M.I.T. ANNUAL CATALOGUES AND BULLETINS
1882/83
01 OF 02

MASSACHUSETTS INSTITUTE OF TECHNOLOGY.

EIGHTEENTH

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.

1882-1883.

BOSTON:
W. J. SCHOFIELD, PRINTER, 105 SUMMER STREET.
1882.

MASSACHUSETTS INSTITUTE OF TECHNOLOGY.

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BOSTON:
W. J. SCHOFIELD, PRINTER, 105 SUMMER STREET.
1882.

CALENDAR FOR 1882–1883.

School year began	Monday, Sept. 25, 1882.
Second term begins	Tuesday, Jan. 30, 1883.
Degrees conferred	Tuesday, May 29, 1883.
First Entrance Examinations	Thursday, May 31, 1883, and Friday, June 1, 1883.
Second Entrance Examinations	Tuesday, Sept. 18, 1883, and Wednesday, Sept. 19, 1883.
Examinations for Advanced Standing	Thursday, Sept, 20, 1883.
Next School-year will begin	Monday, Sept. 24, 1883.

CALENDAR FOR 1883–1884.

School year will begin	Monday, Sept. 24, 1883.
Second term will begin	Tuesday, Jan. 29, 1884.
Degrees conferred	Tuesday, May 27, 1884.
First Entrance Examinations	Thursday, May 29, 1884, and Friday, May 30, 1884.
Second Entrance Examinations	Tuesday, Sept. 23, 1884. Wednesday, Sept. 24, 1884.
Examinations for Advanced Standing	Thursday, Sept. 25, 1884.
School-year of 1884-85 will begin	Monday, Sept. 29, 1884.

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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.

CORPORATION

OF THE

MASSACHUSETTS INSTITUTE OF TECHNOLOGY,

FOR THE YEAR 1882–1883.

President.

FRANCIS A. WALKER.

Secretary.	Treasurer.
LEWIS WM. TAPPAN, JR.	JOHN CUMMINGS.

Committee on the School of Industrial Science.

EDWARD ATKINSON,	CHARLES J. PAINE,
HOWARD A. CARSON,	EDWARD S. PHILBRICK,
CHARLES L. FLINT,	JOHN D. PHILBRICK,
FRED. W. LINCOLN,	HENRY B. ROGERS,
AUGUSTUS LOWELL,	ALEXANDER S. WHEELER.

President and Treasurer, *ex-officio.*

Committee on Finance.

WILLIAM ENDICOTT, JR.,	JAMES L. LITTLE,
JOHN M. FORBES,	SAMUEL D. WARREN,
HENRY P. KIDDER,	DAVID R. WHITNEY.

President and Treasurer, *ex-officio.*

Committee on the Museum.

SAMUEL C. COBB,	M. D. ROSS,
CHARLES FAIRCHILD,	NATHANIEL THAYER,
HENRY D. HYDE,	FRANCIS H. WILLIAMS.

President, *ex-officio.*

Committee on the Society of Arts.

JOHN D. RUNKLE,	J. C. HOADLEY,
MARSHALL P. WILDER,	SAMUEL K. LOTHROP,
THOMAS T. BOUVÉ,	ALEXANDER H. RICE.
JAMES B. FRANCIS,	

President, *ex-officio.*

On the Part of the Commonwealth.

HIS EXCELLENCY GOVERNOR JOHN D. LONG.

HON. MARCUS MORTON, *Chief Justice of the Supreme Court.*

HON. JOHN W. DICKINSON, *Secretary of the Board of Education.*

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.

JOHN M. ORDWAY, A.M.,
Professor of Metallurgy and Industrial Chemistry.

ROBERT H. RICHARDS, S.B.,
Professor of Mining Engineering, and Director of the Mining and Metallurgical Laboratories.

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 and of Organic Chemistry.

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

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

CHANNING WHITAKER, S.B.,
Professor of Mechanical Engineering.

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

GAETANO LANZA, S.B., C.E.,
Professor of Theoretical and Applied Mechanics.

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

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

EUGENE LETANG,
Assistant Professor of Architecture.

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

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

CHARLES KASTNER,
Lowell Instructor in Practical Design.

HENRY K. BURRISON, S.B.,
Instructor in Mechanical and Free-Hand Drawing.

CLARENCE W. FEARING, A.M.,
Instructor in the School of Mechanic Arts.

ELLEN H. RICHARDS, A.M., S.B.,
Instructor in Chemistry and Mineralogy in the Woman's Laboratory.

WILLIAM O. CROSBY, S.B.,
Instructor in Geology, Palæontology, and Mineralogy.

COL. JOHN C. CHADWICK,
Instructor in Military Tactics.

GEORGE F. SWAIN, S.B.,
Instructor in Civil Engineering.

WEBSTER WELLS, S.B.,
Instructor in Mathematics.

