M.I.T. ANNUAL CATALOGUES AND BULLETINS
1884/85

01 OF 02

MASSACHUSETTS INSTITUTE OF TECHNOLOGY.

TWENTIETH

ANNUAL CATALOGUE

OF THE

OFFICERS AND STUDENTS,

WITH A

STATEMENT OF THE COURSES OF INSTRUCTION,

And a List of the Alumni, and of the Members of the Society of Arts.

1884-1885.

BOSTON:
FRANKLIN PRESS: RAND, AVERY, AND COMPANY.
1884.

MASSACHUSETTS INSTITUTE OF TECHNOLOGY.

TWENTIETH

ANNUAL CATALOGUE

OF THE

OFFICERS AND STUDENTS,

WITH A

STATEMENT OF THE COURSES OF INSTRUCTION,

And a List of the Alumni, and of the Members of the Society of Arts.

1884-1885.

BOSTON:
FRANKLIN PRESS: RAND, AVERY, AND COMPANY.
1884.

GENERAL SUMMARY.

STUDENTS AND GRADUATES: MASSACHUSETTS INSTITUTE OF TECHNOLOGY.

STUDENTS.

School of Industrial Science	579
School of Mechanic Arts	66
School of Design	61
Total	706

GRADUATES.

School of Industrial Science	359
School of Mechanic Arts	25
School of Design	118
Total	502

CALENDAR FOR 1884–85.

School year began	Monday, Sept. 29, 1884.
Second term will begin	Tuesday, Feb. 3, 1885.
Degrees conferred	Tuesday, June 2, 1885.
First Entrance Examinations	Thursday, June 4, 1885, and Friday, June 5, 1885.
Second Entrance Examinations	Tuesday, Sept. 22, 1885, and Wednesday, Sept. 23, 1885.
Examinations for Advanced Standing	Thursday, Sept. 24, 1885.
School year for 1885–86 will begin	Monday, Sept. 28, 1885.

CALENDAR FOR 1885–86.

School year will begin	Monday, Sept. 28, 1885.
Second term will begin	Tuesday, Feb. 2, 1886.
Degrees conferred	Tuesday, June 1, 1886.
First Entrance Examinations	Thursday, June 3, 1886. Friday, June 4, 1886.
Second Entrance Examinations	Tuesday, Sept. 21, 1886. Wednesday, Sept. 22, 1886.
Examinations for Advanced Standing	Thursday, Sept. 23, 1886.
School year of 1886–87 will begin	Monday, Sept. 27, 1886.

CONTENTS.

MASSACHUSETTS INSTITUTE OF TECHNOLOGY.

Historical Sketch. The foundation of the Massachusetts Institute of Technology was laid in a report by Professor William B. Rogers, entitled "Objects and Plan of an Institute of Technology, including a Society of Arts, a Museum of Arts, and a School of Industrial Science." A charter for the institution thus projected was granted by the Legislature of Massachusetts in an Act dated April 10, 1861. In this charter, the threefold plan outlined by Professor Rogers, who became the first President of the Institute of Technology, was preserved.

Of the three integral parts of the Institute, the SOCIETY OF ARTS was first organized, and has continued ever since to hold semi-monthly meetings from October to May of each year. A more detailed account of this society, with lists of its officers and members, will be found on pages 117 to 124

THE SCHOOL OF INDUSTRIAL SCIENCE was opened in February, 1865, in temporary rooms in Mercantile Building, Summer Street, Boston, with twenty-seven pupils, of whom fourteen graduated with the diploma of the Institute of Technology in 1868. The growth of this school since its opening is shown in the lists of its graduates. Its present organization and condition, with an account of its courses of study and research, and with registers of its officers and students, will be found on pages 11 to 103. The first building of the Institute of Technology, now known as the Rogers Building, was erected on land conceded by the State, and was occupied by the chemical department in the spring of 1866. In the fall of the same year the whole School of Industrial Science,

together with the Society of Arts, was removed to the same structure.

Two subsidiary schools have been organized under the control of the Corporation of the Institute: one, the Lowell School of Practical Design, whose object and organization, with lists of graduates and present students, will be found on pages 112 to 116; the other, the School of Mechanic Arts, a full account of which will be found on pages 103 to 111.

Less formal action has been taken for carrying out the purposes of the founders of the Institute of Technology in the establishment of a MUSEUM OF ARTS. Varied and valuable collections have been made, which, taken together, would constitute no inconsiderable foundation for such a museum; but, thus far, this material has been divided, so that the portions especially relating to individual departments of study and research might be placed within easy reach of the students and teachers respectively concerned therewith.

Buildings. The buildings now occupied are, (1) the Rogers Building, on Boylston Street, devoted to the engineering departments and to instruction in mathematics, mechanics, geology, mineralogy, and physiology; (2) the New Building, corner of Boylston and Clarendon Streets, mainly devoted to the departments of chemistry, physics, civil engineering, and architecture, and to instruction in language, literature, and history; (3) a series of laboratories, drawing and recitation rooms, at the foot of Garrison Street, mainly devoted to work in the mechanic arts and to the instruction of the Mechanic Arts School and the Lowell School of Design; (4) a gymnasium and drill hall, on Exeter Street.

EXTRACTS FROM ACTS OF THE GENERAL COURT OF MASSACHUSETTS, IN RELATION TO THE MASSACHUSETTS INSTITUTE OF TECHNOLOGY.

Act of Incorporation. "William B. Rogers [and others named], their associates and successors, are hereby made a body corporate, by the name of the MASSACHUSETTS INSTITUTE OF TECHNOLOGY, for the purpose of instituting and maintaining a SOCIETY OF ARTS, a MUSEUM OF ARTS, and a SCHOOL OF INDUSTRIAL SCIENCE, and aiding generally, by suitable means, the advancement, development, and practical application of sciences in connection with arts, agriculture, manufactures, and commerce."

Chapter 183, *Acts and Resolves of* 1861.

Grant of Public Lands. "When the Massachusetts Institute of Technology shall have been duly organized, located, and established, . . . there shall be appropriated and paid to its Treasurer each year, on the warrant of the Governor, for its endowment, support, and maintenance, one-third part of the annual interest or income which may be received from the fund created under and by virtue of the 130th chapter of the Acts of the 37th Congress, at the second session thereof, approved July 2, 1862 [giving public lands to the States in aid of instruction in Agriculture, the Mechanic Arts, and Military Science and Tactics]. . . . Said Institute of Technology, in addition to the objects set forth in its Act of Corporation [as above quoted], shall provide for instruction in military tactics."

Chapter 186, *Acts and Resolves of* 1863.

Power to confer Degrees. "The Massachusetts Institute of Technology is hereby authorized and empowered to award and confer degrees appropriate to the several courses of study pursued in said Institution, on such conditions as are usually prescribed in universities and colleges in the United States, and according to such tests of proficiency as shall best promote the interests of sound education in this Commonwealth."

Chapter 247, *Acts and Resolves of* 1868.

MEMBERS OF THE CORPORATION.

President.

FRANCIS A. WALKER.

Treasurer.

JOHN CUMMINGS.

Secretary.

LEWIS WM. TAPPAN, JUN.

MARSHALL P. WILDER.
JOHN D. PHILBRICK.
HENRY B. ROGERS.
JAMES B. FRANCIS.
EDWARD ATKINSON.
JOHN D. RUNKLE.
CHARLES L. FLINT.
JOHN C. HOADLEY.
ALEXANDER H. RICE.
M. DENMAN ROSS.
FREDERICK W. LINCOLN.
JAMES L. LITTLE.
WILLIAM ENDICOTT, JUN.
SAMUEL K. LOTHROP.
JOHN M. FORBES.
EDWARD S. PHILBRICK.
THOMAS T. BOUVÉ.
SAMUEL D. WARREN

HENRY P. KIDDER.
AUGUSTUS LOWELL.
HOWARD A. CARSON.
CHARLES J. PAINE.
CHARLES FAIRCHILD.
DAVID R. WHITNEY.
SAMUEL C. COBB.
HENRY D. HYDE.
ALEXANDER S. WHEELER.
FRANCIS H. WILLIAMS.
BENJAMIN P. CHENEY.
JAMES P. TOLMAN.
HOWARD STOCKTON.
MOSES WILLIAMS.
ELIOT C. CLARKE.
CHARLES T. HUBBARD.
NATHANIEL THAYER.
CHARLES F. CHOATE.

On the Part of the Commonwealth.

HIS EXCELLENCY, GOV. GEORGE D. ROBINSON.
HON. MARCUS MORTON, *Chief Justice of the Supreme Court.*
HON. JOHN W. DICKINSON, *Secretary of the Board of Education.*

VISITING COMMITTEES.

The School of Mechanic Arts, and the Lowell School of Industrial Design.

EDWARD ATKINSON. JOHN D. RUNKLE.
JAMES L. LITTLE. SAMUEL D. WARREN.
M. DENMAN ROSS.

Departments of Literature, History, and Political Economy.

ALEXANDER H. RICE. FREDERICK W. LINCOLN.
SAMUEL C. COBB. S. K. LOTHROP.
MARSHALL P. WILDER.

Departments of Chemistry, Physics, and Biology.

HOWARD A. CARSON. JAMES P. TOLMAN.
FRANCIS H. WILLIAMS.

Departments of Mathematics and Civil Engineering.

EDWARD S. PHILBRICK. CHARLES F. CHOATE.
MOSES WILLIAMS.

Departments of Mining and Metallurgy.

THOMAS T. BOUVÉ. HOWARD STOCKTON.
CHARLES FAIRCHILD. B. P. CHENEY.

Department of Modern Languages.

CHARLES L. FLINT. JOHN D. PHILBRICK.
NATHANIEL THAYER.

Departments of Mechanical Engineering and Applied Mechanics.

JOHN C. HOADLEY. JAMES B. FRANCIS.
CHARLES T. HUBBARD.

Department of Architecture.

HENRY P. KIDDER. ALEXANDER S. WHEELER.
ELIOT C. CLARKE.

SCHOOL OF INDUSTRIAL SCIENCE.

SCHOOL OF INDUSTRIAL SCIENCE.

OFFICERS OF INSTRUCTION.

FRANCIS A. WALKER, PH.D., LL.D., *President.*

JOHN D. RUNKLE, PH.D., LL.D.,
Walker Professor of Mathematics.

WILLIAM P. ATKINSON, A.M.,
Professor of English and History.

GEORGE A. OSBORNE, S.B.,
Professor of Mathematics.

ROBERT H. RICHARDS, S.B.,
Professor of Mining Engineering and Metallurgy.

WM. RIPLEY NICHOLS, S.B.,
Professor of General Chemistry.

CHARLES P. OTIS, A.M., PH.D.,
Professor of Modern Languages.

CHARLES H. WING, S.B.,
Professor of Analytical Chemistry.

ALPHEUS HYATT, S.B., Custodian of Boston Society of Natural History,
Professor of Zoölogy and Palæontology.

WILLIAM H. NILES, PH.B., A.M.,
Professor of Geology and Geography.

CHARLES R. CROSS, S.B.,
Thayer Professor of Physics.

GAETANO LANZA, S.B., C.E.,
Professor of Theoretical and Applied Mechanics: in charge of the Department of Mechanical Engineering.

GEORGE L. VOSE, A.M., C.E.,
Hayward Professor of Civil and Topographical Engineering.

THEODORE M. CLARK, A.B.,
Professor of Architecture.

EUGENE LETANG,
Associate Professor of Architecture.

JULES LUQUIENS, PH.D.,
Associate Professor of Modern Languages.

WILLIAM T. SEDGWICK, PH.D.,
Associate Professor of Biology.

SILAS W. HOLMAN, S.B.,
Assistant Professor of Physics.

WEBSTER WELLS, S.B.,
Assistant Professor of Mathematics.

WILLIAM O. CROSBY, S.B.,
Assistant Professor of Mineralogy and Lithology.

LEWIS M. NORTON, PH.D.,
Assistant Professor of Organic and Industrial Chemistry.

GEORGE F. SWAIN, S.B.,
Assistant Professor of Civil Engineering.

ALFRED E. BURTON, S.B.,
Assistant Professor of Topographical Engineering.

PETER SCHWAMB, S.B.,
Assistant Professor of Mechanism, and Director of the Workshops.

CHARLES H. FISHER, S.B.,
Assistant Professor of Mechanical Engineering.

CECIL H. PEABODY, S.B.,
Assistant Professor of Applied Mechanics.

THOMAS E. POPE, A.M.,
Assistant Professor of Analytical Chemistry.

LINUS FAUNCE, S.B.,
Assistant Professor of Drawing.

HENRY K. BURRISON, S.B.,
Instructor in Mechanical Drawing.

ELLEN H. RICHARDS, A.M., S.B.,
Instructor in Sanitary Chemistry.

ARTHUR N. WHEELOCK, A.M.,
Instructor in English.

DWIGHT PORTER, PH B.,
Instructor in Mathematics.

WILLIAM H. PICKERING, S.B.,
Instructor in Physics.

WALTER S. ALLEN, S.B.,
Instructor in Chemical Analysis.

EDWARD F. ELY, A.B., S.B.,
Instructor in Architecture.

FREDERICK W. CLARK, S.B.,
Instructor in Mining and Metallurgy.

SAMUEL G. STEPHENS,
Instructor in Mechanical Engineering.

S. HOMER WOODBRIDGE, A.M.,
Instructor in Physics, and Lecturer on Ventilation.

GEN. HOBART MOORE,
Instructor in Military Tactics.

WILLIAM W. JACQUES, PH.D.,
Instructor in Telegraph Engineering.

HOWARD V. FROST, S.B.,
Instructor in General Chemistry.

CLEMENT W. ANDREWS, A.M.,
Instructor in Organic Chemistry.

JAMES A. SEWALL, A.B.,
Instructor in Civil Engineering.

CHARLES A. FRENCH, S.B.,
Assistant in Mathematics.

GEORGE H. BARTON, S.B.,
Assistant in Geology.

GEORGE R. UNDERWOOD, S.B.,
Assistant in Industrial Chemistry.

CHARLES O. PRESCOTT, S.B.,
Assistant in Chemical Analysis.

WILLIAM B. LINDSAY, A.B., S.B.,
Assistant in Chemical Analysis.

CHARLES B. APPLETON, S.B.,
Assistant in Mechanical Engineering.

FREDERIC L. BARDWELL, B.S., S.B.,
Assistant in General Chemistry.

AUGUSTUS H. GILL, S.B.,
Assistant in General Chemistry.

GEORGE F. KNAPP, S.B.,
Assistant in Mining and Metallurgy.

WILLIAM L. PUFFER, S.B.,
Assistant in Physics.

ARTHUR J. PURINTON, S.B.,
Assistant in Mechanical Engineering.

HARRY W. TYLER, S.B.,
Assistant in Mathematics.

CHARLES F. WILLIAMS, Jun., S.B.,
Assistant in Applied Mechanics.

CHARLES W. EATON,
Assistant in Drawing.

PETER BURNS,
Assistant in General Chemistry.

Lecturers for the Current Year.

GEORGE L. BLODGETT, S.B.,
Lecturer on the Application of Electricity to Railway Working.

HENRY M. HOWE, A.B., S.B.,
Lecturer on Metallurgy.

EDMUND B. WILSON, Ph.D.,
Lecturer on Comparative Anatomy and Physiology.

ROSS TURNER,
Lecturer on Water-Color and Sketching.

C. HOWARD WALKER,
Lecturer on Decoration.

FACULTY.

FRANCIS A. WALKER, *President.*
JOHN D. RUNKLE.
WILLIAM P. ATKINSON.
GEORGE A. OSBORNE.
ROBERT H. RICHARDS.
WM. RIPLEY NICHOLS.
CHARLES P. OTIS.
CHARLES H. WING.
ALPHEUS HYATT.
WILLIAM H. NILES.
CHARLES R. CROSS.
GAETANO LANZA.
GEORGE L. VOSE.
THEODORE M. CLARK.
EUGENE LETANG.
JULES LUQUIENS.
SILAS W. HOLMAN.
WEBSTER WELLS.
WILLIAM O. CROSBY.
LEWIS M. NORTON.
GEORGE F. SWAIN.
WILLIAM T. SEDGWICK.
ALFRED E. BURTON.
PETER SCHWAMB.
CECIL H. PEABODY.
CHARLES H. FISHER.
THOMAS E. POPE.
LINUS FAUNCE.

JAMES P. MUNROE, *Secretary.*

COURSES OF INSTRUCTION.

The SCHOOL OF INDUSTRIAL SCIENCE of the Massachusetts Institute of Technology provides an extended series of scientific and literary studies, and of practical exercises. The courses of study include the Physical, Chemical, and Natural Sciences and their applications; Pure and Applied Mathematics; Drawing; the English, French, German, and other Modern Languages; History; Political Economy; and International and Business Law. These studies and exercises are so arranged as to offer a liberal and practical education in preparation for active pursuits, as well as a thorough training for most of the scientific professions. The positions and the character of the work for which the several courses fit their graduates are best indicated by an inspection of the record of the present occupations of graduates given on pages 122 to 141.

The following regular courses of study, each four years in duration, have been established; and, for proficiency in any one of them, the degree of Bachelor of Science, S.B., in the course pursued is conferred. Details of the courses are given on pages 23 to 33.

I.	CIVIL AND TOPOGRAPHICAL ENGINEERING.
II.	MECHANICAL ENGINEERING.
III.	MINING ENGINEERING.
IV.	ARCHITECTURE.
V.	CHEMISTRY.
VI.	ELECTRICAL ENGINEERING.
VII,A.	NATURAL HISTORY.
VII,B.	BIOLOGY, — Preparatory to Medical Studies.
VIII.	PHYSICS.
IX.	GENERAL COURSE.

Courses I. to VI. are distinctly professional, the character of the chief work of each course being indicated by its title. Schedules showing the distribution of the topics of instruction included in the courses, and statements of the methods of instruction used, will be found for Course I. on pp. 23 and 44; Course II. on pp. 24 and 46; Course III. on pp. 25 and 48; Course IV. on pp. 26 and 54; Course V. on pp. 27 and 37.

Course III., Mining. This course is planned to prepare students for Mining, Geology, and Metallurgy, in accordance with the present demand for men. It is therefore laid out with three options. In the first, a considerable amount of time is devoted to surveying, mathematics, and drawing, — subjects of importance to the Mine Surveyor and Engineer. The second emphasizes the geological subjects, and leads towards the surveying of geological deposits with special reference to their economical value. The third is devoted to the metallurgical and chemical sides of the profession. It will be necessary, therefore, for the student, on reaching the middle of the second year, to choose one of these branches of the profession, and subsequently to follow the options corresponding to this choice.

Course VI., Electrical Engineering. This course was established in 1882, in order to meet the wants of young men desirous of entering upon the practice of any of the various applications of electricity in the arts. The instruction given includes the study of theoretical and applied electricity in its various branches; so that one completing the course may acquire a knowledge of the technical application of electricity to land and sub-marine telegraphy, telephony, electric lighting, and the electrical transmission of power. Those portions of Mechanical Engineering which are especially important in connection with dynamo-electric machinery are pursued at length. The schedule is on p. 28, and further details on p. 41.

Course VII.A., Natural History, affords an appropriate general training for those whose ulterior object is the special

pursuit of Geology, Mineralogy, Botany, or Zoölogy, or who desire to become teachers of Natural History. The schedule of this course is given on p. 29.

Course VII,B., Biology, Preparatory to Medical Studies. The recent remarkable development of the biological sciences, and especially the applications of physics and chemistry to physiology, have led to the establishment of a course of study in which biology is a prominent feature. Moreover, the intimate relations now existing between the study of life and living things (biology) and medicine, in its more modern and scientific form, make this subject, especially when combined with a due proportion of physics, chemistry, drawing, French, and German, peculiarly adapted to one who intends eventually to study medicine. The course of study outlined on p. 30 has accordingly been so arranged as to furnish a good knowledge of biology, such, for example, as a prospective teacher of this subject might require; at the same time giving perhaps the best preparation possible at present for the professional study of medicine.

Aside from the subjects pertaining to a general scientific education, and shared with other courses of the school, the biological student becomes familiar with the anatomy and physiology of normal living things, — a familiarity which is of inestimable value in the study of disease. Equally important is that education of the hand and the eye, and that mental habit which comes only from constant use of the microscope, the scalpel, and instruments of precision. At first, therefore, are studied such forms as yeast, amœba, moulds, bacteria, the fern, the seed-plant, hydra, the earthworm, lobster, dog-fish, frog, pigeon, and rabbit; while in the later years higher biology (introducing topics like natural selection, mimicry, the germ theory of disease and evolution) is carried on contemporaneously with experimental animal physiology and histology. To this end a large biological laboratory is provided, and well equipped with microscopes, microtomes, recording instruments, and other biological apparatus.

Course VIII., Physics, is based on the physical and mathematical sciences, and offers suitable training for persons who desire to pursue the study of physical science, and for those who intend to teach Physics, or to enter upon its various practical applications. See pp. 31 and 39.

Course IX., General Course, has been laid out to meet the wants of students who do not purpose to enter any technical profession (such as those to which Courses I. to VI. have special reference), or to follow a career of scientific investigation (for which either Course VII., Natural History, or Course VIII., Physics, would serve as an appropriate preparation and introduction), but who purpose to engage in some branch of commercial or manufacturing business, or in some work of general administration. For such scholars the studies of Course IX. have been arranged with a view to securing an education primarily through scientific study and experiment, yet with a larger amount of philosophical study in history, language, and literature than is found compatible with the requirements of any of the other courses in the Institute. The space for studies of the general character indicated has, in forming Course IX., been cleared by the omission of much of those highly technical exercises which are essential to one or another of the first six courses, or of some of that special training and special knowledge which is required for a satisfactory attainment of the purposes of Courses VII. and VIII. The time thus released is occupied, in Course IX., by (1) the more extended study of French and German; (2) the introduction of other modern languages, especially Spanish and Italian; (3) the more extended study of the so-called English subjects required in the other regular courses; viz., History, especially the History of the United States, English Literature, Political, Commercial, and Industrial Geography, and Political Economy; (4) the introduction of certain subjects for which no room can be found in the professional courses, but a knowledge of which is likely to be useful to the man of business, or which minister to general culture; e.g., Finance, Statistics, and Commercial and International Law.

In providing that body of scientific, as distinguished from philosophical, study which it is intended shall give to the instruction in Course IX. its predominant character, extensive options within certain fields are allowed. Thus, in the first term of the second year the student may choose between Theoretical Chemistry and Advanced Algebra; the latter leading up to further options in pure Mathematics, the former to three other lines of options in which the prominent subjects are respectively Biology, Geology including either Zoölogy or Mineralogy, and Chemistry pure and applied. (See p. 32.)

Options. To enable a student to devote himself more closely to some one or more branches of the professional or scientific course of study which he has undertaken, and to give him a choice as to which branch he shall pursue, a further introduction of optional lines of study has been made in some of the courses. An inspection of the schedules, pp. 25 to 33, will show, that, in the second and later years of courses III., V., VII.A., VII.B., VIII., and IX., choice is offered between several more or less distinct lines of study. The choice among these options in the later years is necessarily to some extent restricted by the decision made in the first instance, owing to the requirement of certain of the earlier subjects as preparation for the corresponding later ones. While in some cases the later options are positively determined by the earlier ones, in other cases a wide choice is offered throughout all the years, the difference in this respect arising largely from the nature of the topics involved. In all cases the necessary sequence of subjects may be determined by consulting the Schedule of Topics, pp. 63 to 77. In some instances the options of the course schedules are so numbered as to indicate their sequence. In Course V., p. 27, the selection of options is less limited than in other instances; and the necessary order of pursuing the options can be learned by reference to the Schedule of Topics, pp. 63 to 77. The options of Courses III. and IX. are stated on pp. 17 and 20. In Course VII.A., option is offered between geological, zoölogical, and physiological lines of special study. In course VII.B.,

the range of option is still wider. In course VIII. the option lies mainly between a course tending to the study of pure Mathematics and its applications to Physics, and one giving more attention to Chemistry.

Advanced courses of study may be pursued either with or without reference to the advanced degrees authorized by the corporation. See p. 34.

Fifth year. Students who find it advantageous to take fewer studies in any year than are prescribed in a single regular course, may continue in the School a fifth year, to make up the studies required for a degree.

Free evening courses of scientific and literary instruction, open to both sexes, are given each year, being supported by the trustee of the Lowell Institute. Details may be found on p. 101.

Schedules of the Courses. The following pages contain the schedules of the distribution of studies throughout the whole of the various courses given in the School of Industrial Science.

The first year for all courses is the same, and contains subjects which are considered essential as preliminary training and as a foundation for the more strictly professional studies of the later years of all courses. At the end of the first year the regular student selects the course which he will pursue during the remaining three years; and his work becomes more specialized thereafter as it progresses.

A clear idea of the nature and amount of the work to be done in any of the regular courses may be obtained by considering, in connection with the schedule of that course — as given on one of the following ten pages, — the statements in regard to the various branches of study (e.g., Chemistry, Physics, Mathematics, etc.), made in the paragraphs descriptive of the "Methods and Apparatus of Instruction," pages 35 to 57; and by referring, at the same time, to the "Schedule of Topics," given on pages 63 to 77.

Methods and Apparatus of Instruction. The statements given on pp. 35 to 57 supply a general outline of the character of instruction given, of the methods by which it is given, and of the equipment of the laboratories, museums, and libraries which form conspicuous features in the work of the Institute.

The Schedule of Topics gives information as to the nature, number, and period of occurrence of exercises in any particular topic, the name of the instructor, and the preparation required for admission to exercises in that subject. This is particularly of service to the applicant for special courses, or to the special student, in affording him the means of ascertaining precisely what instruction is given in any topic which he may desire to pursue, when, at what length, and by whom it is treated, and exactly what preparation will be demanded of every applicant for the topic considered. By careful consultation of this schedule, the special course may be so planned that the earlier studies shall afford suitable preparation for those more advanced towards which the course is directed. See p. 61.

REGULAR COURSES.

SCHEDULES OF PRESCRIBED AND OPTIONAL STUDIES.

I.—CIVIL ENGINEERING.

FIRST TERM.	SECOND TERM.
First Year.	
Algebra.	Trigonometry.
Solid Geometry.	General Chemistry.
General Chemistry.	Chemical Laboratory.
Chemical Laboratory.	Modern History.
Rhetoric.	English Literature.
English Composition.	French.
French.	Mechanical Drawing
Mechanical Drawing.	Military Drill.
Military Drill.	
Second Year.	
Surveying: Compass and Transit.	Levelling: Profiles.
Plotting from Notes.	Elements of Topography.
Analytic Geometry.	Advanced Geometrical Drawing.
Descriptive Geometry.	Differential Calculus.
Physics.	Physics.
Modern History.	Physical Geography.
German.	Modern History.
	German.
Third Year.	
Railroad Engineering.	Railroad Engineering.
Advanced Field Work.	Topography and Map Work.
Topographical Drawing.	Kinematics and Dynamics.
Integral Calculus.	Strength of Materials.
General Statics.	Physics: Laboratory Work.
Physics: Lectures and Laboratory.	Historical Geology.
Structural Geology.	Political Economy
Constitutional History.	German.
German.	
Fourth Year.	
Principles of Construction.	Principles of Construction.
Engineering Practice.	Engineering Practice.
Hydraulic Engineering.	Hydraulic Engineering.
Sanitary Engineering.	Theory of Elasticity.
Coast and Harbor Works.	Dynamics.
Strength of Materials.	Practice in Design.
Geodetic Projections.	Thesis Work.
Practice in Design.	

II. — MECHANICAL ENGINEERING.

First Year.

FIRST TERM.	SECOND TERM.
Algebra.	Trigonometry.
Solid Geometry.	General Chemistry.
General Chemistry.	Chemical Laboratory.
Chemical Laboratory.	Modern History.
Rhetoric.	English Literature.
English Composition.	French.
French.	Mechanical Drawing.
Mechanical Drawing.	Military Drill.
Military Drill.	

Second Year.

FIRST TERM.	SECOND TERM.
Principles of Mechanism.	Mechanism of Mill Machinery.
Construction of Gear Teeth.	Mechanism of Shop Machinery.
Drawing.	Slide Valve. Link Motion.
Carpentry and Wood Turning (shopwork).	Drawing.
Analytic Geometry.	Pattern Work (shopwork).
Descriptive Geometry.	Differential Calculus.
Physics.	Physics.
Modern History.	Modern History.
German.	German.

Third Year.

FIRST TERM.	SECOND TERM.
Thermodynamics.	Steam Engineering.
Steam Engineering.	Drawing, Design, and Surveying.
Drawing, Design, and Surveying.	Mech. Engineering Laboratory.
Forging (shopwork).	Forging, Chipping, Filing, and Foundery (shopwork).
Integral Calculus.	Kinematics and Dynamics.
General Statics.	Strength of Materials.
Physics: Lectures and Laboratory.	Physical Laboratory.
Constitutional History.	Political Economy.
German.	German.

Fourth Year.

FIRST TERM.	SECOND TERM.
Hydraulic Engineering.	Hydraulic Engineering.
Machine Design.	Construction and Equipment of Mills and Machine Shops.
Mech. Engineering Laboratory.	Mech. Engineering Laboratory.
Engine Lathe Work (shopwork).	Machine Design.
Strength of Materials.	Engine Lathe Work (shopwork).
Hydraulics.	Hydraulics.
Metallurgy.	Theory of Elasticity.
Heating and Ventilation.	Dynamics.
	Thesis Work.

III.—MINING ENGINEERING.

First Year.

First Term.	Second Term.
Algebra.	Trigonometry.
Solid Geometry.	General Chemistry.
General Chemistry.	Chemical Laboratory.
Chemical Laboratory.	Modern History.
Rhetoric.	English Literature.
English Composition.	French.
French.	Mechanical Drawing.
Mechanical Drawing.	Military Drill.
Military Drill.	

Second Year.

First Term.	Second Term.
Chemical Analysis.	Chemical Analysis.
Physics.	Physics.
German.	German.
Analytic Geometry.	*Options.*
Surveying.	1. Surveying; Diff. Calculus.
Drawing.	2. Phys. Geog.; Gen. Biology and Botany; Zoöl. and Palæontology; Mineralogy.
	3. Surveying; Mineralogy.

Third Year.

First Term.	Second Term.
Chemical Analysis.	Chemical Analysis and Assaying.
Physics: Lectures and Laboratory.	German.
German.	Mining.
Mining.	Political Economy.
Options.	*Options.*
1. Chemistry; Int. Calculus and App. Mech.; Surveying.	1. App. Mechanics; Mineralogy.
2. Chemistry; Const. History; Geology; Zoöl. and Palæontology.	2. Chemistry; Physical Laboratory; Geology.
3. Const. History; Sp. Methods; Ind. Chem.; Theoret. Chem.	3. Chemistry; Physical Laboratory; Industrial Chemistry.

Fourth Year.

First Term.	Second Term.
Chemical Analysis.	Chemical Analysis.
Mining Laboratory.	Modern History.
Modern History.	Metallurgy and Ore Dressing.
Metallurgy.	Memoirs.
Memoirs.	*Options.*
Options.	1. Mining Laboratory.
1. App. Mechanics; Geology.	2. Special Geological Work.
2. Chem.; Sp. Geological Work.	3. Mining Laboratory.
3. Chemistry; Sp. Metallurgical Work.	

IV. — ARCHITECTURE.

First Year.

First Term.	Second Term.
Algebra.	Trigonometry.
Solid Geometry.	General Chemistry.
General Chemistry.	Chemical Laboratory.
Chemical Laboratory.	Modern History.
Rhetoric.	English Literature.
English Composition.	French.
French.	Mechanical Drawing.
Mechanical Drawing.	Military Drill.
Military Drill.	

Second Year.

First Term.	Second Term.
Materials.	Original Design.
Greek and Roman Architectural History.	Common Constructions.
Drawing.	Mediæval or Modern Architectural History.
Analytic Geometry.	Shades, Shadows, and Perspective.
Physics.	Drawing.
Descriptive Geometry.	Differential Calculus.
Modern History.	Physics.
German.	Modern History.
	German.

Third Year.

First Term.	Second Term.
Original Design.	Original Design.
Sketching and Water Color.	Sketching and Water Color.
Lectures on Fine Arts.	Surveying.
Working Drawings and Framing.	Iron Construction.
Integral Calculus.	Kinematics and Dynamics.
General Statics.	Strength of Materials.
Structural Geology.	Stereotomy.
Physics: Lectures and Laboratory Work.	Political Economy.
Constitutional History.	German.
German.	Acoustics.

Fourth Year.

First Term.	Second Term.
Advanced Original Design.	Advanced Original Design.
History of Ornament.	Sketching and Water Color.
Sketching and Water Color.	Planning.
Problems in Construction.	Schools, Theatres, and Churches.
Specifications.	Problems in Construction.
Strength of Materials.	Specifications and Contracts.
Lectures on Fine Arts.	Advanced French.
Ventilation and Heating.	Thesis Work.
Language.	

V.—CHEMISTRY.

