. R. Co., Prior Lien Ry. .	4%	1997	67,875.00
332,000	No. Pacific Ry. Co., Ref. & Imp. . . .	6%	2047	353,836.50
84,000	Oregon R. R. & Nav. Co., Cons. Mtge.	4%	1946	82,668.25
50,000	Oregon Short Line R. R. Co., Ref. (Reg.)	4%	1929	48,500.00
14,500	Oregon Short Line R. R., Cons. Mtge. .	5%	1946	15,030.00
18,000	Pennsylvania R. R. Co., Cons. Mtge. .	4½%	1960	18,480.00
15,000	Pennsylvania R. R. Co., Equip. Trust .	5%	1929	14,901.00
5,000	Pennsylvania R. R. Co., Equip. Trust	5%	1931	4,961.50
100,000	Pennsylvania R. R. Co., Gen. Mtge.. .	4½%	1965	100,864.00
117,900	Pere Marquette Ry., 1st Mtge. "A" .	5%	1956	104,719.59
37,500	Pere Marquette Ry. Co., 1st Mtge. "B"	4%	1956	37,500.00
51,000	Rio Grande Western Ry. Co., Mtge. .	4%	1939	49,935.00
1,000	Somerset Ry. Co., 1st & Ref. Mtge. . .	4%	1955	850.00
5,000	Southern Pacific Co. Gold	4%	1949	.....
25,000	So. Ry. Co., Dev. & Gen. Mtge. . . .	4%	1956	21,242.50
25,000	So.Ry.Co.,St.Louis Div.,1st Mt. (Reg.)	4%	1951	24,875.00
100,000	Term. R. R. Asso. of St. Louis, Mtge. .	4½%	1939	100,188.00
20,000	Union Pacific R. R. Co.	4½%	1967	.....
100,000	Un. Pac. R. R. Co., 1st Mtge. & L. Gr.	4%	1947	100,720.00
10,000	Western Pacific R. R. Co., 1st Mtge. "A"	5%	1946	8,000.00
50,000	Winston Salem South. Ry. Co., Mtge. .	4%	1960	43,875.00
	Sold or matured during year			500,570.90
$4,364,600	*Total Railroad Bonds*			$4,274,657.27

	RAILROAD STOCKS	*Div.*	*Shares*	
$33,600	Atchison, Topeka & Santa Fe Co., Pref.	5%	336	$25,200.00
104,000	Atchison, Topeka & Santa Fe Co., Com.	10%	1,040	95,291.55
50,000	Atlanta, Birmingham & Coast R. R., Pfd.	5%	500	50,000.00
35,000	Baltimore & Ohio R. R., Common . .	6%	350	16,100.00
50,200	Boston & Albany R. R. Co., Capital. .	8¾%	502	94,883.25
13,300	Chic. Jct. Rwys. & Union St. Yds. Co.	6%	133	.....
20,000	Chicago & Northwestern Ry., Common.	4%	200	16,975.00
103,200	Delaware & Hudson R. R., Cap . . .	9%	1,032	126,604.00
12,500	Del., Lack. & Western R. R.	7%	250	35,050.00
72,500	Great Northern Ry. Co., Preferred . .	5%	725	62,815.00
8,400	Illinois Central R. R. Pref. "A". . . .	6%	84	8,400.00
44,000	Illinois Central R. R. Co., Capital . .	7%	440	47,400.00
115,000	Louisville & Nashville R. R.	7%	1,150	99,251.04
31,600	Maine Central R. R. Co., Capital . .	4%	316	9,500.00
17,600	Minn., St. Paul & S. St. Marie Co., Pref.	4%	176	9,680.00

Schedule H (*Continued*)

Purchases and Charges during the year	*Sales and Credits during the year*	*Balance June 30, 1928*	*Accrued Interest, etc.*	*Income Received*
.....	.....	$6,320.00	.....	$320.00
.....	.....	67,875.00	.....	3,000.00
.....	$184.50	353,652.00	.....	19,920.00
.....	.....	82,668.25	.....	3,360.00
.....	.....	48,500.00	.....	2,000.00
.....	30.00	15,000.00	.....	725.00
.....	15.00	18,465.00	.....	810.00
.....	.....	14,901.00	.....	750.00
.....	.....	4,961.50	.....	250.00
.....	24.00	100,840.00	.....	4,500.00
.....	.....	104,719.59	.....	5,895.00
.....	.....	37,500.00	.....	1,500.00
.....	.....	49,935.00	.....	2,040.00
.....	.....	850.00	.....	40.00
$4,575.00	.....	4,575.00	.....	.....
.....	.....	21,242.50	.....	1,000.00
.....	.....	24,875.00	.....	1,000.00
.....	17.00	100,171.00	.....	4,500.00
73,140.00	53,740.00	19,400.00	$16.26	720.00
.....	38.00	100,682.00	.....	4,000.00
.....	.....	8,000.00	.....	500.00
.....	.....	43,875.00	.....	2,000.00
.....	500,570.90	.....	.....	17,643.32
$492,498.25	$572,700.55	$4,194,454.97	$648.90	$206,693.65
.....	.....	$25,200.00	.....	$1,680.00
$4,000.00	.....	99,291.55	.....	10,100.00
.....	.....	50,000.00	.....	.....
.....	$479.17	15,620.83	.....	2,100.00
.....	.....	94,883.25	.....	4,392.50
12,718.13	.....	12,718.13	.....	598.50
.....	.....	16,975.00	.....	800.00
.....	.....	126,604.00	.....	9,288.00
.....	8,250.00	26,800.00	.....	1,750.00
.....	.....	62,815.00	.....	3,625.00
.....	.....	8,400.00	.....	504.00
.....	.....	47,400.00	.....	3,080.00
.....	.....	99,251.04	.....	8,050.00
.....	.....	9,500.00	.....	1,264.00
.....	.....	9,680.00	.....	704.00

Schedule H (*Continued*)

Par Value	*Description of Securities*	*Div.*	*Shares*	*Balance June 30, 1927*
	RAILROAD STOCKS (*Continued*)			
$7,800	N. Y., N. H. & H. R. R. Co. Pref. . .	7%	78	.....
33,500	Norfolk & Western Ry. Co., Common .	10%	335	$38,860.00
33,000	Northern Pacific Ry., Capital	5%	330	26,523.75
33,800	Old Colony R. R. Co., Capital	7%	338	39,612.50
65,000	Southern Pacific Co., Capital	6%	650	58,500.00
100,000	Union Pacific R. R., Common	10%	1,000	142,573.13
30,000	Vicksburg, Shreveport & Pacific Rwy. Co.	5%	300	29,250.00
	Sold or matured during year			6,274.01
$1,014,000	*Total Railroad Stocks*			$1,038,743.23
	REAL ESTATE BONDS	*Rate*	*Maturity*	
$10,000	Cent. Mfg. Dist., 1st Mfg. R. E. Imp.	5½%	1931	$9,925.00
4,000	Cent. Mfg. Dist., 1st Mfg. R. E. Imp.	5½%	1940	3,970.00
9,000	Cent. Mfg. Dist., 1st Mfg. R. E. Imp.	5½%	1941	8,955.00
14,000	Ellicott Sq. Co. of Buffalo, 1st Mtge. .	5%	1935	13,580.00
447,000	Equitable Office Bldg. Corp., 35-Yr. Deb.	5%	1952	456,000.00
5,680	Equitable Real Estate Co., Gold Notes	6%	1930	5,695.00
4,400	Equitable Real Estate Co., Gold Notes.	6%	1931	4,415.00
20,000	Equitable Real Estate Co., Gold Notes.	6%	1932	20,086.00
50,000	43 Exchange Pl. Bldg., 1st Mtge. S. F..	6%	1938	49,625.00
13,000	Jersey Mtge. & Title Guaranty Co. . .	5½%	1933	.....
50,000	Steiger Bldg., 1st Mtge. Gold	5½%	1952	49,875.00
700	Technology Club of New York W. F. .	5%	....	700.00
98,000	Trinity Bldg. Corp. of N. Y., 1st Mtge.	5½%	1939	94,750.00
	Sold or matured during year			14,925.00
$725,780	*Total Real Estate Bonds*			$732,501.00
	REAL ESTATE STOCKS	*Div.*	*Shares*	
$58,800	Alaska Building Trust	4%	588	$58,251.22
20,000	Boston Cham. of Com. Realty Tr., 1st pf.	7%	200	19,200.00
68,000	Boston Real Estate Trust Capital . .	5%	68	71,661.64
$146,800	*Total Real Estate Stocks*			$149,112.86
	BANK STOCKS			
$32,500	First Nat'l Bank of Boston	16%	325	$82,650.00
16,500	Guaranty Trust Co. of New York . .	16%	165	40,904.00
	Sold during year			7,204.86
$49,000	*Total Bank Stocks*			$130,758.86

Schedule H (*Continued*)