LEWIS M. NORTON, PH.D.,
Instructor in General Chemistry and Qualitative Analysis.

HERMAN HOLLERITH, E.M.,
Instructor in Mechanical Engineering.

ALFRED E. BURTON, S.B.,
Instructor in Topographical Engineering.

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

CHARLES L. ADAMS,
Instructor in Drawing in the School of Mechanic Arts.

WM. H. PICKERING, S.B.,
Assistant in Physics.

JOHN DUFF, JR., S.B.,
Assistant in the Mining and Metallurgical Laboratory.

EVELYN M. ORDWAY, S.B.,
Assistant in Chemistry and Biology.

WALTER S. ALLEN, S.B.,
Assistant in Quantitative Analysis.

JAMES LUND, S.B.,
Assistant in Quantitative Analysis.

EDWARD F. ELY, A.B., S.B.,
Assistant in Applied Mechanics.

FREDERICK W. CLARK, S.B.,
Assistant in the Mining and Metallurgical Laboratory.

CHASE PALMER, PH.D.,
Assistant in General Chemistry and Qualitative Analysis.

HOWARD V. FROST, S.B.,
Assistant in General Chemistry and Qualitative Analysis.

CLARA P. AMES, S.B.,
Assistant in the Woman's Laboratory.

WALTER BRADLEE SNOW, S.B.,
Assistant in Mechanical Engineering.

The instruction in Political Economy and in International Law is given by the President; that in Stereotomy and Descriptive Geometry by Prof. VOSE and Mr. WELLS, respectively; that in Descriptive Astronomy by Prof. CROSS; and that in Botany and Biology by Prof. ORDWAY. The instruction in Quantitative Analysis in the Woman's Laboratory is also in charge of Prof. ORDWAY.

WEBSTER WELLS, S.B., *Bursar.* JAMES P. MUNROE, S.B., *Clerk.*

WORKSHOPS.

THOMAS FOLEY,
In charge of Iron Work.

GEORGE SMITH,
In charge of Wood Work.

ARTHUR W. SANBORN,
Assistant in Iron Work.

JOHN SCOTT,
Assistant in the Weaving Department of the Lowell School of Practical Design.

ZACHARIAH NASON,
Assistant in Wood Work.

FACULTY.

FRANCIS A. WALKER, *President.*
JOHN D. RUNKLE.
WILLIAM P. ATKINSON.
GEORGE A. OSBORNE.
JOHN M. ORDWAY.
ROBERT H. RICHARDS, *Secretary.*
WILLIAM RIPLEY NICHOLS.
CHARLES P. OTIS.
CHARLES H. WING.
ALPHEUS HYATT.
WILLIAM H. NILES.
CHANNING WHITAKER.
CHARLES R. CROSS.
GAETANO LANZA.
JULES LUQUIENS.
GEORGE L. VOSE.
THEODORE M. CLARK.

STUDENTS.

GRADUATE STUDENTS.

NAME.	HOME.	RESIDENCE.
Atkinson, Edward W., *A. B.* (*Harvard College*)	Brookline,	Brookline.
Bardwell, F. L., *B. S.* (*University of Minnesota*)	Minneapolis, Minn.	30 Dwight St.
Carleton, James G., *A. B.* (*Amherst College*)	Barre, Vt.,	28 Yarmouth St.
Carr, W. Frank, *B. S.* (*Mass. Agricultural Col.*)	Clinton,	94 Waltham St.
Day, Sarah L., *A. B.* (*Vassar College*)	Roxbury,	9 Day St.
Jones, Mary E., *A. B.* (*Vassar College*)	Boston,	10 James St.
Linton, Laura A., *B. S.* (*University of Minnesota*)	Minneapolis, Minn.,	Jamaica Plain.
Merryman, W. C., *B. S.* (*Bowdoin College*)	Brunswick, Me.,	48 Chandler St.
Milinowski, Harriet R., *A. B.* (*Vassar College*)	Buffalo, N. Y.,	Hotel Bellevue.
Morse, Philip S., *A. B.* (*Harvard College*)	Boston,	33 Marlboro' St.
Otis, James, *A. B.* (*Harvard College*)	Roxbury,	Roxbury.
Pierce, Josiah, Jr., *B. A.* (*University of Cambridge*)	London, Eng.,	8 St. James Ave.
Weston, J. F., *U. S. A.* (*U. S. Artillery School*)	Boston,	159 High St.
Willcutt, George B., *Ph. B.* (*University of California*)	Oakland, Cal.,	323 Columbus Ave.

REGULAR STUDENTS.

I. Civ. Eng.; II. Mech. Eng.; III. A. Min. Eng.; III. B. Geol. and Min.; IV. Arch.; V. Chem.; VI. Metal.; VII. Nat. Hist.; VIII. Phys.; IX. General Course.

FOURTH YEAR.