FIRST TERM.	FIRST YEAR.	SECOND TERM.
Algebra. Solid Geometry. General Chemistry. Chemical Laboratory. Rhetoric. English Composition. French. Mechanical Drawing. Military Drill.		Trigonometry. General Chemistry. Chemical Laboratory. Modern History. English Literature. French. Mechanical Drawing. Military Drill.
FIRST TERM.	SECOND YEAR.	SECOND TERM.
Chemical Analysis. Theoretical Chemistry. Physics. German. Modern History. Analytic Geometry.		Chemical Analysis. Mineralogy. Physics. German. Modern History. *Options.* Differential Calculus. { Physical Geography. { Gen. Biology and Botany.
FIRST TERM.	THIRD YEAR.	SECOND TERM.
Chemical Analysis. Special Methods. Industrial Chemistry. Physics: Lectures and Laboratory. German. Constitutional History. *Options.* { Integral Calculus. { Physical Laboratory. Geology. Chemical Laboratory. General Physics (Electricity).		Chemical Analysis. Theoretical Chemistry. Industrial Chemistry. Physical Laboratory. German. Political Economy. *Options.* Physics. Geology. Sanitary Chemistry. Industrial Chemistry.
FIRST TERM.	FOURTH YEAR.	SECOND TERM.
Chemical Analysis. Organic Chemistry. Physics. Metallurgy. Abstracts. *Options.* Physics. Language. Sanitary Chemistry. *Laboratory Options.* Analytic Chemistry. Organic Chemistry. Metallurgical Chemistry. Industrial Chemistry.		Organic Chemistry. Thesis Work.

VI. — ELECTRICAL ENGINEERING.

First Year.

First Term.	Second Term.
Algebra. Solid Geometry. General Chemistry. Chemical Laboratory. Rhetoric. English Composition. French. Mechanical Drawing. Military Drill.	Trigonometry. General Chemistry. Chemical Laboratory. Modern History. English Literature. French. Mechanical Drawing. Military Drill.

Second Year.

First Term.	Second Term.
Physics: Lectures. General Physics: Mechanics. Analytic Geometry. Descriptive Geometry. Carpentry and Wood-Turning (shopwork). Modern History. German. Mechanism.	Physics: Lectures. Physical Lab.: General Work. Differential Calculus. Shopwork: Metal Turning. Physical Geography. Modern History. German. Acoustics: Lectures. Mechanism. Drawing.

Third Year.

First Term.	Second Term.
Physics: Lectures and Laboratory. Electricity: Readings. Integral Calculus. General Statics. Mechanical Engineering. Drawing. Constitutional History. German.	Physical Lab.: Electricity, Heat, Special Methods in Photometry. Electricity: Readings. Kinematics and Dynamics. Strength of Materials. Mechanical Engineering. Mech. Engineering Laboratory. Drawing. Political Economy. German.

Fourth Year.

First Term.	Second Term.
Physical Laboratory: Electrical Testing, and Construction of Instruments. Testing of Telegraph Lines, Dynamo Machines, etc. Technical Applications of electricity to Telegraph, Telephone, Electric Lighting, etc.: Lectures. Mechanical Engineering. Mech. Engineering Laboratory. Applied Mechanics, Thermodynamics, Hydraulics, etc.	Physical Research. Technical Applications of Electricity. Advanced Physics, Memoirs, etc. Differential Equations. Theory of Probabilities. Method of Least Squares. Calculus of Variations. Mechanical Engineering. Mech. Engineering Laboratory.

Note. — The student is advised to take Advanced German.

VII.A. — NATURAL HISTORY.

First Year.

First Term.	Second Term.
Algebra.	Trigonometry.
Solid Geometry.	General Chemistry.
General Chemistry.	Chemical Laboratory.
Chemical Laboratory.	Modern History.
Rhetoric.	English Literature.
English Composition.	French.
French.	Mechanical Drawing.
Mechanical Drawing.	Military Drill.
Military Drill.	

Second Year.

First Term.	Second Term.
Physics.	Chemical Analysis.
Chemical Analysis.	Blowpipe Analysis and Mineralogy.
Theoretical Chemistry.	General Biology and Botany.
General Biology.	Zoölogy and Palæontology.
Analytic Geometry.	Physical Geography.
Modern History.	Physics.
German.	Modern History.
	German.

A part of the summer vacation is to be devoted to field-work in Botany, Zoölogy, or Geology.

Third Year.

First Term.	Second Term.
Animal Physiology and Histology.	Historical Geology.
Structural and Chemical Geology.	Political Economy.
Physics: Lectures and Laboratory.	Embryology.
Constitutional History.	Physical Laboratory.
Zoölogy and Palæontology.	German.
German.	*Options.*
Options.	1. Geology.
1. Geology.	2. Zoölogy.
2. Zoölogy.	3. Physiology.
3. Physiology.	

Fourth Year.

First Term.	Second Term.
Ventilation, Heating, and Drainage.	History of Natural Sciences.
Heredity: Lectures.	Climatology.
Advanced Language.	Advanced Language.
Principles of Scientific Investigation.	Thesis Work.
Thesis Work.	*Options.*
Options.	1. Geology.
1. Geology.	2. Zoölogy.
2. Zoölogy.	3. Physiology.
3. Physiology.	

VII.B.—BIOLOGY, PREPARATORY TO MEDICAL STUDIES.

First Year.

First Term.	Second Term.
Algebra.	Trigonometry.
Solid Geometry.	General Chemistry.
General Chemistry.	Chemical Laboratory.
Chemical Laboratory.	Modern History.
Rhetoric.	English Literature.
English Composition.	French.
French.	Mechanical Drawing.
Mechanical Drawing.	Military Drill.
Military Drill.	

Second Year.

First Term.	Second Term.
Chemical Analysis.	Chemical Analysis.
Analytic Geometry.	Physics.
Theoretical Chemistry.	General Biology and Botany.
Physics.	Zoölogy and Palæontology.
General Biology.	Physical Geography.
Modern History.	Freehand Drawing.
German.	Modern History.
	German.
	Options.
	1. Physics. 3. Biology.
	2. Chemistry.

Third Year.

First Term.	Second Term.
Comparative Anatomy.	Animal Physiology and Histology.
Animal Physiology and Histology.	Physical Laboratory.
Physics: Lectures and Laboratory.	Historical Geology.
Chemical Analysis.	Embryology.
Structural Geology.	Political Economy.
Zoölogy and Palæontology.	German.
Constitutional History.	*Options.*
German.	1. Physics.
Options.	2. Chemistry.
1. Physics. 2. Chemistry.	3. Biology.
3. Biology; Comp. Anatomy or Physiology and Histology.	4. Geology.
	5. The Latin of Natural Science.

Fourth Year.

First Term.	Second Term.
Animal Physiology and Histology.	Climatology.
Ventilation, Heating, Drainage.	Germs and Germicides.
Heredity: Lectures.	History of the Biological Sciences.
Readings of Memoirs in French and German.	Thesis Work.
Practice in Research.	*Options.*
Thesis Work.	1. Physics.
Prin. of Scientific Investigation.	2. Chemistry.
Options.	3. Biology.
1. Physics. 3. Biology.	4. Geology.
2. Chemistry. 4. Geology.	5. Advanced Language.
5. Advanced Language.	

VIII. — PHYSICS.

First Year.

First Term.	Second Term.
Algebra.	Trigonometry.
Solid Geometry.	General Chemistry.
General Chemistry.	Chemical Laboratory.
Chemical Laboratory.	Modern History.
Rhetoric.	English Literature.
English Composition.	French.
French.	Mechanical Drawing.
Mechanical Drawing.	Military Drill.
Military Drill.	

Second Year.

First Term.	Second Term.
Physics: Lectures.	Physics: Lectures.
General Physics: Mechanics.	Physical Laboratory.
Analytic Geometry.	Differential Calculus.
Chemical Analysis.	Microscopy.
Theoretical Chemistry.	Modern History.
Descriptive Astronomy.	German.
Modern History.	Acoustics: Lectures.
German.	*Options.*
	1. Chemistry.
	2. General Theory of Equations and Determinants.

Third Year.

First Term.	Second Term.
Physics: Lectures and Laboratory.	Physical Laboratory.
General Physics: Optics or Electricity.	General Physics: Optics or Electricity.
Integral Calculus.	Kinematics and Dynamics.
Extra Integral Calculus.	Strength of Materials.
Extra Physical Laboratory.	Theoretical Chemistry.
Constitutional History.	Political Economy.
German.	German.
Options.	*Options.*
1. Chemistry. / Histology or Shopwork.	1. Chemistry.
2. Analytic Geometry of Three Dimensions. / Histology or Shopwork.	2. Advanced Analytic Geometry and Calculus.

Fourth Year.

First Term.	Second Term.
Physical Laboratory.	Physical Research.
General Physics.	General Physics.
Advanced Physics: Memoirs, etc.	Advanced Physics: Memoirs, etc.
Prin. of Scientific Investigation.	Theory of Probabilities, Least Squares, and Calculus of Variations.
Photography.	*Options.*
Applied Mechanics: Thermodynamics, Hydraulics, etc.	Physiological Measurements.
Differential Equations.	Physical Laboratory.
Options.	Quaternions.
1. Chemistry.	
2. Definite Integrals.	

IX.—GENERAL COURSE.

First Year.

First Term.	Second Term.
Algebra.	Trigonometry.
Solid Geometry.	General Chemistry.
General Chemistry.	Chemical Laboratory.
Chemical Laboratory.	Modern History.
Rhetoric.	English Literature.
English Composition.	French.
French.	Mechanical Drawing.
Mechanical Drawing.	Military Drill.
Military Drill.	

Second Year.

First Term.	Second Term.
Physics: Lectures.	Physics: Lectures.
Modern History.	Modern History.
German.	Modern History (special).
Advanced French.	English Literature.
Analytical Geometry.	German.
1. *Options.*	Advanced French.
2. Theoretical Chemistry.	Physical Geography.
3.	*Options.*
4.	1. General Biology and Botany; Zoölogy and Palæontology.
5. Advanced Algebra and Trigonometry.	2. Phys. Geog.; Zoöl. and Palæontology; Special Work in either subject.
	3. Mineralogy.
	4. Chemical Analysis.
	5. Differential Calculus.

Third Year.

First Term.	Second Term.
Physics: Lectures and Laboratory.	Physical Laboratory.
Constitutional History.	English Literature.
Modern History.	Political Economy.
English History and Literature.	International Law.
German.	German.
Language.	Language.
Shopwork: Carpentry and Wood Turning.	Historical Geology.
Options.	Shopwork: Filing and Machine Tool Work.
1. Physiology and Histology; Zoölogy and Palæontology.	*Options.*
2, 3. Structural Geology; Special Geological Work or Zoölogy and Palæontology.	1. Biology; Embryology; Physiology.
4. Ind. Chem.; Chem. Analysis.	2, 3. Historical Geology; Special Geological Work.
5. Integral Calculus.	4. Ind. Chem.; Theoret. Chem.
	5. Gen. Theory of Equations; Determinants.

Fourth Year.

In process of revision by the Faculty.

SPECIAL COURSES.

In general, no schedule for special courses of study is laid down; but any special course selected by the student or applicant, and receiving the approval of the Faculty, may be pursued. (See pp. 17 and 60.) All special students in Architecture, however, are required to take in full, as a minimum, the following course of two years' duration, no other special students in architectural subjects being admitted: —

SCHEDULE OF SPECIAL COURSE IN ARCHITECTURE.

FIRST YEAR.

FIRST TERM.	SECOND TERM.
The Orders, and their Applications.	Original Design.
Sketching and Water-Color.	Sketching and Water-Color.
Mechanical Drawing.	Common Constructions.
Materials.	Projections.
Ancient Architectural History.	Shades, Shadows, and Perspective.
Elementary Mechanics.	Mediæval or Modern Arch. History.

SECOND YEAR.

FIRST TERM.	SECOND TERM.
Original Design.	Original Design.
Sketching and Water-Color.	Specifications and Contracts.
Specifications.	Planning.
Ornament and Decoration.	Iron Construction.
Problems in Construction.	Schools, Theatres, Churches.
Ventilation, Heating, Acoustics.	Surveying.
Working-Drawings, and Framing.	Problems in Construction.

REQUIREMENTS FOR GRADUATION.

The degree, Bachelor of Science (S.B.), in the course pursued, is given for the satisfactory completion of any regular course of study.

To be entitled to a degree, the student must have passed satisfactory examinations in all the prescribed studies and exercises, and, in addition, a final or degree examination,

embracing all the subjects which particularly relate to his course. He must, moreover, prepare a dissertation on some subject included in his course of study; or an account of some research made by himself; or an original report upon some machine, work of engineering, industrial works, mine, or mineral survey; or an original architectural design accompanied by an explanatory memoir. This thesis or design must be approved by the Faculty, to whom it must be submitted for examination on or before May 10, except it be dependent on laboratory work, in which case it must be presented two days after the close of the respective laboratories.

Students leaving the school before graduation should apply for an honorable dismission, to which they shall be entitled if their record for conduct, attention to studies, and scholarship, is satisfactory to the Faculty.

ADVANCED COURSES.

The degree Master of Science (M.S.) is awarded for proficiency in complete advanced courses of study of at least one year's duration.

The degrees Doctor of Philosophy (Ph.D.) and Doctor of Science (S.D.) are awarded for proficiency in complete advanced courses of study of at least two years' duration.

The particular course of study which candidates for these degrees wish to pursue must be submitted in writing to the Faculty, and must meet with approval. Occasional short absences, when the time is spent upon professional work by advice of the Faculty, will not be considered as interruptions of the student's residence.

Advanced courses in chosen lines of study, and without reference to the degrees, may be pursued by graduates of the Institute without preliminary examination, or by Bachelors of other institutions, who may satisfy the Faculty, by examination or otherwise, that they are qualified to take with advantage the course proposed.

METHODS AND APPARATUS OF INSTRUCTION.

Ordinary Exercises. — Instruction is given by lectures and recitations, and by practical exercises in the field, the laboratories, and the drawing-rooms. Text-books are used in many, but not in all, departments. In some departments, the notes of the several courses of lectures and laboratory work have been privately printed, and are furnished to students at cost. A high value is set upon the educational effect of laboratory practice, drawing, and field-work.

Written Examinations. — Besides oral examinations in connection with the ordinary exercises, written examinations are held from time to time. Near the close of the months of January and May, general examinations are held. After the examinations, the standing of the student in each distinct subject is reported to his parent or guardian. The examinations of January and May form the basis of admonition or advice from the Faculty in the case of students who are not profiting by their connection with the school.

The Instruction in Mathematics. — Great importance is attached to the study of mathematics, both as a means of mental discipline and as affording a necessary basis for further instruction in the professional courses. All regular students conclude Algebra, and also study Solid Geometry, Plane Trignometry, and Analytic Geometry. Students in most of the courses receive instruction in the Differential and Integral Calculus. Courses in Differential Equations, the Theory of Probabilities and the Method of Least Squares, are given in the course in Electrical Engineering, and in Spherical Trignometry in the course in Civil Engineering. In addition to these, opportunities are afforded in courses VIII. and IX. for the study of the Theory of Equations, Determinants, Definite Integrals, the Calculus of Variations, and Quaternions.

The Instruction in Descriptive Geometry. — The exercises in Descriptive Geometry are of two kinds. In the lecture-room the instruction is given by means of models and diagrams, and also by the use of text-books. In the drawing-room the student is drilled in the construction of such problems as shall illustrate the work of the class-room, and make him thoroughly familiar with this branch of mathematics.

The Instruction in Drawing. — Instruction is given to all regular students in the principles of Geometrical and Mechanical Drawing; and a large amount of time is devoted to practice in the drawing-room, to enable the student to acquire the necessary skill, and to prepare him for his future work. Drawing is also continued in connection with the professional studies.

The Instruction in Modern Languages. — While the primary object of the instruction in French and German is reading, so that the student may avail himself of foreign works relating to his particular department, much importance is attached to the study of these languages as a means of general training. In either case, a thorough and systematic study of the structure of the language is deemed to be an essential basis. This is, however, accomplished by means of practical work with the language itself, including written and oral exercises, rather than by an abstract study of the rules of grammar. French (see conditions of admission, p. 58) is continued through one year, and German through two years, for all regular students. In certain departments, there is an advanced course in each. Instruction is also given in the elements of Italian and Spanish.

The Instruction in English. — In this department, all regular students receive a course of instruction, extending throughout one year, in Rhetoric and Criticism, in the elements of Deductive and Inductive Logic, and in the History of English Literature. This is accompanied by practice in composition, and in the critical reading of English texts, so

far as time allows. Additional instruction in these subjects is given in connection with the General Courses.

The Instruction in History and Political Science. — All regular students receive instruction in the history of recent times, followed by a course in general European History, and a course in English and American Constitutional History. A course in Political Economy is given to all regular students. Students in the General Course receive more extended instruction in Political Economy, and in American and European Political History.

The Instruction in Chemistry. — In General Chemistry, all candidates for a degree attend a course of lectures on Inorganic Chemistry, illustrated by experiments, and perform actual experimental work in the laboratory for general chemistry. The lectures are intended to prepare the student for his work in the laboratory, and to emphasize the facts which he there learns. In the laboratory, the student receives instruction in chemical manipulation, and performs a series of experiments designed to illustrate the properties of the more important elements, and the laws of chemical action. In connection with the lectures in Inorganic Chemistry, the elements of theoretical chemistry are taught; and the student has practice in the solution of stochiometrical and other chemical problems. The study of the theory of the subject is continued by a more advanced course of lectures and recitations, in which are presented the prevailing theoretical views as to chemical action, the constitution and classification of chemical compounds, as well as certain portions of molecular physics which bear directly upon chemical theories, especially in the matter of thermo-chemistry.

The instruction in Analytical Chemistry extends through two or more years. In the analytical laboratory, the system of instruction in classes is not employed. Each student is given a desk in the laboratory, which is open to him at all times, and receives personal instruction. The rate of progress depends upon the personal ability and application of the

student, and upon the amount of time spent in the work. Each student has a course of analytical work especially assigned. This will include analyses, qualitative and quantitative, involving such a variety of methods and processes as will tend to qualify the student to undertake any chemical analysis, yet so selected as to afford a preparation for any special branch of chemistry which he may have in view. A special laboratory has been fitted for volumetric analysis. Here students are taught to graduate and calibrate with accuracy the various instruments used, and to work with that attention to detail necessary to impart accuracy to these rapid methods of analysis. Full development is given this department, in view of the increasing importance of volumetric methods. A laboratory has also been fitted up for Sanitary Chemistry, in which opportunity is given for studying the methods of analysis of milk and other articles of food, air, water, etc.

As an introduction to original work, each student is required to undertake a critical examination of some process of analysis, to determine its limits of accuracy under various conditions, and to make a written report thereon.

The special instruction in the laboratory is supplemented by a course of lectures upon methods of analysis and manipulation; and a course of lectures and exercises involving the preparation of abstracts, and the critical comparison of the special methods of analysis appearing in the various chemical journals, is given.

Industrial Chemistry is taught by a course of lectures, and by work in the laboratory of industrial chemistry. A full description of the most important technical applications of chemistry is given in the lectures. A part of the lectures will be given by persons actively employed in carrying out the processes which they will describe. The department possesses a very valuable collection of charts illustrating chemical industries, presented by the late Prof. Robert E. Rogers. In the industrial laboratory, the students prepare chemical products from raw materials. They also undertake the preparation of pure chemicals. They are taught fractionation and

distillation. The present year particular attention is paid to the preparation of dyes and mordants. A full course of instruction in bleaching and dyeing is given. It includes scouring, bleaching of cotton and wool, and the dyeing of yarn and cloth. The students are taught how to make comparative tests of dye-stuffs, and qualitative tests to determine the dyes present upon fibres. The students also become familiar with many of the most useful methods of commercial analysis. The laboratory instruction is supplemented by excursions to manufacturing establishments where the practical working of chemical industries can be examined.

The instruction in Organic Chemistry consists of lectures and laboratory work. The theories of organic chemistry are discussed, and the practical applications of these theories described. The work in the laboratory consists of ultimate analysis, preparation of organic products, and original research. Ample opportunities are afforded for the prosecution of investigations in organic chemistry.

The Kidder Laboratories of Chemistry afford accommodations for five hundred students. They are fitted with all the necessary appliances for instruction in general, analytical, and organic chemistry, and offer good facilities for the prosecution of research. In the reading-room is a valuable chemical library, containing files of the more important chemical periodicals. The library has been enriched during the present year by the addition of a set of Poggendorff's Annalen, presented by Mrs. William B. Rogers; a number of important chemical works presented by Professor W. P. Atkinson, Dr. C. S. Minot, and others; and portraits in oil of St. Hilaire, Vauquelin, Fourcroy, and Guyton de Morveau from the late Dr. Robert E. Rogers.

The Instruction in Physics.—This begins by a series of lectures attended by all regular students, in which the whole subject of Physics is discussed. The various branches are treated both mathematically and experimentally. In all cases, the theoretical discussion of a question is followed by a full account of its practical applications.

The Institute possesses an extensive and constantly increasing collection of physical apparatus, which has been materially increased during the past year by a gift from the late Dr. Robert E. Rogers, of his valuable cabinet of optical and electrical instruments.

In addition to the courses of general lecture-room and laboratory exercises in Physics, which are required of all regular students, various special courses of lectures, readings, and laboratory exercises in Optics, Heat, Acoustics, and Electricity are provided for those making a specialty of Physics. Students pursuing these courses gain a familiarity with standard works on the various branches of Physics, in both their own and foreign languages. The subject of Photography, including its applications to micro-photography, spectrum photography, and the various photo-mechanical processes, will be discussed in a series of lectures accompanied by practical exercises in the photographic laboratory. Instruction will also be given in Microscopy, and in the use of the lantern as an instrument of demonstration in the lecture-room. A course of lectures and laboratory instruction in Calorimetric Measurements and allied subjects has been instituted, and the course in general Electrical Measurements has been very considerably extended.

As many of the students taking the course in Physics intend to make teaching their profession, a special course called Advanced Physics is arranged with this object in view, in which each student in turn investigates the present condition of our knowledge of some particular phenomenon or law, and presents the result, which frequently embodies the outcome of his own researches as well as of the researches of others, in the form of a scientific memoir or lecture.

The Rogers Laboratory of Physics. — At the close of the lectures on Physics, all regular students enter this laboratory, and receive training in the use of various instruments for physical measurement, and verify many of the fundamental laws of nature. The experiments are so chosen that some of them — for instance, those with the microscope,

spectroscope, and apparatus for electrical measurements — have a direct technical value; others are intended to establish certain principles in the mind, to cultivate manual skill in handling minute or delicate objects, or to exercise the reasoning faculties, and show the application of mathematics to concrete problems. Thus the course has a value beyond the immediate aim of the experiments in the direction of general culture, teaching the student to derive conclusions from observed facts, and showing him various methods of experimental research. A portion of the students carry on advanced work of a more technical nature. Original investigation is stimulated as far as possible, and the result has been a considerable number of published memoirs.

The library of the department contains the standard works upon various branches of Physics. It is especially full in those relating to electricity, and all new works of value on that subject are added as they appear. Most of the leading scientific and technical periodicals devoted to Physics are regularly received, and are accessible to the students.

The Instruction in Electrical Engineering. — As a foundation for subsequent work, thorough instruction will be given in the theory of electricity. Also an extended course of lectures will be devoted to the consideration of the various technical applications of electricity to land and submarine telegraphy, the telephone, electric lighting, and the electrical transmission of power. Instruction will be given by lectures and laboratory exercises upon the processes of photometry, especially as applied to the measurement of electric lights. Advanced instruction in electrical measurements, including work with dynamo-electric machinery, together with a course in the electrical testing of telegraph lines, will be provided. The subjects of construction, specifications, and contracts will also receive attention.

Besides the work done by the regular staff of instruction of the Institute, special teaching will be given by gentlemen who are professionally engaged in various departments of Electrical Engineering, or especially conversant with certain

branches of applied electricity. Among those who will give such instruction during the current year are the following gentlemen: —

Mr. George W. Blodgett, Electrician of the Boston and Albany Railroad, on the Application of Electricity to Railway Signalling; Mr. J. Rayner Edmands, of the Harvard College Observatory, on the Establishment and Distribution of Time; Mr. C. J. H. Woodbury, of the Manufacturers' Mutual Fire Insurance Company, on Electric Lighting in its Relation to Fires and Fire Insurance; Mr. E. H. Hewins, of the New England Weston Electric Light Company, on Specifications and Contracts for Electric Lighting; Messrs. A. C. White and H. B. Gale, of the New England Weston Electric Light Company, on Electric Light Installations.

The Institute has recently received from the Union Electric Switch and Signal Company the valuable gift of a complete set of its electric railway signals, and is also indebted to the Brush Electric Company for the loan of a dynamo-electric machine, together with electric lamps of several patterns.

The Instruction in Theoretical and Applied Mechanics begins with the study of the Composition and Resolution of Forces, the general laws of Kinematics and Dynamics, mathematically discussed, the principles governing the determination of the stresses in the different members of trusses, centre of gravity, moment of inertia, and the ordinary principles of the strength of materials.

The more advanced part of this instruction embraces the completion of the study of Strength of Materials, including laboratory work, Theory of Elasticity, main principles of the Stability of Arches and Domes, Hydraulics, Thermo-dynamics, and special study of Dynamics.

The methods of the differential and integral calculus are freely used whenever they are the most convenient.

The Laboratory of Applied Mechanics. — The object of this laboratory is to give to the students, as far as possible, the opportunity of becoming familiar, by actual test, with

the strength and elastic properties of the materials used in construction. It is furnished with two testing-machines of fifty thousand pounds capacity, one capable of determining the elasticity and tensile strength of specimens not more than two feet long, and the compressive strength and elasticity of short specimens; and the other the transverse strength and stiffness of beams up to twenty-five feet in length, as well as of many of the framing joints used in practice. The classes are divided into small sections when making tests with the machines. All the experiments are so chosen as to make the student better acquainted with the resisting properties of materials, many of them forming part of some original research; and those on transverse strength and stiffness are also serving to determine certain constants for use in construction, which have not heretofore been determined from tests on full-sized pieces.

The Instruction in the Mechanic Arts.— Practical instruction in the nature of the materials of construction, and in the typical operations concerned in the arts, is considered a very valuable adjunct to the theoretical treatment of professional subjects. Mechanical laboratories have been provided, and furnished with the more important hand and machine tools, so that the student may acquire a direct knowledge of the nature of metals and woods, and some manual skill in the use of tools. These laboratories are now located in the building on Garrison Street, and are equipped as follows: —

The carpenter, wood-turning, and pattern-making departments contain 40 carpenter's benches, 2 circular-saw benches, a swing-saw, 2 jig-saws, a buzz-planer, a boring-machine, 36 wood-lathes, a large pattern-maker's lathe, and 36 pattern-maker's benches. The foundry contains a cupola furnace for melting iron, 2 brass furnaces, and 32 moulder's benches. The smith's shop contains 32 forges, 7 blacksmith's vises, and 2 blacksmith's hand-drills. The machine-shop contains 22 engine-lathes, and 15 hand-lathes of recent approved patterns, a machine drill, 2 planers, a shaping-machine, a universal milling-machine, a grinding-lathe, and 32 vise-benches arranged for instruction in vise-work.

The Instruction in Civil Engineering is given by means of lectures and recitations, and by practice in the field and in the drawing-room. The use of the various instruments employed in surveying is taught mainly by actual work in the field. The student is thus made familiar in a practical way with the several operations involved in Railroad, Hydraulic, and Sanitary Engineering. The work in the drawing-room consists in representing upon paper the surveys made in the field, and in making both working-drawings and finished plans from direct measurement of actual engineering structures, a large number of which are found in the immediate neighborhood of the Institute.

The course in Civil Engineering embraces roads, railroads, bridges, rivers, harbors, canals, water-power, water-supply, sewerage, drainage, and irrigation. The subject of Roads and Railroads includes the survey, location, construction, and equipment of railroads, and the laying out, building, and maintaining of town and county roads, and of city streets and pavements. In addition to the work in the class-room, an actual railroad survey and location, several miles in length, is made each year upon such ground as shall best illustrate the actual problems occurring in practice. The instruction in Hydraulic Engineering embraces the subjects of hydrology, rivers and canals, water-supply, and water-power. A thorough study is made of the fundamental principles of hydraulics and hydrostatics, and the application of these principles to practice is shown by numerous examples. Special attention is given to the sources and supply of water, to its flow in both natural and artificial channels, and to the methods of collecting, storing, filtering, raising, and distributing water for domestic purposes, with practical details for carrying out such works. A particular study is also made of the control and improvement of rivers, of the construction of locks, dams, and canals, and of the utilization of water as a motive power. The most improved instruments have been provided for the use of the classes; and the students are trained in the practical gauging of rivers on the large scale, and in designing various hydraulic works. The subject of Sanitary En-

gineering embraces the study in detail of the house, with its apparatus, the disposal of sewage by surface or sub-surface irrigation for isolated buildings, the collection and removal of sewage in the larger towns, sanitary drainage for cities, and drainage and irrigation for agricultural purposes. Coast and harbor work includes the design and construction of docks, wharves, sea-walls, jetties, and breakwaters, the formation of bars and the maintenance of channels, and the building and illumination of lighthouses.

The work in Engineering Construction consists of a complete series of lessons on bridges and roofs, foundations and masonry, piers, abutments, arches, and retaining-walls, with ample illustrations of the different methods of determining the strength and stability of such works. Parallel with the above, and as a part of the same course, runs an extended examination of wood, iron, steel, brick, stone, mortar, and cement, and a study of the practical details by means of which these materials are applied to use. The student is taken to the quarry, the foundry, the rolling-mill, the stone-cutting sheds, the shops for bridge-building, and to numerous works in process of construction, and is shown the origin of the different materials he is to use, and the method of applying them in actual structures. Following the above, comes a study of various engineering works, especial care being taken to call attention to defective methods and to faulty construction, and to impress upon the student the importance of thorough and exact knowledge as the basis of sound engineering.

The study of Specifications and Contracts includes the various methods of obtaining the quantities, and estimating the cost of engineering structures, the study in detail of a variety of actual specifications, the preparation of working-drawings, and other operations preliminary to carrying out any work of construction. Under the head of Practice in Designing, the student selects some piece of work, and proceeds as if he were about to build it; studying it generally and in detail; drawing on his previous theoretical studies, and also on any illustrations he can get from actual works;

making all necessary computations and drawings; laying the work out on the ground if the subject admits of it; and concluding with a thesis, which is placed on file as evidence that he has satisfactorily completed his studies.

The object throughout the above course is not only to make the student familiar with the general principles of engineering, but also with the practical details through which alone those principles can be made of use. The several subjects are in every case presented by the threefold method of lectures, reference to books, and examination of actual works; and the whole course is so arranged as to lead the student gradually from the methods of the school to those of the practical engineer. By the kindness of many active members of the profession, and of the managers of the various railroads leading out of Boston, the classes are enabled to inspect a great variety of engineering structures, and are thus made to see the exact connection between the work of the school and the real engineering practice of the day.

The Instruction in Mechanical Engineering is given by means of lectures and recitations, and by practice in the drawing-rooms and in the mechanical engineering laboratory. Frequent visits, also, are made to machine-shops and manufacturing establishments, to witness running machinery and manufacturing processes in addition to those which can be seen at the Institute itself.

Instruction is given in the principles of mechanism, in the construction of gear teeth, in the slide valve and link motions; and also, by means of certain courses specially prepared for the purpose, the students are familiarized, as far as possible, with the mechanism of the shop and of the mill machinery to be found in the market at the present time. This is followed by the study of thermo-dynamics, of steam and heat engines, of steam boilers, and of other subjects connected with steam, such as the indicator, cylinder condensation, pressure on the crank, steam heating, etc.

Lectures are given on the rate of flow of water and on water-motors, on the construction and equipment of mills

and of machine shops, and on other subjects connected with machinery and with steam. Besides this, a course in design is given under the supervision of the instructors in the department. Some of the designs are readily solved by calculation, and are almost in the form of problems; while others, such as the design of a boiler, or of some more or less elaborate machine, require a considerable amount of study, of calculation, of drawing, and sometimes of research. All, however, require the student to apply the principles he has learned in his previous work in this or in other departments of the school, and to search for all the evidence that he can find bearing upon each of the practical cases thus brought to his attention.

The laboratory work, in its earlier portions, is devoted to some of the more simple experiments, such as will impart to the students a familiarity with the manner of running the engines, taking indicator cards, and using the other apparatus in the laboratory. The later laboratory work takes very largely the form of original research; and it is intended that this laboratory shall undertake the investigation, in an experimental way, at the hands of the students under suitable direction, of some important engineering problems.

A large amount of drawing is done by the students throughout their course in connection with their regular work, drawing for mere practice ceasing at the end of the first year. A style is adopted that is believed to be a good one, and is adhered to throughout; and early in their course the students are taught to use the "Blue process."

The students of mechanical engineering also receive instruction in carpentry, wood-turning, foundry work, forging, chipping, filing, and in machine-tool work in the mechanical laboratories in the building on Garrison Street.

The Laboratory of Mechanical Engineering. — This laboratory is situated in the basement of the Rogers building, and contains the following as a portion of its equipment: an eighty-horse-power Porter-Allen engine in constant use for driving a fan for the heating and ventilation of the new build-

ing; a sixteen-horse-power Harris-Corliss engine provided with a condenser, and other apparatus, rendering it suitable for a variety of steam experiments, and to be used either with a friction brake or to supply power; a calorimeter; a vacuum-pump; machinery for testing the transmission of power by belting; transmission dynamometers; a mule; a drawing-frame; a ring-frame; a fly-frame; a speeder; a carding engine; and apparatus for hydraulic experiments, besides indicators, thermometers, gauges, etc. There are also available for work, in connection with this department, five steam boilers; a forty-horse-power engine, used for running the lathes, planers, etc., in the mechanical laboratories; and a number of looms.

As examples of the work done in the laboratory, the following experiments are enumerated: tests of the evaporative power of boilers; tests of the effects of different cut-off, compression, back-pressure, speed, etc., of engines under constant and variable loads; calorimetric tests; tests of the transmission of power by belting.