Purchases and Charges during the year	*Sales and Credits during the year*	*Balance June 30, 1928*	*Accrued Interest, etc.*	*Income Received*
$7,800.00	.....	$7,800.00	.....	$273.00
.....	.....	38,860.00	.....	3,350.00
.....	.....	26,523.75	.....	1,650.00
.....	.....	39,612.50	.....	2,366.00
.....	.....	58,500.00	.....	3,900.00
.....	.....	142,573.13	.....	10,000.00
.....	.....	29,250.00	.....	1,500.00
.....	$6,274.01	.....	.....	1,252.33
$24,518.13	$15,003.18	$1,048,258.18	.....	$72,227.33
.....	.....	$9,925.00	.....	$550.00
.....	.....	3,970.00	.....	220.00
.....	.....	8,955.00	.....	495.00
.....	.....	13,580.00	.....	700.00
.....	$9,000.00	447,000.00	.....	22,800.00
.....	7.00	5,688.00	.....	340.80
.....	5.00	4,410.00	.....	264.00
.....	22.00	20,064.00	.....	1,200.00
.....	.....	49,625.00	.....	3,000.00
$12,967.50	.....	12,967.50	$29.79	.....
.....	.....	49,875.00	.....	2,750.00
.....	.....	700.00	.....	35.00
.....	.....	94,750.00	.....	5,390.00
.....	14,925.00	.....	.....	825.00
$12,967.50	$23,959.00	$721,509.50	$29.79	$38,569.80
.....	.....	$58,251.22	.....	$1,764.00
.....	.....	19,200.00	.....	350.00
.....	.....	71,661.64	.....	3,400.00
.....	.....	$149,112.86	.....	$5,514.00
$19,500.00	.....	$102,150.00	.....	$4,160.00
12,300.00	$134.98	53,069.02	.....	1,984.00
.....	7,204.86	.....	.....	432.00
$31,800.00	$7,339.84	$155,219.02	.....	$6,576.00

Schedule H (*Continued*)

Par Value	*Description of Securities*	*Rate*	*Maturity*	*Balance June 30, 1927*
	MORTGAGE NOTES			
$65,000	Harrison O. Apthorp	6%	1928	.....
14,000	Beta Nu House Corporation	5½%	1929	$16,000.00
4,500	E. V. and C. H. Bigelow	5%	....	4,500.00
40,000	Cambridge Tobacco Co.	5½%	1930	40,000.00
40,000	F. J. Holderried (2 at $20,000 each)	6%	1930	40,000.00
5,000	Kappa Sigma			.....
7,000	N. & V. Lomusico	5%	....	7,000.00
75,000	Ella C. Martin	5¼%	1930	.....
20,000	Theta Chi	5½%	....	21,000.00
	Sold or matured during year			95,500.00
$270,500	*Total Mortgage Notes*			$224,000.00
	MISCELLANEOUS			
$50,000	Aldred Investment Trust Deb.	4½%	1967	.....
.....	Aldred Investment Trust Common	..	500†	.....
60,000	Old Colony Trust Associates	..	600†	.....
400,000	Demand Loans (Bank Participations)	..	....	.....
$510,000	*Total Miscellaneous*			.....
	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
15,000.00	No. 7 Central St., Winchester, Land and Building			15,000.00
$606,097.08	*Total Real Estate*			$606,097.08

RECAPITULATION, GENERAL INVESTMENTS

		Per cent of total 1928	*Per cent of total 1927*	
$1,730,000.00	Government and Municipal Bonds	9.50	9.30	$1,704,253.98
1,489,250.00	Industrial Bonds	8.00	8.80	1,620,631.78
2,932,560.00	Industrial Stocks	10.40	11.90	2,209,290.44
5,341,300.00	Public Utility Bonds	28.00	28.50	5,310,859.93
419,800.00	Public Utility Stocks	2.70	2.70	506,963.41
4,364,600.00	Railroad Bonds	22.80	23.20	4,274,657.27
1,014,000.00	Railroad Stocks	5.70	5.60	1,038,743.23
725,780.00	Real Estate Bonds	3.90	4.00	732,501.00
146,800.00	Real Estate Stocks	.80	.80	149,112.86
49,000.00	Bank Stocks	.80	.70	130,758.86
270,500.00	Mortgage Notes	1.50	1.20	224,000.00
606,097.08	Real Estate	3.30	3.30	606,097.08
510,000.00	Miscellaneous	2.60	..	.....
$19,599,687.08	*Total General Investments*	100.00	100.00	$18,507,869.84

†Shares.

Schedule H (*Continued*)

Purchases and Charges during the year	*Sales and Credits during the year*	*Balance June 30, 1928*	*Accrued Interest, etc.*	*Income Received*
$65,000.00	.....	$65,000.00	.....	$1,950.00
.....	$2,000.00	14,000.00	.....	1,265.00
.....	.....	4,500.00	.....	225.00
.....	.....	40,000.00	.....	2,200.00
.....	.....	40,000.00	.....	2,400.00
5,000.00	.....	5,000.00	.....	.....
.....	.....	7,000.00	.....	350.00
75,000.00	.....	75,000.00	.....	1,968.75
.....	1,000.00	20,000.00	.....	1,155.00
.....	95,500.00	.....	.....	3,187.50
$145,000.00	$98,500.00	$270,500.00	.....	$14,701.25
$50,000.00	.....	$50,000.00	.....	$1,125.00
.....	.....	.....	.....	.....
30,000.00	.....	30,000.00	.....	.....
400,000.00	.....	400,000.00	.....	15,441.00
$480,000.00	.....	$480,000.00	.....	$16,566.00
.....	.....	$205,632.55	$7,391.61	$8,012.99
.....	.....	385,364.53	13,227.92	36,872.92
.....	.....	100.00	78.00	.....
.....	.....	15,000.00	651.85	1,620.00
.....	.....	$606,097.08	$21,349.38	$46,505.91
$161,394.03	$125,976.00	$1,739,672.01	$132.45	$82,068.79
197,045.12	351,110.90	1,466,566.00	13.89	84,962.14
83,915.00	369,456.54	1,923,748.90	295.60	194,921.33
379,537.95	524,180.29	5,166,217.59	471.19	273,710.50
46,130.13	56,261.70	496,831.84	.....	31,801.75
492,498.25	572,700.55	4,194,454.97	648.90	206,693.65
24,518.13	15,003.18	1,048,258.18	.....	72,227.33
12,967.50	23,959.00	721,509.50	29.79	38,569.80
.....	.....	149,112.86	.....	5,514.00
31,800.00	7,339.84	155,219.02	.....	6,576.00
145,000.00	98,500.00	270,500.00	.....	14,701.25
.....	.....	606,097.08	21,349.38	46,505.91
480,000.00	.....	480,000.00	.....	16,566.00
$2,054,806.11	$2,144,488.00	$18,418,187.95	$22,941.20	$1,074,818.45

Schedule H (*Continued*)

Par Value	*Description of Securities*	*Rate*	*Maturity*	*Balance June 30, 1927*
	GOVERNMENT AND MUNICIPAL BONDS (EASTMAN CONTRACT)			
$115,000	Great Britain & Ireland	5½%	1937	$121,133.00
25,000	Imperial Japanese Govt. Ext. Loan	6½%	1954	23,125.00
30,000	Manitoba, Province of	4½%	1945	28,650.00
70,000	Manitoba, Province of	5%	1944	70,777.00
100,000	Montreal, City of	5%	1958	101,536.00
100,000	Montreal, City of	5%	1963	101,654.00
150,000	Ontario, Province of	5%	1942	151,968.00
50,000	Ontario, Province of	5%	1952	50,864.00
40,000	Ottawa, City of	5½%	1932	40,986.00
5,000	Ottawa, City of	5%	1933	5,035.00
36,000	Ottawa, City of	5%	1934	36,274.00
35,000	Ottawa, City of	5%	1940	35,401.00
25,000	Ottawa, City of	5%	1945	25,286.00
25,000	Ottawa, City of	5%	1946	25,296.00
29,000	Ottawa, City of	5%	1954	29,628.00
100,000	Quebec, Province of	4½%	1950	97,000.00
200,000	Winnipeg, City of	4½%	1944	189,000.00
$1,135,000	*Total Government and Municipal Bonds*			$1,133,613.00

	INDUSTRIAL BONDS (EASTMAN CONTRACT)			
$200,000	Armour & Co., Real Estate 1st Mtge.	4½%	1939	$175,116.25
50,000	Chile Copper Co., Gold Deb.	5%	1947	48,500.00
300,000	Consolidation Coal Co., 1st & Ref. S. F.	5%	1950	268,806.25
98,000	Indiana Steel Co., 1st Mtge.	5%	1952	100,130.00
50,000	National Tube Co., 1st Mtge.	5%	1952	51,049.00
41,500	Swift & Co.	5%	1932	48,975.00
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 the year			111,875.00
$979,500	*Total Industrial Bonds*			$1,035,490.25

	INDUSTRIAL STOCKS (EASTMAN CONTRACT)	*Div.*	*Shares*	
*$1,875,000	Eastman Kodak Common	8%	18,750	$1,875,000.00
180,000	Eastman Kodak Preferred	6%	1,800	198,000.00
21,000	International Match Co., Part. Pfd.	3.20	600	18,711.30
$2,076,000	*Total Industrial Stocks*			$2,091,711.30

*No par value.