NAME.	COURSE.	HOME.	RESIDENCE.
Bardwell, Herbert T.	I.	Springfield,	25 Holyoke St.
Bryant, George H.	II.	Brockton,	Brockton.
Chase, Harvey S.	II.	Haverhill,	Haverhill.
Davis, Frank E.	II.	Somerville,	Somerville.
Eppendorff, John G.	IV.	Milburn, N. J.,	127 Charles St.
Foran, George J.	II.	E. Boston,	54 Princeton St.
Fuller, William B.	I.	Magnolia,	25 Holyoke St.
Gale, Horace B.	II.	Natick,	Natick.
Gustin, George H.	III. A.	Dorchester,	Dorchester.
Harriman, Frederic O.	I.	Boston,	652 Tremont St.
Hutchings, James H.	II.	Boston,	68 Carver St.
Leonard, H. Ward,	III. A.	Cincinnati, O.,	142 Boylston St.
Mansfield, Harvey M.	III. A.	Wakefield,	Wakefield.
Scott, Robert W.	II.	Great Falls, N. H.,	19 St. Charles St.
Smith, George A.	V. C.	Arlington,	Arlington.
Tenney, Frank,	III. A.	Boston,	64 Rutland St.
Tompkins, Chas. H. Jr.,	III. A.	Staten Island, N. Y.	142 Boylston St.
Underwood, George R.	V. A.	Boston,	643 Tremont St.
Wild, Herbert H.	V. B.	Billerica,	Billerica.

THIRD YEAR.

NAME.	COURSE.	HOME.	RESIDENCE.
Appleton, Charles B.	II.	Boston,	39 Worcester St.
Baldwin, H. Furlong,	II.	Waterbury, Md.,	55 Warren Ave.
Bartlett, T. Harris,	III. B.	Portsmouth, N. H.,	Milton.
Boardman, Henry A.	V. C.	Melrose,	Melrose.
Bothfeld, Charles C.	I.	Newton,	Newton.
Brown, Alice I.	V. A.	Roxbury,	Hayward St.
Carr, W. Frank, *B. S.*	I.	Clinton,	94 Waltham St.
Carven, Christopher J.	I.	So. Boston,	125 Broadway.
Chase, Roscoe L.	V. A.	Lowell,	Lowell.
Doane, Alfred O.	III. B.	Cambridgeport,	Cambridgeport.
Fitch, Alfred L.	II.	Chicago, Ill.,	94 Waltham St.

NAME.	COURSE.	HOME.	RESIDENCE.
French, George L.	R. I.	E. Boston,	203 Lexington St.
Gill, Augustus H.	V.A.	Canton,	Canton.
Haines, Frank M.	III.B.	Boston,	Townsend St.
Heywood, George H.	III.B.	Gardner,	204 Dartmouth St.
Holder, James G.	V.A.	Lynn,	Lynn.
Linton, Laura A., *A. B.*	V.C.	Minneapolis, Minn.,	Jamaica Plain.
Otis, Herbert F.	IV.	Boston,	139 Beacon St.
Puffer, William L.	III.B.	West Newton,	West Newton.
Purinton, Arthur J.	II.	Boston,	88 W. Newton St.
Robinson, Theodore W.	III.B.	Wareham,	190 W. Springf'd St.
Rotch, A. Lawrence,	II.	Boston,	3 Com'w'lth Ave.
Ryder, Josiah P.	V.C.	E. Boston,	25 Saratoga St.
Stantial, Amy M.	V.A.	Melrose,	Melrose.
Stuart, Frederic M.	I.	Newton Centre,	Newton Centre.
Sturgis, Elliot T.	III.A.	New York, N. Y.,	307 Beacon St.
Tyler, Harry W.	V.A.B.	Ipswich,	Ipswich.
Ward, Nahum,	V.C.	Roxbury,	Mt. Seaver Ave.
Whitney, William M.	II.	Winchendon,	204 Dartmouth St.

SECOND YEAR.

NAME.	COURSE.	HOME.	RESIDENCE.
Allen, Charles R.	V.C.	New Bedford,	232 W. Canton St.
Ayer, Harry W.	III.A.	Medford,	Medford.
Baker, David,	III.A.	Auburndale,	Auburndale.
Bartlett, Charles H.	I.	Milford, N. H.,	Cambridgeport.
Bates, James S.	II.	Cincinnati, O.,	24 Appleton St.
Cochran, Heywood,	II.	Louisville, Ky.,	Cambridge.
Cone, Albert P.	I.	Wellsboro', Pa.,	27 Chester Park.
Davenport, James F., Jr.	II.	Fall River,	46 Cortes St.
Dawes, William H.	VIII.B.	E. Boston,	246 Saratoga St.
Dewson, Edward H., Jr.	II.	Quincy,	Quincy.
Doane, Arthur H.	I.	Middleboro',	349 Columbus Av.
Eaton, Charles W.	I.	Haverhill,	Haverhill.
Fox, Frederick, Jr.	V.C.	Portland, Me.,	620 Tremont St.
Fry, Thomas W.	II.	Chicago, Ill.,	54 W. Cedar St.
Goodrich, R. R.	III.A.	So. Boston,	801 Broadway.
Greene, S. Cuyler,	II.	Dorchester,	Dorchester.
Harrington, Walter K.	I.	Newport, R. I.	118 Chandler St.
Hildreth, Herbert V.	II.	Malden,	Malden.