The department has, since the publication of the last catalogue, been the recipient of the following very valuable gifts: —

A Garland atomizer from Mr. J. G. Garland; models of bevel gears from Messrs. Brehmer Brothers; samples of card-clothing from Messrs. Stedman and Fuller; a top flat cotton-card from the Whitin Machine Works; card-clothing for the same from Messrs. A. White & Son; a test-gauge and patent square-inch test-valve from the Utica Steam-Guage Company; working-drawings from the Putnam Tool Company, from Messrs. Pratt and Whitney, and from the Pond Machine-Tool Company.

The Instruction in Mining includes a course of lectures on the general character of the various deposits of useful minerals, and on the theory and practice of mining operations, such as prospecting, boring, sinking of shafts, driving of levels, different methods of working, hoisting, pumping, ventilation, etc. These lectures are illustrated by photo-

graphs, drawings, and a set of models from Freiberg, Saxony, which show in detail the methods of working underground, by underhand and overhand stoping, the timbering and walling of shafts and levels, the arrangement of pumps, man-engines, ladder-ways, hoisting-ways, the sinking of shafts, etc.

Ore-dressing and Metallurgy are taken up in a course of lectures, accompanied by a series of continuous practical exercises in the mining and metallurgical laboratories in the concentration and smelting of ores.

The valuable scientific library of the late Prof. Henry D. Rogers, of the University of Glasgow, presented to the Institute by Mrs. Rogers, is accessible to the students in geology and mining.

The Mining and Metallurgical Laboratories. — During the summer of 1884, the mining laboratory was re-arranged, reconstructed, and enlarged to considerably more than double its former dimensions. Such of the machines as were suitable to use again have been put in thorough repair, and those that were not, have been replaced by new machines. The furnaces were all torn down and rebuilt. The plant is now arranged on spacious, substantial floors, furnished with all the appliances of power, water, and steam that may be necessary for crushing, stamping, washing, amalgamating and leaching, roasting, and smelting ores by the methods that are approved at the best works in the country.

The aim of the laboratory is to furnish students the means for studying, experimentally, various processes of ore-dressing and smelting, and at the same time to enable them to gain an idea of what is required of a miner or a metallurgist. To this end the apparatus has been chosen with the view of illustrating, as far as possible, the principles of the more important machines and furnaces which are used in Mining and Metallurgy.

The metallurgy of lead, copper, gold, and silver has been chosen as the best suited for laboratory illustration: production of iron and steel in quantity is prohibited by the size of the plant, and by the large amount of ores and fluxes necessary to put this into operation.

The experimental work of the laboratory is carried on by the students under the immediate charge of an instructor. A sufficiently large quantity of ore is assigned to each student, who first examines it for its component minerals, sorts and samples it, and determines its character and value by analysis and assays, and makes such other preliminary examinations as serve to indicate the proper method of treatment. He then treats the given quantity, makes a careful examination of the products at each step of the process, ascertains the amount of power, water, chemicals, fuel, and labor expended, wherever practicable, and thus learns approximately the effectiveness and economy of the method adopted. He learns, also, the value of chemistry as a check upon metallurgical work. Each student is assisted in working his ore by his classmates, each of whom has an opportunity in turn to manage the machines and furnaces.

The Institute does not claim that this laboratory is in any sense of the word a substitute for the works. What is claimed is, that it prepares students to go into works, and to profit by them. The spirit of investigation which is awakened is of great advantage to the student.

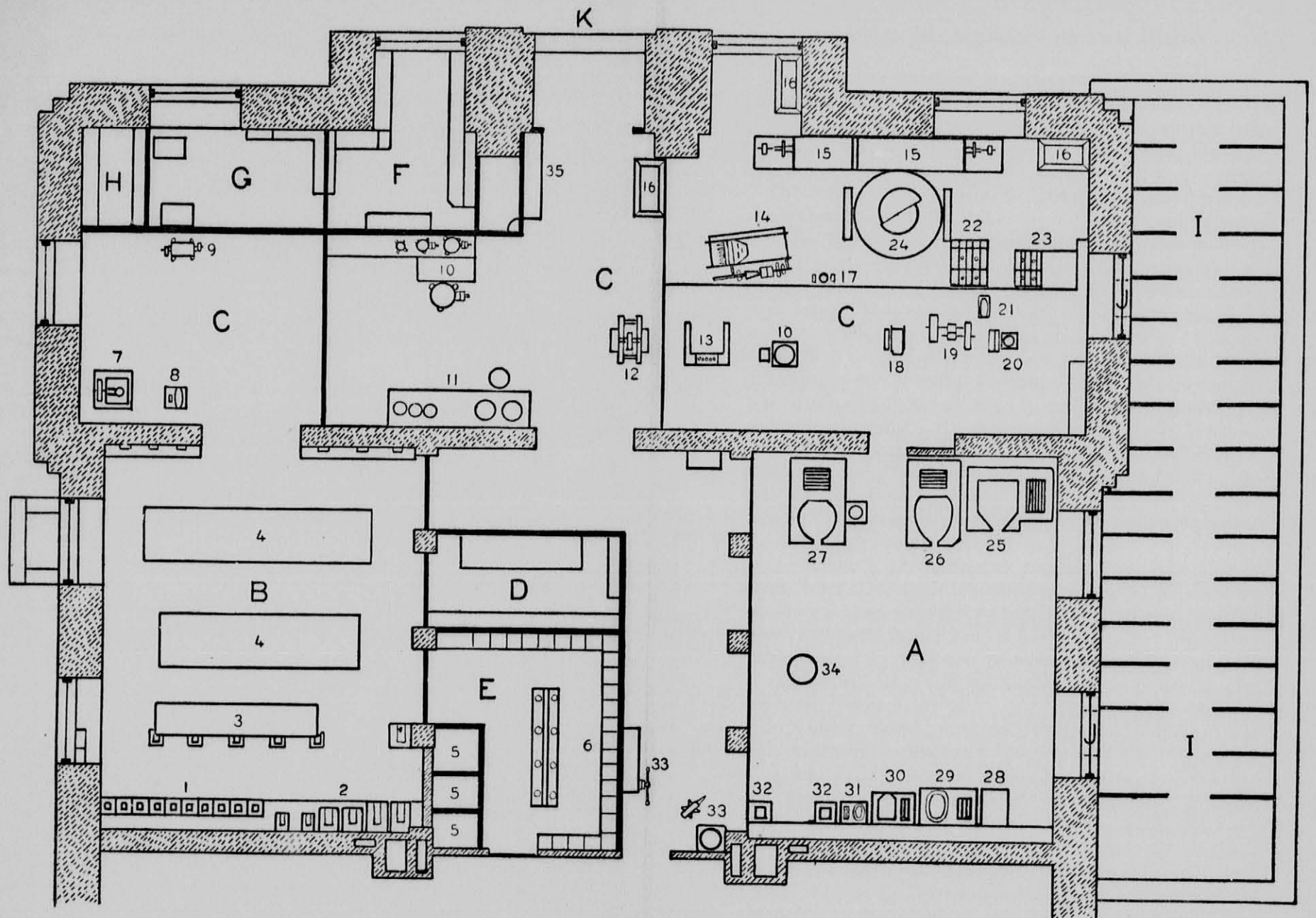
The mining laboratory consists of three parts, — milling-room, furnace-room, and assay-room, — with ample storage-vaults, supply-room, and toilet-room attached.

The milling-room is supplied with four suites of milling-apparatus: —

I. A five-stamp battery, a set of amalgamating plates, a mercury-saver, a Frue-vanner for concentrating tailings, an Atwood's amalgamator, a settling-tank, and centrifugal-pump.

II. A Blake crusher, crushing-rolls with automatic sizing screens, a Richards-Coggin separator, a spitzkasten, four automatic machine-jigs, an Evans table or rotary-buddle, a settling-tank, and a centrifugal-pump, which throws the water from the settling-tank back to the machine, the same water being thus used over and over again, to avoid loss in slimes.

III. A set of four amalgamating-pans, 30, 18, 12, and 8 inches in diameter respectively, also a 36-inch settler, and a little automatic kieve for separating mercury from pulp.



A. Furnace Room.
B. Assay Room.
C. Milling Room.
D. Supply Room.
E. Toilet Room.
F. Private Laboratory.
G. Office.
H. Balance Room.

I. Vaults.
J. Entrance to Vaults.
K. Newbury-street Door.

1. Crucible Furnaces.
2. Muffle Furnaces.
3. Iron Work-table.
4. Students' desks.

5. Closets.
6. Clothes Lockers.
7. Steam Engine.
8. Dynamo.
9. Root Blower.
10. Amalgamating Pans.
11. Leaching Tubs.
12. Ball Amalgamator.

13. Stamp Mill.
14. Frue Vanner.
15. Slime Tanks and Pumps.
16. Drying Tables.
17. Automatic Kieve.
18. Blake Crusher.
19. Cornish Rolls.
20. Sampling Mill.

21. Dust Fan.
22. Larger Jigs.
23. Smaller Jigs.
24. Evans Table.
25. Calcining Furnace.
26. Copper Refining Furnace.
27. Lead Smelting Furnace.
28. Kiln.

29. Large Cupelling Furnace.
30. Small Calciner.
31. Small Cupelling Furnace.
32. Pot Furnaces.
33. Forge Anvil, Vise Bench.
34. Water Jacket Smelter.
35. Carpenter's Bench.

Joggins coal-mines, Parrsborough and Blomedan mineral localities, Spring Hill coal-mines, Acadia iron-mines, furnaces, and rolling-mill, Pictou coal-mines, Oldham gold-mines, Halifax glacial exposures, Mt. Uniacke gold-mines, Winsor plaster-quarries, Margaretville mineral localities. The excursion lasted three weeks. Lesser excursions of a day or two at a time are made while the school is in session.

The Instruction in Geology and Physical Geography. — The instruction in these branches has been so arranged that the topics to be taught may be presented in the order of their logical succession ; namely, —

I. *Physical Geography, including Dynamical Geology.* — It is the aim of the lessons on these topics to lead the student to a scientific knowledge of the principal features of the earth's surface, their characteristics, classification, geographical relations, and the changes which they have experienced within the historic period. Frosts, glaciers, rains, streams, tides, volcanoes, earthquakes, plants, animals, etc., are considered as geological agencies, and also in their bearing upon navigation, the construction and maintenance of roads, and various works of improvement.

II. *Structural Geology, including a systematic course in Lithology.* — Oral instruction and laboratory work are combined in this course, the aim being to place in the hands of each student a specimen of each type to be considered. The principal structural features characterizing large masses of rocks, embracing stratification, joint structure, faults, folds, slaty-cleavage, veins, dikes, etc., are taught as practically as circumstances will allow. This instruction is supplemented by frequent excursions to localities of geological interest in the vicinity of Boston. The instruction in Chemical Geology and the history of crystalline formations comprises the formation, alteration, and decay of rocks, the origin of vein-stones and ore deposits, of rock-salt and mineral waters, and of coal and petroleum ; also a general sketch of the chemical forces which co-operated with physical agencies in the formation of the earth.

III. *Historical Geology.* — In this branch the outlines of the physical history of the earth are taught, and special attention is given to American geological history. The geological positions of ores and other economic products, and the modes of their occurrence, are taught in connection with the geological formations in which they are found. The instruction is made as practical as its limits will admit. A collection of specimens and a series of pictorial representations are employed in the illustration of this branch. During the summer vacations, excursions of a few weeks are often made to regions where the fossiliferous formations are well developed.

The instruction in Climatology and Industrial Geography includes the influences of geographical positions, physical features, climates, etc., upon the nature and distribution of animals and plants, upon the resources of countries, and upon the character and prosperity of nations.

The Instruction in Mineralogy. — Crystallography is taught with the aid of models, diagrams, and a series of crystals. In Descriptive Mineralogy, specimens are freely used, an example of each of all the more important species being placed before each student; while a collection of typical specimens is accessible to students at all times. In Determinative Mineralogy, students are taught to identify minerals by their crystallization and physical properties, as well as by their blowpipe or chemical characters. The instruction in Blowpipe Analysis is given in a separate laboratory, and is supplemented by sufficient practice to insure familiarity with the methods.

In the spring, several excursions are made to interesting mineral localities.

The Instruction in Zoölogy and Palæontology, including the history of ancient animal life and the study of the distinctive and characteristic fossils of the different formations, is given as a necessary foundation for the further study of Geology. The aim of the course is to give the student a

practical acquaintance with the structure of the characteristic families and orders of living and extinct animals, and, by a judicious selection of examples, to familiarize him to some extent with the forms which characterize different periods.

The handling and drawing of specimens by the student are essential features of the method of instruction. The lectures of the instructor are devoted largely to explanatory demonstrations of the specimens which the students have studied and drawn.

The Instruction in Architecture. — The instruction in this subject is practical as well as theoretical. Besides the scientific study of construction and materials, it comprises the study of building processes and of professional practice, as well as that of composition and design, and of the history of the art. It is so arranged as to meet the wants, both of those who commence their professional studies at the beginning, and of experienced draughtsmen who desire to make up deficiencies in their training, or to qualify themselves for understanding the responsibilities of practice.

The more strictly professional work begins with the study of the Five Orders and their applications, and of Architectural History; while, with constant practice in drawing, the students are familiarized with the material elements of their future work by a course in practical construction illustrated by lectures, problems, and by visits to buildings. During the following years the subject of specifications and contracts is thoroughly gone over; and problems in construction of all kinds serve to fix in the memory the principles already learned, and to supplement them by more advanced instruction.

The students are continually practised in architectural design. Each set of drawings is examined, and criticised before the classes. Instruction is also given in sketching in black and white and water-color; and an evening class is held during the winter for drawing from the life, to which all students in the department are admitted who have reached sufficient proficiency in drawing from the cast.

The Architectural Museum. — Several thousand photo-

graphs, prints, drawings, and casts have been collected for this department, by means of a special fund raised for the purpose. To these collections the following additions have been made, mostly by gifts: a considerable collection of photographs, lithographs, and drawings presented to the Institute by French, English, and American architects, taken from their own works, including sets of actual working-drawings, with details and specifications. A complete series of drawings, mostly presented by the late Ernst Benzon, Esq., of London, formerly a merchant of Boston, illustrating the course of architectural instruction in the École des Beaux-Arts in Paris, — *Esquisses-Esquisses, Projets Rendus, Projets d'Ordre, Projets de Construction, Grand Prix de Rome, Envoi de Rome.* Besides these, a very large number of models and illustrations of architectural detail and materials are arranged in the rooms of the department.

The chief part of the collection of casts of architectural sculpture and detail belonging to the department has been deposited in the Museum of Fine Arts, together with the architectural collections belonging to the Museum. The students of the department have free access to them at all times; and, as the museum building is close at hand, no inconvenience results from the change. The space thus gained is filled with specimens of metal-work, tile-work, glass-work, and wood-work, partly purchased, but mostly deposited with the department by the manufacturers, forming a museum of sanitary and building appliances. The library of this department contains nearly four hundred well-selected volumes; and the principal technical periodicals, both American and foreign, are regularly taken. The publications of the Royal Institute of British Architects, and of the Société Centrale des Architectes in Paris, are presented by the authorities of those institutions.

The Instruction in Military Science and Tactics. — In conformity with the requirements of the Act of Congress of July 2, 1862, and of the Act of the General Court of Massachusetts in furtherance thereof, the Institute provides instruc-

tion in military tactics. All students who take two or more first year studies are required to attend three times a week an exercise in tactics, unless specially excused by the Faculty. A written and drill examination are held at the end of the year. For the drill exercises, they are required to provide themselves with uniforms which are made from measures and by contract, in order to secure uniformity of material and manufacture as well as cheapness. The whole cost to each student does not exceed fifteen dollars. Applications to be excused from drill may be granted by the Faculty, when the student is an alien, a college graduate, or over twenty-one years of age, when he has a surgeon's certificate of disability, or is able to pass an examination satisfactory to the department, in both theoretical and practical tactics and drill.

The large drill-hall includes a gymnasium, used by all classes in the Institute.

Libraries. — The Institute possesses a good and increasing general library of reference for use by the students; and each department of instruction has, in its own reading-room or laboratory, its separate working library of reference. These departmental libraries, which are of the greatest value to students, are intended to contain a careful selection of the best text-books, special treatises, monographs, etc., and the more valuable periodical publications, in the subjects germane to the work of the department. They are accessible to all students; and a certain valuable experience in the use of them is acquired before the completion of the regular courses, either incidentally to the preparation of theses or in connection with lectures or recitations.

The Boston Society of Natural History grants to the students of the Institute the full use of its valuable library. The unusual facilities of the Boston Public Library, of 430,300 volumes, are at the disposal of all students of the Institute. The collections of this library are of exceptional value, and contain the best scientific, literary, and technical publications of various countries, whether standard or special treatises, periodicals, or works of more purely literary or historical

value; and new books are promptly bought on proper application to the authorities of the library.

Many libraries of scientific societies, of individuals, and of private corporations, rich in complete sets of the scientific periodicals of all countries, and of the publications of leading scientific societies throughout the world, are, through the courtesy of the owners, open to advanced students of the Institute.

REQUIREMENTS FOR ADMISSION.

Time of Examination for Admission. — A first examination for admission to the first year class will be held in the Rogers Building, 187 Boylston Street, beginning at 9 A.M., on the first Thursday after May 29, and continuing two days. A second examination will begin at 9 A.M., on the first Tuesday after September 17, and will continue two days (see Calendar, page 77). Attendance on both days of either examination is required.

Entrance examinations were held in May, 1884, in Chicago, Cincinnati, St. Louis, Washington, and San Francisco. Arrangements will be made for examining applicants in May, 1885, in the same cities, and possibly, also, in Atlanta, New Orleans, and St. Paul. For detailed information, address the secretary.

Applicants for advanced standing must pass the entrance examinations, as before given, and present themselves for further examination at 9 A.M. on the Thursday following the second entrance examination (see Calendar, page 77).

Applications for admission to the regular and special courses at other times than the above will be received only when illness or some other equally good cause has prevented attendance on the days prescribed. A fee of five dollars will be charged for all such examinations held at other times than those above specified. Women who are properly qualified are admitted to any of the courses of the school.

TO THE REGULAR COURSES.

First Year. — To be admitted as a regular student in the first-year class, the applicant must have attained the age of sixteen years, and must pass a satisfactory examination in Arithmetic, Algebra, Plane Geometry, French, English Grammar and Composition, History, and Geography.

The requirements in the various subjects are as follows: —

1. *Arithmetic.* — Prime and composite numbers, greatest common divisor and least common multiple, ratio and proportion, common and decimal fractions, percentage, simple and compound interest, compound numbers, metric system of weights and measures, and square root. A satisfactory treatment of these subjects may be found in either Seaver and Walton's Arithmetic, Wentworth and Hill's Arithmetic, or Greenleaf's Complete Arithmetic.

2. *Algebra.* — Elementary operations; factoring; greatest common divisor and least common multiple; fractions; equations of the first degree, including those containing two or more unknown quantities; involution and evolution of monomials and of polynomials; radicals and theory of exponents; imaginary expressions; inequalities; equations of the second degree, including those containing two or more unknown quantities; ratio and proportion; binomial theorem with positive integral exponents; arithmetical progression and geometrical progression. A satisfactory treatment of these topics may be found in either of the following text-books: Wells' University Algebra, Wentworth's Complete Algebra, or Todhunter's Algebra for Beginners.

3. *Plane Geometry.* — As much as is contained in the first five books of Chauvenet's, or of Wentworth's Geometry.

4. *French.* — Elements of grammar, and some practice in translation. Part I. of Otto's Grammar, with fifty or sixty pages of easy reading, represents, in general, the required amount.

5. *English.* — The elements of English grammar as they

are to be found in Professor Whitney's "Essentials of English Grammar," or an equivalent; the principal rules respecting correctness of style as they are to be found in Campbell's "Philosophy of Rhetoric," Book II., or Whately's "Elements of Rhetoric," Book III., or in any reputable modern school Rhetoric; such a knowledge of the history of English literature as may be obtained from Brooke's "Primer of English Literature," together with evidence that the candidate has really read, and is more or less familiar with, some of the classical English writers in prose and verse.

6. *History.* — So much knowledge of recent history as may be obtained from Mackenzie's "Nineteenth Century," or an equivalent.

7. *Geography.* — The text-books intended for use in grammar schools usually represent the amount of preparation required. Practice in free-hand map-drawing from memory is strongly recommended.

Certificates of clear admission to colleges or technical schools of recognized standing, and with requirements equivalent to those of this school, will be accepted in place of the entrance examinations.

In general, the training given in the best high schools and academies will afford suitable preparation. To the student, the importance of thorough preparation is great, as the character and amount of instruction given in the school from the outset leave little opportunity for one imperfectly fitted to make up deficiencies, and render it impossible for him to derive the full benefit from his course, or perhaps even to maintain his standing.

Students will find their progress in Physics and Chemistry promoted by making themselves thoroughly familiar with so much of Physics as is contained in Balfour Stewart's Primer.

A knowledge of the Latin language is not required for admission; but the study of Latin is strongly recommended to persons who purpose to enter this school, as it gives a better understanding of the various terms used in science, and

greatly facilitates the acquisition of the modern languages. Those who intend to take the course in Natural History or in Biology, preparatory to Medical Studies, will find it advantageous to acquire also the elements of Greek.

Second, Third, and Fourth Years. — To be admitted as a regular student in either of these classes, the applicant for this advanced standing must have attained the proper age (seventeen, eighteen, and nineteen years respectively), must in general pass satisfactorily the examination for admission to the first-year class, and examinations on all of the subjects given in the earlier years of the course which he desires to enter. See pages 57 to 60, and pages 23 to 33. Applicants for advanced standing in the course preparatory to Medical Studies will not for the present be received.

Graduates of colleges who find it possible to enter upon most of the studies of the third year will be afforded opportunity to make up those studies of the earlier years in which they are not prepared: they will, in general, be accredited with all subjects in earlier or later years in which they can show, by examination or otherwise, a standing satisfactory to the Faculty, and be received provisionally as regular students. The attention of such applicants is particularly called to the schedules of courses on pp. 23 to 33 and to the schedule of topics on pp. 61 to 77.

TO SPECIAL COURSES.

To be admitted as a student in any one or more selected subjects in any of the regular courses, except that in Architecture (see p. 33), i.e., to partial or special courses, the applicant must have attained the age of at least sixteen years, and must pass satisfactorily such examinations as shall prove him to be qualified to pursue to advantage the subjects chosen.

By means of the schedule of topics and requirements as given in the following sixteen pages, the applicant may ascertain what the individual subjects of study are, how and by whom they are given, by what regular courses and when

they are taken, the subjects required in preparation for each, and the time occupied by it. In general, no student will be allowed to take any one of these topics until he has passed a suitable examination in all the others required as preparation for that applied for.

Special students in Architecture and Chemistry must pass the regular entrance examination to the first-year class (p. 57). Special students in Architecture are received only into the full two years' special course given at p. 33. The student may, however, with the consent of the Faculty, elect such additional studies as he may desire.

SCHEDULE OF TOPICS.

THE following fourteen pages form a schedule which includes the larger part of all the distinct topics or subjects of study taught in the School of Industrial Science. The various branches of study are classified under headings, such as "Mathematics," "Chemistry," "Physics," "Non-professional Studies," etc. In the first column of the table is given the numeral by which any given topic is designated for convenience of reference; in the second column, the name of the subject; in the third, the manner in which this is taught, whether by lectures, by recitations, or by work in the laboratory, drawing room, or field, or by several of these in conjunction; in the fourth, the name of the professor or instructor taking charge of the exercise; in the fifth, the courses taking this subject; in the sixth and seventh, the term (1st or 2d) and number of the year (1st, 2d, 3d, or 4th) in which the subject occurs; in the eighth and ninth, the number of weeks and of hours per week given to the subject; and, in the tenth, the number of the preparatory subject or subjects required of any one who desires to be admitted to the topic under consideration, such requirements including, not merely the subjects referred to by number, but all subjects, required as preparation for these. Thus, for instance, the requirements for 32 (Applied Mechanics) are 31 and 126; that for 31 is 30; that for 30 is 28; that for 28 is

29A ; those for 29A are 26 and 27 ; those for 26 and 27 are 1, 2, and 3 (the admission requirements in arithmetic, algebra, and plane geometry) ; that for 126 is 29, which has already been followed through. So that, to take up the course 32 in Applied Mechanics, the applicant must be prepared to pass or must have passed in 26, 27, 28, 29, 30, 31, 126, and in 1, 2, and 3. The sufficient reason for this is, that, in course 32, use is made of all of the subjects referred to ; and, to carry on the work, the student must have had suitable training in all of them, and must give satisfactory evidence by examination or otherwise that such is the case.

By a careful consideration of the schedule, in connection with the pages on the "Methods and Apparatus of Instruction" (35 to 57), the applicant for a special course may select for the earlier part of that course such topics as will enable him to pursue later those more advanced subjects which he may particularly desire. He may also ascertain what preparatory training is desirable before entering the School.

The topics included in the schedule are, of course, subject to change at any time through action of the Faculty.

Subjects numbered from 1 to 7 are the entrance requirements, full statements of which are given on pages 58 and 59.

1. Arithmetic.
2. Algebra.
3. Plane Geometry.
4. French.
5. English.
6. History.
7. Geography.

MATHEMATICS.

	Subject.	Lect., Rec., Lab., Draw., or Field.	Professor or Instructor.	Taken by	Year.	Term.	No. of Weeks.	Hours per Week.	Preparation Required.
26	Algebra	Rec.	Osborne, French, Porter, Tyler.	All reg. students . .	1	1	8	5	(1) (2)
27	Solid Geometry	Rec.	Osborne, French, Porter, Tyler.	All reg. students . .	1	1	7	5	(3)
28	Plane Analytic Geometry .	Lect., Rec.	Runkle, Wells.	All reg. students . .	2	1	15	3	(29 A)
29A	Plane Trigonometry . . .	Rec.	Runkle, Porter, French, Tyler.	All reg. students . .	1	2	15	5	(26) (27)
29B	Spherical Trigonometry . .	Rec.	Osborne.	I., IX.	2	1	15	1	(29 A)
30	Differential Calculus . . .	Lect., Rec.	Osborne, Wells.	I., II., III., IV., V., VI., VIII., IX.	2	2	15	3	(28)
31A	Integral Calculus	Lect., Rec.	Runkle.	I., II., III., IV., V.	3	1	7	3	(30)
31B	Integral Calculus	Lect., Rec.	Osborne.	VI., VIII., IX. . .	3	1	15	3	(30)
32	Applied Mechanics (Statics and Stresses in Frames) .	Lect., Rec.	Peabody.	I., II., III., IV., VIII., IX. . . .	3	1	8	3	(31 A) (126)
33	Applied Mechanics (Strength of Materials, Kinematics, and Dynamics)	Lect., Rec.	Peabody.	I., II., III., IV., VI., VIII., IX. .	3	2	15	3	(32)
34	Applied Mechanics (Strength of Materials, Hydraulics, Dynamics, and Thermodynamics)	Lect., Rec., Lab.	Lanza.	I., II., III., IV., VI., VIII., IX. .	4	1	15	3	(33)

MATHEMATICS.

	Subject.	Lect., Rec., Lab., Draw., or Field.	Professor or Instructor.	Taken by	Year.	Term.	No. of Weeks.	Hours per Week.	Preparation Required.
35	Applied Mechanics (Strength of Materials, Hydraulics, Dynamics, and Thermodynamics)	Lect., Rec., Lab.	Lanza.	I., II., VIII. . . .	4	2	15	3	(34)
36	General Theory of Equations and Determinants . . .	Lect., Rec.	Wells.	VIII., IX.	2, 3	2	15	3	(26)
37	Advanced Algebra and Trigonometry	Lect., Rec.	Osborne.	IX.	2	1	15	2	(29 A)
38	Analytic Geometry of Three Dimensions	Lect., Rec.	Runkle.	VIII., IX.	3, 4	1	15	2	(30)
39	Advanced Analytic Geometry and Calculus	Lect., Rec.	Runkle.	VIII., IX.	3, 4	2	15	3	(30) (36)
40	Definite Integrals	Lect., Rec.	Wells.	VIII., IX.	4	1	15	1	(31 B)
41	Differential Equations. . .	Lect., Rec.	Osborne.	VI., VIII., IX. . .	4	2	15	3	(31 B)
42	Theory of Probabilities and Method of Least Squares .	Lect., Rec.	Wells.	VI., VIII., IX. . .	4	2	15	3	(31 B)
43	Quaternions	Lect., Rec.	Osborne.	VIII., IX.	4	2	15	3	(31 B)

	Subject.	Lect., Rec., Lab., Draw., or Field.	Professor or Instructor.	Taken by	Year.	Term.	No. of Weeks.	Hours per Week.	Preparation Required.
	DRAWING.								
51	Geometrical and Mechanical Drawing	Lect., Draw.	Faunce, Burrison.	All reg. students . .	1	1, 2	30	6	
52	Descriptive Geometry . . .	Rec., Draw.	Faunce.	I., II., IV., VI., VIII.,	2	1	15	2	(1) (27) (51)
	NON-PROFESSIONAL STUDIES.								
76	Rhetoric and English Composition	Lect., Rec.	Wheelock.	All reg. students . .	1	1	15	2	(5) (6)
77	Modern History and English Literature	Lect., Rec.	Wheelock.	All reg. students . .	1	2	15	2	(76)
78	Modern History	Lect., Rec., Writ.	Atkinson.	All reg. students . .	2	1, 2	30	2	
79	English History and Literature (collateral reading and study)	Read.	Atkinson.	IX.	2	2	15	3	
80	Constitutional History . .	Rec., Writ., Read.	Atkinson.	All reg. students . .	3	1	15	2	

NON-PROFESSIONAL STUDIES.

	Subject.	Lect., Rec., Lab., Draw., or Field.	Professor or Instructor.	Taken by	Year.	Term.	No. of Weeks.	Hours per Week.	Preparation Required.
81	Constitutional History of the United States	Lect., Rec.	Atkinson.	IX.	4	1	15	2	
82	English History and Literature (special studies)	Read.	Atkinson.	IX.	4	1	15	2	
83	Modern History and Literature	Lect.	Atkinson.	IX.	3	1, 2	30	3	
84	Political Economy	Lect., Rec.	The President.	All reg. students	3	2	15	2	
85	International Law	Lect., Rec.	The President.	IX.	3	2	15	2	
86	Special Studies in Finance	Rec.	The President.	IX.	4	1	–	–	
87	French (grammar and translation)	Lect., Rec.	Luquiens.	All reg. students	1	1, 2	30	3	(4)
88	Advanced French	Lect., Rec.	Luquiens.	IX.	2	1, 2	30	3	(87)
90	German (elementary)	Lect., Rec.	Otis.	All reg. students	2	1, 2	30	3	
91	German (grammar and translation)	Lect., Rec.	Otis.	All reg. students	3	1, 2	30	3	(90)

NON-PROFESSIONAL STUDIES.

	Subject.	Lect., Rec., Lab., Draw., or Field.	Professor or Instructor.	Taken by	Year.	Term.	No. of Weeks.	Hours per Week.	Preparation Required.
92	German (advanced) . . .	Lect., Rec.	Otis.	IX.	4	1, 2	30	3	(91)
93	Language	Lect., Rec.	Otis or Luquiens.	IV., V., VII., IX. .	3, 4	1, 2	30	2	(87) (90)

CHEMISTRY.

101	General Chemistry	Lect., Lab.	Nichols, Frost.	All reg. students . .	1	1, 2	30	6	(1) (2) (3) (4) (5) (6) (7)
102	Chemical Analysis	Lect., Lab.	Wing, Pope.	III., V., VII., VIII., IX. . .	2	1, 2	30	–	(87) (101)
103A	Theoretical Chemistry . .	Lect., Rec.	Nichols.	III., V., VII., VIII., IX. . .	2	1	15	2	(101)
103B	Theoretical Chemistry . .	Lect., Rec.	Nichols.	V., VIII., IX. . . .	3	2	15	1	(103A)
104	Chemical Analysis	Lab.	Wing, Pope.	III., V.	3	1, 2	30	–	(90) (102)
105	Chemical Analysis	Lab.	Wing, Pope.	VII.B., VIII. . . .	3	1	30	–	(102)
106	Special Methods.	Rec.	Wing, Pope.	III., V.	3	1	15	2	(90) (102)
107	Industrial Chemistry . . .	Lect.	Norton.	III., V., IX. . . .	3	1, 2	15	2	(90) (102)
108	Chemical Analysis	Lab.	Wing, Pope.	III., V., VIII. . .	4	1	15	–	(104)

CHEMISTRY.

	Subject.	Lect., Rec., Lab., Draw., or Field.	Professor or Instructor.	Taken by	Year.	Term.	No. of Weeks.	Hours per Week.	Preparation Required.
109	Chemical Analysis	Lab.	Wing, Pope.	III., V.	4	2	15	–	(108)
110	Organic Chemistry	Lect.	Norton.	V., IX.	4	1, 2	30	2	(103) (90) (104)
111	Organic Chemistry	Lab.	Norton.	V.	4	1, 2	30	12	(110)
112	Industrial Chemistry . . .	Lab.	Norton.	V., IX.	4	1	15	12	(104) (107)
113	Sanitary Chemistry	Lab.	Nichols. Mrs. Richards.	V.	3	2	15	6	(104) (106)
114	Industrial Chemistry . . .	Lab.	Norton.	V.	3	2	15	6	(105) (107)
115	Sanitary Chemistry	Lab.	Nichols. Mrs. Richards.	V.	4	1	15	6	(104) (106)

PHYSICS.