Schedule H (*Continued*)

Purchases and Charges during the year	*Sales and Credits during the year*	*Balance June 30, 1928*	*Accrued Interest, etc.*	*Income Received*
.....	$681.00	$120,452.00	.....	$6,325.00
.....	.....	23,125.00	.....	1,625.00
.....	.....	28,650.00	.....	1,350.00
.....	49.00	70,728.00	.....	3,500.00
.....	52.00	101,484.00	.....	5,000.00
.....	48.00	101,606.00	.....	5,000.00
.....	141.00	151,827.00	.....	7,500.00
.....	36.00	50,828.00	.....	2,500.00
.....	247.00	40,739.00	.....	2,200.00
.....	7.00	5,028.00	.....	250.00
.....	46.00	36,228.00	.....	1,800.00
.....	34.00	35,367.00	.....	1,750.00
.....	17.00	25,269.00	.....	1,250.00
.....	17.00	25,279.00	.....	1,250.00
.....	25.00	29,603.00	.....	1,450.00
.....	.....	97,000.00	.....	4,500.00
.....	.....	189,000.00	.....	9,000.00
.....	$1,400.00	$1,132,213.00	.....	$56,250.00
.....	.....	$175,116.25	.....	$9,000.00
.....	.....	48,500.00	.....	2,500.00
.....	.....	268,806.25	.....	15,000.00
.....	$89.00	100,041.00	.....	4,900.00
.....	44.00	51,005.00	.....	2,500.00
$280.50	8,606.25	40,649.25	.....	2,500.00
.....	.....	188,288.75	.....	9,500.00
.....	.....	42,750.00	.....	2,500.00
.....	111,875.00	.....	.....	4,895.82
$280.50	$120,614.25	$915,156.50	.....	$53,295.82
.....	.....	$1,875,000.00	.....	$150,000.00
.....	.....	198,000.00	.....	10,800.00
.....	.....	18,711.30	.....	1,920.00
.....	.....	$2,091,711.30	.....	$162,720.00

Schedule H (*Continued*)

Par Value	*Description of Securities*	*Rate*	*Maturity*	*Balance June 30, 1927*
	PUBLIC UTILITY BONDS (EASTMAN CONTRACT)			
$200,000	Alabama Power Co., 1st Mtge. "A" .	5%	1946	$191,501.25
200,000	Am. Tel. & Tel. 35-Yr. Deb.	5%	1960	190,000.00
100,000	Cedars Rapids Mfg. & P'r Co., S. F. .	5%	1953	99,875.00
50,000	Ch.N.Sh.&Mil.R.R.Co.,1st&Ref.Mt."A"	6%	1955	49,000.00
49,000	Cleveland Elec. Ill. Co., 1st Mtge. . .	5%	1939	49,362.00
75,000	Cohoes P'r & Lt. Corp., 1st Mtge. . .	6%	1929	75,750.00
50,000	Columbus Elec. & Power Co.	5%	1929	49,875.00
200,000	Consolidated Gas Co. of N. Y.	5½%	1945	202,676.00
100,000	Consolidated Gas & El. Lt. & Pr. Co. .	4½%	1935	96,500.00
200,000	Consumers Power Co., 1st & Ref. . .	5%	1936	199,000.00
55,000	Cumberland County P'r&Lt.Co.,1st Mt.	4½%	1956	51,837.50
500,000	Edison Elec. Ill. Co., Boston Notes . .	4½%	1930	.....
10,000	Hydraulic Pr. Co. of Niagara Falls . .	5%	1951	10,059.00
50,000	Illinois Pr.&Lt.Corp., 1st&Ref.Mt."B"	5½%	1954	48,500.00
100,000	Montreal Lt., Heat & Pr., 1st Mtge. .	4½%	1932	98,750.00
100,000	Nebraska Power Co., 1st Mtge. "A". .	5%	1949	98,750.00
100,000	Pacific Gas & El. Co., 1st Ref. Mt. "B"	6%	1941	103,900.00
50,000	SanJoaquinLt.&Pr.Co.Un.&Ref.Gold"D"	5%	1957	49,125.00
50,000	Sierra Pacific Elec. Co., Gold	5%	1929	49,802.50
50,000	Syracuse Lt. Co., Inc., 1st&Ref. Mtge.	5½%	1954	50,672.00
50,000	Tennessee Pr. Co., 1st Mtge.	5%	1962	46,625.00
100,000	Western Union Tel. Co.	5%	1951	100,000.00
	Sold or matured during the year . . .			545,175.00
$2,439,000	*Total Public Utility Bonds*			$2,456,735.25

Par Value		*Div.*	*Shares*	
	PUBLIC UTILITY STOCKS (EASTMAN CONTRACT)			
$50,000	Central Illinois Pub. Ser. Co., Pref. . .	6%	500	$42,937.50
28,600	Edison Electric Ill. Co., Capital. . . .	12%	286	57,802.50
50,000	Knoxville Pr. & Lt. Co., Pref.	7%	500	49,375.00
50,000	Memphis Pr. & Lt. Co., Pref..	7%	500	49,375.00
50,000	Public Service Elec. & Gas. Co., Pref. .	6%	500	47,250.00
$228,600	*Total Public Utility Stocks*			$246,740.00

	RAILROAD BONDS (EASTMAN CONTRACT)	*Rate*	*Maturity*	
$100,000	Chicago & Northwestern R.R.Co.Gen'l	4%	1987	.....
50,000	Chic., Rock Is. & Pacific, 1st & Ref. Mt.	4%	1934	$42,406.25
100,000	Delaware & Hudson, 1st & Ref. Mtge..	4%	1943	89,500.00
50,000	East Penn. Ry. Co., 1st Mtge.	5%	1936	46,875.00
100,000	Florida East Coast Ry.Co.,1st&Ref.Mt.	5%	1974	95,633.75
11,000	Illinois Central R. R. Equip. Trust "K"	4½%	1931	10,876.51

Schedule H (*Continued*)

Purchases and Charges during the year	*Sales and Credits during the year*	*Balance June 30, 1928*	*Accrued Interest, etc.*	*Income Received*
.....	.....	$191,501.25	.....	$10,000.00
.....	.....	190,000.00	.....	10,000.00
.....	.....	99,875.00	.....	5,000.00
.....	.....	49,000.00	.....	3,000.00
.....	$33.00	49,329.00	.....	2,450.00
.....	750.00	75,000.00	.....	4,500.00
.....	.....	49,875.00	.....	2,500.00
.....	158.00	202,518.00	.....	11,000.00
.....	.....	96,500.00	.....	4,500.00
.....	.....	199,000.00	.....	10,000.00
.....	.....	51,837.50	.....	2,475.00
$499,375.00	.....	499,375.00	.....	11,600.00
.....	3.00	10,056.00	.....	500.00
.....	.....	48,500.00	.....	2,750.00
.....	.....	98,750.00	.....	4,500.00
.....	.....	98,750.00	.....	5,000.00
.....	300.00	103,600.00	.....	6,000.00
.....	.....	49,125.00	.....	2,500.00
.....	.....	49,802.50	.....	2,500.00
.....	26.00	50,646.00	.....	2,750.00
.....	.....	46,625.00	.....	2,500.00
.....	.....	100,000.00	.....	5,000.00
.....	545,175.00	.....	.....	19,187.38
$499,375.00	$546,445.00	$2,409,665.25	.....	$130,212.38
.....	.....	$42,937.50	.....	$3,000.00
.....	.....	57,802.50	.....	3,324.00
.....	.....	49,375.00	.....	3,500.00
.....	.....	49,375.00	.....	3,500.00
.....	.....	47,250.00	.....	3,000.00
.....	.....	$246,740.00	.....	$16,324.00
$96,500.00	.....	$96,500.00	.....	$2,000.00
.....	.....	42,406.25	.....	2,000.00
.....	.....	89,500.00	.....	4,000.00
.....	.....	46,875.00	.....	2,500.00
.....	.....	95,633.75	.....	5,000.00
.....	.....	10,876.51	.....	495.00

Schedule H (*Continued*)

Par Value	*Description of Securities*	*Rate*	*Maturity*	*Balance June 30, 1927*
	RAILROAD BONDS (EASTMAN CONTRACT) *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
25,000	Ill. Cent. & Chic. St. L. & N. O. R.R.	4½%	1963	.....
50,000	Kansas City, Ft. Scott & Memphis Cons.	4%	1936	41,243.75
50,000	Kansas City Terminal Ry., 1st Mtge. .	4%	1960	42,750.00
200,000	Minn., St. Paul & S. St. Marie Ry. Co..	4%	1938	175,710.00
100,000	Missouri, Pacific Ry. Co.1st&Ref.Mt."F"	5%	1977	99,750.00
50,000	New York, Chicago & St. Louis Ry.. .	5½%	1974	47,350.00
200,000	Northern Pacific Ry. Co., Ref.&Imp."B"	6%	2047	215,584.00
5,000	Penn. R. R. Equip. Trust "A"	5%	1932	4,959.00
50,000	St. Louis Iron Mt. & Southern Ry. . .	4%	1933	42,290.00
50,000	St. Louis, San Francisco Ry., Prior Lien	5½%	1942	47,258.75
50,000	South. Ry. Co., Dev. & Gen. Mtge. . .	4%	1956	37,492.50
100,000	Terminal R.R.Asso.of St.Louis Gen.Mt.	4%	1953	83,860.00
100,000	Union Term. Co. of Dallas, 1st Mt. S.F.	5%	1942	99,673.75
200,000	Virginian Ry. Co., 1st Mtge. "A" . .	5%	1962	191,737.50
$1,730,000	*Total Railroad Bonds*			$1,502,371.71

Par Value	*Description of Securities*	*Div.*	*Shares*	*Balance June 30, 1927*
	RAILROAD STOCKS (EASTMAN CONTRACT)			
$8,000	Bangor & Aroostook R. R. Common .	3.50	80	.....
20,000	Bangor & Aroostook R. R., Pref. . . .	7%	200	$19,000.00
121,000	New York Central R. R., Capital . .	8%	1,210	107,188.53
100,000	Pere Marquette Ry. Pr., Pref. Cum.. .	5%	1,000	80,024.40
$249,000	*Total Railroad Stocks*			$206,212.93