NAME.	COURSE.	HOME.	RESIDENCE.
Homer, Eleazer B.	IV.	Belmont, . . .	Belmont.
Kellogg, Lansing O.	II.	San Francisco, Cal.,	198 Beacon St.
Kimball, James L. .	II.	Westford, . . .	129 Charles St.
Kimball, John M. .	I.	Bath, Me., . . .	202 Dartmouth St.
Litchfield, Isaac W.	VIII.B.	Warwick, N. Y., .	357 Columbus Ave.
Little, Arthur D. .	V.B.	Portland, Me., .	111 Warren Ave.
Lord, Frank H. .	II.	E. Somerville, .	E. Somerville.
Lyon, Tracy, . . .	II.	Oswego, N. Y., .	198 Beacon St.
MacRae, Donald, Jr.	II.	Wilmington, N. C.,	27 St. James Ave.
MacRae, Hugh, . .	III.B.	Wilmington, N. C.,	27 St. James Ave.
Martin, Henry, . .	V.A.	Lowell, ...	Lowell.
McKim, Alex. R. .	I.	Jamaica Plain, .	Jamaica Plain.
Merrill, Allyne L. .	II.	Cambridge, . .	Cambridge.
Merrill, Eben G. .	I.	Chelsea, . . .	Chelsea.
Morss, Everett .	III.A.B.	Boston, ...	323 Marlboro' St.
Mowry, William C.	I.	Woonsocket, R. I.,	349 Columbus Ave.
Mumford, Edgar H.	II.	Dorchester, . .	Dorchester.
Nute, Joseph E. .	I.	Boston, ...	335 Columbus Ave.
Nye, George H. .	I.	New Bedford, .	New Bedford.
O'Brien, William L., Jr.	I.	Cincinnati, O., .	Hotel Brunswick.
O'Grady, Marcella I.	IX.C.	Boston, ...	82 Conant St.
Parsons, Sidney A.	I.	Gloucester, . .	Gloucester.
Pickernell, Frank A.	VIII.B.	So. Boston, . .	551 E. 5th St.
Plaisted, Arthur I.	VIII.B.	E. Somerville, .	E. Somerville.
Pratt, Herbert G. .	II.	West Newton, .	West Newton.
Randall, Newbert M.	III.A.	E. Boston, . .	23 London St.
Rawson, Edward L.	II.	E. Somerville, .	E. Somerville.
Recuero, Manuel E.	I.	Panama, S. A., .	753 Tremont St.
Richards, Charles R.	II.	Boston, ...	36 Lambert St.
Robinson, Chas. Stanley	IIIA.	Boston, ...	88 Pinckney St.
Ruffin, C. Stanley	VIII.B.	Boston, ...	170 Cambridge St.
Spring, Charles F. .	I.	Boston, ...	40 Harrison Ave.
Stantial, Otis T. .	III.A.	Melrose, . . .	Melrose.
Steele, George F. .	II.	E. Somerville, .	E. Somerville.
Talbot, Harry P. .	V.C.	Holliston, . . .	Holliston.
Vanier, George P. .	III.A.	Boston, ...	1 Marble St.
Wilder, C. Morris,	VIII.B.	Cincinnati, O., .	129 Charles St.
Williams, Sidney, .	I.	Boston, ...	15 Arlington St.
Worthington, Erastus, Jr.	I.	Dedham, . . .	Dedham.

FIRST YEAR.