126	Physics	Lect.	Cross.	All reg. students . .	2	1, 2	30	3	(29)
127	Descriptive Astronomy . .	Read.	Pickering.	VIII.	–	–	–	–	(27)
128	General Physics (in connection with 126)	Rec.	Pickering.	VI.	2	1	15	2	(29)
129	Physical Laboratory . . .	Lab.	Pickering, Woodbridge.	VIII.	2	2	15	2	(126) (128)
130	Acoustics	Lect.	Cross.	VI.	2	2	15	1	(126)

PHYSICS.

	Subject.	Lect., Rec., Lab., Draw., or Field.	Professor or Instructor.	Taken by	Year.	Term.	No. of Weeks.	Hours per Week.	Preparation Required.
131	Physical Laboratory . . .	Lab.	Holman, Pickering, Woodbridge.	VI.	2	2	15	2	(126) [1]
132	Physics	Lect., Lab.	Holman, Pickering, Woodbridge.	All reg. students . .	3	1, 2	30	2	(126)
133	Physical Laboratory . . .	Lab.	Cross, Holman, Pickering, Woodbridge.	V., VIII.	3	–	–	–	(126)
134	Physical Laboratory . . .	Lab.	Cross, Holman, Pickering, Woodbridge.	VI.	3	1, 2	15 15	2 3	(126) (130) (131)
135	Electricity	Read.	Cross.	V., VI.	3	1, 2	30	3	(128) (132) (87) (31)
136	General Physics (optics or acoustics)	Read.	Cross, Pickering.	VIII.	3	1, 2	30	3	(132) (87) (28)
137	Advanced Physics (memoirs, etc.)	Read.	Cross, Holman.	VI., VIII.	4	–	–	–	(132) (87)
138	History of Physical Science .	Read.	Cross.	VIII.	3	–	–	–	(87) (90) (126)
139	Physics	Lab.	Cross, Holman, Pickering.	V., VI., VIII. . . .	4	1	15	–	(132)

[1] The student must also be qualified to enter VI., as a regular, 2d year, 1st term.

PHYSICS.

	Subject.	Lect., Rec., Lab., Draw., or Field.	Professor or Instructor.	Taken by	Year.	Term.	No. of Weeks.	Hours per Week.	Preparation Required.
140	History of Physical Science .	Read.	Cross.	VIII.	4	–	–	–	(87) (90) (126)
141	General Physics	Read.	Cross, Holman, Pickering.	VIII.	4	1, 2	–	–	(87) (31) (132) (90)
143	Physical Laborat'y (acoustics),	Lab.	Cross, Woodbridge.	VII.B.	–	–	–	–	(130) (132)
144	Electrical Engineering . .	Lect.	Cross.	VI.	4	1, 2	15 15	3 2	(134) (135)

CIVIL ENGINEERING.

151	Surveying	Lect., Rec., F'ld, Draw.	Burton, Sewall, Porter.	I., III., IX.	2	1, 2	30	8	(29) (51)
152	Adv. Geometrical Drawing .	Draw.	Burton, Porter.	I.	2	2	15	4	(52)
153	Elements of Topography. .	Draw.	Burton.	I.	2	2	15	4	(29) (51)
154	Railroad Engineering . . .	Lect., Rec., F'ld, Draw.	Vose, Sewall.	I.	3	1, 2	30	3	(151) (153)
155	Advanced Topography . .	Draw.	Burton.	I.	3	1, 2	30	4	(151) (153)

CIVIL ENGINEERING.

	Subject.	Lect., Rec., Lab., Draw., or Field.	Professor or Instructor.	Taken by	Year.	Term.	No. of Weeks.	Hours per Week.	Preparation Required.
156	Principles of Construction	Lect., Rec., Draw.	Swain.	I.	4	1, 2	30	3	(33)
157	Engineering Practice	Lect., Rec., F'ld, Draw.	Vose.	I.	4	1, 2	30	3	(154) (155)
158	Hydraulic Engineering	Lect., Rec., Draw.	Swain.	I.	4	1, 2	30	3	(33)
159	Surveying	Lect., Dr'w, Field.	Burton.	III.	3	1	15	6	(151)
160	Sanitary Engineering	Lect.	Sewall.	I.	4	1	15	2	(154)

MECHANICAL ENGINEERING.

176	Mechanism (must take also 28 and 52)	Lect., Rec., Draw.	Schwamb, Stephens.	II., VI.	2	1	15	4	(29) (51)
177	Mechanism (must take also 30)	Lect., Rec., Draw.	Schwamb, Fisher, Stephens.	II., VI.	2	2	15	9	(176)

MECHANICAL ENGINEERING.

	Subject.	Lect., Rec., Lab., Draw., or Field.	Professor or Instructor.	Taken by	Year.	Term.	No. of Weeks.	Hours per Week.	Preparation Required.
178	Mechanical Engineering (must take also 31, 32, and 132)	Lect., Rec., Draw.	Lanza, Peabody.	II., VI.	3	1	15	9	(30) (177)
179	Mechanical Engineering (must take also 33 and 132)	Lect., Rec., Draw., Lab.	Lanza, Peabody, Fisher.	II., VI.	3	2	15	11	(178)
180	Mechanical Engineering (must take also 34) . . .	Lect., Rec.	Lanza, Fisher, Peabody.	II., VI.	4	1, 2	30	5	(179)
181	Designing (must take also 34)	Draw.	Fisher.	II.	4	1	15	8	(179)
182	Mechanical Engineering . .	Lab.	Lanza, Fisher, Peabody.	II., VI.	4	1, 2	30	4	(179)
183	Carpentry and Wood-Turning	Shop.	Merrick.	II., VI., IX. . . .	2	1	15	4	
184	Pattern Work	Shop.	Merrick.	II.	2	2	7	4	(183)
185	Forging, Chipping and Filing, and Foundry	Shop.	Lambirth.	II.	3	1, 2	30	6	
186	Machine Tool Work . . .	Shop.	Stephenson.	II.	4	1, 2	30	6	

MINING ENGINEERING.

	Subject.	Lect., Rec., Lab., Draw., or Field.	Professor or Instructor.	Taken by	Year.	Term.	No. of Weeks.	Hours per Week.	Preparation Required.
201	Mineralogy (including Blow-pipe Analysis and Crystallography)	Lect., Lab.	Crosby.	III., V., VII., IX. .	2	2	15	6	(3) (101)
202	Mining Engineering . . .	Lect.	Richards.	III.	3	1, 2	30	3	(126) (201)
203	Assaying by Fire	Lab.	Clark.	III., V.	3	2	5	6	(1) (201)
204	Metallurgy	Lect.	Richards.	II.	4	1	15	1	(101)
205	Metallurgy	Lect.	Richards.	III., V., IX. . . .	4	1	9	3	(104)
206	Mining and Metallurgy . .	Lab.	Richards, Clark.	III., V.	4	1	15	8	(104) (203)
207	Mining and Metallurgy . .	Lab.	Richards, Clark.	III.	4	2	15	12	(206)
208	Ore Dressing	Lect.	Richards.	III.	4	1	6	3	(126) (201) (205)
209	Metallurgy	Lect.	Richards.	III.	4	2	15	3	(205)

ARCHITECTURE.

	Subject.	Lect., Rec., Lab., Draw., or Field.	Professor or Instructor.	Taken by	Year.	Term.	No. of Weeks.	Hours per Week.	Preparation Required.
226	Architectural History . . .	Lect.	Clark.	IV.	2	1, 2	30	1	Students in Architecture must follow the regular course (p. 26), or the special two-year course (p. 33). The regular examinations for admission (see p. 58) are required for either course.
227	Orders	Lect., Draw.	Ely.	IV.	2	1	12	4	
228	Materials of Architecture .	Lect.	Clark.	IV.	2	1	15	2	
229	Common Construction . .	Lect.	Clark.	IV.	2	2	15	1	
230	Shades, Shadows, and Perspective	Lect., Draw.	Clark, Ely.	IV.	2	2	7	2	
231	Working Drawings	Draw.	Clark.	IV.	3	1	15	1	
232	Iron Construction	Lect.	Clark.	IV.	3	2	15	1	
233	Fine Art	Lect.	——	IV.	3, 4	1	15	1	
234	Sketching	Draw.	Turner.	IV.	3, 4	1, 2	30	2	
235	Specifications and Contracts,	Lect.	Clark.	IV.	4	1, 2	30	1	
236	Problems in Construction .	Lect., Draw.	Clark.	IV.	4	1, 2	30	1	
238	Schools, Theatres, Churches, Hospitals, etc.	Lect.	Clark.	IV.	4	2	15	1	

ARCHITECTURE.

	Subject.	Lect., Rec., Lab., Draw., or Field.	Professor or Instructor.	Taken by	Year.	Term.	No. of Weeks.	Hours per Week.	Preparation Required.
239	Planning	Draw.	Clark.	IV.	4	2	15	1	
240	Designing	Draw.	Létang.	IV.	–	1, 2	30	–	
241	Elementary Mechanics . .	Lect.	Ely.	IV. (Sp.)	1	1, 2	30	3	
242	Heating, Ventilation, and Drainage	Lect.	Woodbridge.	II., IV., VII. . . .	4	1	15	–	

NATURAL SCIENCES.

251	Physical Geography . . .	Lect.	Niles.	I., III., V., VII., IX.,	2	2	15	3	(7)
252	General Biology	Lect., Rec., Lab.	Sedgwick.	VII..	2	1	15	2	(1) (2)
253	General Biology and Botany,	Lect., Rec., Lab.	Sedgwick.	III., V., VII., IX. .	2	2	15	3	(1) (2)
254	Zoölogy and Palæontology .	Lect., Lab.	Hyatt.	III., VII., IX.. . . .	2	2	15	2	
255	Zoölogy and Palæontology .	Lect., Lab.	Hyatt.	III., VII., IX.. . . .	3	1	15	2	(254)

NATURAL SCIENCES.

	Subject.	Lect., Rec., Lab., Draw., or Field.	Professor or Instructor.	Taken by	Year.	Term.	No. of Weeks.	Hours per Week.	Preparation Required.
256	Geology (Elements of Lithology and Structural Geology)	Lect., Lab.	Crosby.	I., IV., IX.	3	1	15	2	(101) (251)
257	Geology (Lithological, Structural and Chemical) . . .	Lect., Lab.	Crosby.	III., V., VII. . . .	3	1	15	3	(201) (251)
258	Historical Geology	Lect., Rec.	Niles.	I., III., V., VII., IX.,	3	2	15	3	(256) or (257)
260	Embryology	Lect., Lab.	Sedgwick.	VII., IX.	3	2	15	2	(252) (253)
261	Animal Physiology and Histology	Rec., Lab.	Sedgwick.	VII., IX.	3	1, 2	30	–	(252) (253)
262	Comparative Anatomy . .	Lab.	Sedgwick.	VII. B	3	1	15	6	(252)
263	Germs and Germicides . .	Lect., Lab.	Sedgwick.	VII. B	4	2	15	–	(101) (252)
264	Climatology	Lect., Rec.	Niles.	VII., IX.	4	2	–	–	

REGULATIONS OF THE SCHOOL.

School Year. — The first term begins on the last Monday in September. There is a recess of one week after the semi-annual examinations, and the second term begins on the first Tuesday after Jan. 28. On legal holidays, and on the Friday and Saturday following Thanksgiving Day, the exercises of the school are suspended.

CALENDAR FOR 1884–85.

School year began	Monday, Sept. 29, 1884.
Second term will begin	Tuesday, Feb. 3, 1885.
Degrees conferred	Tuesday, June 2, 1885.
First Entrance Examinations	Thursday, June 4, 1885, and Friday, June 5, 1885.
Second Entrance Examinations	Tuesday, Sept. 22, 1885, and Wednesday, Sept. 23, 1885.
Examinations for Advanced Standing,	Thursday, Sept. 24, 1885.
School year of 1885–86 will begin	Monday, Sept. 28, 1885.

CALENDAR FOR 1885–86.

School year will begin	Monday, Sept. 28, 1885.
Second term will begin	Tuesday, Feb. 2, 1886.
Degrees conferred	Tuesday, June 1, 1886.
First Entrance Examinations	Thursday, June 3, 1886, and Friday, June 4, 1886.
Second Entrance Examinations	Tuesday, Sept. 21, 1886. and Wednesday, Sept. 22, 1886.
Examinations for Advanced Standing,	Thursday, Sept. 23, 1886.
School year of 1886–87 will begin	Monday, Sept. 27, 1886.

Status of Students in regard to scholarship and ability to continue their courses is largely determined by means of examinations, but regularity of attendance and faithfulness to daily duties are considered essential.

Examinations. — A semi-annual examination is held in January, which will cover all the studies of the preceding term; and an annual examination in May, which in the first,

second, and third years will cover the studies of the entire year, except subjects finished during the first half year; and in the fourth year will cover all the professional work of the year, and any professional work of previous years upon which it may be deemed best to hold examination.

Examinations for conditioned students will be held on the Thursday and following days after the September entrance examinations, and at the time of the semi-annual and annual examinations. But any candidate for graduation, conditioned at the semi-annual examination of the fourth year, will be re-examined at such time previous to March 1 as may be convenient for the professor in whose subject he has been conditioned.

Intermediate examinations, the results of which are not made a matter of permanent record, may be held at any time in place of a regular exercise.

Students conditioned in any subject, and failing to make up the condition at the time appointed for the examination, will not be allowed another examination, but will be required either to repeat the subject, or to drop it, as well as all subjects dependent thereon, unless further time be allowed by special vote of the Faculty. A regular student failing entirely to make up any condition, will cease to be regular, and his name will be therefore transferred to the list of special students.

Any special student attaining a proper standing in all subjects required of a regular student up to any given period of the course, may apply to have his name transferred to the list of regular students.

Attendance Paper. — At the opening of each term of every year, the student should fill out, and present to the Secretary, an attendance paper, blank forms for which will be supplied. This paper should contain, in the case of a regular student, the course to be pursued, and, in the case of a special student, a statement of every subject which he desires to take during the term, and the years (1st, 2d, 3d, or 4th) in which these subjects are given. The attendance

paper is the direct means by which the student must place before the Faculty his wishes in regard to his course or selection of studies. The paper must be presented at the earliest possible moment, to insure prompt placing of the names upon the class lists, and to give opportutity for the immediate determination of qualifications. After the first week of the term, no changes can be made in the attendance papers except by special vote of the Faculty.

Petitions. — Special matters in regard to courses of study, etc., may be brought before the Faculty for action by suitable petitions presented through the Secretary.

Bond or Deposit. — Every student is required, on entering the school, to file with the Bursar a bond in the sum of two hundred dollars, signed by two sureties, one of whom must be a citizen of Massachusetts, as security for the payment of all bills of the Massachusetts Institute of Technology; or he may deposit with the Bursar two hundred dollars in money or in United States bonds for the same purpose; or he may deposit fifty dollars as security, and pay his tuition fees in advance as follows: five-eighths on or before Oct. 10, and three-eighths on or before Feb. 10. No officer of instruction or student of the Institute will be received as a surety.

Fees. — The fee for regular students is $200 per year; $125 at the beginning, and $75 at the middle (first Tuesday in February) of the school year. For one-half, or any less fraction, of the school year, the fee is $125. Payment is also required of the cost of apparatus injured or destroyed in the laboratories.

Special students pay, in general, the full fee; but when a few branches only are pursued, and the time required for instruction is limited, some deduction may be made. The fee for students in the advanced courses is the same as that for regular students.

Scholarships. — A scholarship for regular students has been founded by the English High School Association, in

memory of the late Thomas Sherwin, who for more than thirty years was the distinguished Master of the English High School in the City of Boston. Mr. Sherwin was also an active and influential member of the Corporation of the Institute. The pupil, to receive the privilege of this scholarship, is to be a graduate of the English High School of Boston, and is to be selected by the Faculty of the Institute in concurrence with the Head Master of the High School for the time being.

Two scholarships were founded by the late James Savage, L L. D., the benefit of which is given to meritorious students on recommendation of the Faculty.

Applications for any of these scholarships should be made to the Faculty. No student will be recommended for a scholarship who has not been in the Institute at least one year, and shown himself an earnest and faithful student.

Graduate Scholarships. — Five scholarships for graduates of the Institute have been established, and will be awarded to such applicants as are recommended by the Faculty.

Residence and Expenses. — As the exercises of the school begin at nine o'clock in the morning, and end before five o'clock in the afternoon, students may conveniently live in any of the neighboring cities or towns on the lines of the various railroads if they prefer to do so.

The cost of board and rooms in Boston and the neighboring cities and towns need not exceed from six to eight dollars a week.

The cost of books, drawing-instruments, paper, etc., exclusive of chemical breakage, is from twenty-five to thirty-five dollars a year.

Attendance. — Regular students are expected to attend all the exercises of their several courses. Special students are expected to attend all the exercises in the subjects they have selected, unless excused by special vote of the Faculty. Students entering a lecture-room, drawing-room, or laboratory more than five minutes after the hour designated for the

beginning of the exercise, will be marked tardy. Students are, in general, expected to devote themselves to the work of the school between the hours of 9 A.M. and 4.15 P.M., except during the interval from 1 P.M to 2 15 P.M. There are no exercises on Saturday afternoon, and the rooms are closed.

Discipline. — While within the limits of the Institute, students are expected to behave with decorum, to obey the regulations of the school, and to pay a due respect to its officers. Every student will be held responsible for the furniture which he uses, and the cost of repairing any damage thereto will be charged to him. In case of injury to the building, or to any of the furniture, apparatus, or other property of the Institute, the damage will be charged to the student or students known to be immediately concerned; but, if the persons who caused the damage are unknown, the cost of repairing the same will be assessed equally upon all the students of the school. Conduct inconsistent with the general good order of the school, if repeated after admonition, will be followed by suspension or dismissal. It is the aim of the Faculty so to administer the discipline of the school as to maintain a high standard of integrity and a scrupulous regard for truth; and the attempt of any student to present as his own the work of another, or to pass any examination by improper means, is regarded as a most serious offence, rendering the offender liable to immediate expulsion.

REGISTER OF STUDENTS.

GRADUATE STUDENTS.

NAME.	HOME.	RESIDENCE.
Benton, Edward R., Ph.D., Harvard University.	*Newton Centre.*	Newton Centre.
Coit, Robert, A.B., Harvard University.	*Winchester.*	Winchester.
Currier, Albert D., S.B., Northwestern University.	*Neponset, Ill.*	115 Dartm'th St.
Cushing, William C., B.A., University of New Brunswick.	*St. John, N.B.*	298 Col'mb's Ave.
Draper, Jason T., A.B., Boston University.	*West Somerville.*	West Somerville.
Ellinger, Julian O., U.S. Naval Academy.	*Baltimore, Md.*	331 Col'mb's Ave.
Foss, Fred E., A.B., Bates College.	*Lewiston, Me.*	Cambridgeport.
Frost, Edgar A., A.B., University of Wooster.	*Chillicothe, O.*	132 Chandler St.
Gunnison, Sarah P., A.B., Vassar College.	*Gloucester.*	Gloucester.
Hargitt, Charles W., B.S., A.M., Illinois Wesleyan University.	*Moore's Hill, Ind.*	36 Bromfield St.
Hayes, Hammond V., A.B., Harvard University.	*Cambridge.*	Cambridge.
Howe, John E., A.B., Harvard University.	*Cambridge.*	Cambridge.
Hoyt, Frank C., A.B., Wesleyan University.	*Springfield.*	98 Appleton St.
Hutchings, James H., S.B., Mass. Institute of Technology.	*Boston.*	68 Carver St.
Jones, Mary E., A.B., Vassar College.	*Boston.*	10 James St.
King, Thomas C., A.B., Howard College.	*Marion, Ala.*	28 Dwight St.
Mahon, William L'E., Ph.B., University of Michigan.	*Boston.*	291 Col'mb's Ave.
McColl, Archibald, B.S., Dalhousie University.	*New Glasgow, N.S.*	110 Appleton St.
Morong, Arthur B., A.B., M.D., Amherst College. Harvard University.	*Boston.*	713 Tremont St.

NAME.	HOME.	RESIDENCE.
Page, James, A.B., Johns Hopkins University.	*Baltimore, Md.*	204 Dartm'th St.
Pierce, Richard H., A.B., Yale College.	*Brighton.*	Brighton.
Plummer, Thomas R., A.B., Harvard University.	*New Bedford.*	31 Chestnut St.
Robinson, C. Snelling, S.B., Mass. Institute of Technology.	*Wareham.*	200 W. Sp'gf'd St.
Robinson, Theodore W., S B., Mass. Institute of Technology.	*Wareham.*	200 W. Sp'gf'd St.
Sargent, William D., A.B., Northwestern University.	*Evanston, Ill.*	115 Dartm'th St.
Simpson, Edmund S., M.D., Harvard University.	*Boston.*	56 Boylston St.
Smith, Sidney F., Jun., U.S. Naval Academy.	*Exeter, N.H.*	350 Col'mb's Ave.
Van Buskirk, William F., Royal Military College of Canada.	*St. Thomas, Ont.*	71 Chandler St.
Vielé, Maurice A., B.S., Hobart College.	*Geneva, N.Y.*	27 St. James Ave.
Watters, William, A.B., Bates College.	*Lynn.*	Lynn.
Williams, Henry J., A.B., Harvard University.	*Boston.*	143 W. Newton St.

REGULAR STUDENTS.

FOURTH YEAR.

NAME.	COURSE.	HOME.	RESIDENCE.
Allen, Charles R.,	V.	*New Bedford.*	418 Col'mb's Ave.
Baker, David,	III.	*Auburndale.*	Auburndale.
Bennett, Henry D.,	I.	*Brookline.*	Brookline.
Benton, Edward R., Ph.D.,	IV.	*Newton Centre.*	Newton Centre.
Cochran, Heywood,	II.	*Louisville, Ky.*	Melrose.
Dewson, Edward H., Jun.,	II.	*Quincy.*	Quincy.
Fox, Frederick, Jun.,	V.	*Portland, Me.*	68 M'tgomery St.
Fry, Thomas W.,	II.	*Chicago, Ill.*	54 W. Cedar St.
Harrington, Walter K.,	I.	*Newport, R.I.*	118 Chandler St.
Homer, Eleazer B.,	IV.	*Belmont.*	Belmont.
Lord, Frank H.,	II.	*Somerville.*	Somerville.
Lyon, Tracy,	II.	*Oswego, N.Y.*	256 Newbury St.
MacRae, Hugh,	III.	*Wilmington, N.C.*	129 Dartm'th St.
Martin, Henry,	V.	*Lowell.*	Lowell.
McKim, Alexander R.,	I.	*Jamaica Plain.*	Jamaica Plain.
Merrill, Allyne L.,	II.	*Cambridge.*	Cambridge.
Merrill, Eben G.,	I.	*Chelsea.*	Chelsea.
Morss, Everett,	III.	*Boston.*	323 Marlboro' St.
Newell, Frederick H.,	III.	*Bradford, Penn.*	Brookline.

NAME.	COURSE.	HOME.	RESIDENCE.
Nute, Joseph E.,	I.	*Boston.*	32 Yarmouth St.
O'Grady, Marcella I.,	IX.	*West Roxbury.*	Mt. Vernon St.
Pickernell, Frank A.,	VI.	*South Boston.*	551 Fifth St.
Randall, Newbert M.,	III.	*East Boston.*	23 London St.
Richards, Charles R.,	II.	*Boston.*	36 Lambert St.
Robinson, C. Stanley,	III.	*Boston.*	88 Pinckney St.
Spring, Charles F.,	I.	*Boston.*	40 Harrison Ave.
Stantial, Otis T.,	III.	*Melrose.*	Melrose.
Talbot, Henry P.,	V.	*Holliston.*	Holliston.
Vanier, George P.,	III.	*Boston.*	9 Wakullah St.
Worthington, Erastus, Jun.,	I.	*Dedham.*	Dedham.

THIRD YEAR.

Aborn, George P.,	II.	*Wakefield.*	Wakefield.
Anthony, Arthur,	III.	*Boston.*	285 Marlboro' St.
Bartlett, Dana P.,	II.	*Boston.*	24 Milford St.
Batcheller, Birney C.,	II.	*Wallingford, Vt.*	85 Dartmouth St.
Bates, James H.,	II.	*Cincinnati, O.*	24 Appleton St.
Brainerd, William L.,	IV.	*So. Englewood, Ill.*	Upham's Corner.
Burgess, John K.,	II.	*Dedham,*	Dedham.
Burlingham, Charles L.,	III.	*Chicago, Ill.*	54 Chester Sq.
Chadbourn, William H., Jun.,	III.	*Wilmington, N.C.*	131 W. Newt'n St.
Chase, Arthur T.,	VI.	*Haverhill.*	Haverhill.
Clifford, Harry E. H.,	VI.	*So. Boston.*	801 Broadway.
Cobb, Louis R.,	I.	*Chicago, Ill.*	Cambridgeport.
Coit, Robert, A.B.,	IV.	*Winchester.*	Winchester.
Crane, Frank H.,	VI.	*Stoughton.*	Stoughton.
Cutter, Louis F.,	I.	*Winchester.*	Winchester.
Doolittle, Orrin S.,	V.	*Wallingford, Conn.*	19 St. James Ave.
Draper, Nelson C.,	VI.	*Stoughton.*	Stoughton.
Duff, James C.,	V.	*Charlestown.*	14 Sheafe St.
Ellinger, Julian O.,	VI.	*Baltimore, Md.*	331 Col'mb's Ave.
Farmer, George W.,	II.	*Rutland, Vt.*	50 Appleton St.
Foss, Edward S.,	V.	*Malden.*	Malden.
Foster, Theodore R.,	II.	*Charlestown.*	15 Harvard St.
Frost, Edgar A., A.B.,	I.	*Chillicothe, O.*	132 Chandler St.
Garfield, Alexander S.,	II.	*Lexington.*	Lexington.
Higgins, Edward E.,	VI.	*Chelsea.*	Chelsea.
Hoyt, Frank C., A.B.,	VI.	*Springfield.*	98 Appleton St.
Ingalls, Walter R.,	III.	*Lynn.*	Lynn.
Jordan, William F.,	I.	*Auburn, Me.*	Cambridgeport.
Kenney, C. Belle,	V.	*East Boston.*	111 Saratoga St.
Leach, Albert E.,	II.	*Newtonville.*	Newtonville.
Lewis, Fred,	VI.	*Haverhill.*	Haverhill.

NAME.	COURSE.	HOME.	RESIDENCE.
Locke, Frank L.,	I.	*Boston.*	7 Eaton St.
Low, Wilson H.,	V.	*Brookline.*	Brookline.
Lynde, James P.,	III.	*Athol.*	164 W. Canton St.
Merriam, Harry B.,	I.	*Fort Scott, Kan.*	112 Dartm'uth St.
Merriam, Henry P.,	VI.	*Lawrence.*	Lawrence.
Miller, Edward F.,	II.	*Cambridge.*	Cambridge.
Mumford, Edgar H.,	II.	*Boston.*	8 St. James Ave.
Page, James, A.B.,	VI.	*Baltimore, Md.*	204 Dartm'uth St.
Richardson, Charles F.,	II.	*Brooklyn, N.Y.*	66 Beacon St.
Robbins, Arthur G.,	I.	*Carlisle.*	Watertown.
Seavey, John F.,	II.	*Boston.*	27 Polk St.
Simpson, James E.,	III.	*Lawrence.*	Lawrence.
Smith, Sidney F., Jun.,	VI.	*Exeter, N.H.*	350 Col'mb's Ave.
Stebbins, Theodore,	VI.	*Onawa, Iowa.*	361 Col'mb's Ave.
Stoughton, Augustus B.,	II.	*Philadelphia, Penn.*	7 Charles St.
Taylor, William M.,	II.	*Indianapolis, Ind.*	361 Col'mb's Ave.
Thacher, Lawrence M.,	I.	*Yarmouth.*	147 Warren Ave.
Tucker, H. Judson,	VI.	*Providence, R.I.*	Cambridgeport.
Turnbull, Charles D.,	II.	*Boston.*	111 Beacon St.
Van Alstine, David,	II.	*Louisville, Ky.*	361 Col'mb's Ave.
Van Buskirk, William F.,	VI.	*St. Thomas, Ont.*	71 Chandler St.
Vielé, Maurice A., B.S.,	II.	*Geneva, N.Y.*	27 St. James Ave.
Wilder, C. Morris,	VI.	*Cincinnati, O.*	73 Chandler St.
Williams, Henry J., A.B.,	V.	*Boston.*	143 W. Newt'n St.
Wilson, Elwood J.,	III.	*Jamaica Plain.*	Enfield St.
Wood Charles,	I.	*Edinburgh, Scot.*	369 Col'mb's Ave.
Woodbury, Charles H.,	II.	*Lynn.*	Lynn.
Worcester, Vernor F.,	II.	*Chelsea.*	Chelsea.
Young, Fred R.,	III.	*Brookline.*	Brookline.

SECOND YEAR.

Armington, George A.,	II.	*Weymouth.*	Weymouth.
Attwill, William H.,	VI.	*Lynn.*	Lynn.
Banes, Warner J.,	II.	*Philadelphia, Penn.*	Newton.
Barbour, Fred F.,	VI.	*Cambridgeport.*	Cambridgeport.
Barton, Charles A.,	II.	*Waltham.*	Waltham.
Billings, George L.,	IV.	*Milford, N.H.*	14 Truro St.
Bliss, William S.,	I.	*Carson, Nev.*	1507 W'sh'gt'n St.
Bowles, Samuel W., Jun.,	VI.	*Springfield.*	351 Col'mb's Ave.
Brace, Walter C.,	III.	*Leavenworth, Kan.*	24 Rutland Sq.
Brainerd, Henry B.,	IX.	*Montreal, P.Q.*	32 Union Park.
Brainerd, Thomas D.,	IX.	*Montreal, P.Q.*	32 Union Park.
Bryant, Henry F.,	I.	*Bryantville.*	Bryantville.
Burgess, Frank G.,	I.	*Boston.*	175 Warren Ave.

NAME.	COURSE.	HOME.	RESIDENCE.
Cameron, Julian A.,	II.	*Westford.*	Westford.
Carleton, Elbridge S.,	IV.	*Rochdale.*	2 Ashburton Pl.
Carney, Frank D.,	III.	*Thomaston, Me.*	2 Sunderland St.
Caughey, Edward G.,	II.	*Allegh'y City, Penn.*	Newton.
Childs, Edward L.,	II.	*Lee.*	10 Boylston Pl.
Coburn, Howard L.,	II.	*Patten, Me.*	Hyde Park.
Cole, Winthrop,	II.	*Newton.*	Newton.
Conant, Henry J.,	II.	*Watertown.*	Watertown.
Cooley, Maurice W.,	I.	*Little Britain, N.Y.*	41 Appleton St.
Currier, Albert D., S.B.,	VI.	*Neponset, Ill.*	115 Dartm'th St.
Curtis, Ralph E.,	VI.	*Newburyport.*	Newburyport.
Cushing, Albert L.,	VI.	*Jamaica Plain.*	Jamaica Plain.
Cushing, William C., B.A.,	I.	*St. John, N.B.*	298 Col'mb's Ave.
Edgett, Horace P.,	I.	*Beverly.*	Beverly.
Farwell, Lyman,	IV.	*St. Paul, Minn.*	42 Worcester St.
Fox, John M.,	VI.	*Portland, Me.*	68 M'ntg'mery St.
Fuller, J. Franklin, Jun.,	V.	*West Newton.*	West Newton.
Gay, Joseph B.,	IV.	*Boston.*	4 Ashburton Pl.
Gleason, Walter H.,	V.	*Boston.*	24 Bowdoin St.
Greeley, James T.,	V.	*Nashua, N.H.*	313 Col'mb's Ave.
Gulliver, Frederic P.,	III.	*Norwich, Conn.*	112 Dartmo'th St.
Hadaway, William S., Jun.,	VIII.	*Plymouth.*	Plymouth.
Haskell, Edward A.,	I.	*East Cambridge.*	East Cambridge.
Hathaway, Savory C., Jun.,	VI.	*New Bedford.*	16 Circuit St.
Hill, Henry F.,	I.	*Augusta, Me.*	4 Milford St.
Hobart, James C.,	II.	*Cincinnati, O.*	309 Col'mb's Ave.
Jones, Edward A.,	II.	*Pittsfield.*	19 Upton St.
Kendall, Charles B.,	V.	*Manchester, N.H.*	3 Columbus Sq.
King, Thomas C., A.B.,	III.	*Marion, Ala.*	28 Dwight St.
Knox, George A.,	II.	*Lynn.*	Lynn.
Lane, Benjamin C.,	V.	*Boston.*	623 Tremont St.
Livermore, William D.,	V.	*Charlestown.*	45 Soley St.
Manning, George L.,	II.	*Boston.*	25 Claremont Pk.
McColl, Archibald, B.S.,	II.	*New Glasgow, N.S.*	110 Appleton St.
Mirrlees, James H.,	II.	*Glasgow, Scot.*	86 Mt. Vernon St.
Moody, Walter S.,	VI.	*Chelsea.*	Chelsea.
Mossman, Philip A.,	III.	*Beverly.*	Beverly.
Mulliken, Samuel P.,	V.	*Newburyport.*	Newburyport.
Nichols, Frank C.,	II.	*New London, Conn.*	25 Holyoke St.
Norris, George L.,	III.	*Melrose.*	Melrose.
Northey, Herbert W.,	IV.	*Salem.*	Salem.
Pearson, Edwin R.,	VI.	*Portsmouth, N.H.*	14 Temple St.
Peters, Quintard,	II.	*Atlanta, Ga.*	115 Chandler St.
Richardson, Herbert A.,	V.	*Boston.*	1818 W'sh'gt'n St.