Par Value	*Description of Securities*	*Div.*	*Shares*	*Balance June 30, 1927*
	MISCELLANEOUS (EASTMAN CONTRACT)			
$4,000	First National Bank of New York. . .	100%	40	$104,328.00
60,000	Old Colony Trust Co. of Boston . . .	12%	600	131,878.76
300,000	Gannett Co., Inc., Note	5%	..	300,000.00
$364,000	*Total Miscellaneous*			$536,206.76

Schedule H (*Continued*)

Purchases and Charges during the year	*Sales and Credits during the year*	*Balance June 30, 1928*	*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
$24,375.00	.....	24,375.00	.....	562.50
.....	.....	41,243.75	.....	2,000.00
.....	.....	42,750.00	.....	2,000.00
.....	.....	175,710.00	.....	8,000.00
.....	.....	99,750.00	.....	5,000.00
.....	.....	47,350.00	.....	2,750.00
.....	$131.00	215,453.00	.....	12,000.00
.....	.....	4,959.00	.....	250.00
.....	.....	42,290.00	.....	2,000.00
.....	.....	47,258.75	.....	2,750.00
.....	.....	37,492.50	.....	2,000.00
.....	.....	83,860.00	.....	4,000.00
.....	.....	99,673.75	.....	5,000.00
.....	.....	191,737.50	.....	10,000.00
$120,875.00	$131.00	$1,623,115.71	.....	$78,312.50
$4,800.00	.....	$4,800.00	.....	$210.40
.....	.....	19,000.00	.....	1,400.00
11,000.00	.....	118,188.53	.....	9,240.00
.....	.....	80,024.40	.....	5,000.00
$15,800.00	.....	$222,012.93	.....	$15,850.40
.....	.....	$104,328.00	.....	$4,000.00
.....	.....	131,878.76	.....	7,200.00
.....	.....	300,000.00	.....	15,000.00
.....	.....	$536,206.76	.....	$26,200.00

Schedule H (*Continued*)

Par Value	*Description of Securities*	*Per cent of Total 1928*	*Per cent of Total 1927*	*Balance June 30, 1927*
	RECAPITULATION, EASTMAN CONTRACT INVESTMENTS			
$1,135,000	Government and Municipal Bonds	12.00	11.90	$1,133,613.00
979,500	Industrial Bonds	9.70	10.80	1,035,490.25
2,076,000	Industrial Stocks	22.00	22.00	2,091,711.30
2,439,000	Public Utility Bonds	25.40	26.00	2,456,735.25
228,600	Public Utility Stocks	2.60	2.60	246,740.00
1,730,000	Railroad Bonds	17.10	15.80	1,502,371.71
249,000	Railroad Stocks	2.30	2.10	206,212.93
364,000	Miscellaneous	5.70	5.65	536,206.76
300,000	Cash Reserve	3.20	3.15	300,000.00
$9,501,100	*Total Investments (Eastman Contract)*	100.00	100.00	$9,509,081.20

INVESTMENTS, MALCOLM COTTON BROWN FUND

		Rate	*Maturity*	
$15,000	Metro. West Side Elev. Ry. Co., Mtg..	4%	1938	$6,750.00
10,000	Metro. West Side Elev. Ry. Co., Mtge.	4%	1938	4,100.00
$25,000	*Total*			$10,850.00

INVESTMENTS, FRANK HARVEY CILLEY FUND

$10,000	New York, City of, Corp. Stock	4¼%	1964	$10,350.00
5,000	St. Louis Iron Mt.&So.R.R.Mtg.(Reg.)	4%	1933	4,812.50
6,000	Edison Elec. Ill. Co. Boston, Gold	4½%	1930	.....
5,000	Chic. & Northwestern Ry. Co. Equip. Tr.	5%	1938	5,000.00
2,500	Boston Elev. Ry. Co., 2d Pfd.	7%	25†	2,600.00
5,900	Edison Electric Ill. Co., Capital.	12%	59†	12,667.09
7,500	Mass. Gas Companies, Pref.	4%	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
1,600	Mortgage Notes, Isabella Aznive	6%	..	1,600.00
2,400	Mortgage Note, E. and A. Orlogski	5%	..	2,400.00
	Sold or matured during year			9,410.00
$55,950	*Total*			$72,079.09

†Shares.

Schedule H (*Continued*)

Purchases and Charges during the year	*Sales and Credits during the year*	*Balance June 30, 1928*	*Accrued Interest, etc.*	*Income Received*
.....	$1,400.00	$1,132,213.00	.....	$56,250.00
$280.50	120,614.25	915,156.50	.....	53,295.82
.....	.....	2,091,711.30	.....	162,720.00
499,375.00	546,445.00	2,409,665.25	.....	130,212.38
.....	.....	246,740.00	.....	16,324.00
120,875.00	131.00	1,623,115.71	.....	78,312.50
15,800.00	.....	222,012.93	.....	15,850.40
.....	.....	536,206.76	.....	26,200.00
.....	.....	300,000.00	.....	9,000.00
$636,330.50	$668,590.25	$9,476,821.45	.....	$548,165.10
.....	.....	$6,750.00	.....	$600.00
.....	.....	4,100.00	.....	400.00
.....	.....	$10,850.00	.....	$1,000.00
.....	$10.00	$10,340.00	.....	$425.00
.....	.....	4,812.50	.....	200.00
$6,030.00	10.00	6,020.00	$125.25	135.00
.....	.....	5,000.00	.....	250.00
.....	.....	2,600.00	.....	175.00
.....	.....	12,667.09	.....	687.00
.....	.....	6,825.00	.....	300.00
.....	.....	2,125.00	.....	137.50
.....	.....	12,589.50	.....	682.50
.....	.....	1,700.00	.....	92.50
.....	.....	1,600.00	.....	96.00
.....	.....	2,400.00	.....	120.00
.....	9,410.00	.....	.....	726.15
$6,030.00	$9,430.00	$68,679.09	$125.25	$4,026.65

Schedule H (*Continued*)

Par Value	*Description of Securities*	*Rate*	*Maturity*	*Balance June 30, 1927*
	INVESTMENTS, EBEN S. DRAPER FUND			
$16,000	Georgia Ry. & Elec. Co., 1st Mt. S. F..	5%	1932	$16,072.00
20,000	New York Tel. Co., 1st & Gen. Mtge. .	4½%	1939	19,395.00
20,000	Wilmington City Elec. Co., 1st Mtge. .	5%	1951	19,600.00
4,000	Chic.Mil.,St. Paul & Pac.R.R.Gold"A"	5%	1975	.....
16,000	C. M., St. P. & Pac.RR..Conv.Gold"A"	5%	2000	.....
24,000	Indianapolis Un. Ry. Co., Gen. Mtge. .	5%	1965	23,880.00
	Sold or matured during year			20,348.00
$100,000	*Total*			$99,295.00
	INVESTMENTS, HENRY C. FRICK FUND			
$50,000	Province of British Columbia	4½%	1939	.....
50,000	Province of Ontario Deb.	4½%	1934	$48,314.30
50,000	Commonwealth Elec. Co., 1st Mtge.. .	5%	1943	47,937.50
51,000	Cumberland Tel. & Tel. Co., 1st Mtge.	5%	1937	50,305.75
25,000	Puget Sound P.&L.Co.1st Ref.Mtg."B"	5%	1931	.....
50,000	American Radiator Co. Gold Deb. . .	4½%	1947	.....
25,000	U. S. Cold Storage Co., 1st Mtge. R. E.	6%	1945	16,340.00
25,000	Canadian Natl. Rys.Equip.Tr.Gold "J"	4½%	1937	.....
25,000	Ill.Cent & Chic.,St.L.&New Orleans R.R.	4½%	1963	.....
25,000	Southern Ry.Co.Dev.& Gen.Mtge."A"	4%	1956	21,425.00
40,000	Union Pacific R. R. Co.	4½%	1967	.....
*37,000	Cerro de Pasco Copper Corp.	4%	370†	18,870.00
170,000	Chic. & Northwestern Ry. Co. Com. .	4%	1700†	93,500.00
.....	Taxes Advanced	..	..	.....
	Sold or matured during the year . . .			38,400.00
$623,000				$335,092.55
	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. . .	5%	..	5,000.00
$10,000	*Total*			$9,075.00
	INVESTMENTS, RICHARD LEE RUSSEL FELLOWSHIP FUND			
$2,000	Trinity Build. Corp. of N. Y., 1st Mt. .	5½%	1939	$2,000.00
	INVESTMENTS, SUSAN H. SWETT SCHOLARSHIP FUND			
$10,000	Mass. Hospital Life Insurance Co.	5%	..	$10,000.00

*No par value.
†Shares.