NAME.	HOME.	RESIDENCE.
Aborn, George P.	Wakefield,	Wakefield.
Anthony, Arthur C.	Boston,	285 Marlboro' St.
Appleton, Thomas, 2nd,	Marblehead,	Marblehead.
Attwill, William H.	Lynn,	Lynn.
Baker, Francis C.	Salem,	Salem.
Bartlett, Dana P.	Boston,	24 Milford St.
Bartlett, Sidney R.	Newton,	Newton.
Bennett, Stephen H.	Brookline,	Brookline.
Blake, William B.	Newburyport,	6 Staniford St.
Blunt, Matthew M.	E. Somerville,	E. Somerville.
Borden, Richard P.	Fall River,	373 Columbus Ave.
Brainerd, William L.	Hyde Park, Ill.,	Upham's Corner.
Brown, Arthur H.	Lynn,	Lynn.
Brown, Augustus M.	Marblehead,	Marblehead.
Burgess, John K.	Dedham,	Dedham.
Burlingham, Charles L.	Springfield, Ill.,	535 Columbus Ave.
Buswell, William H.	Methuen,	Methuen.
Chadbourn, William H.	Wilmington, N. C.,	357 Columbus Ave.
Chase, Arthur T.	Haverhill,	Haverhill.
Cheney, William B.	Newtonville,	Newtonville.
Clifford, Harry E. H.	So. Boston,	125 Emerson St.
Cobb, Louis R.	Chicago, Ill.,	Cambridgeport.
Coffin, Edward L.	E. Somerville,	E. Somerville.
Coffin, Horace P.	Nantucket,	614 Tremont St.
Crane, Frank H.	Stoughton,	Stoughton.
Cromwell, Richard, Jr.	Baltimore, Md.,	55 Warren Ave.
Crowell, Prince M.	East Dennis,	304 Columbus Av.
Currier, William M.	Lynn,	Lynn.
Cutter, Louis F.	Winchester,	Winchester.
Doe, Charles C.	Boston,	224 Com'w'lth Av.
Doolittle, Orrin S.	Wallingford, Conn.,	5 St. James Ave.
Douglas, William B.	Middletown, Conn.,	165 W. Canton St.
Draper, Nelson C.	Stoughton,	Stoughton.
Duff, James C.	Charlestown,	14 Sheafe St.
Eaton, Frederick W.	Maplewood,	Maplewood.
Eaton, George H.	Middleboro',	349 Columbus Ave.
Eliot, Jesse L. R.	Cambridgeport,	Cambridgeport.
Ellis, Warren H.	Waukegan, Ill.,	586 Tremont St.

NAME.	HOME.	RESIDENCE.
Farmer, George W.	Rutland, Vt.,	577 Tremont St.
Field, Frank R.	Greenfield,	45 Chester Park.
Fletcher, Perry R.	Middlebury, Vt.,	134 W. Chester P'k.
Fogg, Arthur G.	Norwood,	Norwood.
Foss, Edward S.	Malden,	Malden.
Foster, Theodore R.	Charlestown,	430 Main St.
Frink, William P.	Greenland, N. H.,	104 Dartmouth St.
Gamwell, Roland G.	Providence, R. I.,	Jamaica Plain.
Garfield, Alexander S.	Lexington,	Lexington.
Gay, Edward H.	Marlboro',	Marlboro'.
Gerrish, Willard P.	Roxbury,	Hartwell St.
Getchell, Alice M.	Brookline,	Brookline.
Hadaway, Will S.	Plymouth,	27 Dover St.
Harrington, Frederic,	Cambridge,	Cambridge.
Hatch, James W.	Hartford, Conn.,	381 Columbus Ave.
Heath, Frederick A.	Brookline,	Heath St.
Herrick, John W.	Hartford, Conn.,	381 Columbus Ave.
Higgins, Edward E.	Chelsea,	Chelsea.
Howard, Henry A.	Providence, R. I.,	283 Columbus Ave.
Howard, John G.	Chelmsford,	116 Appleton St.
Ingalls, Walter R.	Lynn,	Lynn.
Jones, Edward A.	Pittsfield,	62 Berkeley St.
Jones, Theodore,	Brookline,	Brookline.
Jordan, William F.	Auburn, Me.,	1 Union Park.
Kenney, C. Belle,	E. Boston,	111 Saratoga St.
Kilburn, John F.	Rutland, Vt.,	85 Dartmouth St.
Kimball, Clarence L.	Lowell,	Lowell.
Knox, George A.	Lynn,	Lynn.
Leach, Albert E.	Newtonville,	Newtonville.
Lewis, Fred,	Haverhill,	Haverhill.
Lloyd, James D.	Sandwich,	3118 Washingt'n St.
Locke, Frank L.	Boston,	7 Eaton St.
Low, Wilson H.	Chelsea,	Chelsea.
Lynde, James P.	Athol,	129 Dartmouth St.
Mackintosh, Fred,	Boston,	27 St. James Ave.
Merriam, Henry P.	Lawrence,	Lawrence.
Miller, Douglas G.	Garden City, L. I.,	29 Dartmouth St.
Miller, Edward F.	Cambridge,	Cambridge.
Mitchell, Edward W.	Medford,	Medford.