NAME.	COURSE.	HOME.	RESIDENCE.
Ruffin, Roulhac,	I.	*Old Church, Va.*	293 Col'mb's Ave.
Sargent, William D., A.B.,	II.	*Evanston, Ill.*	115 Dartmo'th St.
Schwarz, Franz H.,	II.	*Boston.*	157 Charles St.
Sears, Henry D.,	VI.	*Dubuque, Ia.*	5 Moseley Ave.
Sears, Willard T.,	II.	*Plymouth.*	Hyde Park.
Shepard, Frank E.,	II.	*Dorchester.*	Ashland St.
Smith, Charles P.,	II.	*Cambridge.*	Cambridge.
Smith, Harry E.,	V.	*Marshalltown, Ia.*	Jamaica Plain.
Solomon, Frank L.,	I.	*Somerville.*	Somerville.
Souther, Henry, Jun.,	III.	*So. Boston.*	546 Broadway.
Spaulding, Hollon C.,	II.	*East Boston.*	9 Princeton St.
Sprague, T. W.,	III.	*Fitchburg.*	366 Col'mb's Ave.
Stanwood, James H.,	I.	*Portland, Me.*	Columbus Ave.
Stewart, Norman Q.,	III.	*Everett.*	Everett.
Stoddard, Henry F.,	II.	*Plymouth.*	Plymouth.
Taintor, Giles,	VI.	*Keene, N.H.*	41 Union Park.
Thomas, Edward G.,	II.	*Hingham Centre.*	309 Col'mb's Ave.
Thorp, Frank H.,	III.	*Bloomington, Ill.*	285 Col'mb's Ave.
Twombly, Alex. H.,	II.	*Boston.*	39 High St.
Underhill, Charles D.,	VII.B.	*Chelsea.*	Chelsea.
Vose, Ralph,	VI.	*Hyde Park.*	Hyde Park.
White, J. Foster,	V.	*Brookline.*	Brookline.
Whitmore, Walter G.,	VI.	*Plymouth.*	Plymouth.
Whitney, Granger,	III.	*Beverly.*	Beverly.
Whitney, William A.,	I.	*Boston.*	75 Kendall St.
Wilcox, Herbert A.,	III.	*Somerville.*	Somerville.
Wood, H. Clifford,	II.	*Braintree.*	Braintree.
Young, Royal B.,	I.	*Boston.*	5 Rollins St.

FIRST YEAR.

NAME.	HOME.	RESIDENCE.
de Ajuria, Manuel.	*Havana, Cuba.*	118 Boylston St.
Aldrich, Will S.	*Freeport, Me.*	524 Tremont St.
Allison, James.	*Allisona, Tenn.*	123 Pembroke St.
Bailey, Henry H.	*Faulkner.*	Faulkner.
Baldwin, Hiram E.	*Niles, O.*	8 Union Park.
Baldwin, James C. T.	*Jamaica Plain.*	Jamaica Plain.
Ball, Henry B.	*Portsmouth, N.H.*	Lexington.
Beaman, William M.	*Rutland, Vt.*	62 Rutland Sq.
Belser, James L.	*Marlborough.*	Marlborough.
Besler, William G.	*Galesburg, Ill.*	44 Cortes St.
Bigelow, Henry F.	*Clinton.*	91 Boylston St.
Binney, Harold O.	*Newport, R.I.*	Walpole.
Bird, Herbert S.	*City Mills.*	City Mills.

NAME.	HOME.	RESIDENCE
Blair, Donald M.	*Boston.*	31 Upton St.
Blanchard, Winslow.	*Dorchester.*	Park St.
Blodgett, John.	*Pawtucket, R.I.*	Pawtucket, R.I.
Blood, William H., Jun.	*Auburndale.*	Auburndale.
Bowen, Morgan H.	*Scranton, Penn.*	60 Clarendon St.
Bradlee, Arthur T.	*Boston.*	113 Beacon St.
Brayton, David, Jun.	*Brockton.*	Brockton.
Bridges, Luther W.	*South Framingham.*	South Framingham.
Brown, Charles L.	*Stoughton.*	Stoughton.
Buttolph, Benjamin G.	*Buffalo, N.Y.*	38 Upton St.
Capen, Frank I.	*Stoughton.*	Stoughton.
Cavanagh, John T.	*Braintree.*	Braintree.
Center, David A.	*Gloucester.*	Gloucester.
Cheney, Frank P.	*Lowell.*	Lowell.
Chester, Arthur H.	*Boston.*	Hotel Glendon.
Chickering, Edward W.	*Boston.*	57 Chestnut St.
Child, Stephen.	*West Newton.*	West Newton.
Claflin, George E.	*Providence, R.I.*	12 Highland Ave.
Clement, Russell M.	*Cakland, Cal.*	357 Columbus Ave.
Cobb, Sylvanus H.	*Hyde Park.*	Hyde Park.
Coffin, Ellery F.	*Muirkirk, Md.*	Savin Hill.
Colby, Russell H.	*Leominster.*	50 Monument Sq.
Cole, Fred B.	*Kingston.*	Kingston.
Cole, Walter H.	*Woonsocket, R.I.*	25 Holyoke St.
Collins, Bertrand R. T.	*Ferry Village, Me.*	Columbus Ave.
Collins, Edward, Jun.	*Milton.*	Milton.
Conner, Arthur J.	*Boston.*	Hotel Berwick.
Crabtree, Fred.	*Lawrence.*	Lawrence.
Crane, Frederick G.	*Dalton.*	373 Columbus Ave.
Cromwell, Charles H.	*Baltimore, Md.*	84 Charles St.
Currier, Guy W.	*Lawrence.*	Lawrence.
Cushman, Allerton S.	*Newport, R.I.*	9 Charles St.
Daniell, Eugene S.	*Franklin, N.H.*	Newton.
Dean, Luther.	*Taunton.*	Taunton.
Dearborn, William L.	*Dorchester.*	Harrison Sq.
Dempsey, George C.	*Lowell.*	Lowell.
Devens, Richard.	*Boston.*	Hotel Berkeley.
Doane, Ralph W.	*Harwichport.*	67 Dartmouth St.
du Pont, Maurice.	*Henry Clay P.O., Del.*	361 Columbus Ave.
Dutton, Edgar F.	*Roxbury.*	534 Warren St.
Eastman, Henry F.	*Lowell.*	56 Chester Sq.
Ellis, Fred E.	*Melrose.*	Melrose.
Ellsworth, Alfred B.	*Buffalo, N.Y.*	352 Tremont St.
Eppes, Richard, Jun.	*City Point, Va.*	371 Columbus Ave.
Fairbairn, John T.	*Hyde Park.*	Hyde Park.

NAME.	HOME.	RESIDENCE.
Faxon, John G.	*Quincy.*	Quincy.
Fay, Ralph M.	*Xenia, O.*	199 W. Newton St.
Ferguson, Louis A.	*Dorchester.*	Centre Ave.
Flint, Bertram P.	*Roxbury.*	27 Linwood St.
Foque, Theodore A.	*Malden.*	Malden.
Freeman, John H.	*Brewster.*	12 E. Springfield St.
Frye, Albert I.	*Hyde Park.*	Hyde Park.
Fukuzawa, Stejirau.	*Tokio, Japan.*	620 Tremont St.
Fuller, James E., Jun.	*Worcester.*	311 Columbus Ave.
Gage, Walter C.	*Warren.*	E. Somerville.
Gaines, Ambrose P.	*Nashville, Tenn.*	123 Pembroke St.
Gammans, James A.	*Belfast, Me.*	Newton Centre.
Gay, Robert T.	*Winchester, Ky.*	753 Tremont St.
Gerrish, William H.	*Lowell.*	Lowell.
Gould, Edward S.	*Andover.*	Andover.
Graves, Edward H.	*Orange, N.J.*	129 W. Chester Park.
Greene, Irving G.	*Boston.*	480 Columbus Ave.
Grose, Charles W.	*No. Abington.*	No. Abington.
Gross, Harold G.	*Eureka, Cal.*	604 Tremont St.
Hall, William A.	*Lawrence.*	18 Louisburg Sq.
Hamblett, George W.	*Lawrence.*	Lawrence.
Harvey, George L.	*Chicago, Ill.*	41 W. Newton St.
Hastings, Charles F.	*West Newton.*	West Newton.
Hawes, John W.	*Worcester.*	91 Boylston St.
Heath, Edward W.	*Waterville, Me.*	29 Dartmouth St.
Heath, George L.	*Everett.*	Everett.
Henshaw, Franklin.	*Boston.*	407 Beacon St.
Herrick, Edward W.	*Northampton.*	311 Columbus Ave.
Hillyer, William L.	*Washington, D.C.*	289 Columbus Ave.
Hix, Edward R.	*New York, N.Y.*	331 Columbus Ave.
Hobart, Lowell F.	*Cincinnati, O.*	309 Columbus Ave.
Hodgkins, Howard G.	*Boston.*	77 Montgomery St.
Holman, George U. G.	*East Boston.*	20 Chelsea St.
Holton, Edward C.	*Winchester.*	Winchester.
Hoppin, Francis L. V.	*Pomfret, Conn.*	66 Mt. Vernon St.
Horn, Henry J., Jun.	*St. Paul, Minn.*	131 West Newton St.
Horton, Lawrence.	*Canton.*	Ponkapoag.
Howes, Herbert M.	*Somerville.*	Somerville.
Hyams, Isabel F.	*Boston.*	5 Jefferson Pl.
James, Frank M.	*Haverhill.*	Haverhill.
Jameson, Thomas E.	*Cambridge.*	Cambridge.
Jones, Arthur W.	*Germantown, Penn.*	Norfolk House.
Jones, Everett S.	*Spencer.*	688 Tremont St.
Jordan, Edwin O.	*Auburndale.*	Auburndale.
Kean, Alexander L.	*Elizabeth, N.J.*	1 Oxford Terrace.

NAME.	HOME.	RESIDENCE.
Keough, William T.	*East Boston.*	25 Maverick St.
Kimball, Thomas R.	*Omaha, Neb.*	371 Columbus Ave.
Kirkpatrick, James L.	*Pittsburg, Penn.*	5 St. James Ave.
Knapp, Charles H.	*Chelsea.*	Chelsea.
Ladd, Frank M.	*Uncasville, Conn.*	6 Cazenove St.
Lee, George S.	*Acton.*	Acton.
Lewis, Walter E.	*Roxbury.*	137 Highland St.
Linzee, John W., Jun.	*Boston.*	1 St. James Ave.
Lockett, Benjamin C.	*New York, N.Y.*	331 Columbus Ave.
Loveland, James W.	*East Boston.*	28 Princeton St.
Mann, Arthur S.	*West Medway.*	West Medway.
May, Ernest S.	*Newton Centre.*	Newton Centre.
McConnell, George B.	*Roxbury.*	153 Blue-hill Ave.
McLauthlin, George V.	*Matfield.*	Matfield.
Mead, Adelbert F.	*West Acton.*	West Acton.
Merrell, Charles G.	*Cincinnati, O.*	21 Pinckney St.
Merrick, Sumner B.	*Arlington Heights.*	Arlington Heights.
Moore, Ernest B.	*Malden.*	Malden.
Moore, Frank A.	*Worcester.*	311 Columbus Ave.
Moore, George D.	*Danville, Ill.*	1 Sunderland St.
Moore, Harry C.	*Roxbury,*	Norfolk House.
Mower, Charles H.	*West Newton.*	West Newton.
Muhlenberg, Frederick H.	*Reading, Penn.*	287 Columbus Ave.
Munn, George L.	*Chicopee Falls.*	59 Chester Sq.
Newell, Joseph P.	*Mt. Tabor, Ore.*	339 Tremont St.
Nichols, Fred R.	*Keene, N.H.*	458 Columbus Ave.
Nickerson, Addison D.	*Harwichport.*	17 Dartmouth St.
Palmer, Harold P.	*Somerville.*	Somerville.
Partridge, Leon J.	*Malden.*	Malden.
Pease, Calvin E.	*Dayton, O.*	214 Columbus Ave.
Perkins, Albert J.	*Newark, N.Y.*	339 Tremont St.
Perley, Clarence W.	*Lynn.*	Lynn.
Pierce, Herbert F.	*So. Braintree.*	So. Braintree.
Pitman, Harold A.	*Somerville.*	Somerville.
Poor, Harris O.	*Boston.*	260 Comm'nw'lth Ave.
Proctor, William, Jun.	*Arlington.*	Arlington.
Quigley, Edward P.	*Pewee Valley, Ky.*	142 Chandler St.
Ranlett, Foster P.	*Boston.*	21 Worcester St.
Rathbun, E. Walter.	*Deseronto, Ont.*	283 Columbus Ave.
Ray, John S. G. B.	*Cincinnati, O.*	36 W. Newton St.
Ray, Victor.	*Cincinnati, O.*	36 W. Newton St.
Rhoads, Joseph G.	*Williamsport, Penn.*	282 Columbus Ave.
Robb, Russell.	*Detroit, Mich.*	620 Tremont St.
Rollins, John L.	*Newtonville.*	Newtonville.
Runkle, John C.	*Brookline.*	Brookline.

NAME.	HOME.	RESIDENCE.
Sabine, Charles W., Jun.	*Brookline.*	Brookline.
Safford, Frederick H.	*Lawrence.*	Lawrence.
Sawyer, Alfred H.	*Concord.*	Concord.
Sayer, Frederick L.	*New Bedford.*	84 W. Rutland Sq.
Scales, George C.	*Newton.*	Newton.
Shattuck, George C.	*Nashua, N.H.*	201 W. Springfield St.
Shaw, Walter K.	*Lexington.*	Lexington.
Silsbee, Walter E.	*Lynn.*	Lynn.
Silverberg, David.	*Washington, D.C.*	241 W. Canton St.
Sjöström, Ivar L.	*Lawrence.*	Lawrence.
Smith, Edward M.	*No. Hampton, N.H.*	4 Oliver Pl.
Snow, William G.	*Watertown.*	Watertown.
Spurr, William F.	*Dorchester.*	Magnolia St.
Steele, Henry M.	*Baltimore, Md.*	366 Columbus Ave.
Stetson, Frank O.	*Newton.*	Newton.
Stevens, Charles W.	*Cambridge.*	Cambridge.
Stone, Charles A.	*Newton.*	Newton.
Sully, John M.	*Cambridge.*	Cambridge.
Swasey, Sumner E.	*Cambridgeport.*	Cambridgeport.
Sweetland, Ralph.	*Natick.*	Natick.
Tenny, Robert C.	*Eaton, N.Y.*	729 Tremont St.
Thompson, Sanford E.	*Newton Highlands.*	Newton Highlands.
Towne, Walter I.	*Topsfield.*	Topsfield.
Underhill, William W.	*Winchester.*	Winchester.
Underwood, Walter H.	*Chicago, Ill.*	509 Columbus Ave.
Vorce, Clarence B.	*Farmington, Conn.*	41 Appleton St.
Vose, Richard H.	*Brookline.*	Brookline.
Walker, Charles R.	*Cambridgeport.*	Cambridgeport.
Walker, Mary B.	*Jamaica Plain.*	Jamaica Plain.
Warren, Algernon S.	*Newport, R.I.*	29 W. Cedar St.
Webster, Edwin S.	*Boston.*	232 Newbury St.
Wheeler, Eugene C.	*Charlestown.*	32 Soley St.
Wheeler, Samuel.	*Concord.*	Concord.
Williams, Arthur S.	*Boston.*	15 Arlington St.
Willingham, Winburn J.	*Albany, Ga.*	255 Tremont St.
Windett, Victor.	*Chicago, Ill.*	54 Montgomery St.
Wood, Frederick J.	*Boston.*	237 W. Canton St.
Woodward, Amos E.	*East Somerville.*	East Somerville.
Woodworth, Harry S.	*Rochester, N.Y.*	157 Boylston St.
Work, Norman P.	*Middletown, Conn.*	Roslindale.
Wright, Julian V.	*Cincinnati, O.*	373 Columbus Ave.
Wright, Minturn T.	*Philadelphia, Penn.*	192 Boylston St.
Wrightington, Stewart.	*Brookline.*	Brookline.
Wynne, Philip H.	*Shelburne Falls.*	6 Joy St.
Young, John E.	*Danielsonville, Conn.*	283 Columbus Ave.

SPECIAL STUDENTS.[1]

NAMES.	HOME.	RESIDENCE.
Adams, Frank H.,	*Akron, O.*	11 Union Park.
Math., Chem., Eng., Draw., Mil.		
Adams, Henry S.,	*Cambridge.*	Cambridge.
Civ. Eng., Math., Phys., Desc. Geom.		
Ahl, Leonard D.,	*Boston.*	10 Commonw'lth Ave.
Fr., Chem., Eng., Germ., Mil.		
Allen, Anson W.,	*Walpole.*	Walpole.
Chem., Met., Germ.		
Allen, Granville S.,	*East Freetown.*	Auburndale.
Math., Chem., Eng., Draw., Mil.		
Ames, Frank M.,	*Boston.*	447 Shawmut Ave.
Germ., Chem., Biol., Span.		
Atkinson, J. Spencer,	*Baltimore, Md.*	381 Columbus Ave.
Arch.		
Atkinson, William,	*Brookline.*	Brookline.
Math., Eng., Chem.		
Baker, Charles V. B.,	*Troy, N.Y.*	290 Columbus Ave.
Arch.		
Baldwin, Ernest H.,	*Everett.*	Everett.
Math., Draw., Mil.		
Baldwin, Jessie,	*Winchester.*	Winchester.
Math., Chem., Biol., Germ.		
Ballantyne, James R.,	*Tilton, N.H.*	Newton.
Math., Eng., Draw., Phys.		
Bartlett, Sidney R.,	*Boston.*	13 Arlington St.
Biol., Phys., Chem., Zoöl., Eng., Germ., Geol.		
Bates, Henry D.,	*Racine, Wis.*	22 Yarmouth St.
Math., Chem., Eng., Draw., Germ., Mil.		
Baumgarten, Emil,	*New York, N.Y.*	West Newton.
Arch.		
Blake, William B.,	*Newburyport.*	Newburyport.
Germ., Geol., Math., Desc. Geom., Civ. Eng., Phys.		
Borden, Richard P.,	*Fall River.*	369 Columbus Ave.
Mech. Eng., Math., Phys., Shop., Draw.		
Botsford, Edward K.,	*West Roxbury.*	West Roxbury.
Chem., Eng., Biol.		
Bowditch, Nathaniel I.,	*Framingham.*	29 Commonw'lth Ave.
Math., Draw., Chem., Biol., Mil.		

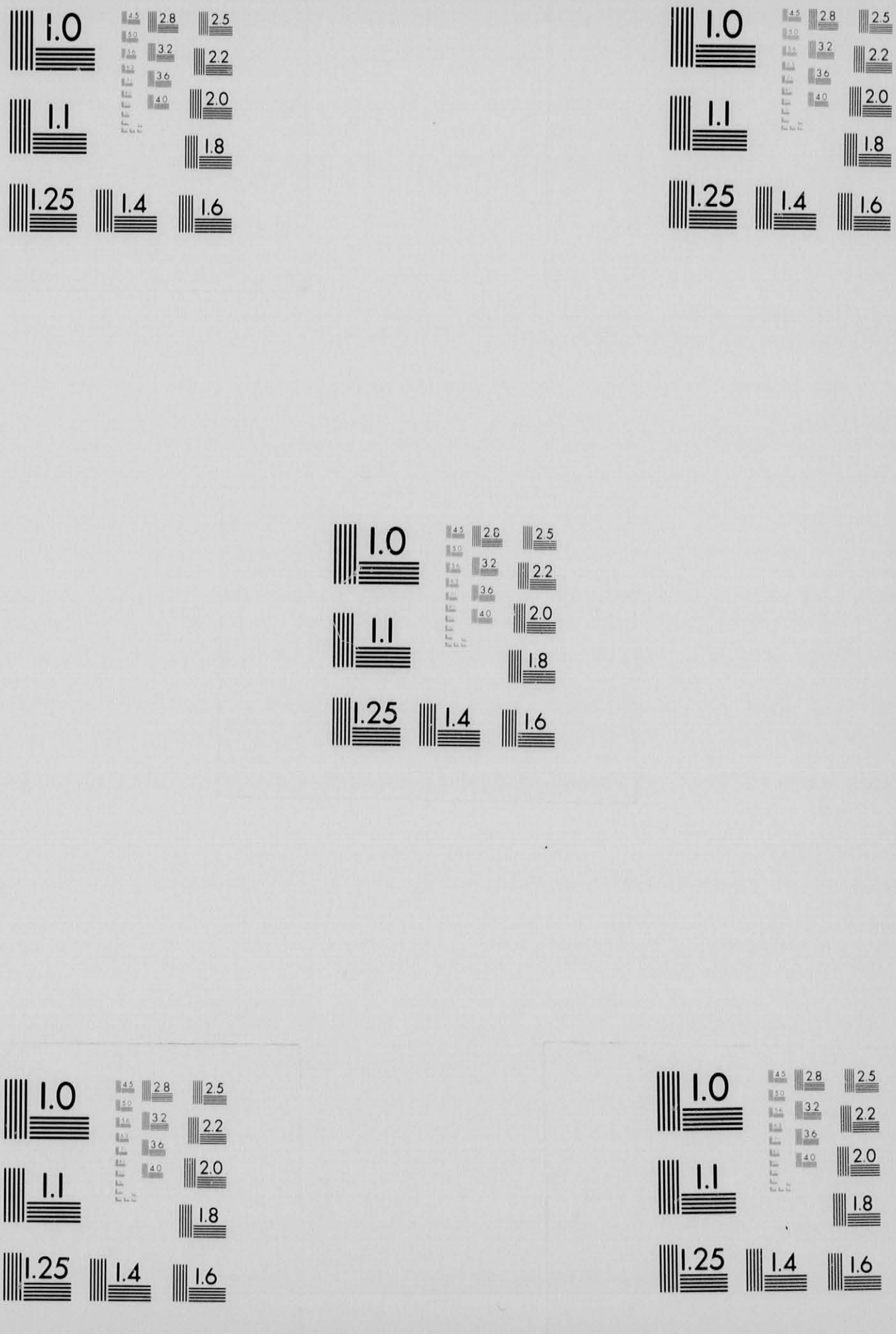
[1] The abbreviations used in this list, which includes all students who are not in the full regular courses, are, —

App. Mech.	Applied Mechanics.	Eng.,	English.	Mil.,	Military Drill.
Arch.,	Architecture.	Fr.,	French.	Min.,	Mining.
Biol.,	Biology.	Geol.,	Geology.	Min. Lab.,	Mining Laboratory.
Chem.,	Chemistry.	Germ.,	German.		
Civ. Eng.,	Civil Engineering.	Math.,	Mathematics.	Phys.,	Physics.
		Mech.,	Mechanism.	Shop.,	Shopwork.
Draw.,	Drawing.	Mech. Eng.,	Mechanical Engineering.	Span.,	Spanish.
Desc. Geom.,	Descriptive Geometry.			Surv.,	Surveying.
		Met.,	Metallurgy.	Zoöl.,	Zoölogy.

NAMES.	HOME.	RESIDENCE.
Brett, Franklin,	*Brookline.*	Brookline.
Mech., Germ., Math., Phys., Desc. Geom., Shop., Draw.		
Bullard, Frederic F.,	*Boston.*	Hotel Edinburgh.
Chem., Germ.		
Cady, Walter C.,	*New London, Conn.*	25 Holyoke St.
Arch.		
Carpenter, James E. R.,	*Columbia, Tenn.*	229 W. Canton St.
Math., Arch., Fr., Germ.		
Carter, N. P. Ames,	*Chicopee Falls.*	688 Tremont St.
Mech., Phys., Germ., Eng., Shop., Draw.		
Chandler, Howland S.,	*Allston.*	Allston.
Arch.		
Church, William L.,	*Malden.*	Malden.
Phys., Math., Mech. Eng., Germ., Eng., Draw., Shop.		
Cobb, Morton E.,	*Newton.*	Newton.
Mech., Math., Phys., Desc. Geom., Shop., Draw.		
Codman, Ogden, Jun.,	*Boston.*	15 Charles St.
Arch.		
Conant, William A.,	*Boston.*	169 W. Chester Park.
Chem., Fr., Germ., Eng.		
Cone, Albert P.,	*Wellsborough, Penn.*	27 Chester Park.
Civ. Eng , App. Mech., Draw.		
Coombs, Stephen E.,	*Brunswick, Me.*	Brookline.
Civ. Eng., Math., Phys., Desc. Geom., Draw., Eng., Germ.		
Corns, Archer C.,	*Massillon, O.*	11 Union Park.
Mech., Eng., Phys., Math., Germ., Desc. Geom., Eng., Fr., Shop.		
Crafts, William,	*Charleston, S.C.*	113 Berkeley St.
Mech., Math., Phys., Desc. Geom., Germ., Eng., Shop.		
Crosby, Freeman M.,	*Brewster.*	Melrose.
Chem., Math., Phys., Germ., Eng.		
Cudworth, Edward A.,	*Boston.*	Fountain St.
Arch.		
Cumnock, Victor I.,	*Lowell.*	Lowell.
Math., Chem., Eng., Draw.		
Currier, Lillian C.,	*Jamaica Plain.*	Jamaica Plain.
Chem., Biol.		
Currier, William M.,	*Lynn.*	Lynn.
Math., Phys., Fr.		
Curtis, Louis L.,	*Newark, Del.*	368 Columbus Ave.
Chem.		
Curtiss, George F.,	*New Britain, Conn.*	58 Chandler St.
Math., Phys , Desc. Geom., Chem., Germ., Mech.		
Davenport, George W.,	*Fall River.*	10 St. Charles St.
Mech., Math., Phys., Shop., Germ., Desc. Geom.		
Doane, Arthur H.,	*Middleborough.*	147 Warren Ave.
Civ. Eng., App. Mech., Draw.		
Doe, Charles C.,	*Boston.*	224 Comm'nw'lth Ave.
Phys , Biol., Zoöl., Eng., Chem., Geol.		
Dorrance, Amos P.,	*Norwich, Conn.*	19 St. James Ave.
Math., Shop., Draw.,		

NAMES.	HOME.	RESIDENCE.
Douglas, William B.,	*Middletown, Conn.*	165 W. Canton St.
Mech., Phys., Germ., Eng., Desc. Geom., Shop.		
Draper, George O.,	*Milford.*	200 Dartmouth St.
Math., Draw., Mech., Phys., Eng., Desc. Geom., Shop.		
Draper, Jason T., A.B.,	*West Somerville.*	West Somerville.
Phys.		
Dudley, Helena S.,	*Denver, Col.*	78 Montgomery St.
Chem., Biol.		
Duncan, James P.,	*Perry, Ga.*	Auburndale.
Math., Chem., Eng., Draw., Mil.		
Eliot, George,	*Chicopee.*	44 Brimmer St.
Phys., Chem., Math., Biol., Germ., Eng.		
Eliot, Jesse L. R.,	*Cambridgeport.*	Cambridgeport.
Math., Phys., Mech., Germ., Eng., Desc. Geom., Shop.		
Faunce, Charles L.,	*New Bedford.*	40 Dwight St.
Math., Chem., Draw., Mil.		
Fish, Walter C.	*Taunton.*	Taunton.
Phys., Math., Shop., Mech.		
Fletcher, P. Russell,	*Bellows Falls, Vt.*	50 Appleton St.
Phys., Germ., Eng., Desc. Geom.		
Fogg, Arthur G.,	*Norwood.*	Norwood.
Civ. Eng., Phys., Germ., Geol., Eng.		
Forsyth, Joshua E.,	*Pemberton, N.J.*	5 Brookline Ave.
Chem., Draw., Shop., Mil.		
Foss, Fred. E., A.B.,	*Lewiston, Me.*	Cambridgeport.
Math., Phys., Civ. Eng.		
Foss, Walter N.,	*Campello.*	Campello.
Math., Chem., Fr., Germ.		
Fox, Thomas A.,	*Dorch ter.*	Sawyer Ave.
Arch.		
Freeman, J. Eugene,	*South Boston.*	395 Fourth St.
Math., Phys., Germ., Eng., Arch., Desc. Geom.		
Frink, William P.,	*Greenland, N.H.*	104 Dartmouth St.
Phys., Math., Germ., Mech. Eng., Eng.		
Fuller, Mary A. H.,	*South Boston.*	561 E. Seventh St.
Chem.		
Gardner, George C.,	*Brightwood.*	Newton.
Arch.		
Goodrich, Robert R.,	*South Boston.*	801 Broadway.
App. Mech., Min. Lab., Chem., Met.		
Gordon, Carrie,	*Oxford.*	Jamaica Plain.
Chem., Biol., Germ.		
Goss, Edward O.,	*Waterbury, Conn.*	43 Bowdoin St.
Math., Mech., Desc. Geom., Shop., Eng.		
Greeley, Morris L.,	*Chicago, Ill.*	54 W. Cedar St.
Mech. Eng., App. Mech., Shop., Met.		
Green, Lonsdale,	*College Hill, O.*	34 Buckingham St.
Arch.		
Greene, S. Cuyler,	*Dorchester.*	Pleasant St.
Mech. Eng., Shop., App. Mech., Met.		

NAMES.	HOME.	RESIDENCE.
Gunnison, Sarah P., A.B., Biol., Germ.	*Gloucester.*	Gloucester.
Handy, James O., Chem., Fr., Math., Draw., Germ.	*Barnstable.*	381 Meridian St.
Harding, George F., Arch.	*Boston.*	14 Arlington St.
Hargitt, Chas. W., B.S., A.M., Biol., Chem., Geol.	*Moore's Hill, Ind.*	36 Bromfield St.
Harrington, Frederic, Germ., Eng., Phys., Math.	*Cambridge.*	Cambridge.
Harris, William L., Math., Phys., Germ., Eng., Chem., Biol.	*Marblehead.*	Marblehead.
Hathaway, D. Lewis, Math., Mech. Eng., Germ., Fr., Eng., Shop.	*Rochester.*	40 Gray St.
Hayes, Hammond V., A.B., Phys., App. Mech., Mech. Eng.	*Cambridge.*	Cambridge.
Hayward, A. W., Arch.	Chicago, Ill.	Dorchester.
Hildreth, William O., Chem., Eng., Mech., Shop., Math., Desc. Geom., Phys., Germ.	*Gardiner, Me.*	65 Dorchester St.
Hill, Henry E., Arch., Fr., Mil.	*Kansas City, Mo.*	——
Hiscox, James A., Arch.	*Norwich, Conn.*	6 Cazenove St.
Hoadley, Francis W., Math., Chem., Eng., Draw.	*Boston.*	86 Mt. Vernon St.
Hodgkins, Charles C., Arch.	*Lynn.*	Lynn.
Holmes, Charles L., Mech., Math., Desc. Geom., Phys., Shop.	*Waterbury, Conn.*	43 Bowdoin St.
Hopkins, William J., Phys., App. Mech., Mech. Eng.	*New Bedford.*	418 Columbus Ave.
Howard, John G., Arch., Biol., Eng., Fr., Geol., Germ., Math.	*Chelmsford.*	116 Appleton St.
Howe, John E., A.B., Arch.	*Cambridge.*	Cambridge.
Hussey, Oren S., Phys., Math., Desc. Geom., Shop., Germ., Mech.	*Nashua, N.H.*	309 Columbus Ave.
Hutcheson, Mary, Chem.	*Columbus, O.*	84 Charles St.
Hutchings, James H., S.B. Mech. Eng., Phys.	*Boston.*	68 Carver St.
Hutchings, Lydia A., Chem., Fr., Phys., Biol.	*Boston.*	68 Carver St.
Ingraham, Irving E., Math., Chem., Shop., Draw., Mil.	*Bristol, Conn.*	2 James St.
Izard, Edward M., Phys.	*Philadelphia, Penn.*	30 Hancock St.
Jarecki, Alexander, Math., Chem., Draw., Mil.	*Erie, Pa.*	524 Columbus Ave.


1.0
1.1
1.25
1.4
1.6
2.8
2.5
3.2
2.2
3.6
2.0
4.0
1.8

M. I. T. ANNUAL CATALOGUES AND BULLETINS
1884/85

02 OF 02

NAMES.	HOME.	RESIDENCE.
Jones, Mary E., A.B. Biol., Zoöl., Chem.	*Boston.*	8 James St.
Jones, Theodore, Chem., Eng., Germ.	*Brookline.*	Brookline.
Kendall, Frederick A., Arch., Desc. Geom., Germ.	*Boston.*	5 Oxford Terrace.
Keyser, E. W., Arch.	*Washington, D.C.*	290 Columbus Ave.
Kimball, Clarence L., Arch., Desc. Geom., Math.	*Lowell.*	Lowell.
Kimball, Harry W., Mech., Math., Desc. Geom., Germ., Shop.	*Bath, Me.*	96 Pembroke St.
Kimball, James L., Mat^{l}, Phys., Germ., Shop., Desc. Geom., Mech.	*Westford.*	71 Chandler St.
Kirkham, Guy, Arch.	*Springfield.*	351 Columbus Ave.
Krucker, Frank G., Arch.	*Cincinnati, O.*	28 Worcester St.
Ladd, Caroline C., Chem., Biol.	*Ottumwa, Ia.*	2 Derne St.
Lavalle, John W., Arch.	*Boston.*	24 Marlborough St.
Lawrence, John M., Mech. Eng., Math., Phys., Eng., Germ., Chem.	*St. John, N.B.*	40 Gray St.
Lawrence, Warrington G., Arch.	*Baltimore, Md.*	14 Worcester Sq.
Lee, John C., Math., Chem., Phys.	*Roxbury.*	145 Cedar St.
Leonard, William K., Math., Chem., Eng., Draw., Mil.	*Piqua, O.*	60 Rutland Sq.
Lincoln, Theodore, Chem., Math., Draw., Mil,	*Dennysville, Me.*	Cambridgeport.
Lloyd, James D., Chem., Phys., Germ., Eng.	*Sandwich.*	37 Dwight St.
Loewenthal, Joseph B., Chem., Germ., Eng., Biol., Fr.	*Chicago, Ill.*	102 Dartmouth St.
Lord, Austin W., Arch.	*Minnesota City, Minn.*	89 W. Springfield St.
Loud, Joseph P., Chem., Fr., Math., Phys., Arch.	*Boston.*	135 Mt. Vernon St.
Lufkin, Elgood C., Math., Mech. Eng., Germ., Phys.	*Titusville, Penn.*	73 Chandler St.
Maher, Edward F., Arch.	*Canton, Md.*	381 Columbus Ave.
Mahon, William L'E., Ph.B., Mech. Eng., App. Mech., Met., Shop.	*Boston.*	291 Columbus Ave.
McNeil, Grant C., Fr., Mech., Math., Desc. Geom., Phys., Eng., Mil.	*Akron, O.*	11 Union Park.
Means, Ellison C., Math., Chem., Fr., Draw., Mil.	*Ashland, Ky.*	229 W. Canton St.