Schedule H (*Continued*)

Purchases and Charges during the year	*Sales and Credits during the year*	*Balance June 30, 1923*	*Accrued Interest, etc.*	*Income Received*
.....	$18.00	$16,054.00	.....	$800.00
.....	.....	19,395.00	.....	900.00
.....	.....	19,600.00	.....	1,000.00
$4,068.80	.....	4,068.80	.....	.....
16,275.20	.....	16,275.20	.....	320.00
.....	.....	23,880.00	.....	1,200.00
.....	20,348.00	.....	.....	600.00
$20,344.00	$20,366.00	$99,273.00	.....	$4,820.00
$48,325.00	.....	$48,325.00	.....	$1,125.00
.....	.....	48,314.30	.....	2,250.00
.....	.....	47,937.50	.....	2,500.00
.....	.....	50,305.75	.....	2,550.00
24,812.50	.....	24,812.50	.....	625.00
48,000.00	.....	48,000.00	.....	1,125.00
9,191.00	$32.00	25,499.00	.....	1,230.00
24,605.00	.....	24,605.00	.....	562.50
24,312.50	.....	24,312.50	.....	562.50
.....	.....	21,425.00	.....	1,000.00
38,800.00	.....	38,800.00	.....	900.00
.....	.....	18,870.00	.....	1,480.00
.....	.....	93,500.00	.....	6,800.00
.....	.....	.....	$5,033.56	.....
.....	38,400.00	.....	.....	1,166.67
$218,046.00	$38,432.00	$514,706.55	$5,033.56	$23,876.67
.....	.....	$4,075.00	.....	$250.00
.....	.....	5,000.00	.....	250.00
.....	.....	$9,075.00	.....	$500.00
.....	.....	$2,000.00	.....	$110.00
.....	.....	$10,000.00	.....	$500.00

Schedule H (*Continued*)

Par Value	*Description of Securities*	*Rate*	*Maturity*	*Balance June 30, 1927*
	INVESTMENTS, JONATHAN WHITNEY FUND			
$25,000	Montreal, City of, Canada	5%	1936	$25,000.00
25,000	New York, City of, Corporate Stock.	4½%	1964	25,932.00
25,000	American Thread Co., 1st Mtge. . . .	6%	1928	25,000.00
21,000	Standard Oil Co. of New York	4½%	1935	.....
25,000	Swift & Co., 1st Sinking Fund	5%	1944	22,625.00
27,000	U. S. Steel Corp., S. F.	5%	1963	30,285.00
28,000	Western Electric Co., Deb.	5%	1944	27,720.00
25,000	Detroit Edison Co., 1st Mtge.	5%	1933	25,150.00
25,000	Georgia Rail. & Elec. Co., 1st Mtge. .	5%	1932	25,168.00
25,000	N. Y. Tel. Co., 1st & Gen. Mtge. . . .	4½%	1939	24,150.39
25,000	Western Tel. & Tel. Co., Co. Tr. . . .	5%	1932	25,188.00
25,000	Atch.,Top.&S.F.,Cal.&Ar.Lines, 1st Mt.	4½%	1962	24,381.25
35,000	Chicago Union Station, 1st Mtge. . .	4½%	1963	35,201.00
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	25,009.00
7,000	New York Central Equip. Tr.	4½%	1935	.....
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
150,000	Mortgage Note, M. I. T. Dormitory. .	5%	..	150,000.00
	Sold or matured during year			21,050.00
$607,000	*Total*			$590,742.74
$30,533,737.08	Grand Total, All Investments (*Schedule D*)			$29,146,085.42

Schedule H (*Continued*)

Purchases and Charges during the year	*Sales and Credits during the year*	*Balance June 30, 1928*	*Accrued Interest, etc.*	*Income Received*
.....	.....	$25,000.00	.....	$1,250.00
.....	$26.00	25,906.00	.....	1,062.50
.....	.....	25,000.00	.....	1,500.00
$21,103.19	15.19	21,088.00	$55.13	.....
.....	.....	22,625.00	.....	1,250.00
271.50	3,308.00	27,248.50	.....	1,500.00
.....	.....	27,720.00	.....	1,400.00
.....	30.00	25,120.00	.....	1,250.00
.....	42.00	25,126.00	.....	1,250.00
.....	.....	24,150.39	.....	1,125.00
.....	47.00	25,141.00	.....	1,250.00
.....	.....	24,381.25	.....	1,125.00
.....	6.00	35,195.00	.....	1,575.00
.....	.....	22,625.00	.....	1,000.00
.....	.....	42,750.00	.....	2,000.00
.....	2.00	25,007.00	.....	1,125.00
7,000.00	.....	7,000.00	.....	157.50
.....	.....	8,558.10	.....	405.00
.....	.....	4,950.00	.....	250.00
.....	.....	150,000.00	.....	7,500.00
.....	21,050.00	.....	.....	1,050.00
$28,374.69	$24,526.19	$594,591.24	$55.13	$29,025.00
$2,963,931.30	$2,905,832.44	$29,204,184.28	$28,155.14	$1,686,841.87

RECAPITULATION, ALL INVESTMENTS

	Per cent of Total 1928	*Per cent of Total 1927*	*Book Value June 30, 1928*
Government and Municipal Bonds	10.40	10.10	$3,029,770.31
Industrial Bonds	8.90	9.70	2,593,903.00
Industrial Stocks	13.80	14.80	4,034,330.20
Public Utility Bonds	27.00	27.60	7,874,469.98
Public Utility Stocks	2.70	2.70	767,788.93
Railroad Bonds	21.00	21.00	6,151,216.03
Railroad Stocks	4.70	4.40	1,378,060.61
Real Estate Bonds	2.50	2.50	723,509.50
Real Estate Stocks	.50	.50	149,112.86
Bank Stocks	1.30	1.25	391,425.78
Mortgage Notes	2.50	2.30	724,500.00
Real Estate	2.10	2.10	606,097.08
Miscellaneous	1.60	..	480,000.00
Cash Reserve	1.00	1.05	300,000.00
	100.00	100.00	$29,204,184.28

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	619,380.64
Main Educational Building Group	4,071,492.13
Pratt School of Naval Architecture	674,971.70
Guggenheim Aeronautical Laboratory	241,363.28
Mechanic Arts Building	83,658.89
Power Plant (inc. Machinery and Equipment)	302,569.27
*Homberg Memorial Infirmary	167,361.70
Educational Equipment, Cambridge	2,039,953.60
Steam and Electrical Distribution System, Cambridge	155,448.64
Gas Engine Laboratory	26,301.88
Automotive Laboratory	11,000.00
Compression Laboratory	31,000.00
Tractor Garage	6,400.00
Service Garage	5,981.54
Athletic Field	24,815.14
Walker Memorial Building	575,111.50
Walker Memorial Building, Equipment	139,475.52
Dormitories (1916) ($331,357.67 less mortgage $150,000)	181,357.67
Dormitories (1916) Equipment	26,967.85
Dormitory, Class of '93	185,718.91
Dormitory, Class of '93, Equipment	9,518.04
Alumni Dormitories (1928)	291,274.49
Alumni Dormitories (1928) Equipment	18,971.05
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, 1928 (Schedule D)	$13,453,954.01

*Not completed.

SCHEDULE K

PRINCIPAL GIFTS AND APPROPRIATIONS FOR EDUCATIONAL PLANT

George Eastman, for New Buildings	$3,500,000.00
Maria A. Evans, for Dormitories	161,192.55
Class of 1893, for Dormitory	100,000.00
Appropriation, Maria A. Evans Fund	169,080.60
T. C. du Pont, Donation for Land	625,000.00
T. C. du Pont, Donation for Dormitories	100,000.00
T. C. and P. S. du Pont, Charles Hayden, for Mining Building	215,000.00
Pratt Fund, for School of Naval Architecture	675,150.00
Alumni Fund, Equipment, Dormitories and Walker Memorial	622,119.38
Alumni Dormitory Fund	288,500.31
Walker Memorial Fund, for Walker Memorial	167,303.96
Improvement Fund for Walker Memorial	24,491.04
Appropriation of Emma Rogers Fund, for Equipment	528,077.06
Daniel Guggenheim Fund	230,000.00
Estate of F. W. Emery, for Equipment	126,423.80
Appropriation of Charles C. Drew Fund	305,171.52
Appropriation of Lucius Tuttle Fund for Equipment	50,000.00
Subscriptions to Homberg Memorial Infirmary	75,075.00
Appropriation of Frank E. Peabody Fund	52,238.89
Appropriation of Nathaniel Thayer Fund for Equipment	25,000.00
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
Anonymous for Boat House Additions	30,000.00
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.	2,074,931.41
*Total, June 30, 1928 (Schedule D)	$13,334,314.67

*Less $119,639.34 to be appropriated.