NAME.	HOME.	RESIDENCE.
Neave, Jos. S.	Cincinnati, O., .	18 Louisburg Sq.
Peirce, Charles C. . . .	Newport, R. I., .	115 Chandler St.
Percy, Arthur S. . . .	Bath, Me., . . .	202 Dartmouth St.
Perkins, Frederick W. .	Burlington, Wis.,	293 Columbus Ave.
Pierce, Edward L., Jr., .	Milton, ...	Milton.
Plummer, Harold H. . .	Boston, ...	225 Shawmut Ave.
Pope, Percival W. . .	Portsmouth, N. H.,	Dedham.
Prescott, Howard B. S. .	Arlington, . . .	Arlington.
Putnam, Fred W. . . .	Waterville, N. Y.,	52 Chandler St.
Richardson, Charles F. .	Brookline, N. Y.,	66 Beacon St.
Russell, L. Kimball, . .	Arlington, . . .	Arlington.
Seavey, John F. . . .	Boston, ...	27 Polk St.
Shipman, Pelham W. .	Long Isl'd City, N.Y.	521 Columbus Ave.
Shove, Edward, . . .	Fall River, . .	373 Columbus Ave.
Shuman, Edwin A. . .	Boston, ...	60 Vernon St.
Simpson, James E. . .	Lawrence, . . .	Lawrence.
Smith, Irwin Z. . . .	St. Louis, Mo., .	7 W. Cedar St.
Stebbins, Theodore, . .	Onawa, Iowa, .	75 Chandler St.
Stickney, Samuel C. . .	St. Paul, Minn., .	357 Columbus Ave.
Stoughton, Augustus B. .	Philadelphia, Pa.,	7 Charles St.
Taylor, Edwin P., Jr., .	E. Somerville, .	E. Somerville.
Thacher, Lawrence M. .	Yarmouth, . .	79 Appleton St.
Tirrell, Minot, Jr., . . .	Lynn, ...	Lynn.
Torrey, Josiah C. . . .	Rockland, . . .	Rockland.
Tucker, Harvey J. . .	Sandwich, . . .	Sandwich.
Turnbull, Charles D. . .	Boston, ...	111 Beacon St.
Van Alstine, David, . .	Louisville, Ky., .	Lexington.
Walker, Mary B. . . .	Jamaica Plain, .	Jamaica Plain.
Wetherbee, Frank E. .	Ellsworth, . . .	Cambridgeport.
White, J. Foster, . . .	Brookline, . . .	Brookline.
Willey, Theodore P. . .	Weymouth, . .	Weymouth.
Wilson, Elwood J. . .	Jamaica Plain, .	Jamaica Plain.
Winsor, Paul, ...	Winchester, . .	Winchester.
Wood, Charles, . . .	Edinburgh, . .	349 Columbus Av.
Woodbury, Charles H. .	Lynn, ...	Lynn.
Worcester, Vernor F. .	Chelsea, . . .	Chelsea.
Young, Fred R. . . .	Brookline, . . .	Brookline.

SPECIAL STUDENTS.

The abbreviations used in the following list, which includes all students who are not in the full regular courses, are: —

Arch.	Architecture.	Desc.Geom.	Descriptive Geometry.	Mil.	Military Drill.
Assay.	Assaying.	Eng.	English.	Min.	Mineralogy.
Ast.	Descriptive Astronomy.	Fr.	French.	Min. Eng.	Mining Engineering.
Biol.	Biology.	Geol.	Geology.	Persp.	Perspective.
Bot.	Botany.	Germ.	German.	Phys.	Physics.
Build.M.	Building Materials.	Math.	Mathematics.	S. S.	Shades and Shadows.
Chem.	Chemistry.	Mech.	Mechanics.	Shop.	Shopwork.
Civ.Eng.	Civil Engineering.	Mech.Eng.	Mechanical Engineering.	Span.	Spanish.
Draw.	Drawing.	Met.	Metallurgy.	Ster.	Stereotomy.
		Met. Lab.	Metallurgical Laboratory.	Surv.	Surveying.
				Zool.	Zoology.