NAMES.	HOME.	RESIDENCE.
Merrill, Frank A., Math., Germ., Chem., Draw.	*Exeter, N.H.*	Newton.
Morong, A. B., A.B., M.D., Biol.	*Boston.*	713 Tremont St.
Morrison, Gilbert W., Math., Mech., Phys., Germ., Shop., Desc. Geom.	*Exeter, N.H.*	Exeter, N.H.
Mullins, William J., Math., Fr., Chem., Zoöl., Eng.	*Allegheny, Penn.*	23 Beacon St.
Neave, Joseph S., Math., Mech. Eng., Phys., Eng., Shop.	*Cincinnati, O.*	369 Columbus Ave.
Neiler, Samuel G., Math., Draw., Shop.	*Minneapolis, Minn.*	Dorchester.
Newell, Lorenzo B., Math., Chem., Fr., Draw., Mil.	*Newton Centre.*	Newton Centre.
Nickels, Arthur R., Math., Chem., Germ., Phys., Surv.	*Cherryfield, Me.*	145 W. Newton St.
Noble, Theron A., Chem., Fr., Mech., Eng., Germ., Phys.	*Des Moines, Ia.*	Newton.
Noyes, Arthur A., Chem., Phys., Germ., Eng., Draw.	*Newburyport.*	Newburyport.
Nutter, Charles P., Math., Chem., Eng., Draw., Mil.	*Cape Elizabeth, Me.*	Hotel Byron.
Nutter, Oscar E., Math., Phys., Mech., Shop., Desc. Geom., Germ., Eng.	*Great Falls, N.H.*	355 Dudley St.
Page, Frank H., Math., Mech. Eng., Phys., Eng., Shop., Germ., Desc. Geom.	*Chicopee Falls.*	59 Chester Sq.
Palmer, Alice W., Zoöl., Geol., Biol., Chem.	*Roxbury.*	Believue St.
Park, Walter L., Arch., Desc. Geom.	*Taunton.*	Taunton.
Parmelee, George L., Chem.	*Boston.*	15 Chester Park.
Parsons, Sidney A., Civ. Eng., App. Mech., Phys.	*Gloucester.*	Gloucester.
Parsons, William E., Chem., Math.	*Everett.*	Everett.
Patterson, William F., Phys., Draw., Shop.	*Allegheny City, Penn.*	45 Concord Sq.
Pierce, Edward L., Jun., Phys., Math., Mech. Eng., Eng., Germ.	*Milton.*	Milton.
Pierce, Richard H., A.B., Phys., App. Mech.	*Hopkinton.*	Brighton.
Plaisted, Arthur I., Phys., Math., Mech. Eng., Germ.	*East Somerville.*	East Somerville.
Plummer, Thomas R., A.B., Arch.	*New Bedford.*	31 Chestnut St.
Pool, George B., Math., Chem., Eng., Draw., Mil.	*Forest Hills.*	Forest Hills.
Pratt, Charles E., Phys., Math., Desc. Geom , Mech., Shop., Chem., Fr.	*Kansas City, Mo.*	10 Claremont Park.

NAMES.	HOME.	RESIDENCE.
Pratt, Herbert G., Phys., Mech. Eng., Span.	*West Newton.*	West Newton.
Preble, William H., Math., Eng., Draw., Fr., Mil.	*Melrose.*	Melrose.
Prescott, Howard B. S., Arch., Math., Geol., Germ., Eng.	*Arlington.*	Arlington.
Preston, Samuel A. J., Arch.	*Austin, Tex.*	107 Chandler St.
Proctor, Charles A., Math., Germ., Eng., Chem.	*Peabody.*	Peabody.
Proudfoot, William, Arch.	*Indianapolis, Ind.*	——
Putnam, Frederick W., Chem., Germ., Min., Civ. Eng., Geol.	*Waterville, N.Y.*	409 Columbus Ave.
Rawson, Edward L., Eng., Math., Mech. Eng., Shop.	*Los Angeles, Cal.*	44 Cortes St.
Reynolds, Blake, Shop.	*Chic[illegible] Ill.*	——
Reynolds, George F., Math., Mech. Eng., Phys., Germ., Eng., Shop., Chem.	*Evanston, Ill.*	115 Dartmouth St.
Reynolds, Ralph W., Math., Chem., Eng., Draw., Mil.	*Fall River.*	26 Appleton St.
Rice, Charles G., Math., Eng., Germ., Fr., Chem., Mil.	*Boston.*	341 Comm'nw'lth Ave.
Rice, David, Phys., Math., Mech. Eng.	*Roxbury.*	272 Seaver St.
Richardson, Robert E., Mech. Eng., Phys., Desc. Geom., App. Mech., Shop.	*Concord.*	Concord.
Ricker, George A., Civ. Eng., Geol., Phys.	*Buffalo, N.Y.*	88 Pinckney St.
Robertson, Nathaniel G., Min. Lab., Chem., Geol., App. Mech.	*Providence, R.I.*	153 Worcester St.
Robinson, C. Snelling, S.B., Met., Chem.	*Wareham.*	200 W. Springfield St.
Robinson, Miner, Math., Fr., Chem., Eng., Shop.	*West Newton.*	West Newton.
Robinson, Theo. W., S.B., Met., Chem.	*Wareham.*	200 W. Springfield St.
Ruffin, C. Stanley, Phys., Germ.	*Boston.*	170 Cambridge St.
Russell, L. Kimball, Chem., Phys., Germ., Eng.	*Arlington.*	Arlington.
Safford, Leandro T., Mech., Math., Draw., Phys., Germ., Shop.	*Boston.*	308 Columbus Ave.
Sands, Frank E., Eng., Shop., Germ.	*Cambridge.*	Cambridge.
Saunders, Walter M., Chem., Germ., Mil.	*Olneyville, R.I.*	1 Harwich St.
Schmid, Richard G., Arch.	*Chicago, Ill.*	165 Boylston St.

NAMES.	HOME.	RESIDENCE.
Schmidt, Richard E., Arch.	*Chicago, Ill.*	467 Columbus Ave.
Sever, George F., Chem., Draw., Phys., Math., Shop., Eng., Germ.	*Cambridge.*	Cambridge.
Shepard, William E., Phys., Math., Germ., Shop., Eng., Fr.	*Hartford, Conn.*	134 W. Brookline St.
Shipman, Pelham W., Phys.	*Astoria, N.Y.*	271 Columbus Ave.
Shortall, John L., Arch.	*Chicago, Ill.*	150 Chandler St.
Simpson, Edmund S., M.D., Chem.	*Boston.*	56 Boylston St.
Smith, James M., Jun., Phys., Geol., Eng., Chem., Fr.	*Boston.*	10 Greenwich Park.
Smith, J. Waldo, Civ. Eng., Math., Germ., Eng.	*Lincoln.*	Lincoln.
Sparhawk, N. Arthur, Phys., Math., Shop., Mech., Draw.	*Boston.*	1766 Washington St.
Stearns, Charles K., Mech., Shop., Math.	*Newton Centre.*	Newton Centre.
Stearns, John W., Germ., Eng., Math., Chem., Draw.	*Waltham.*	Waltham.
Steele, George F., Mech. Eng., Math., Phys., Shop., Germ.	*East Somerville.*	East Somerville.
Stickney, Samuel C., Phys., Civ. Eng., Math., Geol.	*St. Paul, Minn.*	131 West Newton St.
Sturges, Solomon, Math., Phys., Eng., Shop., Mech., Germ.	*Chicago, Ill.*	150 Chandler St.
Sweetser, Albert R., Chem., Shop.	*Gloucester.*	Gloucester.
Sylvester, George E. Surv., Math., Phys., Desc. Geom.	*Danversport.*	Danversport.
Tenney, Frederic, Chem., Draw., Mech., Math., Phys.	*Providence, R.I.*	11 Concord Sq.
Thomas, Fred A., Surv., Math., Phys., Desc. Geom.	*Woonsocket, R.I.*	25 Holyoke St.
Thomas, William R., Math., Phys., Mech., Desc. Geom., Shop., Germ., Eng.	*Boston.*	16 Circuit St.
Thompson, Frederick, Surv., Math., Desc. Geom., Phys., Germ., Eng.	*Washington, D.C.*	293 Columbus Ave.
Thompson, Walter S., Surv., Math., Desc. Geom., Phys., Germ., Eng.	*Roxbury.*	33 Rockland St.
Todd, Frederick C., Phys., Math., Shop., Eng., Germ., Mech.	*Milltown, N.B.*	45 W. Newton St.
Torrey, J. Carleton, Civ. Eng., Math., Geol., Germ.	*Rockland.*	Rockland.
Totman, Harry F., Surv., Math., Desc. Geom., Phys., Germ., Eng.	*Fairfield, Me.*	29 Dartmouth St.
Tucker, Greenleaf R., Eng., Chem., Germ.	*Boston.*	City Hospital.

NAMES.	HOME.	RESIDENCE.
Tuttle, Edward O., Phys., Eng., Shop., Biol., Geol.	*Holyoke.*	59 Chester Sq.
Varney, William W., Mech. Eng., Phys., Shop., Math., Eng., Germ.	*Boston.*	409 Columbus Ave.
Very, Nathaniel T., Math., Eng., Draw., Chem., Shop., Germ.	*Salem.*	Salem.
Vinton, Charles H., Math., Mech., Desc. Geom., Germ., Eng.	*Lafayette, Ind.*	361 Columbus Ave.
Vinton, Raymond P., Arch.	*Pomfret Centre, Conn.*	66 Mt. Vernon St.
Wakefield, F. Manton, Math., Eng., Geom., Arch., Phys.	*St. Paul, Minn.*	159 Warren Ave.
Walker, Stoughton, Chem., Eng., Geol., Zoöl., Biol., Shop.	*Boston.*	237 Beacon St.
Watters, William, A.B., Biol.	*Lynn.*	Lynn.
Weil, Charles L., Math., Phys., Chem., Mech., Desc. Geom., Germ., Eng.	*North Andover.*	52 Chandler St.
Whitney, Joseph T., Phys., Math., Shop., Germ., Mech.	*Leominster.*	56 Chandler St.
Whitney, Samuel A., Jun., Chem., Germ., Geol.	*Glassborough, N.J.*	403 Columbus Ave.
Williams, Alfred B., Arch., Fr.	*Taunton.*	Taunton.
Williams, Sidney, Civ. Eng., Met., Math., Phys., Shop., Germ.	*Boston.*	15 Arlington. St.
Windom, William D., Arch.	*Washington, D.C.*	5 Oxford Terrace.
Winsor, Paul, Phys., Math., Mech. Eng., Shop.	*Winchester.*	Winchester.
Woodbury, Merton G., Math., Fr., Eng.	*Melrose.*	Melrose.
Woodward, Harvey G., Chem., Draw., Shop.	*Wheeling, Ala.*	40 Upton St.

SUMMARY: SCHOOL OF INDUSTRIAL SCIENCE.

GRADUATE STUDENTS	31
REGULAR STUDENTS, 4th year	30
" " 3d "	60
" " 2d "	85
" " 1st "	193
SPECIAL STUDENTS	211
	610
Deduct names counted twice	31
Total	579

FREE COURSES OF INSTRUCTION.

The Trustee of the Lowell Institute has established, under the supervision of the Institute of Technology, courses of instruction, generally given in the evening, and open to students of either sex, free of charge.

These courses are more or less varied from year to year by the omission or interchange of particular subjects, but include, in their entire scope, instruction in mathematics, mechanics, physics, drawing, chemistry, geology, natural history, biology, English, French, German, history, navigation, and nautical astronomy, architecture, and engineering.

The subjects, and the extent of the several courses, will be made known, by suitable advertisement in the public journals, in October of each year.

As it is the object of these courses to provide substantial teaching rather than merely popular illustration of the subjects treated, it is expected that all persons attending will come with a serious purpose of improvement, and that they will cheerfully comply with such rules as may be prescribed in regard to attendance and to order in the class or lecture-room.

The conditions of attendance on these gratuitous courses are as follows: —

1. Candidates must have attained the age of eighteen years.

2. Their applications must be made in writing, addressed to the Secretary of the Faculty, specifying the course or courses they desire to attend, mentioning their present or prospective occupations, and, when the course is of a nature demanding preparation, stating the extent of their preliminary training.

The number of students in each class is necessarily limited.

The courses for 1884–85 are on the following subjects:—

I. *Analytic Geometry.* — Twelve lectures by Professor Runkle, on Mondays and Wednesdays, beginning Nov. 10.

II. *Structural Geology.* — Twelve lectures by Assistant Professor Crosby, on Mondays and Thursdays, beginning Nov. 17.

III. *Chemistry of the Aniline Colors.* — Twelve lectures by Assistant-Professor Norton, on Mondays and Wednesdays, beginning Nov. 19.

IV. *Plane Trigonometry.* — Twelve lectures by Assistant Professor Wells, on Mondays and Fridays, beginning Nov. 21.

V. *Phenomena and Laws of Electricity.* — Twelve lectures by Professor Cross, on Mondays and Wednesdays, beginning Nov. 24.

VI. *Old French.* — Twelve lectures by Associate Professor Luquiens, on Tuesdays and Fridays, beginning Dec. 12.

VII. *Principles and Instruments of Electrical Measurements.* — Twelve elementary demonstrations by Assistant Professor Holman. Date and days to be assigned later.

VIII. *Fermentation, and its relation to Putrefaction, Digestion, and the "Germ" Theory of Disease.* — Twelve lectures by Associate Professor Sedgwick, on Tuesdays and Fridays, beginning Jan. 7.

SCHOOL OF MECHANIC ARTS.

SCHOOL OF MECHANIC ARTS.

For the benefit of those who are unable, for want of time or means, to go through one of the regular courses of the School of Industrial Science, and yet desire a good preparation for industrial pursuits, a subordinate School of Mechanic Arts has been established by the Corporation of the Institute, in which special prominence is given to handwork in connection with high-school studies, affording an opportunity to such students as have completed the ordinary grammar school course to continue the elementary scientific and literary studies, together with mechanical drawing, while receiving instruction in the use of the typical hand and machine tools for working iron and wood.

The general plan of the school is similar to that of the Imperial Technical School of Moscow, the Royal Mechanic Art School of Komotau in Bohemia, the École Municipale d'Apprentis of Paris, or that of the Ambachtsschoole of the principal cities of Holland, but has been specially adapted to the somewhat different conditions existing in our own country. The object is not to fit the pupil for a particular trade, but to develop the bodily and mental powers in harmony with each other, and with reference to the actual wants of life. The handwork is done without regard to pecuniary profit, but is calculated to give the student good judgment, self-reliance, and executive power. Its exact and systematic method affords the direct advantage of training the hand and eye for accurate and efficient service with the greatest economy of time; and the instruction in the use of tools and materials has also proved a valuable aid in intellectual development.

The school occupies a building on Garrison Street, a short distance from the Rogers Building. The facilities for instruction are ample and increasing; and the mechanical laboratories, in which the instruction in the mechanic arts is given, have a thorough equipment (see p. 43).

The instruction in the mechanic arts given to each regular student, at present embraces: —

1. Carpentry and Joinery; 2. Wood-turning; 3. Pattern-making; 4. Foundery-Work; 5. Iron-Forging; 6. Vise-Work; 7. Machine-Tool Work.

The regular course also includes two years of study. Special students may be received, upon the approval of the Faculty, for shorter times, or for particular parts of the course.

The present regular course is as follows: —

REGULAR COURSE.

FIRST YEAR.

FIRST TERM.	SECOND TERM.
Shopwork, — Carpentry.	Shopwork, — Wood-turning, Pattern-making, Foundry-work.
Algebra.	Algebra.
Geometry.	Plane Geometry.
English Composition.	English Composition.
Mechanical and Freehand Drawing.	Mechanical and Freehand Drawing.

SECOND YEAR.

FIRST TERM.	SECOND TERM.
Shopwork, — Forging.	Shopwork, — Vise-work, Machine-Tool-work.
Algebra.	Geometry.
Elementary Physics.	Physics.
English Composition.	English Composition.
Mechanical Drawing.	Mechanical Drawing.
French.	French.

As there are many who desire a year of study and work additional to the regular course, to become better fitted either for the superintendence of labor or for giving instruction to others, it is expected, that, when the new arrangements are completed, the increased facilities will render such a course possible.

REQUIREMENTS FOR ADMISSION.

Applicants for the regular course must be at least fifteen years of age, and must pass a satisfactory examination, at the time and place of the examinations for the School of Industrial Science, in Arithmetic, Geography, History of the United States, and English Composition. For shopwork only, or for mechanical drawing, no examination is required.

The requirements in the various subjects are as follows: —

1. *Arithmetic.* — Prime and composite numbers, greatest common divisor, and least common multiple, ratio and proportion, common and decimal fractions, percentage, simple and compound interest, and compound numbers; as treated in the text-books of either Seaver and Walton, Wentworth and Hill, or Greenleaf.

2. *English.* — Parts of speech, inflection, and parsing, as found in the text-books of either Swinton, Whitney, or Greene; also fair penmanship and orthography.

3. *History.* — As much of the history of the United States as may be obtained from the text-books of either Anderson, Higginson, or Barnes.

4. *Geography.* — As much as may be obtained from the grammar school text-books of either Guyot or Swinton.

An equivalent preparation in the works of other authors than those named should prepare the student for examination.

In general, the training given in the grammar schools will afford a suitable preparation.

REGULATIONS OF THE SCHOOL.

School-year. — The beginning and ending of the school-year and the days of examinations are the same as in the School of Industrial Science (see Calendar, page 77).

Attendance. — Students are expected to be prompt in their attendance on all the exercises of their course, and no excuse will be granted except by special vote of the Officers of Instruction. The daily exercises of the school begin at 9 A.M., and end at 4.15 P.M., with an intermission from 12 until 1.15 P.M., except on Saturdays, when the exercises close at noon.

Fees. — The tuition fee is one hundred and fifty dollars a year, payable one hundred dollars at the beginning of the year, and fifty dollars at the commencement of the second term (February). Special students taking fewer studies than those of the regular course may be charged less.

No extra charge is made for materials, nor for the proper use of tools, except in case of special students who pursue more than one branch of shopwork at a time. All unnecessary damage to tools or furniture must be paid for.

Each student provides his own drawing instruments. The cost of books and stationery will not exceed fifteen dollars a year.

Bond. — The regulations concerning the bond are the same as in the School of Industrial Science (see page 79).

Examinations. — Examinations are held at the close of each term, and a report of the progress of each student is made to his parent or guardian.

Each regular student will be entitled to a certificate of proficiency on the satisfactory completion of the course.

Scholarships of the Massachusetts Charitable Mechanics' Association. — The two scholarships founded by this Association are awarded, on competitive examination, to sons of present or past members of the Association.

OFFICERS OF INSTRUCTION.

FRANCIS A. WALKER, LL.D., *President.*
PETER SCHWAMB, S.B., *Director.*
JULES LUQUIENS, Ph.D., *Instructor in French.*
CLARENCE W. FEARING, A.M., *Instructor in English and Mathematics.*
CHARLES L. ADAMS, *Instructor in Drawing.*
WILLIAM H. PICKERING, S.B., *Instructor in Physics.*
CHARLES H. STEPHENSON, *Instructor in Machine-Tool work.*
THEODORE B. MERRICK, *Instructor in Wood work.*
JAMES R. LAMBIRTH, *Instructor in Forging.*
——— , *Instructor in Foundry work.*
WILLIAM R. MAXWELL, *Assistant in Wood work.*
JOHN COOK, *Assistant in Machine-Tool work.*
OSCAR L. PATCH, *Assistant in Forging.*

Special instruction is given also by members of the Faculty of the School of Industrial Science.

SCHOOL OF MECHANIC ARTS.

REGISTER OF STUDENTS.

SECOND YEAR.

NAME.	HOME.	RESIDENCE.
English, James W., Jun.,	*Atlanta, Ga.*	115 Chandler St.
Heath, Charles A.,	*Brookline.*	Brookline.
Kendricken, Paul J.,	*Boston.*	376 Dudley St.
Morgan, William M.,	*Everett.*	Everett.
Orrok, George A.,	*Dorchester.*	Olney St.
Thompson, A., Jun.	*Boston.*	8 Moon St.
Wright, Lincoln,	*Lowell.*	Lowell.

FIRST YEAR.

Ball, James T.,	*Derby Line, Vt.*	West Somerville.
Barnes, Harry W.,	*Boston.*	112 Appleton St.
Benson, Harry P.,	*Salem.*	Salem.
Edwards, William T.,	*Pittsburg, Penn.*	87 W. Rutland Sq.
Floyd, Henry D.,	*Lynn.*	Lynn.
Goddard, Frank C.,	*Woburn.*	Woburn.
Harris, Robert L.,	*Penacook, N.H.*	75 Chester Sq.
Holmes, Charles E.,	*Melrose.*	Melrose.
Howe, Benjamin M.,	*Natick.*	Natick.
Killinger, John W.,	*Lebanon, Penn.*	287 Columbus Av.
Lawton, Henry L. B.,	*Chelsea.*	Chelsea.
Leigh, Richard A.,	*Chelsea.*	Chelsea.
Maxim, Hiram P.,	*Hyde Park.*	Hyde Park.
McGraw, Fred M.,	*Cortland, N.Y.*	Brighton.
Noble, Howard G.,	*Westfield.*	Cambridge.
Ormsby, Fred. R. S.,	*Janesville, Wis.*	749 Tremont St.
Osgood, Edward G.,	*Bellows Falls, Vt.*	189 W. Canton St.
Pratt, Nathan R.,	*Sudbury.*	Sudbury.
Richardson, Walter P.,	*Salem.*	Salem.
Safford, Francis R.,	*Salem.*	Salem.
Schneidt, Frederic A.,	*Boston.*	59 Fayette St.
Smith, William C.,	*Brighton.*	Brighton.
Stewart, Samuel B., Jun.,	*Lynn.*	Lynn.
Sutherland, Reynold H.,	*Lynn.*	Lynn.
Tripp, Thaxter N.,	*Lynn.*	Lynn.
Turner, Willie P.,	*Isle au Haut, Me.*	Hotel Clifton.

NAME.	HOME.	RESIDENCE.
Tyler, Fred. W.,	*Westborough.*	88 Pinckney St.
Whitney, Fred. A.,	*Leominster.*	56 Chandler St.
Wilson, Frank S.,	*Brighton.*	Brighton.
Wooldridge, Norman S.,	*Pittsburg, Penn.*	87 W. Rutland Sq.

SPECIAL STUDENTS.

Agassiz, Max, Shop.	*Cambridge.*	Cambridge.
Arnold, Fred J., Math., Draw., Fr.	*Waterville, Me.*	24 Dartmouth St.
Atwood, Fred M., Math., Shop.	*Taunton.*	Salem.
Beular, Frank E., Draw.	*Yarmouth, N.S.*	385 Columbus Av.
Bush, Harry G., Math., Eng., Fr., Shop., Draw.	*New Orleans, La.*	350 Columbus Av.
Campbell, William K., Math., Draw.	*Cambridge.*	Cambridge.
Daniell, Francis G., Shop.	*Dedham.*	Dedham.
Dawson, William F., Math., Shop., Draw., Eng., Fr.	*Jamaica Plain.*	Jamaica Plain.
Godder, Louis H., Draw.	*Winchester.*	Winchester.
Grush, Charles E., Math., Shop., Draw.	*Beverly.*	Beverly.
Harrington, Edward M., Math., Shop., Draw., Fr., Phys.	*Reading.*	Reading.
Hawkes, Walter, Shop., Draw.	*Lynn.*	Lynn.
Hayward, William W., Shop., Draw.	*Easton.*	Easton.
Herrick, Charles H., Shop., Draw.	*Winchester.*	Winchester.
Howard, Henry, Shop.	*Brookline.*	Brookline.
Langdon, James, Shop., Draw.	*Plymouth, N.H.*	61 Clarendon St.
Leach, Edward F., Shop., Draw.	*Manchester.*	Manchester.
Littlefield, Willie S., Shop., Draw.	*Melrose.*	Melrose.
Malchy, Jeremiah W., Draw.	*So. Newmarket, N.H.*	S. Newmarket, N.H.
Manning, J. Woodward, Shop., Draw., Math., Fr., Phys.	*Reading.*	Reading.
Mears, Henry A., Math., Eng., Shop , Draw.	*Neponset.*	Neponset.

NAME.	HOME.	RESIDENCE.
Merrill, William H., jun., Math., Shop., Draw., Phys., Eng., Fr.	*Roxbury.*	25 Linden Park.
Parke, Louis L., Math., Eng., Fr., Draw.	*Fort Union, N.M.*	405 Columbus Av.
Porter, Fred, Math., Draw., Shop., Fr., Phys.	*No. Easton.*	No. Easton.
Power, Roy W., Math., Phys., Eng., Draw., Shop.	*Pittsfield.*	Winchester.
Sanborn, Charles A., Draw.	*So. Newmarket, N.H.*	S. Newmarket, N.H.
Walker, Ambrose, Shop., Draw.	*Boston.*	237 Beacon St.
Wall, William L., Shop., Draw.	*Boston.*	231 Tremont St.
Wright, Walter G., Math., Shop., Draw.	*Lowell.*	Lowell.

SUMMARY: SCHOOL OF MECHANIC ARTS.

REGULAR STUDENTS, 2d YEAR	7
" " 1st "	30
SPECIAL "	29
Total	66

LOWELL SCHOOL OF PRACTICAL DESIGN.

LOWELL SCHOOL OF PRACTICAL DESIGN.

The Lowell School of Practical Design was established in 1872, by the Trustee of the Lowell Institute, for the purpose of promoting Industrial Art in the United States. The Corporation of the Massachusetts Institute of Technology, having approved the purpose and general plan of the school as proposed by the Trustee of the Lowell Institute, assumed the responsibility of conducting it; and, in the same year, the first pupils were admitted.

The expenses of this school are borne by the Lowell Institute, and tuition is free to all pupils.

The school occupies a drawing-room and a weaving-room in the building of the Institute on Garrison Street. The weaving-room affords students an opportunity of working their designs into actual fabrics of commercial sizes and of every variety of material and of texture. The room is supplied with two fancy chain-looms for dress goods, three fancy chain-looms for fancy woollen cassimeres, one gingham loom, and one Jacquard loom. The school is constantly provided with samples of all the novelties in textile fabrics from Paris, such as brocaded silks, ribbons, alpacas, armures, and fancy woollen goods.

Course of Study. — Students are taught the art of making patterns for prints, ginghams, delaines, silks, laces, paper-hangings, carpets, oil-cloths, etc. The course is of three years' duration, and embraces, —

1. Technical manipulations; 2. Copying and variations of designs; 3. Original designs or composition of patterns; 4. The making of working drawings, and finishing of designs.

Instruction is given personally to each student over his work, with occasional general exercises. Students supply their own instruments and materials, the cost of which is about $5 per year.

The class is under the personal direction of Mr. CHARLES KASTNER, assisted in the weaving department by Mr. John Scott, and in the designing department by Miss Delphina Weston.

Requirements for Admission. — To teach drawing is not among the objects of this school. Applicants must therefore possess a knowledge of drawing adequate to enable them advantageously to begin the work of composition and design. A considerable degree of skill in freehand drawing from nature, and in the use of the brush, will be positively required for entrance to the school.

Applicants for admission, or persons desiring further information regarding this school, may apply by letter to the President of the Institute.

Regulations of the School. — The next school-year will begin on Sept. 28, 1885. The number of students in the school, including those to be admitted, will be limited to sixty. Examinations for applicants for admission will be held on Sept. 22, 1885. Students are required to be regular in their attendance, the hours being from 9.30 A.M. to 12 M., and from 2 P.M. to 4.30 P.M. Only those students can be retained in the school who, after a fair and patient trial, are found to have some aptitude for the work. At the close of each half-year, the director will, with the approval of the President of the Institute, convey the needed information to such students as shall be found gravely deficient in qualifications for an advantageous pursuit of their studies. No publication will be made of the fact, and such students will be left to withdraw as of their own motion.

A list of those who have received the certificate of this school and of their occupations is given at p. 144.

STUDENTS.

NAME.	HOME.	RESIDENCE.
Akin, Thomas B.,	*New Bedford.*	New Bedford.
Bailey, Cora L.,	*Boston.*	14 Warrenton St.
Boyden, George H.,	*Worcester.*	——
Bradsley, Edward,	*Taftville, Conn.*	25 Claremont Park.
Brainard, Ida A.,	*Hyde Park.*	Hyde Park.
Brightman, Arthur L.,	*New Bedford.*	New Bedford.
Burr, Arthur M.,	*Melrose.*	Melrose.
Center, Lizzie M.,	*Gloucester.*	Gloucester.
Coburn, Clarence S.,	*Charlestown.*	12 Monument Sq.
Coldwell, Joseph,	*Taftville, Conn.*	25 Claremont Park.
Cox, Herbert L.,	*Arlington.*	Arlington.
Crowther, Frank,	*Canton.*	Canton.
Curtis, Marion B.,	*Boston.*	15 Holyoke St.
Cutting, Francis S.,	*Chelsea.*	Chelsea.
Drew, Sarah A.,	*Cambridgeport.*	Cambridgeport.
Folsom, Fred N.,	*Salisbury Point.*	411 Columbus Av.
French, Isabella C.,	*Dedham.*	Dedham.
Gage, Nellie F.,	*Charlestown.*	9 Park St.
Goering, Edwin R.,	*Boston.*	16 Beethoven St.
Goodwin, G. Irving,	*Boston.*	12 Gray St.
Green, Fred W.,	*So. Boston.*	365 Silver St.
Hawes, Nellie L.,	*Boston.*	Harrison Sq.
Henchman, Russel B., Jun.,	*Hyde Park.*	Hyde Park.
Hoogs, Margaret I.,	*Hyde Park.*	Hyde Park.
Hoyt, Mabel M.,	*Chelsea.*	92 Essex St.
Irish, George O.,	*New Bedford.*	——
Jennings, Philip B.,	*Warren.*	486 Tremont St.
Johnson, Fred J.,	*Saco, Me.*	25 Holyoke St.
Leland, Herbert M.,	*Boston.*	596 Tremont St.
Mathewson, Frank C.,	*Providence, R.I.*	18 Claremont Park.
Morse, Walter H.,	*Uxbridge.*	——
Moulton, David P.,	*Chelsea.*	Chelsea.
Murdock, Herbert T.,	*Uxbridge.*	313 Columbus Av.
Neally, Grace H.,	*Dover, N.H.*	——
Noyes, Fred W.,	*Melrose.*	Melrose.
Owen, Walter T.,	*Springfield.*	Newton.
Peirce, Edith A.,	*Dover, N.H.*	109 Worcester St.
Rand, James L.,	*Dover, N.H.*	South Boston.

NAME.	HOME.	RESIDENCE.
Rawlings, U. S. G.,	*Boston.*	3114 Washington St.
Reed, Eaton V.,	*So. Weymouth.*	So. Weymouth.
Ricker, Everett W.,	*Jamaica Plain.*	Jamaica Plain.
Robbins, Anna S.,	*Boston.*	8 Centre St.
Robinson, Albert E.,	*Oxford, Me.*	56 Putnam St.
Ross, Martha,	*St. Johnsbury, Vt.*	1512 Washington St.
Sheehy, Michael,	*New Bedford.*	New Bedford.
Sjöström, Ebba S. C.,	*Lawrence.*	Lawrence.
Sloan, Bertha L.,	*Hyde Park.*	Hyde Park.
Smith, James F.,	*Jamaica Plain.*	Jamaica Plain.
Springer, Fred A.,	*Marlborough.*	Marlborough.
Stedman, Joseph C.,	*Jamaica Plain.*	Jamaica Plain.
Stevens, Harry E.,	*Chelsea.*	Chelsea.
Swain, Will C.,	*Dover, N.H.*	350 Columbus Av.
Sweet, Mary R.,	*Hyde Park.*	Hyde Park.
Teel, Margaretta R.,	*Cambridgeport.*	Cambridgeport.
Underwood, Walter A.,	*Dorchester.*	Dorchester.
Underwood, Western,	*Boston.*	643 Tremont St.
Vogel, Emma C.,	*So. Boston.*	53 B St.
Ward, Abba L.,	*Charlestown.*	36 Soley St.
Whipple, Lillian W.,	*Salem.*	Salem.
White, Mary A.,	*Chelsea.*	Chelsea.
Wilson, John H.,	*Jamaica Plain.*	Jamaica Plain.

TOTAL . . . . . 61.

THE SOCIETY OF ARTS.

THE SOCIETY OF ARTS.