SCHEDULE P

ENDOWMENT FUNDS FOR GENERAL PURPOSES

Restricted Funds	*Funds, June 30, 1927*	*Investment Income*	*Other Income*	*Expended or Transferred*	*Funds, June 30, 1928*
George Robert Armstrong	$5,000.00	$277.50	.....	$277.50	$5,000.00
Charles Choate	35,858.15	1,998.00	.....	1,998.00	35,858.15
Eben S. Draper	100,000.00	4,820.00	.....	4,820.00	100,000.00
*Eastman Contract . . .	5,746,053.90	548,165.10	.....	248,165.10	6,046,053.90
George Eastman (Building)	2,500,000.00	138,750.00	.....	138,750.00	2,500,000.00
Educational Endowment	7,567,306.72	420,024.00	$3,653.55	420,024.00	7,570,960.27
Martha Ann Edwards . .	30,000.00	1,665.00	.....	1,665.00	30,000.00
William Endicott	25,000.00	1,387.50	.....	1,387.50	25,000.00
Francis Appleton Foster .	1,000,000.00	55,500.00	.....	55,500.00	1,000,000.00
Jonathan French	25,212.48	1,387.50	.....	1,387.50	25,212.48
Henry C. Frick	555,846.77	18,843.11	864.00	18,843.11	556,710.77
General Endowment. . .	1,527,549.00	84,776.25	.....	84,776.25	1,527,549.00
James Fund	163,654.21	9,102.00	.....	9,102.00	163,654.21
Katharine B. Lowell. . .	5,000.00	277.50	.....	277.50	5,000.00
M. I. T. Alumni Fund (Bal.)	1,244.59	66.60	.....	.....	1,311.19
Kate M. Morse	25,000.00	1,387.50	.....	1,387.50	25,000.00
Richard Perkins	50,000.00	2,775.00	.....	2,775.00	50,000.00
J. W. and B. L. Randall .	83,452.36	4,662.00	.....	4,662.00	83,452.36
Wm. Barton Rogers Mem.	250,225.00	13,875.00	.....	13,875.00	250,225.00
†Saltonstall Fund	54,082.60	2,997.00	.....	2,247.75	54,831.85
Samuel E. Sawyer. . . .	4,764.40	266.40	.....	266.40	4,764.40
Andrew Hastings Spring .	50,000.00	2,775.00	.....	2,775.00	50,000.00
Seth K. Sweetser	25,061.62	1,387.50	.....	1,387.50	25,061.62
William J. Walker . . .	23,663.59	1,332.00	.....	1,332.00	23,663.59
Albion K. P. Welch . . .	5,000.00	277.50	.....	277.50	5,000.00
	$19,858,975.39	$1,318,774.96	$4,517.55	$1,017,959.11	$20,164,308.79
Unrestricted Funds					
Edmund D. Barbour . .	$718,237.97	$44,400.00	$91,778.13	$44,400.00	$810,016.10
William L. Chase	4,090.09	222.00	.....	222.00	4,090.09
Charles W. Eaton . . .	170,854.50	10,600.50	45,326.10	10,600.50	216,180.60
Arthur F. Estabrook (Bal.)	10,000.00	555.00	.....	555.00	10,000.00
Ida F. Estabrook (Bal.) .	2,157.51	111.00	.....	111.00	2,157.51
Walter L. Frisbie	7,614.98	421.80	.....	421.80	7,614.98
Charles Hayden	42,700.76	2,369.85	.....	2,369.85	42,700.76
Frederick S. Hodges . .	.....	2,719.50	49,966.26	2,719.50	49,966.26
Industrial Fund.	88,806.22	5,383.50	19,681.00	5,383.50	108,487.22

*Income added to Fund. See also Special Deposit Fund.
†One-fourth Income added to Fund.

Schedule P (*Continued*)

Unrestricted Funds ((Continued)	*Funds, June 30, 1927*	*Investment Income*	*Other Income*	*Expended or Transferred*	*Funds, June 30, 1928*
Hiram F. Mills	$10,175.00	$555.00	.....	$555.00	$10,175.00
Albert H. Munsell . . .	7,908.28	444.00	.....	444.00	7,908.28
Margaret A. Munsell . .	1,105.32	61.05	.....	61.05	1,105.32
Moses W. Oliver	11,220.49	610.50	.....	610.50	11,220.49
Frances M. Perkins . . .	13,272.68	721.50	.....	721.50	13,272.68
Russell Robb	.....	555.00	25,000.00	555.00	25,000.00
Robert E. Rogers	7,680.77	427.35	.....	427.35	7,680.77
Horace W. Wadleigh . .	2,143.14	116.55	.....	116.55	2,143.14
Kenneth F. Wood . . .	25,000.00	1,387.50	.....	1,387.50	25,000.00
	$1,122,967.71	$71,661.60	$231,751.49	$71,661.60	$1,354,719.20

SCHEDULE Q
ENDOWMENT FUNDS FOR DESIGNATED PURPOSES

Special Deposit Funds					
‡New Dormitory, General	$601.50	.....	$163,237.04	$163,838.54	.....
‡Class of '88 Dormitory.	1,247.00	.....	5,525.00	6,772.00	.....
‡Class of '92 Dormitory.	8,469.77	.....	9,400.00	17,869.77	.....
‡Class of '01 Dormitory	41,487.50	.....	58,532.50	100,020.00	.....
†Geo. Eastman (due under contract).	3,750,000.00	.....	.....	300,000.00	$3,450,000.00
*Endowment Reserve .	458,694.56	$40,223.25	182;905.44	89,820.76	592,002.49
*Anonymous (1924) . .	1,233.10	66.60	.....	.....	1,299.70
*1923 Endowment. . .	86.98	5.55	52.46	.....	144.99
*1923 Endowment Reserve	1,521.38	83.25	1,935.21	1,004.26	2,535.58
*1924 Endowment . .	680.11	38.85	37.76	.....	756.72
*1924 Endowment Reserve	308.74	16.65	1,754.36	856.51	1,223.24
*1925 Endowment . .	374.56	33.30	608.83	.....	1,016.69
1925 Endowment Reserve	.....	.....	1,397.66	739.19	658.47
1926 Endowment . . .	.....	.....	133.70	.....	133.70
*1926 Endowment Reserve	465.99	22.20	954.77	1,277.75	165.21
1927 Endowment . . .	25.00	.....	45.00	.....	70.00
1927 Endowment Reserve	.....	.....	9.90	.....	9.90
1928 Endowment . . .	.....	.....	1,200.00	.....	1,200.00
M. I. T. Teachers' Insurance	218.07	.....	22,466.14	20,037.30	2,646.91
*Class of '98 Loan . .	2,476.50	155.40	845.00	.....	3,476.90
*Gen. Elec. Co. VI and VIII	23,052.00	1,276.50	.....	.....	24,328.50
*Undergraduate Dues, Reserve	5,775.00	321.90	500.00	.....	6,596.90
	$4,296,717.76	$42,243.45	$451,540.77	$702,236.08	$4,088,265.90

*Income added to Fund.
†See also Funds for General Purposes (Eastman Contract)
‡Transferred to Plant Capital, Schedule K.

Schedule Q *(Continued)*

	Funds, June 30, 1927	*Investment Income*	*Other Income*	*Expended or Transferred*	*Funds, June 30, 1928*
FUNDS FOR SALARIES					
Samuel C. Cobb For General Salaries. . .	$36,290.00	$1,998.00	$236.31	$1,998.00	$36,526.31
Sarah H. Forbes For General Salaries. . .	500.00	27.75	.....	27.75	500.00
George A. Gardner For General Salaries. . .	20,000.00	1,110.00	.....	1,110.00	20,000.00
James Hayward Professorship of Engineering	18,800.00	1,043.40	.....	1,043.40	18,800.00
William P. Mason Professorship of Geology	18,800.00	1,043.40	.....	1,043.40	18,800.00
Henry B. Rogers For General Salaries . .	25,000.00	1,387.50	.....	1,387.50	25,000.00
Nathaniel Thayer Professorship of Physics .	25,000.00	1,387.50	.....	1,387.50	25,000.00
	$144,390.00	$7,997.55	$236.31	$7,997.55	$144,626.31
FUNDS FOR LIBRARY, READING ROOMS AND GYMNASIUM					
Walter S. Barker	$10,024.41	$555.00	.....	$469.25	$10,110.16
Edna Dow Cheney	14,858.72	832.50	$9.70	579.35	15,121.57
Frank Harvey Cilley . . .	71,756.37	3,901.40	3,236.26	2,771.64	76,122.39
Charles Lewis Flint Library	5,145.88	277.50	.....	270.98	5,152.40
William Hall Kerr Library .	2,513.81	138.75	.....	14.89	2,637.67
Arthur Rotch Arch. Library	5,000.00	277.50	.....	277.50	5,000.00
Technology Matrons' Teas .	6,616.62	349.65	.....	363.00	6,603.27
John Hume Tod	2,710.85	149.85	.....	106.90	2,753.80
Theodore N. Vail	36,923.50	2,053.50	.....	2,053.50	36,923.50
	$155,550.16	$8,535.65	$3,245.96	$6,907.01	$160,424.76
FUNDS FOR DEPARTMENTS					
Architectural Department .	$255.50	.....	.....	$255.50	.....
William Parsons Atkinson .	13,082.20	$721.50	.....	721.50	$13,082.20
Frank Walter Boles Memorial	15,457.98	832.50	.....	644.46	15,646.02
William E. Chamberlain . .	7,309.77	388.50	.....	388.50	7,309.77
Chemical Engineering Practice	257,772.97	14,319.00	.....	14,319.00	257,772.97
Crosby Honorary Fund . .	701.35	83.25	$826.61	.....	1,611.21
Susan E. Dorr	95,955.67	5,328.00	.....	5,328.00	95,955.67
George Eastman	400,000.00	22,200.00	.....	22,200.00	400,000.00
George Henry May	5,000.00	277.50	.....	277.50	5,000.00
Forris Jewett Moore. . . .	25,303.50	1,443.00	5,785.94	126.35	32,406.09
William E. Nickerson . . .	.....	1,387.50	50,000.00	97.50	51,290.00
Edward D. Peters	5,347.73	277.50	.....	182.36	5,442.87
Pratt Naval Architectural .	392,235.81	21,756.00	.....	21,756.00	392,235.81
Arthur Rotch.	25,000.00	1,387.50	.....	1,387.50	25,000.00
*Edmund K. Turner . . .	231,417.68	12,820.50	.....	10,124.63	234,113.55
	$1,474,840.16	$83,222.25	$56,612.55	$77,808.80	$1,536,865.16

*One-fourth of net income added to fund.