NAME.	HOME.	RESIDENCE.
Abbott, John C., Jr., Arch.	Brookline,	Harvard St.
Adamson, Prescott, Draw., Mech. Eng.	Philadelphia, Pa.,	Brookline.
Alden, Harry B. Arch.	Dedham,	Dedham.
Allen, Anson W. Min., Math., Phys., Eng., Germ.	Walpole,	Walpole,
Ames, Frank M. Chem., Min., Fr., Germ., Mil.	Boston,	447 Shawmut Ave.
Ames, Oakes, Chem., Draw., Shop.	Canton,	46 Com'w'lth Ave.
Anderson, Robert E. Chem., Draw., Mil.	Wellesley,	Wellesley.
Atkinson, Edward W., *A. B.* Shop., Ind. Chem.	Brookline,	Brookline.
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Baker, George L. Math., Draw., Shop., Mech. Eng.	Selma, Ala.,	49 Union Park.
Baker, Moses E. Arch.	Dedham,	Dedham.
Baldwin, Jessie, Chem.	Winchester,	Winchester.
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Barr, Harry P. Fr., Math., Mech. Eng., Shop., Phys., Eng., Germ.	Washington, D. C.,	129 W. Newton St.
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Batcheller, B. C. Math., Chem., Eng., Draw., Mil.	Wallingford, Vt.,	85 Dartmouth St.
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Capen, George H. . . . Chem., Min. Eng., Met. Lab., Met.	Canton, ...	Canton.
Carleton, James G., *A. B.* Surv., Draw., Min. Eng., Geol.	Barre, Vt., . .	28 Yarmouth St.
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Cassidy, Edward R. . . Arch.	Albany, N. Y., .	Parker House.
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Church, William L. . . Chem., Eng., Draw.	Malden, . . .	Malden.
Coburn, Daniel L. . . . Germ., Min., Chem.	Tyngsboro', . .	Tyngsboro'.
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Conro, Emma O. . . . Biol., Geol., Zool. and Pal., Germ., Chem., Phys.	Keeseville, N. Y.,	Charlestown.
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Davis, William C. . . . Chem., Mech. Eng., Math., Phys., Eng.	Denver, Col., . .	5 Cazenove St.
Day, Sarah L., *A. B.*, Chem., Min.	Roxbury, . . .	9 Day St.
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DeCoster, Robert S. . . Arch.	New York, . .	243 W. Canton St.
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Emerson, Charles B. . . Chem., Min., Geol., Assay.	Lynn, ...	Lynn.
Fisher, Gurdon R. . . . Arch.	Hartford, Conn., .	232 W. Canton St.
Fiske, Redington, . . . Chem., Min., Germ , Eng.	Longwood, . .	Longwood.
Frost, Henry G. . . . Chem., Min., Phys., Surv., Germ , Phys. Geog., Eng.	Boston, ...	664 Tremont St.
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Haughton, Laurence, . . Arch.	Chestnut Hill, .	Chestnut Hill.
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Luther, William J. . . Civ. Eng., Math., Mech., Phys., Geol., Chem.	Attleboro', . .	349 Columbus Ave.
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Morse, Philip S., *A. B.* . Mech., Phys., Chem., Min. Lab., Met., Shop., Build. M.	Boston, ...	33 Marlboro' St.
Mullins, William J. . . Chem , Min , Phys., Eng., Germ.	Pittsburgh, Pa., .	23 Beacon St.
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Page, Arthur H. . . . Chem., Eng., Draw.	Newton, . . .	Newton.
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Parker, William H. . . Math., Shop., Phys., Surv., Mech. Eng.	Malden, . . .	Malden.
Peters, Charles B. . . . Draw.	Jamaica Plain, .	Jamaica Plain.
Pierce, Josiah, Jr., *B. A.* Surv., Draw., Civ. Eng.	London, Eng., .	8 St. James Ave.
Powers, Edward G. . . Eng.	Decatur, Ill., . .	22 Claremont P'k.
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Richards, Franklin B. . Chem., Met. Lab , Phys., Shop., Build. M.	Somerville, . .	Somerville.
Richardson, Robert E. . Math., Phys., Eng., Shop., Mech. Eng.	Concord, . . .	Concord.
Ricker, George A. . . Math , Chem., Eng., Draw., Mil.	Buffalo, N. Y., .	Medford Hillside.
Riley, Louis B. . . . Arch.	Boston, ...	119 Pynchon St.
Robbins, Arthur G. . . Math., Chem., Eng., Draw., Mil.	Carlisle, . . .	Watertown.
Robertson, Nathaniel G. . Surv., Math., Phys.. Germ., Chem., Eng., Min.	Providence, R. I.,	526 Columbus Ave.
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Sands, Frank E. . . . Min., Phys., Ast., Surv., Eng , Fr., Chem	Cambridge, . .	Cambridge.
Sedgwick, Ed. . . . . Mech. Eng., Draw., Span.	Boston, ...	58 Chandler St.
Shepard, W. E. . . . Math., Chem., Eng., Draw., Mil.	Hartford, Conn., .	102 Clarendon St.
Shinn, George M. . . . Arch.	Newton, . . .	Newton.
Sise, Lyman. . . . . Germ., Fr., Min., Chem.	Medford, . . .	Medford.
Smith, Delavan. . . . Min., Chem., Pol. Econ.	Chicago, Ill., . .	41 Somerset St.
Smith, Frederic L. . . Chem., Geol. Math., Phys., Surv.	Concord, N. H., .	190 W. Springf'd St.
Smith, James M. . . . Math., Chem., Germ., Draw., Shop.	Boston, ...	10 Greenwich Park.
Spalding, William E. . . Chem., Germ., Eng.	Nashua, N. H., .	153 Worcester St.
Spinney, Frank C. . . Eng.	Lynn, ...	Lynn.
Stanley, Rufus C. . . . Min., Chem., Pol. Econ.	Chicago, Ill., . .	41 Somerset St.
Stebbins, Alfred, Jr. . . Met., Eng., Germ., Chem., Met. Lab.	Roslindale, . .	Roslindale.
Stevens, Edward F. . . Arch.	Pepperell, . . .	Pepperell.
Sunderland, James C. . Arch.	Burlington, Iowa,	665 Tremont St.
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Taylor, William M. . . . Math., Chem., Eng., Draw., Mil.	Indianapolis, Ind.,	112 Dartmouth St.
Thaw, Alex. B. . . . Chem.	Pittsburgh, Pa., .	2 Derne St.
Tilton, Osman B. . . . Math., Chem., Draw., Shop.	Nashua, N. H., .	Nashua, N. H.
Titcomb, John P. . . . Math., Draw.	West Newbury, .	West Newbury.
Trowbridge, James S. . Arch.	Glendale, O. . .	84 Chandler St.
Tucker, Emily J. . . . Chem.	Charlestown, . .	Charlestown.
Tucker, Greenleaf R. . Math., Chem.	Boston, ...	City Hospital.
Tuttle, Edward O. . . Math., Chem., Eng., Draw., Mil.	Holyoke, . . .	61 Dartmouth St.
Tweedy, Robert B. . . Math., Chem., Eng., Draw., Mil.	Milwaukee, Wis.,	510 Columbus Ave.
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Willcutt, George B., *Ph. B.* Chem., Met. Lab., Assay., Shop., Draw., Build. M.	Oakland, Cal.,	323 Columbus Ave.
Williams, Francis C., Jr., Civ. Eng., Math., Phys., Geol., Eng., Germ.	Roxbury,	Roxbury.
Worthy, Frank L. Math., Chem., Draw., Shop., Mil.	West Springfield,	62 Berkeley St.
Wolffe, Edwin D. Chem., Min., Zool., Phys., Geol., Eng., Germ.	New York, N. Y.,	109 Pembroke St.