THIS Society was the first organized of the three distinct component parts, of which, as set forth in the act of incorporation, it was originally intended that the Institute should consist. Its first meeting was held on April 8, 1862; and meetings are now regularly held in the Institute building on the second and fourth Thursdays of each month, from October to May inclusive.

The objects of the Society are to awaken and maintain an active interest in the practical sciences, and to aid generally in their advancement and development in connection with arts, agriculture, manufactures, and commerce. All who have valuable knowledge of this kind, which they are willing to contribute, are invited to attend its meetings, and become members. Persons having valuable inventions, or discoveries which they wish to explain, will find a suitable occasion in the Society's meetings; and while the Society will never indorse, by vote or diploma, or other official recognition, any invention, discovery, theory, or machine, it will give every facility to those who wish to discuss the principles and intentions of their own machines or inventions, and will endeavor at its meetings, or through properly constituted committees, to show how far any communications made to it are likely to prove of real service to the community.

Abstracts of the proceedings of the Society are printed in one or more of the Boston daily papers, and are also published in an annual report.

Candidates for Associate Membership must be recommended by not less than two members, whose signatures shall be affixed to a written or printed form to that effect. Each nomination is referred to the Executive Committee, and when reported upon favorably by it, and read by the Secretary, may be acted upon at the same meeting.

Associate Members pay an admission fee of five dollars before being entitled to the privileges of membership, and an annual assessment of five dollars on the first of October of each year.

An Associate Member who shall have paid at any one time the sum of fifty dollars, or annual assessments for twenty years, shall become a member for life, and be thereafter exempt from annual assessments.

Students of the Institute may be present at the meetings by permission of the Secretary of the Faculty.

Among the papers that have been read before the Society during the past year may be mentioned the following: Japanese Pottery, by Professor Edward S. Morse; The Evolution and Breeds of Domestic Animals, as illustrated in Swine, by Professor William H. Brewer of Yale College; The Chemistry of Cotton, by Dr. C. W. Dabney, State Chemist of North Carolina; Coverings for Steam Pipes, by Professor John M. Ordway; Glass and Glass-making, by Mr. Thomas Gaffield; The Rigs of Ships, by Mr. R. B. Forbes; The Safety Seam Steam Boiler, by Mr. J. R. Robinson; Researches on Growth and Death, by Dr. Charles S. Minot; The U.S. Life-Saving Service, by Capt. D. A. Lyle, U.S.A.; The Influence of Inventions on Civilization, by Mr. Chauncey Smith; The Recent Advances of Sanitary Science, by Dr. H. O. Marcy; The Delany Synchronous Multiplex Telegraph System, by Mr. P. B. Delany of New York; Cranes, by Mr. Henry R. Towne, of Stamford, Conn.; The Cotton Fibre, by Mr. Thomas Pray, Jun.; Musical Pitch, by Professor C. R. Cross; The Proper Method of Measuring Colors, by Professor E. C. Pickering; The Heating and Ventilation of the new Institute Building, by Mr. S. H. Woodbridge.

During the present year, a number of interesting papers are expected, among which may be mentioned the following: Boston Harbor, by Major C. W. Raymond, U.S.A.; The Cholera, by Professor William H. Brewer; Sub-Marine Mines in Sea-Coast Defence, by Gen. Henry L. Abbott, U.S.A.; the Relation of Petroleum Products to Sanitary Legislation, by Professor S. F. Peckham and others, including several by professors and instructors in the Institute.

OFFICERS OF THE SOCIETY FOR 1884–85.

President.

FRANCIS A. WALKER, LL.D.

Executive Committee.

GEORGE L. ROBERTS, *Chairman.*

HOWARD A. CARSON, C. J. H. WOODBURY,
WALDO O. ROSS, GEORGE W. BLODGETT.

Secretary.

GEORGE F. SWAIN.

LIST OF MEMBERS.

Life-Members.

Allen, Stephen M. . Boston.
Amory, William . . "
Atkinson, Edward . "
Atkinson, Wm. P. . "

Baker, William E. . "
Batchelder, J. M. . Cambridge.
Bond, George W. . Boston.
Bouvé, T. T. . . . "
Bowditch, J. I. . . "
Bowditch, Wm. I. . Brookline.
Brimmer, Martin . Boston.
Browne, C. Allen . "
Bullard, W. S. . . "

Cabot, Samuel . . "
Carruth, Charles . . "
Clapp, W. W. . . . "
Cummings, John . . Woburn.
Cummings, Nath'l . Boston.

Dalton, Charles H. . Boston.
Davenport, Henry . "
Delano, J. C. . . . New Bedford.
Dupee, James A. . Boston.

Endicott, Wm., Jun., "

Farmer, Moses G. . Salem.
Fay, Joseph S. . . Boston.
Fay, Mrs. Sarah S. . "
Flint, C. L. . . . . "
Forbes, John M. . . "
Forbes, Robert B. . "
Foster, John . . . "
Francis, James B. . Lowell.

Gaffield, Thomas . Boston.
Gardner, John L. . "
Gookin, Samuel H. . Lexington.
Greenleaf, R. C. . . Boston.
Grover, William O. . "

Hemenway, Mrs. M., Boston.
Henck, J. B. . . . "
Hoadley, J. C. . . "
Holmes, O. W. . . "
Homans, C. D. . . "

Johnson, Samuel . . "

Kehew, John . . . "
Kidder, Henry P. . "
Kneeland, Sam'l, . New York.

Lawrence, Amos A., Boston.
Lee, Henry . . . "
Lincoln, F. W. . . "
Little, James L. . . "
Lothrop, S. K. . . "
Lowe, N. M. . . . "
Lowell, John . . . Newton.

Matthews, Nathan . Boston.
May, J. J. . . . . "

Ordway, John M., New Orleans, La.

Peabody, O. W. . . Boston.
Philbrick, E. S. . . "
Philbrick, J. D. . . Danvers.

Pickering, E. C. . . Cambridge.
Pratt, Miss . . . Boston.
Preston, Jonathan . "

Rice, Alexander H. . "
Richardson, Geo. C., "
Ritchie, E. S. . . . Brookline.
Rogers, Henry B. . Boston.
Ross, M. Denman . Jamaica Plain.
Ross, Waldo O. . . "
Runkle, John D. . . Brookline.

Sayles, Henry . . Boston.
Sullivan, R. . . . "

Tobey, Edward S. . "

Wales, George W. . "
Wales, T. B. . . . "
Wales, Miss . . . "
Ware, William R. . New York.
Warren, Cyrus M. . Brookline.
Whitaker, Channing, Lowell.
Wilder, M. P. . . . Boston.
Williams, H. W. . . "
Winthrop, R. C. . . "
Wolcott, J. H. . . "

Associate Members.

Adams, Joseph H. . Boston.
Allen, W. S. . . . New Bedford.
Amory, Thomas C. . Boston.
Atwood, Nath'l E. . Provincetown.

Baker, C. M. . . . Boston.
Beal, James H. . . "
Bernstein, A. . . . "
Billings, George H., South Boston.
Blodgett, A. D. . . Boston.
Blodgett, G. W. . . "
Brown, E. W. . . . "
Brown, G. W. . . . "
Bunce, F. M. . . . Charlestown.
Burton, A. E. . . . Boston.

Carpenter, Geo. O. . Boston.
Carson, H. A. . . . "
Clark, T. M. . . . "
Clark, John M. . . "
Clark, John S. . . "
Coffin, F. S. . . . "
Cross, Charles R. . "

Davis, Barnabas . . "
Deblois, S. G. . . "
Dewson, F. A. . . Newtonville.
Doane, Thomas . . Charlestown.
Dresser, Jacob A. . Boston.

Eastman, Ambrose . "

Felton, S. M., Jun. . Cleveland, O.
Fisher, C. H. . . . Boston.
Flint, E. A. . . . "
Fuller, H. Weld . . "

Gibbens, Joseph M., "
Guild, Curtis . . . "
Guild, Henry . . . "
Guild, Henry . . . "

Hammond, Geo. W., "
Hartford, R. Frank . Newburyport.
Hathaway, John G. . Boston.
Haven, Franklin . . "
Henck, John B., Jun., "
Hewins, Edmund H., "
Hill, Hamilton A. . "
Hollingsworth, S. . S. Braintree.
Holman, Silas W. . Boston.
Howe, H. M. . . . "
Hubbard, Chas. T. . "
Hyde, George B. . "
Hyde, Henry D. . . "

Jenks, Lewis E. . . "

Kastner, Charles . "
Kendall, J. H. . . Cambridgep't.
Kendall, Edward . "

Ladd, W. H. . . . Boston.
Lanza, Gaetano . . "
Lewis, Charles W. . "
Little, James L., Jun. Brookline.
Little, John M. . . Boston.
Low, J. G. . . . . Chelsea.
Lowell, A. L. . . . Boston.
Lowell, Percival . . "
Lodge, H. Ellerton . "
Lyman, Theodore . "

Marble, George R. . "
Markoe, G. F. H. . "
May, F. W. G. . . "
McClure, Charles . "
McPherson, W. J. . "

Mixter, S. J. . . . Boston.
Moore, Alexander . South Boston.
Morris, Charles W., Boston.
Mower, George A. . "
Nichols, Wm. R. . Roxbury.
Niles, William H. . Cambridge.
Norton, Jacob . . Boston.
Norton, L. M. . . Natick.

Osborne, George A., Boston.

Parsons, William . "
Paul, J. F. . . . . "
Peabody, C. H. . . "
Peabody, W. B. O. . "
Pickering, H. W. . "
Pickering, Wm. H. . "
Plumer, Avery . . "
Pope, Edward E. . "
Porter, Dwight . . "
Prang, Louis . . . "
Purinton, James . . "

Richards, R. H. . . Jamaica Plain.
Robbins, James M. . Milton.
Roberts, George L., Boston.
Robinson, J. R. . . "
Rollins, William H., "
Ruggles, John . . "
Richardson, Charles, "
Russell, Robert S. . "

Salisbury, D. Waldo, "
Sawyer, Edward . Newton.
Sawyer, Joseph . . Boston.
Sawyer, Jacob H. . "
Sawyer, Timothy T., Charlestown.
Schofield, W. J. . . Boston.
Schwamb, Peter. . "
Sears, Philip H. . . "
Sedgwick, W. T. . "
Shaw, Henry S. . . "
Sherwin, Thomas . Jamaica Plain.
Shimmin, Chas. F. . Boston.
Shurtleff, A. M. . . "

Sill, A. N. . . . . Boston.
Sinclair, Alex. D. . "
Smith, Chauncy . . Cambridge.
Sprague, Charles J. . Boston.
Stantial, F. G. . . Melrose.
Stevens, Benj. F. . Boston.
Sturgis, John H. . . Brookline.
Swain, George F. . Boston.

Taber, C. A. . . . Lynn.
Thompson, Wm. H., Boston.
Tolman, James P. . W. Newton.
Tufts, John W. . . Boston.
Tuttle, Joseph H. . "

Van Praag, Judah . "
Vose, George L. . "

Walker, Francis A. . Boston.
Ware, Charles E. . "
Warren, Joseph H. . "
Warren, Samuel D. "
Watson, R. S. . . Milton.
Watson, William . Boston.
Wellington, C. A. . "
Weston, David M. . "
Whitman, Herbert T., "
Whitmore, Wm. H., "
Whiton, David . . "
Whitwell, W. S. . "
Williams, F. H. . . "
Wing, Charles H. . "
Woodbridge, S. H. . "
Woodbury, C. J. H., Lynn.
Wyman, Morrill . . Cambridge.

GRADUATES

FROM THE

SCHOOL OF INDUSTRIAL SCIENCE.

The Roman numerals in the column marked "Course" denote the course in which the Graduate received the degree of S.B. For description of courses, see p.

1868.

NAME AND ADDRESS.	COURSE.	OCCUPATION.
ELLERY C. APPLETON, Allentown, Penn.	III.	Civil Engineer, Lehigh Coal and Navigation Company.
WHITNEY CONANT, 443 West 73d St., New York.	III.	Civil Engineer.
*FRANK R. FIRTH,	I.	Died June 9, 1872.
ELI FORBES, Clinton, Mass.	Sci. and Lit.	Chemist at the Lancaster Mills.
CHARLES C. GILMAN, Marshalltown, Marshall Co., Ia.	III.	Chief Engineer, Iowa Improvement Company.
CHARLES E. GREENE, Ann Arbor, Mich.	I.	Professor of Civil Engineering, University of Michigan.
ALBERT F. HALL, Boston, Mass.	II.	Draughtsman in the employ of the George F. Blake M'f'g Company.
WILLIAM E. HOYT, Rochester, N.Y.	I.	Chief Engineer of Rochester and Pittsburg Railroad Company.
ROBERT H. RICHARDS, Boston, Mass.	III.	Professor of Mining Engineering, Mass. Institute of Technology.
WALTER H. SEARS, 35 Congress Street, Boston.	I.	Civil Engineer.
*CHARLES A. SMITH,	I.	Died Feb. 4, 1884.
JOSEPH STONE, Lawrence, Mass.	I.	Superintendent, Worsted Department, Pacific Mills.
BRYANT P. TILDEN, Junction, Carleton Co., Minn.	III.	Resident Engineer, Northern Pacific Railroad.
JAMES P. TOLMAN, West Newton.	III.	Manufacturer of Cordage, 164 High Street, Boston.

1869.

NAME AND ADDRESS.	COURSE.	OCCUPATION.
WILLIAM H. BAKER, San Marcial, N. M.	I.	Resident Engineer, Atchison, Topeka, and Santa Fé Railroad.
HOWARD A. CARSON, 68 Devonshire Street, Boston.	I.	Civil Engineer.
J. RAYNER EDMANDS, Cambridge, Mass.	II.	In charge of Time Service at the Observatory of Harvard University.
WILLIAM RIPLEY NICHOLS, Boston, Mass.	V.	Professor of General Chemistry, Mass. Institute of Technology.
CHANNING WHITAKER, Box 524, Lowell, Mass.	II.	Mill Engineer.

1870.

*EDWARD K. CLARK,	II.	Died Sept. 10, 1878.
CHARLES R. CROSS, Boston, Mass.	Sci. and Lit.	Professor of Physics, Massachusetts Institute of Technology.
RUSSELL H. CURTIS, 59 Clark Street, Chicago, Ill.	I.	Lawyer.
CHARLES W. HINMAN, 28 Hawley St., Boston, Mass.	III.	State Inspector of Gas.
SAMPSON D. MASON, Brainard, Minn.	I.	Principal Assistant Engineer, Northern Pacific Railroad.
N. FREDERICK MERRILL, Salem, Mass.	V.	Chemist.
THEODORE F. TILLINGHAST, Warren Street, Boston.	I.	In Business.
EDMUND K. TURNER, Fitchburg, Mass.	I.	Assistant Superintendent and Chief Engineer, Fitchburg Railroad.
DANIEL W. WILLARD, 55 Broadway, New York City.	II.	Of the firm of Babb, Cook, & Willard, Architects.
LAWRENCE F. J. WRINKLE, Virginia City, Nev.	III.	Mining Engineer.

1871.

FOSTER E. L. BEAL, Ames, Ia.	I.	Prof. of Zoölogy and Comp. Anatomy, Iowa Agricultural College.
ADDISON CONNOR, Superior, Wis.	I.	Engineer on Northern Pacific Railroad.
*HENRY M. CUTLER,	I.	Died May 16, 1877.
*ELMER FAUNCE,	III.	Died July 6, 1882.
EDWARD H. FOOTE, 10 No. Market St., Boston, Mass.	I.	In Business.
FRANK L. FULLER, 7 Exchange Pl., Boston, Mass.	I.	Civil Engineer. Engineer, Wellesley Water Works.

NAME AND ADDRESS.	COURSE.	OCCUPATION.
HENRY M. HOWE, 75 State St., Boston, Mass.	III.	Mining Engineer.
ALBERT H. HOWLAND, 12 West St., Boston, Mass.	I.	Civil Engineer.
G. RUSSELL LINCOLN, Box 65, Harrisburg, Penn.	III.	In business.
WILLIAM A. PIKE, Minneapolis, Minn.	I.	Professor of Engineering, University of Minnesota.
GEORGE H. PRATT, South Boston, Mass.	V.	Chemist at the Bayside Alkali Works.
EDWARD W. ROLLINS, Box 2157, Denver, Col.	III.	Dealer in Investment Securities.
WALTER W. SMITH, Dayton, O.	II.	Builder of Steam Pumps and Hydraulic Machinery (Smith, Vaile, & Company.)
CHARLES F. STONE, Waltham, Mass.	III.	Lawyer.
*ALMARIN TROWBRIDGE, Jun.	II.	Died Dec. 5, 1878.
ISAIAH S. P. WEEKS, Corvalles, Ore.	I.	Engineer, Oregon Pacific Railroad.
RANDALL WHITTIER, Portland, Me.	V.	Union Mutual Life Insurance Company.
	1872.	
C. FRANK ALLEN, Topeka, Kan.	I.	Atchison, Topeka, and Santa Fé Railroad.
B. E. BREWSTER, Cheyenne, Wyoming Ter.	III.	Manager, War Bonnet Live Stock Company.
WILLIAM B. DODGE, Columbus, O.	I.	Scale Inspector, P. C. & St. L. R.R., Steubenville, O.
FREDERIC A. EMMERTON, Joliet, Ill.	V.	Chemist at the Joliet Iron and Steel Company's Works.
JAMES A. HERRICK, Pittsburg, Penn.	V.	General Superintendent, Spang Steel and Iron Company.
JAMES M. HODGE, Greenup, Ky.	III.	Mining and Civil Engineer, Eastern Kentucky Railroad.
BRADFORD H. LOCKE, Central City, Col.	III.	Mining Engineer.
CHARLES S. MINOT, Harvard Medical School, Boston, Mass.	V.	Instructor in Histology and Embryology.
MAURICE B. PATCH, Houghton, Mich.	III.	Assayer, Lake Superior Copper Company.
WALTER SHEPARD, Dorchester, Mass.	I.	Assistant Engineer, Boston and Albany Railroad.

NAME AND ADDRESS.	COURSE.	OCCUPATION.
RICHARD H. SOULE, Frankfort, Herkimer Co., N.Y.	II.	Superintendent of Motive Power, N. Y., W. S., & B. R'y.
CLARENCE S. WARD, 62 Sears Bu'ld'g, Boston, Mass.	III.	Lawyer.
		1873.
AMORY AUSTIN, 82 Water St., Boston, Mass.	V.	Chemist.
GEORGE W. BLODGETT, 63 Kilby St., Boston, Mass.	I.	Manufacturing Electrician, and Electrician, B. & A. R.R.
WILLIAM E. BROTHERTON, Cincinnati, O.	V.	Second National Bank.
*SAMUEL A FABENS, Jun.,	I.	Died March 14, 1875.
SAMUEL M. FELTON, Jun., Cleveland, O.	I.	Assistant to President of N. Y., L. E., & W. R'y Co.
FREDERICK L. FISHER, Medway, Mass.	I.	Ins. Agt. and Broker, 35 Kilby St., Boston, and Medway, Mass.
FREDERICK GUILD, Jun., 94 Boylston St., Boston, Mass.	Sci. and Lit.	Whittier Machine Company, 1176 Tremont Street.
WILLIAM D. HARRIS, 392 Nelson Street, Ottawa, P.Q., Canada.	I.	Assistant Chief Engineer, P. P. & J. Railway.
CLARENCE L. HOWES, Hanover, Mass.	I.	Physician.
*WILLIAM P. JEWETT.	I.	Died Jan. 4, 1884.
WILLIAM A. KIMBALL, 371 Canal St., New York City.	II.	Manufacturer's Agent and Manufacturer.
*WILLIAM C. MAY,	V.	Died March 11, 1878.
FRANK B. MORSE, Murphy's, Cal.	I.	Superintendent, Oro Plata Mining and Milling Company.
CHARLES O. PARSONS, 77 State St., Boston, Mass.	III.	Mining Engineer.
HENRY A. PHILLIPS, 13 Pemberton Sq., Boston, Mass.	IV.	Boston Bridge Works.
GEORGE PHILLIPS, Marshfield, Mass.	III.	Superintendent of Antimony Mine.
ELLEN H. RICHARDS, Boston, Mass.	V.	Instructor in Sanitary Chemistry, Mass. Institute of Technology.
HENRY L. RIPLEY, Care Horatio Adams, Box 2526, Boston, Mass.	I	Lieutenant U.S. Army, 24th Infantry.
ROBERT A. SHAILER, Milwaukee, Wis.	I.	Engineer, Bridges and Buildings, C., M. & St. P. R.R.
C. EDWARD STAFFORD, Steelton, Dauphin Co., Penn.	III.	Supt., Open Hearth Furnace, Steel Department, Penn. Steel Works.

NAME AND ADDRESS.	COURSE.	OCCUPATION.
SAMUEL E. TINKHAM, City Engineer's Office, Boston, Mass.	I.	Assistant Engineer, New York and New England Railroad.
FRANK W. VERY, Allegheny, Penn.	V.	Assistant Astronomer, Allegheny Observatory.
WEBSTER WELLS, Boston, Mass.	I.	Assistant Professor of Mathematics, Mass. Institute of Technology.
RANDALL WHITTIER,	I.	(See Record of Class of 1871.)
FRANCIS H. WILLIAMS, 100 Boylston Street, Boston, Mass.	V.	Physician.
LOUIS F. WOOD, 56 Broad St., Boston, Mass.	V.	Chemical and Color Manufacturer.

1874.

HERBERT BARROWS, 290 Franklin St., Boston, Mass.	I.	Of the Chauncy Rubber Company.
GEORGE H. BARRUS, 81 Milk St., Boston, Mass.	II.	Consulting Steam Engineer.
WILLIAM T. BLUNT, 25 Euclid Ave., Cleveland, O.	I.	Of the firm of Eisenmann & Blunt, Architects and Engineers.
GEORGE E. DOANE, Middleborough, Mass.	I.	Of the firm of J. & G. E. Doane, Hardware.
WILLIAM B. DOWSE, 290 Franklin St., Boston, Mass.	IV.	Of the Chauncy Rubber Company.
JOSEPH S. EMERSON, Honolulu, Hawaiian Islands.	I.	Civil Engineer, Government Survey.
ELIOT HOLBROOK, Hartford, Conn.	I.	Superintendent Hartford Division, N. Y. & N. E. R.R.
AECHIRAU HONGMA, Tokio, Japan.	I.	Civil Engineer.
CHARLES P. HOWARD, Hartford, Conn.	I.	With J. L. Howard &. Co., dealers in Railway and Car Builders' Supplies.
FRANK H. JACKSON, Maple Hill, Kan.	III.	Stock-raising.
*WILLIS H. MYRICK,	II.	Died Oct. 17, 1875.
HERBERT B. PERKINS, Appleton, Wis.	I.	Professor of Mathematics and Astronomy, Lawrence University.
FRANK H. POND, 709 Market St., St. Louis, Mo.	II.	Proprietor, Pond Engineering Company.
EDWARD S. SHAW, Boston, Mass.	I.	Bridge and Consulting Engineer, Boston and Lowell Railroad.
FRANCIS H. SILSBEE, Lawrence, Mass.	II.	Mechanical Engineer, Pacific Mills.

NAME AND ADDRESS.	COURSE.	OCCUPATION.
*ARTHUR W. SWEETSER,	I.	Died April 10, 1878.
*ROBERT C. WARE,	Sci. and Lit.	Died June 25, 1883.
STEPHEN H. WILDER, 65 West Third St., Cincinnati, O.	Sci. and Lit.	Lawyer.

1875.

SAMUEL E. ALLEN, 65 Chauncy Street, Boston.	I.	Agent for the Nashawanuck Manufacturing Company.
JAMES L. ARNOTT, 371 Canal St., New York City	Sci. and Lit.	In Business.
AMOS J. BOYDEN, 413 Walnut St., Philadelphia, Penn.	IV.	Architect.
MOSES D. BURNET, Ocala, Marion Co., Fla.	III.	Of the firm of Robinson, Burnet, & Co., Milling Business.
HENRY K. BURRISON, Boston, Mass.	I.	Instructor in Drawing in the Mass. Institute of Technology.
CHRISTOPHER P. CHURCH, Lewisburg, Greenbriar Co., W. Va.	I.	Sheep-farming.
FRANK S. DODGE, Cor. Ashland Ave. and Thirty-first Street, Chicago, Ill.	I.	With Union Iron and Steel Company.
EDGAR S. DORR, Mount Auburn, Mass.	I.	Employed in the Sewer Department, Boston, Mass.
WILLIAM C. EDES, San Francisco, Cal.	I.	Assistant Engineer on the Southern Pacific Railroad.
CHARLES W. GOODALE, Charlestown, Pima Co., Ariz.	III.	Supt. of Boston and Arizona Smelting and Reduction Works.
EDWARD A. W. HAMMATT, 5 Pemberton Sq., Boston, Mass.	I.	Civil Engineer.
EDW. A. HANDY, Care Palmer, Sullivan, & Co., City of Mexico, Mex.	I.	Civil Engineer.
*JAMES H. HEAD,	II.	Died Aug. 18, 1875.
THOMAS HIBBARD, Holyoke, Mass.	II.	Head Draughtsman, Deane Steam Pump Company.
*WILLIAM F. HUNTINGTON,	I.	Died Aug. 7, 1877.
LEONARD P. KINNICUTT, Worcester, Mass.	V.	Assistant Professor of Chemistry at Worcester Free Institute.
WILFRED LEWIS, Philadelphia, Penn.	II.	Mechanical Engineer with William Sellers & Co., Philadelphia, Penn.
SAMUEL J. MIXTER, 180 Marlboro' Street, Boston, Mass.	VIII.	Assistant in Anatomy, Harvard Medical School.

NAME AND ADDRESS.	COURSE.	OCCUPATION.
BENJAMIN A. OXNARD, Brooklyn, N.Y.	III.	Superintendent of Fulton Sugar Refinery.
THOMAS D. PLIMPTON, Hyde Park, Mass.	II.	Employed in the Manufacture of Woollen Goods.
WILLIAM A. PRENTISS, Holyoke, Mass.	Sci. and Lit.	Of the firm of George W. Prentiss & Co., Manufacturers, Iron Wire.
FRANCIS T. SARGENT, New York City.	II.	In Business.
WELLAND F. SARGENT, Pullman, Ill.	I.	In charge of Civil Engineering Dept., Pullman Palace Car Co.
WILLIAM H. SHOCKLEY, Candalaria, Esmeralda Co., Nev.	III.	Superintendent, Mount Diablo Mill and Mining Company.
JAMES B. STANWOOD, Mount Auburn, Cincinnati, O.	II.	Head Draughtsman and Engineer with Lane & Bodley.
H. L. J. WARREN, Red Cliff, Eagle Co., Col.	III.	Mining Engineer, and Editor "Eagle River Shaft."
WILLIAM R. WEBSTER, Athens, Penn.	III.	Bridge Inspector for Kellogg & Maurice.

1876.

CHARLES F. ALLEN, Occidental Hotel, San Francisco, Cal.	III.	Mining Engineer and Metallurgist.
THOMAS ASPINWALL, Brookline, Mass.	I.	Civil Engineer, 7 Exchange Place, Boston.
WILLIAM P. ATWOOD, Lowell, Mass.	V.	Chemist at the Hamilton Print Works.
THOMAS W. BALDWIN, Bangor, Me.	I.	In Business.
WALTER B. BARROWS, Middletown, Conn.	VIII.	Instructor in Botany and Assistant in Natural History, Wesleyan University.
AARON D. BLODGETT, 63 Kilby Street, Boston, Mass.	II.	Electrician.
JOSHUA B. F. BREED, 1026 Fourth Av., Louisville, Ky.	I.	Assistant City Engineer, Louisville. In charge of Sewers, West. Dist.
HARRY T. BUTTOLPH, Buffalo, N.Y.	I.	Assistant Engineer, City Engineer's Office.
WILLIAM O. CROSBY, Boston, Mass.	VII.	Assistant Professor of Mineralogy and Lithology, Mass. Institute of Technology.
FREDERICK K. COPELAND, 175 Dearborn St., Chicago, Ill.	I.	General Agent, Diamond Prospecting Company.
WILLIS E. DAVIS, San Francisco, Cal.	Sci. and Lit.	Employed by Davis & Cowell, Manufacturers of Santa Cruz Lime.

NAME AND ADDRESS.	COURSE.	OCCUPATION.
*CLARENCE L. DENNETT,	II.	Died June 5, 1878.
CHARLES R. FLETCHER, Boston, Mass.	V.	Lecturer on Chemistry in Boston Univ., and Mass. State Assayer.
JOHN R. FREEMAN, Lawrence, Mass.	I.	Principal Assistant Engineer, Essex Water-Power Company.
FRANCIS E. GALLOUPE, 30 Kilby Street, Boston, Mass.	II.	Mechanical Engineer.
*ROBERT H. GOULD,	VI.	Died Nov. 19, 1878.
JOHN B. HENCK, Jun. Longwood, Orange Co., Fla.	VIII.	Real estate Agent.
FRANK W. HODGDON, Arlington, Mass.	I.	Asst. Engineer with the Harbor and Land Commissioners of Mass.
SUMNER HOLLINGSWORTH, South Braintree, Mass.	II.	President of Hollingsworth & Whitney Paper Company, Boston.
SILAS W. HOLMAN, Boston, Mass.	VIII.	Assistant Professor of Physics, Mass. Institute of Technology.
ALFRED E. HUNT, 98 Fourth Ave., Pittsburg, Penn.	III.	Chemical Department, Pittsburg Testing Laboratory.
WILLIAM W. JACQUES, 95 Milk St., Boston, Mass.	VIII.	Electrician of the Am. Bell Telephone Co., and Instructor, Mass. Institute of Technology.
SAMUEL JAMES, Jun., Cooke City, Montana Ter.	III.	Superintendent, Republic Mining Company.
ALFRED C. KILHAM, Springfield, Mo.	II.	Employed in repair shops of St. Louis and San Francisco Railroad.
J. AUSTIN KNAPP, Abington, Mass.	II.	Of the firm of J. B. Knapp & Co.
THEODORE J. LEWIS, 2224 Greene St., Phila'phia, Penn.	II.	With the Standard Steel Works, 220 South Fourth St.
ALBERT H. LOW, Argo, Col.	V.	Chemist, Boston and Colorado Smelting Company.
CHARLES T. MAIN, Lawrence, Mass.	II.	Engineer at the Pacific Mills.
ARTHUR L. MILLS, Everett, Mass.	I.	Civil Engineer (in California).
WILLIAM E. NICKERSON, 351 Broad'y, N. Somerville, Mass.	V.	Chemist.
D. W. PHIPPS, 209 Washington St., Boston.	Phil.	Counsellor at Law.
CHARLES F. PRICHARD, Lynn, Mass.	II.	Superintendent of the Lynn Gas-Light Company.
HENRY RAEDER, Jun., Aurora, Ill.	I.	Assistant Engineer of Chicago, Burlington, and Quincy Railroad.
CHARLES L. RICH, East Jaffrey, N.H.	I.	Book-keeper, Monadnock National Bank.

NAME AND ADDRESS.	COURSE.	OCCUPATION.
*T. W. ROBINSON,	III.	Died Nov. 3, 1880.
CHARLES A. SAWYER, Ashland Block, Chicago, Ill.	Sci. and Lit.	Attorney at Law.
THEODORE E. SCHWARZ, Silverton, Col.	III.	Mining Engineer, Yankee Girl and North Star Mining Companies.
JULIUS H. SUSMANN, 273 Wash't'n, St., Boston, Mass.	III.	In Business.
WALTER D. TOWNSEND, Yokohama, Japan.	III.	With the American Clock and Brass Company.
CHARLES N. WAITE, 23 Court St., Boston, Mass.	V.	Chemist, Avery Lactate Company.
HENRY M. WAITT, 1401 Sixth St., S.E., Minneapolis, Minn.	I.	In Business.
*ROBERT C. WARE,	Phil.	Died June 25, 1883.
HENRY B. WOOD, 2828 Wash't'n Ave., St. Louis, Mo.	I.	Assistant Engineer, U.S. Survey of the Mississippi River.

1877.

JOHN ALDEN, Lawrence, Mass.	V.	Chemist at the Pacific Mills.
GEORGE BARTOL, Cleveland, O.	III.	Employed at the Otis Iron and Steel Works.
CHARLES S. BACHELDER, San Francisco, Cal.	V.	Exchange Teller in the Pacific Bank.
J. WILLIAMS BEAL, Hanover P.O., So. Scituate, Mass.	IV.	Architectural Draughtsman.
WILLIAM H. BEECHING, 61 Bl'kstone St., Boston, Mass.	II.	In the Cork Business.
HENRY H. CARTER, 55 St. James St., Roxbury, Mass.	I.	Engineer in charge, Farm Pond Conduit, Boston Water Works.
G. WALTER CAPEN, Canton, Mass.	IV.	Architect.
WILLIAM E. CHAMBERLIN, 6 Beacon St., Boston, Mass.	IV.	Architect.
*GEORGE R. CHAPMAN,	II.	Died Jan. 21, 1879.
LINUS FAUNCE, Boston, Mass.	II.	Assistant Professor of Drawing, Mass. Inst. of Technology.
CHARLES H. FISHER, Ponkapoag P.O., Canton, Mass.	II.	Asst. Prof. of Mechanical Engineering, Mass. Inst. of Technology.
*WILLIAM C. FLINT,	III.	Died June 14, 1881.
PIERCE P. FURBER, 322 Pine St., St. Louis, Mo.	IV.	In charge of office of Peabody & Stearns, Architects.
MARTIN GAY, W. New Brigh'n, Staten Isl., N.Y.	I.	Assistant Engineer, Department of Public Works of New York City.