Schedule Q (*Continued*)

	Funds, June 30, 1927	*Investment Income*	*Other Income*	*Expended or Transferred*	*Funds, June 30 1928*
FUNDS FOR RESEARCH					
John E. Aldred	$101,850.00	$5,661.00	.....	$5,661.00	$101,850.00
Samuel Cabot	72,662.57	3,996.00	.....	3,874.30	72,784.27
Ellen H. Richards	17,989.32	999.00	.....	567.88	18,420.44
Charlotte B. Richardson	39,604.79	2,164.50	.....	1,600.00	40,169.29
Technology Plan Research	2,819.57	155.40	.....	822.65	2,152.32
Edward Whitney	55,170.26	3,052.50	.....	753.15	57,469.61
	$290,096.51	$16,028.40	.....	$13,278.98	$292,845.93
FUNDS FOR FELLOWSHIPS					
Arkwright Club	$2,044.00	$111.00	.....	.....	$2,155.00
William Sumner Bolles	23,953.09	1,332.00	.....	.....	25,285.09
Malcolm Cotton Brown	13,408.00	1,000.00	.....	$1,000.00	13,408.00
Collamore	12,693.11	721.50	.....	.....	13,414.61
H. M. Crane	.....	.....	$3,000.00	2,675.00	325.00
Dalton Graduate Chemical	6,333.25	349.65	.....	.....	6,682.90
du Pont	750.00	.....	.....	750.00	.....
Rebecca R. Joslin	1,841.32	99.90	.....	.....	1,941.22
Moore	7,505.12	416.25	.....	350.00	7,571.37
Williard B. Perkins	6,751.89	371.85	.....	.....	7,123.74
Proprietors Locks & Canals	2,000.00	83.25	2,000.00	1,000.00	3,083.25
Henry Bromfield Rogers	23,432.95	1,276.50	.....	330.00	24,379.45
Richard Lee Russell	2,526.57	110.00	.....	.....	2,636.57
Henry Saltonstall	10,743.24	593.85	.....	550.00	10,787.09
James Savage	11,984.36	666.00	.....	600.00	12,050.36
A. P. Sloan, Jr.	.....	.....	2,000.00	2,000.00	.....
Susan H. Swett	11,595.45	500.00	.....	500.00	11,595.45
Gerard Swope	2,500.00	138.75	2,500.00	2,500.00	2,638.75
Louis Francisco Verges	10,318.11	571.65	.....	500.00	10,389.76
	$150,380.46	$8,342.15	$9,500.00	$12,755.00	$155,467.61
FUNDS FOR SCHOLARSHIPS					
Elisha Atkins	$5,329.77	$294.15	.....	$300.00	$5,323.92
Billings Student	51,314.66	2,830.50	$70.00	2,800.00	51,415.16
Jonathan Bourne	10,815.03	599.40	.....	600.00	10,814.43
Harriet L. Brown	7,060.47	388.50	.....	150.00	7,298.97
Nino Tesher Catlin	1,044.00	55.50	.....	50.00	1,049.50
Chandler	.....	111.00	2,764.75	.....	2,875.75
Lucius Clapp	5,195.26	288.60	.....	300.00	5,183.86
Class of 1896	4,888.77	271.95	.....	240.00	4,920.72
Lucretia Crocker	77,235.40	4,273.50	.....	2,500.00	79,008.90
Isaac W. Danforth	5,416.97	299.70	.....	300.00	5,416.67

Schedule Q (*Continued*)

	Funds, June 30, 1927	*Investment Income*	*Other Income*	*Expended or Transferred*	*Funds, June 30, 1928*
Ann White Dickinson	$42,475.31	$2,358.75	.....	$2,400.00	$42,434.06
Farnsworth	5,536.67	305.25	.....	300.00	5,541.92
Charles Lewis Flint	5,524.69	305.25	.....	290.00	5,539.94
Sarah S. Forbes	3,659.07	199.80	.....	180.00	3,678.87
Gas and Fuel Scholarship	.....	.....	$700.00	350.00	350.00
George Hollingsworth	5,235.62	288.60	.....	300.00	5,224.22
T. Sterry Hunt	3,265.06	183.15	.....	180.00	3,268.21
William F. Huntington	5,410.98	299.70	.....	300.00	5,410.68
Joy Scholarships	17,262.62	960.65	.....	600.00	17,623.27
William Litchfield	5,467.20	305.25	.....	300.00	5,472.45
Elisha T. Loring	5,476.99	305.25	.....	300.00	5,482.24
Lowell Inst. Scholarship	2,591.22	144.30	.....	125.00	2,610.52
George Henry May	6,075.93	349.65	225.00	300.00	6,350.58
James H. Mirrlees	2,654.37	144.30	.....	160.00	2,638.67
Nichols Scholarship	5,420.71	299.70	.....	300.00	5,420.41
Charles C. Nichols	5,467.49	305.25	.....	300.00	5,472.74
John Felt Osgood	5,391.71	299.70	.....	300.00	5,391.41
George L. Parmelee	18,736.28	1,054.50	.....	1,100.00	18,690.78
Richard Perkins	54,559.07	3,052,50	.....	3,500.00	54,111.57
John P. Schenkl	21,400.96	1,165.50	.....	1,200.00	21,366.46
Thomas Sherwin	5,450.70	305.25	.....	300.00	5,455.95
Samuel E. Tinkham	2,384.78	133.20	.....	125.00	2,392.98
F. B. Tough	436.12	22.20	.....	.....	458.32
Susan Upham	1,159.50	61.05	.....	50.00	1,170.55
Vermont Scholarship	6,084.87	333.00	.....	300.00	6,117.87
Ann White Vose	62,393.56	3,441.00	.....	3,525.00	62,309.56
Arthur M. Waitt	10,320.63	571.65	.....	500.00	10,392.28
Louis Weissbein	4,339.23	238.65	.....	250.00	4,327.88
Frances Erving Weston	1,113.48	61.05	200.00	200.00	1,174.53
Samuel Martin Weston	239.93	11.10	200.00	200.00	251.03
Amasa J. Whiting	.....	205.35	4,515.65	.....	4,721.00
	$483,835.08	$27,123.35	$8,675.40	$25,475.00	$494,158.83

FUNDS FOR PRIZES

Robert A. Boit	$5,333.21	$294.15	.....	$375.00	$5,252.36
Class of 1904	430.82	22.20	$10.00	.....	463.02
Roger D. Hunneman	1,050.00	55.50	.....	100.00	1,005.50
James Means	2,458.86	138.75	.....	64.14	2,533.47
Arthur Rotch	5,864.23	321.90	.....	200.00	5,986.13
Arthur Rotch, Special	7,334.41	405.15	.....	200.00	7,539.56
	$22,471.53	$1,237.65	$10.00	$939.14	$22,780.04

Schedule Q (*Continued*)

	Funds, June 30, 1927	*Investment Income*	*Other Income*	*Expended or Transferred*	*Funds, June 30, 1928*
FUNDS FOR RELIEF					
Architectural Society	$1,525.88	.....	.....	$1,525.88	.....
Edward Austin	441,290.93	$24,475.50	.....	24,922.00	$440,844.43
Thomas Wendell Bailey	2,540.65	138.75	.....	140.00	2,539.40
*Charles Tidd Baker	23,896.82	1,326.45	.....	600.00	24,623.27
Levi Boles	10,950.92	610.50	.....	600.00	10,961.42
Bursar's Fund	8.224.83	416.25	$4,933.73	6,520.75	7,054.06
Mabel Blake Case	26,924.35	1,498.50	.....	1,500.00	26,922.85
Dean's Fund	2,560.24	138.75	1,109.95	1,555.00	2,253.94
Carl P. Dennett	130.00	.....	500.00	550.00	80.00
Dormitory Fund	3,838.71	210.90	.....	205.00	3,844.61
Norman H. George	93,968.39	5,217.00	.....	5,500.00	93,685.39
Summer Surveying Camp	500.00	27.75	550.62	500.00	578.37
Teachers' Fund	114,371.98	6,327.00	.....	3,495.02	117,203.96
Samson R. Urbino	1,011.00	55.50	.....	.....	1,066.50
Jonathan Whitney	597,998.83	28,969.87	851.50	27,548.69	600,271.51
Morrill Wyman	73,873.44	4,107.00	.....	6,000.00	71,980.44
	$1,403,606.97	$73,519.72	$7,945.80	$81,162.34	$1,403,910.15

RECAPITULATION OF FUNDS

FOR GENERAL PURPOSES					
Restricted	$19,858,975.39	$1,318,774.96	$4,517.55	$1,017,959.11	$20,164,308.79
Unrestricted	1,122,967.71	71,661.60	231,751.49	71,661.60	1,354,719.20
FOR DESIGNATED PURPOSES					
Special Deposit Funds	4,296,717.76	42,243.45	451,540.77	702,236.08	4,088,265.90
Salaries	144,390.00	7,997.55	236.31	7,997.55	144,626.31
Libraries, etc.	155,550.16	8,535.65	3,245.96	6,907.01	160,424.76
Departments	1,474,840.16	83,222.25	56,612.55	77,808.80	1,536,866.16
Research	290,096.51	16,028.40	.....	13,278.98	292,845.93
Fellowships	150,380.46	8,342.15	9,500.00	12,755.00	155,467.61
Scholarships	483,835.08	27,123.35	8,675.40	25,475.00	494,158.83
Prizes	22,471.53	1,237.65	10.00	939.14	22,780.04
Relief	1,403,606.97	73,519.72	7,945.80	81,162.34	1,403,910.15
Total (Schedule D)	$29,403,831.73	$1,658,686.73	$774,035.83	$2,018,155.61	$29,818,373.68

*One-half of the income added to the principal.