NAME AND ADDRESS.	COURSE.	OCCUPATION.
JOSEPH P. GRAY, Grand Street, Lowell, Mass.	I.	Assistant Engineer in office of Proprietors of Locks and Canals on Merrimack River.
EDMUND GROVER, Hoosac Falls, N.Y.	I.	Civil Engineer.
RICHARD A. HALE, Lawrence, Mass.	I.	Assistant Engineer with the Essex Water Power Company.
JOHN E. HARDMAN, Box 396, Lowell, Mass.	III.	Mining Engineer and Metallurgist.
HENRY D. HIBBARD, South Boston, Mass.	III.	Steel Melter, Norway Iron and Steel Company.
WALTER JENNEY, 56 G St., So. Boston, Mass.	III.	Chemist at Stephen Jenney & Co.'s Coal Oil Works.
JOSEPH KIRK, Box 174, Rondout, N.Y.	II.	Mechanical Engineer for Wallkill Portland Cement Company.
GEORGE W. KITTREDGE, Zanesville, O.	I.	Engineer, Maintenance of Way, Muskingum Valley Div., Pittsburg, Cincinnati, & St. Louis R.R.
CHARLES F. LAWTON, New Bedford, Mass.	I.	Eng. Department, Atlantic and Pacific Railroad, Chino, Arizona.
BENJAMIN C. MUDGE, 72 Summer St., Lynn, Mass.	I.	With the Deane Steam Pump Co. of Holyoke.
CECIL H. PEABODY, Boston, Mass.	II.	Asst. Prof. of Applied Mechanics, Mass. Institute of Technology.
ARTHUR L. PLIMPTON, 7 Hawthorn St., Roxb'y, Mass.	I.	Marine and Landscape Photographer.
HARRY C. SOUTHWORTH, Hancock, Houghton Co., Mich.	III.	Mining Engineer.
*CHARLES E. STEWART,	I.	Died Oct. 7, 1877.
THOMAS F. STIMPSON, Providence, R.I.	III.	With the Silver Spring Bleaching and Dyeing Company.
GEORGE F. SWAIN, Boston, Mass.	I.	Asst. Professor of Civil Engineering, Mass. Inst. of Technology.
FRANK E. WIGGIN, Cordoba, Argentine Republic.	I.	National Observatory.
FREDERICK W. WOOD, Steelton, Dauphin Co., Penn.	III.	Assistant Superintendent, Pennsylvania Steel Company.

1878.

WILLIAM B. ALLBRIGHT, Chicago, Ill.	V.	Chemist with N. K. Fairbank, 18th and Blackwell Sts.
CHARLES M. BAKER, 74 Devonshire St., Boston, Mass.	IV.	With Chase & Barstow, Bankers and Brokers.
TAKUMA DAN, Osaka, Japan.	III.	Professor of Chemistry, Osaka University.

NAME AND ADDRESS.	COURSE.	OCCUPATION.
CHARLES S. EATON, 63 Hanover St., Boston.	IV.	In Business.
ALFRED S. HIGGINS, 130 Court St., Boston, Mass.	IV.	With R. R. Higgins & Co.
JULIAN A. KEBLER, Chariton, Lucas Co., Iowa,	I.	Trackmaster, Chicago, Burlington, and Quincy Railroad.
FRANK H. MORGAN, Springfield, Mass.	V.	Chemist, with Newell Bros. Manufacturing Company.
EVERELL J. NICHOLS, Burlington, Iowa,	I.	Engineer Corps, Chicago, Burlington, and Quincy Railroad.
FREDERICK H. PRENTISS, 28 State St., Boston, Mass.	II.	Mechanical Engineer.
JAMES RITCHIE, Wilson's Point, La.	I.	Assistant Engineer, Mississippi River Improvement.
JAMES W. ROLLINS, Jun., 55 Broadway, New York City.	I.	With M. T. Seymour, Contractor.
CHARLES D. SAWIN, 368 Main St., Charlest'n, Mass.	Sci. and Lit.	House Physician, Boston City Hospital.
PETER SCHWAMB, Boston, Mass.	II.	Asst. Prof. of Mechanism, Mass. Inst. of Technology.
FREDERIC P. SPALDING, 471 Middlesex St., Lowell, Mass.	I.	Employed in the City Engineer's Office, Boston, Mass.
ISAAC M. STORY, Boston, Mass.	I.	Chief Engineer, Boston and Lowell Railroad.
EDMUND TANEY, Washington, D.C.	I.	With the U.S. Coast and Geodetic Survey.
LINWOOD O. TOWNE, Rico, Col.	III.	Assayer, Grand View Mining and Smelting Company.
EMILE F. WILLIAMS, 230 Wash't'n St., Boston, Mass.	I.	In Business.
JAMES G. WOOLWORTH, Providence, R.I.	V.	Chemist with Silver Spring Bleaching and Dyeing Company.

1879.

WALTER S. ALLEN, Boston, Mass.	V.	Instructor in Chemical Analysis, Mass. Institute of Technology.
SAMUEL T. BRALEY, Rutland, Vt.	II.	Draughtsman, Howe Scale Company.
JOHN W. CABOT, Johnstown, Penn.	III.	Superintendent, Open Hearth Furnace, Cambria Iron Company.
HARRY H. CAMPBELL, Steelton, Dauphin Co., Penn.	III.	Asst. Supt., Basic Bessemer Dept., Pennsylvania Steel Company.
FRED. S. COFFIN, Auburndale, Mass.	III.	With Stoddard, Lovering, & Co., 10 Milk Street, Boston, Mass.

NAME AND ADDRESS.	COURSE.	OCCUPATION.
W. Otis Dunbar, 223 S. Fourth St., Phila., Penn.	II.	Signal Department, Pennsylvania Railroad.
George W. Fabens, Burlington, Iowa.	I.	Engineer Corps, Chicago, Burlington, & Quincy Railroad.
Charles S. Gooding, 89 Court St., Boston, Mass.	II.	Mechanical Engineer and Draughtsman.
Ernest G. Hartwell, 68 Devonshire St., Boston, Mass.	IV.	With Hartwell & Richardson, Architects.
Raphael M. Hosea, Johnson Building, Cincinnati, O.	I.	Of L. M. and R. M. Hosea, Solicitors of For'gn and Am. Patents.
Horace J. Howe, St. Paul, Minn.	I.	Engineering Department, Northern Pacific Railroad.
Fred. B. Knapp, Cambridge, Mass.	I.	Superintendent of Buildings and Instructor in Surveying and Drawing, Harvard University.
Fred. H. Lane, Chambersburg, Penn.	II.	Superintendent of the Chambersburg Woollen Mills.
Fred. R. Loring, 8 Greenwich Pk., Boston, Mass.	VII.	Studying in Germany.
William W. Macfarlane, Philadelphia, Penn.	V.	Assistant Superintendent, Quaker City Dye Works.
Arthur H. Metcalf, Pawtucket, R.I.	II.	Manager, Campbell Machine Company.
Edwin C. Miller, 611 Wash'n St., Boston, Mass.	II.	With Henry F. Miller, Piano Manufacturer.
Edward H. Owen, Jun., Lowell, Mass.	II.	Mill Engineer, Lowell Machine Shop.
William H. Pickering, Boston, Mass.	VIII.	Instructor in Physics, Massachusetts Institute of Technology.
George F. Riggs, Memphis, Tenn.	I.	Assistant Engineer, K. C., S., and M. R.R.
Frank G. Stantial, Melrose, Mass.	V.	In charge of Cochrane Chemical Company's Ammonia Works, East Cambridge.
William S. Stearns, Lockland, O.	I.	Superintendent, Stearns & Foster Company's Cotton Factory.
Arthur M. Waitt, 37 Arch St., Boston, Mass.	II.	Mechanical Engineer, Eastern Railroad.

1880.

George H. Barton, Boston, Mass.	III.	Assistant in Geology, Massachusetts Institute of Technology.
Charles H. Brown, Cleveland.	I.	Division Engineer, C. C. C. & I. R.R.

NAME AND ADDRESS.	COURSE.	OCCUPATION.
EDWIN E. CHASE, Central City, Col.	I.	United States Deputy Surveyor.
FREDERICK W. CLARK, Boston, Mass.	III.	Instructor in Mining and Metallurgy, Mass. Institute of Technology.
GEORGE W. HAMILTON, Wrentham, Mass.	I.	Civil Engineer.
LORING R. MILLEN, 16 Beaver St., New York City.	III.	Wholesale Lumber Dealer with Bacon, Pike, & Co.
WILLIAM T. MILLER, 611 Wash'n St., Boston, Mass.	Elective.	With Henry F. Miller, Piano Manufacturer.
*NATHANIEL C. SMALL,	V.	Died July 14, 1880.

1881.

IRA ABBOTT, Windsor Hotel, Montreal, P.Q.	I.	Vice-President and Assistant Engineer, Dominion Bridge Company.
JOHN H. ALLEN, Box 733, Pueblo, Col.	III.	Chemist, Pueblo Smelting and Refining Company.
*JAMES S. ATKINSON,	II.	Died December, 1883.
AMOS BINNEY, A.B., Walpole, Mass.	V.	Chemist, Walpole Dye and Chemical Works.
DAVID S. BISSELL, Pittsburg, Penn.	III.	Chemist.
FRANK H. BRIGGS, 178 High St., Boston, Mass.	IX.	With W. L. Montgomery, Broker in East-India Goods.
FRANK E. CAME, Windsor Hotel, Montreal, P.Q.	I.	Assistant Engineer, Dominion Bridge Company.
FRANK D. CHASE, Rochester, N.Y.	III.	Superintendent, Municipal Gas-Light Company.
BENJAMIN G. COLLINS, Edgartown, Mass.	II.	Mate, Schooner "Ira Bliss."
HARRY H. CUTLER, 19 W. Cedar St., Boston, Mass.	II.	Mill Superintendent.
F. GRAEF DARLINGTON, Arch St., Allegheny City, Penn.	IX.	Engineer of Maintenance of Way, P. C. and St. L. Division, P. C. and St. L. Railroad.
JOHN DUFF, Jun., Atlanta, Alturas Co., Ida.	V.	Superintendent, Big Lode Mining Company.
DAVID S. GODDARD, Steelton, Penn.	III.	In charge of Forge and Sp. Steel Department, Penn. Steel Co.
MARIE O. HOLMAN, A.M., Hotel Columbus, Boston, Mass.	V.	
WALTER J. KOEHLER, Pueblo, Col.	V.	Assistant Metallurgist, Pueblo Smelting and Refining Company.

NAME AND ADDRESS.	COURSE.	OCCUPATION.
EDWIN J. LEWIS, Jun., Adams St., Dorchester, Mass.	IV.	Draughtsman, Peabody & Stearns.
WILLIAM B. LINDSAY, A.B., Boston, Mass.	V.	Assistant in Chemical Analysis, Mass. Institute of Technology.
JAMES LUND, Ithaca, N.Y.	V.	Instructor in Chemical Analysis, Cornell University.
GEORGE A. MOWER, West Newton, Mass.	II.	Expert Engineer, Crosby Steam Gauge and Vapor Company.
WEBSTER NORRIS, Melrose, Mass.	III.	Chemist and Assayer.
EVELYN M. ORDWAY, Jamaica Plain, Mass.	V.	
THEODORE PARKER, Creston, Ia.	I.	Engineer on Western Division, C., B., and Q. R.R.
NATHANIEL W. SHED, Nashua, N.H.	V.	Chemist with the Nashua Iron and Steel Company.
WILLIAM R. SNEAD, 318 W. Chestnut St., Louisville, Ky.	IV.	Superintendent, Snead & Co.'s Architectural Iron Works.
HAROLD E. STEARNS, Montreal, P.Q.	II.	Proprietor, Dominion Wadding Company's Mills.
EDWARD R. WARREN, Crested Buttes, Col.	VII.	Assayer and Chemist.
CHARLES M. WILKES, 5 Bulfinch Pl., Boston, Mass.	IV.	Civil Engineer.
ARTHUR WINSLOW, Hazleton, Penn.	III.	Assistant Geologist, Second Geological Survey of Pennsylvania.

1882.

CLARA P. AMES, Northampton, Mass.	V.	Teacher in Girls' Classical School.
THOMAS B. CARSON, Moline, Ill.	II.	Vice-President and Manager, Moline Screw Company.
EDWARD F. ELY, A.B., Boston, Mass.	IV.	Instructor in Architecture, Massachusetts Institute of Technology.
GEORGE FAUNCE, Jun., A.B., Mansfield Valley, Allegheny Co., Penn.	III.	Assistant Superintendent of Pennsylvania Lead Company's Works.
HARRY A. FOSS, Jamaica Plain, Mass.	II.	Student of Law at Boston University.
CHARLES A. FRENCH, Boston, Mass.	III.	Assistant in Mathematics, Massachusetts Institute of Technology.
HOWARD V. FROST, Arlington, Mass.	V.	Instructor in General Chemistry, Mass. Institute of Technology.

NAME AND ADDRESS.	COURSE.	OCCUPATION.
EDWARD G. GARDINER, Baring Bros., London, Eng.	VII.	Student, Leipzig, Germany.
FRANCIS P. HALL, Columbia St., Dorchester, Mass.	V.	Travelling.
GEORGE L. HEINS, 33 E. 17th St., New York City.	IV.	Architect.
CHARLES D. JENKINS, 32 Hawley St., Boston, Mass.	V.	Assistant State Inspector of Gas.
JAMES W. JOHNSON, Chelsea, Mass.	I.	Assistant Engineer, Hyde Park Water Works.
JOHN F. LOW, Chelsea, Mass.	V.	Of the firm of J. G. & J. F. Low, Art Tile Works.
HARRY G. MANNING, Box 244, Newton, Mass.	II.	Mechanical Engineer, Boston and Albany Railroad Machine Shops.
GEORGE W. MANSFIELD, Greenville, N.J.	III.	Assistant Electrician, Daft Electric Light Company.
FRANK C. MORRISON, So. Framingham, Mass.	I.	Assistant, Boston Water Works.
JAMES P. MUNROE, Boston, Mass.	III.	Secretary, Massachusetts Institute of Technology.
CARRIE L. RICE, Denver, Col.	V.	Assistant in the Denver High School.
WILLIAM T. RIPLEY, Rutland, Vt.	II.	Superin'dent, Ripley Sons' Wholesale Marble Works.
HENRY F. ROSS, Jamaica Plain, Mass.	III.	With Boston Thread and Twine Company.
JOHN H. ROSS, 189 Devonshire St., Boston, Mass.	Elective.	With Ross, Turner, & Co.
GRENVILLE T. SNELLING, Paris, France.	IV.	Studying Architecture.
WALTER B. SNOW, Watertown, Mass.	II.	With B. F. Sturtevant, Blowers and Engines, Jamaica Plain.
ANTHONY C. WHITE, Boston, Mass.	VIII.	Asst. Electrician, N. E. Weston Electric Light Company.

1883.

HERBERT T. BARDWELL, Box 1265, Springfield, Mass.	I.	With Holyoke Water Power Company.
GEORGE H. BRYANT, Lowell, Mass.	II.	Office of Proprietors of Locks and Canals.
HARVEY S. CHASE, Manchester, N.H.	II.	Employed in the Manchester Mills.
FRANK E. DAVIS, Washington, D.C.	II.	Ordnance Department.

NAME AND ADDRESS.	COURSE.	OCCUPATION.
JOHN G. EPPENDORFF, 111 Broadway, New York City.	IV.	With J. C. Cady & Co., Architects.
GEORGE J. FORAN, 54 Oliver St., Boston, Mass.	II.	With Deane Steam Pump Company.
WILLIAM B. FULLER, Lock Box 1053, Bismarck, D.T.	I.	Travelling Engineer between St. Paul and Helena, N. P. R.R.
HORACE B. GALE, Boston, Mass.	II.	With N.E. Weston Electric Light Company.
GEORGE H. GUSTIN, 140 W. Newton St., Boston, Mass.	III.	In business.
FREDERIC O. HARRIMAN, Jaltipan, Mex.	I.	Tehuantepec Inter-Oceanic Railroad.
JAMES H. HUTCHINGS, Boston, Mass.	II.	Student, Massachusetts Institute of Technology.
HARVEY M. MANSFIELD, Wakefield, Mass.	III.	Chemist, Common Sense Fertilizer Co., 42 Congress St., Boston.
ROBERT W. SCOTT, Philadelphia, Penn.	II.	With Southwark Foundry and Machine Company.
GEORGE A. SMITH, So. Chicago, Ill.	V.	Assistant Chemist, No. Chicago Rolling Mill Company.
FRANK TENNEY, Steelton, Dauphin Co., Penn.	III.	With Penn Steel Company.
CHARLES H. TOMPKINS, Jun., Boise City, I.T.	III.	Assistant Engineer, Mining and Irrigation Company.
GEORGE R. UNDERWOOD, Boston, Mass.	V.	Assistant in Industrial Chemistry, Mass. Institute of Technology.
DAVID WESSON, 59 Wabash Ave., Chicago, Ill.	V.	With N. K. Fairbanks & Co.

1884.

CHARLES B. APPLETON, Boston, Mass.	II.	Asst. in Mechanical Engineering, Mass. Inst. of Technology.
H. F. BALDWIN, Louisville, Ky.	II.	Asst. Engineer's Office, Louisville & Nashville R.R.
FRED. L. BARDWELL, Boston, Mass.	V.	Assistant in General Chemistry, Mass. Institute of Technology.
T. HARRIS BARTLETT, Ainsworth, W.T.	III.	Civil Eng. Dept., Northern Pacific R.R.
H. A. BOARDMAN, Providence, R.I.	V.	Chemist, Silver Spring Bleaching and Dyeing Company.
CHARLES C. BOTHFELD, Wilmington, Del.	I.	With Edge Moor Iron and Steel Company.
ALICE I. BROWN, Bradford, Mass.	V.	Teacher, Bradford Academy.

NAME AND ADDRESS.	COURSE.	OCCUPATION.
W. FRANK CARR, Minneapolis, Minn.	I.	Instructor in Civil Engineering University of Minnesota.
C. J. CARVEN, 125 Broad'y, So. Boston, Mass.	I.	City Engineer's Office.
ROSCOE L. CHASE, Albany, N.Y.	V.	With Albany Aniline & Chemical Works, Albany, N.Y.
A. O. DOANE, Newtonville, Mass.	III.	Travelling.
A. L. FITCH, Chicago, Ill.	II.	In business.
GEORGE L. R. FRENCH, Lincoln, Neb.	I.	With Burlington and Missouri River Railroad.
A. H. GILL, Boston, Mass.	V.	Assistant in Sanitary Chemistry, Mass. Institute of Technology.
F. M. HAINES, Ainsworth, W.T.	III.	Civil Eng. Dept., Northern Pacific R.R.
GEORGE H. HEYWOOD, Gardner, Mass.	II.	With Heywood Bros., Chair Mfs.
JAMES G. HOLDER, Lynn, Mass.	V.	Studying Pharmacy.
GEORGE F. KNAPP, Cambridge, Mass.	III.	Assistant in Mining Laboratory, Mass. Institute of Technology.
CAPT. D. A. LYLE, U.S.A., Box 2253, Boston, Mass.	III.	Inspector of Ordnance, United States Army.
PHILIP S. MORSE, Pueblo, Col.	III.	Travelling.
C. O. PRESCOTT, Boston, Mass.	V.	Assistant in Chemical Analysis, Mass. Institute of Technology.
WILLIAM L. PUFFER, Boston, Mass.	III.	Assistant in Physical Laboratory, Mass. Institute of Technology.
A. J. PURINTON, Boston, Mass.	II.	Assistant in Mechanical Engineering, Mass. Inst. of Technology.
WILLIAM J. RICH, Boston, Mass.	III.	Private Assistant to Prof. Richards, Mass. Institute of Technology.
C. SNELLING ROBINSON, Wareham, Mass.	III.	Graduate Student, Massachusetts Institute of Technology.
THEODORE W. ROBINSON, Wareham, Mass.	III.	Graduate Student, Massachusetts Institute of Technology.
A. LAWRENCE ROTCH, 3 Com'wealth Av., Boston, Mass.	II.	Student of Meteorology.
J. P. RYDER, College Hill, Mass.	V.	Assistant in Chemistry, Tufts College.
AMY M. STANTIAL, Melrose, Mass.	V.	Private Assistant to Prof. Nichols, Mass. Institute of Technology.

NAME AND ADDRESS.	COURSE.	OCCUPATION.
A. STEBBINS, Jun., Roxbury, Mass.	III.	In business.
ELLIOT T. STURGIS, Boseman, M.T.	III.	Placer Mining.
HARRY W. TYLER, Boston, Mass.	V.	Assistant in Mathematics, Massachusetts Institute of Technology.
NAHUM WARD, Boston, Mass.	V.	With N. Ward Co.
WILLIAM M. WHITNEY, Winchendon, Mass.	II.	With Baxter D. Whitney, Mfs. Woodworking Machinery.
F. C. WILLIAMS, Jun., Roxbury, Mass.	I.	Assistant in Applied Mechanics, Mass. Institute of Technology.

Alumni will confer a favor by informing the Secretary of the Faculty of any change of address or occupation.

Other persons who have been connected with the Institute for one year or more will also confer a favor by informing the Secretary of the Faculty of their address and occupation.

It should be noticed that the graduates comprise but about one-fifth of all the students who have in the past been connected with this school.

SUMMARY.

Class of 1868	14	Class of 1877	32
" " 1869	5	" " 1878	19
" " 1870	10	" " 1879	23
" " 1871	17	" " 1880	8
" " 1872	12	" " 1881	28
" " 1873	26	" " 1882	24
" " 1874	18	" " 1883	18
" " 1875	29	" " 1884	35
" " 1876	43		
Total			361
Deduct names counted twice			2
			359

GRADUATES

FROM THE

SCHOOL OF MECHANIC ARTS.

1879.

Wm. F. M. Goss, Lafayette, Ind.	Instructor in the Mechanic Arts, Purdue University.
Jas. W. Lawrence, Fort Collins, Col.	Professor of Mechanics and Drawing in State Agricultural College.
Geo. A. Smith, Arlington, Mass.	Graduate of School of Industrial Science, in the class of 1883. (See record of that class.)

1880.

M. Pennock Barnard, Steelton, Dauphin Co., Penn.	Clerk in store of Penn. Steel Co.
*Arthur W. Sanborn,	Died Sept. 17, 1884.

1881.

Parker C. Choate.	——
George A. Coburn, Hopkinton, Mass.	Worked with N. E. Weston Electric Light Co. till he injured his eyes. Not working at present.
Jas. F. Dorsey, 22 Commerce St., Hartford, Conn.	In Business.
Walter E. Frost, Neponset, Mass.	In Business, 26 Federal St., Boston.
Chas. F. Hopkins, 113 Liberty Street, New York.	In a Brass Foundry.
Harry M. Pope, Denver, Colorado.	Agent for Columbia Bicycles.
Lyman Sise.	——

1882.

Solomon F. Cushman, Monson, Mass.	With his father, manufacturing Fancy Cassimeres.
Robert B. Tweedy, Milwaukee, Wis.	On the Survey of the Wisconsin Central R.R.

1883.

HENRY H. DREW, 19 Jay St., Cambridgeport, Mass.	With J. L. Drew & Son, Gold and Silver Refiners, Boston.
JOHN W. HINKLEY, Cor. High and Irving Sts., Brookline, Mass.	Draughtsman at Boston Bridge Works.
WM. R. MAXWELL, Mass. Institute of Technology, Boston.	Assistant in Wood Work, School of Mechanic Arts.
RUDOLPH F. STAHL, 792 Tremont Street, Boston.	In Business.

1884.

WM. L. DEARBORN, Dorchester, Mass.	Student, School of Ind. Science, Mass. Inst. Tech.
HARRY O. EDWARDS, Montreal, P. Q.	——
MICHAEL GOLDEN, Lafayette, Ind.	Assistant in Shopwork, Purdue University.
EDWARD J. HASSETT, Lowell, Mass.	——
CHAS. S. L. KENNEDY, North Eaton, Mass.	——
ARTHUR F. TOWNSEND, Sandy Hook, N. J.	With New York Belting and Packing Co.
WALTER E. TRUFANT, Abington, Mass.	——

SUMMARY.

Class of 1879	3
" " 1880	2
" " 1881	7
" " 1882	2
" " 1883	4
" " 1884	7
Total	25

GRADUATES

FROM THE

LOWELL SCHOOL OF PRACTICAL DESIGN.

[Of the ladies reported without employment in the following list, eight have been married since graduation: they appear on the list with the names with which they received the certificate of the School.]

1875.

Everett Anthes	Manchester Print Co., Boston.
Annie W. Barnard	At home. Florida.
James B. Folsom	Hartford Carpet Co., Thompsonville, Conn.
H. J. Green	Teacher of Drawing. South Boston.
Howard Hinckley	Hamilton Woollen Co., N.Y.
Mary I. Jefferson	Manchester Print Co., Boston.
Alexander Johnston	Pacific Mills, Lawrence.
Elizabeth Mendum	At home. Boston.
Henry Morse	Artist.

1876.

Charles H. Cowdrey	Hamilton Manuf'ring Co., Boston, Mass.
Edgar Eames	Pacific Mills, Boston.
Silas R. Eaton	Pacific Mills, Boston.
Carrol S. Faunce	Pacific Mills, Boston.
Ernest R. Pierce	Physician.
Minnie C. Ricker	At home.

1877.

Mary E. Frederick	Oil Cloth Designer.
Caroline S. Greene	Crayon Artist. Boston.
Samuel Hudson	Pacific Mills, Lawrence.
Henry P. Mabille	American Print Co., New York.
Salmon C. Pennock	Artist, Flower Painting. Boston.
*William Schroeder	Died June, 1880.
*Kate T. Simonds	Deceased.
Annie D. Stimers	At home. New York.
John H. Tarbell	Donnell Manufacturing Co., New York.

1878.

Frank Hyde	Merrimac Print Co., Boston.
Harriet A. Parker	Roxbury Carpet Co., Roxbury.
Caroline L. Stafford	At home. Boston.
Harry M. Symmes	Merrimac Print Co., Boston.
Fannie W. Tewksbury	Artist, Flower Painting. Newtonville.
Charles H. Underwood	At home.
Charles A. Washburne	Amsterdam Carpet Co., Amsterdam, N.Y.
Reuben Winslow	Merrimac Print Co., Boston.

1879.

George Albro	Pacific Mills, New York City.
Elizabeth C. Bott	At home. Boston.
Eva M. Close	At home.
*Charles C. Cox	Deceased.
Abbott Grave	Artist in Flowers. Boston.
Mindora Kennedy	Artist in Wax Flowers. Boston.
John McMann	Lowell Carpet Co., Boston.
Hermann W. Meierhardt	In Business. Boston.
William V. O'Leary	New England Glass Co., Cambridge.
William H. C. Pierce	——
Helen Smiley	Teacher of Drawing. Waterville, Me.
Florence Starbuck	Crayon Artist. Jamaica Plain.
Frank P. Woods	At home. Calais, Me.

1880.

Marie Therese Baker	Oil Cloth Designer. Providence, R.I.
Lizzie F. Burnes	At home. Boston.
Mary T. F. Cook	Drawing, with Robinson Engraving Co.
Abraham Doolittle	Designer, Ames Sword Co., Chicopee, Mass.
Clarence H. Lewis	New England Glass Co., Cambridge.
Philip Little	Artist in Water Color. Boston.
Frederic R. Tower	Pacific Mills, New York.
Delphina Weston	Asst. in Designing, Lowell School of Design.
Henry S. White	At home.

1881.

James B. Boardman	At home. Saugus.
Leila D. Collins	At home.
Abbie A. French	Teacher of Drawing. Franklin Falls, N.H.
Grace A. French	Teacher of Drawing. Franklin Falls, N.H.
Ella C. Frost	Lowell Carpet Co., Boston.
Gustave B. Kiander	At home. Boston.

Clara Leeman	Arlington Mills, Lawrence.
John T. McBarron	Mystic Carpet Co., Boston.
Louisa M. Ordway	At home. Jamaica Plain, Mass.
Andreas Sass	American Print Works.
Fidelia Sheldon	Artist.
Frank L. Tainter	At home.
Albert F. Urban	At home.
Lucy W. Valentine	Lowell Carpet Co., Boston.
Edward F. Whitmore	Putnam Woollen Co., Putnam, Conn.

1882.

Winthrop E. Benner	At home.
Mabel J. Boyd	Mystic Carpet Mills, Medford.
Henry F. Bryant	Forbes Lithographic Co.
Alex. B. Clough	Merrimac Print Works.
Walter T. Dana	Lowell Carpet Mills.
Emma F. Dowd	Manchester Print Works.
Charles Gowing	Pacific Mills.
Arthur A. Haserick	Arlington Mills, Lawrence.
Arthur S. Leland	Methuen Woollen Mills.
George D. Rice	Marysville Woollen Mills, California.
Ida C. Rogers	At home.
John Scott	Assistant in Textile Department, Mass. Institute of Technology.
Lucius E. Shattuck	Arnold Print Works.
Reuben Simmons	At home.

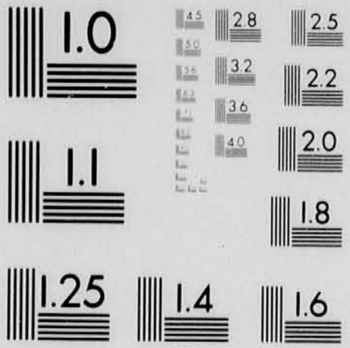
1883.

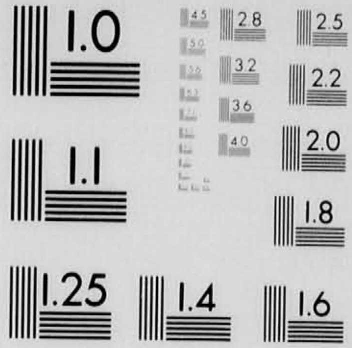
Thomas D. Aylward	Designer for Embroidery. Boston.
George H. Baker	Designer for Wall Paper.
Edward D. Chandler	Carpet Designer.
Solomon F. Cushman	Monson Woollen Mills.
Fred W. Dillon	Springfield Woollen Mills.
Eric Ericson	Pacific Mills. Print Designer.
Edwin C. Foss	Designer. At home. Boston.
Annie W. Mennig	At home. Print Designer.
Walter H. Hersey	N. Andover Woollen Mills.
Herbert W. Munn	Designer. Boston.
Gertrude Rauch	Teacher of Painting.
W. H. Weeks	Embroidery Designer. Boston.
Emily M. Whitten	Flower Painter. Lowell.
Fred N. Williams	Wall Paper designer. Corse & Smith.
Carrie M. Winkley	At home. Carpet Designer.

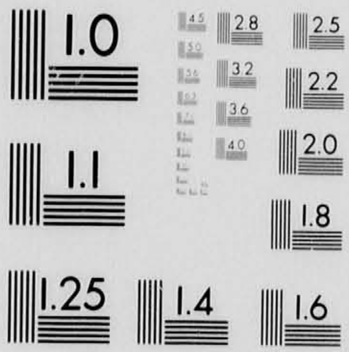
1884.

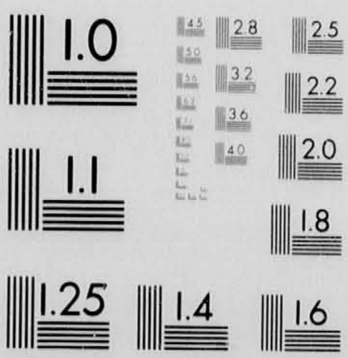
Morton F. Beal	Lowell Carpet Co.
Willis S. Carter	With Redding, Bird, & Co., Stained Glass Manufacturers.
Henry S. Codman	At home. Brookline.
John F. Cushing	At home. Boston.
Charles E. Folger	With Abner Crossman, Decorator. Chicago, Ill.
E. S. Hamer	Booth Manufacturing Co.
Florence Knowles	Asst. Teacher, Industrial Art School of Practical Design. Philadelphia, Penn.
Ella M. Lovering	Teacher of Painting.
F. H. McCafferty	Westerley Woollen Mill.
J. M. Marcuse	Marysville Woollen Mills, California.
George H. Nawn	With Aldrich & Co., Decorators.
Fred C. Packard	Designer and Decorator.
Henry R. Reynolds	With Furness Steamship Co.
Henry M. Roberts	With Joy, Langdon & Co.
Frank O. Spear	With Fertilizer Co.
Charles G. Stratton	Plymouth Woollen Co.
Edward F. Studley	Designer.
William Tilly	Forbes Lithographic Co.
Rebecca Tyler	At home. Westford.
Mary Webster	Designer. At home. Manchester, N.H.

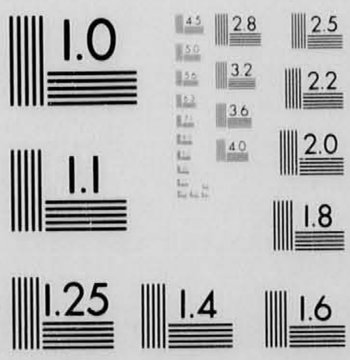
ALPHABETICAL INDEX.


1.0
2.8
2.5
3.2
2.2
3.6
4.0
2.0
1.1
1.8
1.25
1.4
1.6


1.0
2.8
2.5
3.2
2.2
3.6
4.0
2.0
1.1
1.8
1.25
1.4
1.6


1.0
2.8
2.5
3.2
2.2
3.6
4.0
2.0
1.1
1.8
1.25
1.4
1.6


1.0
2.8
2.5
3.2
2.2
3.6
4.0
2.0
1.1
1.8
1.25
1.4
1.6


1.0
2.8
2.5
3.2
2.2
3.6
4.0
2.0
1.1
1.8
1.25
1.4
1.6