SCHEDULE R

MINOR FUNDS

Name	*Balance June 30, 1927*	*Income*	*Other Increases*	*Salaries and Expenses*	*Balance June 30, 1928*
Aeronautics (Wind Tunnels)	*$2,765.03	$3,204.40	.....	$75.00	$364.37
Aldred Lectures	1,142.33	2,500.00	.....	2,065.36	1,576.97
Alumni Dormitory Committee	10,325.59	100.00	.....	7,300.06	3,125.53
Alumni Office	483.67	26,368.21	.....	26,239.65	612.23
American Petroleum Institute	186.64	5,177.50	.....	5,364.14	.....
Am. Tel. and Tel. Fund	4,018.80	.....	.....	4,018.80	.....
Arch. Dept. Special Scholarship	.....	1,000.00	.....	1,000.00	.....
Bench Mark No. 454	1,500.00	.....	.....	1,500.00	.....
Biology, Special (F. and F.)	1,951.10	.....	[1] [2]$2,012.35	2,885.85	1,077.60
Boat House Equipment No. 346	1,423.45	2,250.00	[2]745.17	2,418.62	2,000.00
Burton Portrait Fund	659.45	741.75	[2]98.80	1,500.00	....
Carnegie Corp. Music Fund	.....	6,019.00	.....	2,289.51	3,729.49
Chemistry, Special	783.39	15.66	.....	.....	799.05
Civil Eng. Special No. 567	.....	.....	[1]600.00	378.75	221.25
Civil Eng. Camp No. 476	56.95	.....	.....	56.95	.....
Course VI-A Fund	3,538.21	100.00	[2]4,018.80	2,478.52	5,178.49
Course VI-A Tax	69.70	226.00	.....	181.00	114.70
Course XV Fund	501.40	48.00	.....	98.50	450.90
E. H. Cox Fund	126.48	2.52	.....	.....	129.00
Danish Warship Model No. 564	.....	.....	[1]1,700.00	.....	1,700.00
De Donder Book Account	45.96	139.40	.....	185.36	.....
Dining Service Reserve	9,910.90	4,568.88	.....	2,576.60	11,903.18
Division Fund	1,622.40	32.44	.....	.....	1,654.84
Div. of M. and Indust. Research	*2,324.10	35,314.87	[2]5,661.00	42,877.22	*4,225.45
Division of I. C. and R. No. 2	6,403.68	38,645.93	.....	34,250.75	10,798.86
Dormitory Tax	316.03	850.00	.....	935.00	231.03
Dormitory Telephone Acct.	.....	.....	[1]11,462.00	6,611.97	4,850.03
Edison Elec. Ill. Co., Com. Res.	*219.24	6,811.24	.....	8,996.53	*2,404.53
Dynamometer No. 506	1,260.00	.....	[1]3,431.87	4,691.87	.....
Elec. Eng., Special 468	14,879.80	262.53	[2]1,349.21	3,203.57	13,287.97
Employees Health & Acc. Ins. Fd.	.....	3,216.50	.....	3,216.50	.....
General Library — New Stacks	23,720.00	.....	[1]4,819.31	28,539.31	.....
General Library — Special No. 542	.....	.....	500.00	278.44	221.56
Hale Spectroscopic	3,023.64	60.46	.....	.....	3,084.10
Health Education Research	1,142.86	134.60	[1]400.00	707.70	969.76
High Velocity Blower No. 561	.....	.....	[1]1,200.00	842.53	357.47
Historic Memorials Committee	301.47	.....	.....	227.29	74.18
Horowitz Building Construction	2,146.55	5,000.00	.....	7,146.55	.....
Hydraulic Laboratory No. 241	1,480.51	29.60	.....	.....	1,510.11
Integraph Account No. 594	.....	.....	[1]3,000.00	2,435.53	564.47
Journal of Mathematics and Physics	19.86	287.26	[1]3,000.00	822.31	2,484.81
Liquid Soap Account	37.02	.....	[2]984.59	1,149.02	*127.41

(Continued)

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

Schedule R (*Continued*)

Name	*Balance June 30, 1927*	*Income*	*Other Increases*	*Salaries and Expenses*	*Balance June 30, 1928*
Mech. Eng. Dept., No. 482	$1,450.00	$29.00	.....	.....	$1,479.00
Mech. Eng. Dept., No. 568	.....	175.00	[1]$625.00	.....	800.00
Medical Department, Special	1,411.81	313.62	.....	$799.08	926.35
Metallography, 590	.....	.....	[1]1,597.00	.....	1,597.00
Met. Life Ins. Co. Public Health.	.....	2,006.66	.....	.....	2,006.66
Model Great Court.	1,710.00	.....	.....	1,710.00	.....
National Res. Com. on Indus. Ltg.	.....	394.05	.....	243.76	150.29
New Dormitory Plan, No. 551	.....	.....	[4]4,000.00	.....	4,000.00
Nutrition Research	1,012.35	.....	.....	1,012.35	.....
Ore Dressing Laboratory	1,307.66	26.14	.....	.....	1,333.80
Pabst Research	.....	5,033.33	.....	200.00	4,833.33
Paper Ins. Cable Research	*532.62	4,165.69	.....	2,629.57	1,003.50
Photographic Service	*3,331.93	3,810.72	[1]1,000.00	5,077.28	*3,598.49
Photostat Service	609.47	4,378.29	.....	4,567.00	420.76
Presidents.	50.41	.....	.....	50.41	.....
Public Health	757.38	15.14	.....	.....	772.52
R.O.T.C. Uniform Accts.	.....	5,153.10	.....	4,851.58	301.52
Research Lab. Applied Chemistry	19,916.74	101,064.12	.....	120,980.86	.....
Res. Lab. App. Chem. (Cont. Acct.)	.....	6,342.45	.....	.....	6,342.45
Research Lab. Industrial Physics.	4,108.50	830.00	.....	670.00	4,268.50
Res. Lab. Phys. Chem. (Royalties)	849.52	423.75	.....	528.71	744.56
Research on Explosives, No. 34161	1,647.07	.....	.....	1,647.07	.....
Roentgen Ray	1,775.92	35.50	.....	.....	1,811.42
Sargent Fund	216.03	4.32	.....	.....	220.35
Short Wave Research.	1,708.11	30,089.88	.....	11,939.09	19,858.90
Simms Co. Research	.....	3,500.00	.....	2,592.75	907.25
Single Cyl. Crank Case 535	5,000.00	.....	[2]156.20	5,156.20	.....
Special, F. L. Foster, No. 598	.....	.....	[1]700.00	300.00	400.00
Special Research No. 13101a	1,318.55	26.37	.....	.....	1,344.92
Steam Table Research	*5,650.17	7,602.77	.....	2,562.71	*610.11
Supercharger, Aero. Eng., No. 560	.....	.....	[2]2,000.00	1,955.73	44.27
Summer School of Physics	.....	.....	[2]2,500.00	.....	2,500.00
Suspense Accounts	.....	.....	[2]5,989.52	702.50	5,287.02
Special, C. F. Taylor, No. 601	.....	.....	[1]800.00	489.50	310.50
Travel. Scholarship in Architecture	.....	.....	[3]1,500.00	.....	1,500.00
Universal S. C. Engine No. 463	6,176.85	.....	[2]23.75	6,200.60	.....
W. M. (Library)	537.31	.....	[4]2,472.20	2,191.99	817.52
Total	$129,818.43	$318,526.65 (Schedule B)	$68,346.77	$388,603.50 (Schedule C)	$128,088.35 (Schedule D)

*Overdraft.
[1]Appropriation from Current Funds.
[2]Transfer.
[3]Appropriation from Austin Fund.
[4]Appropriation from Cilley Fund.

SCHEDULE S

Current Surplus

Balance, June 30, 1927	$54,417.69
Net Decrease (Schedule A)	13,645.97
Balance, June 30, 1928 (Schedule D)	$40,771.72

Detail of Profit and Loss Account

Losses and Charges:

Students Accounts (previous years), charged off	$360.96
Miscellaneous Charges	498.31
Total Losses	$859.27

Gains and Credits:

Students' Fees and Deposits (previous years)	$140.70
Miscellaneous Credits	838.20
Total Gains	$978.90
Profit and Loss. Net Profit (Schedule A)	$119.63

AUDITORS' CERTIFICATE

We have examined the books and accounts of the Treasurer and the Bursar of the Massachusetts Institute of Technology for the year ended June 30, 1928, and we report upon the accompanying financial statements of the Treasurer, as follows:

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

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

WE HEREBY CERTIFY that the accompanying Balance Sheet and the Statements of Income and Expenditures correctly set forth respectively the financial condition of the Institute at June 30, 1928, and the financial results for the year ended at that date, and that the financial statements are in accordance with the books of the Institute.

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

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

Respectfully submitted,

PATTERSON, TEELE & DENNIS,
Accountants and Auditors.

1 Federal Street, Boston, Mass.

August 31, 1928