STUDENTS IN THE SCHOOL OF MECHANIC ARTS.

SECOND YEAR.

NAME.		HOME.	RESIDENCE.
Agassiz, Max	sp.	Cambridge,	Cambridge.
Binney, Arthur,		Roxbury,	Highland St.
Browning, John F.	sp.	Salem,	Salem.
Codding, Walter M.	sp.	Neponset,	Neponset.
Collins, Joseph L.	sp.	E. Boston,	E. Boston.
Corser, George H.	sp.	Portland, Me.	8 Berwick Park.
Deshon, Charles A.	sp.	Leon, Nicaragua,	14 Worcester St.
Downes, Charles C.	sp.	S. Boston,	269 Gold St.
Drew, Henry H.		Cambrigeport,	Cambridgeport.
Everett, Edward,	sp.	Canton,	Canton.
French, Frank J.	sp.	Three Rivers, Mich.,	293 Columbus Ave.
Hamill, Hugh,	sp.	Stoneham,	Stoneham.
Herrick, Celeste W.	sp.	New York, N. Y.,	Cambridge.
Hinkley, John W.		Brookline,	Brookline.
Howland John E.	sp.	Vineyard Haven,	Chelsea.
Lee, John C.	sp.	Roxbury,	145 Cedar St.
Maxwell, William R.		Medford,	Medford.
Savage, Henry,	sp.	Boston,	431 Beacon St.
Southwick, Philip R.	sp.	Boston,	126 W. Concord St.
Stahl, Rudolph F.		Boston,	6 Hersey Pl.
Wilson, Horace M.		Cambridge,	Cambridge.

FIRST YEAR.

NAME.	HOME.	RESIDENCE.
Bigelow, Charles H. . .	Salem, ...	Salem.
Chapel, Edward A. sp.	Chelsea, . . .	Chelsea.
Chapman, Winthrop M. sp.	Needham, . . .	Needham.
Crosby, Herbert H. . .	Natick, ...	Natick.
Davis, John C. . . sp.	Plymouth, . . .	Plymouth.
Dearborn, William L. .	Dorchester, . .	Ashland St.
Dodge, Charles C. . . .	Charlestown, . .	35 Soley St.
Draper, Harry, . . sp.	Stoughton, . .	Stoughton.
Drugan, William H. sp.	Walpole, . . .	Dedham.
Edwards, Harry O. . .	Montreal, P. Q., .	Watertown.
Edwards, James H. . .	Jamaica Plain, .	Jamaica Plain.
Gay, Nathan O. . sp.	Walpole, . . .	Walpole.
Golden, Michael, . . .	Lawrence, . . .	Lawrence.
Guest, David P. . sp.	Charlestown, . .	106 Chelsea St.
Guthrie George E. . .	Somerville, . .	Somerville.
Hanks, Arthur R. . sp.	Charles R. Village,	Charles R. Village.
Hassett, Edward J. . .	Lowell, ...	Lowell.
Heath, Charles A. . .	Brookline, . . .	Brookline.
Holmes, Joseph E. sp.	Cambridgeport, .	Cambridgeport.
Kennedy, Chas. S. L. .	N. Easton, . . .	N. Easton.
Lilley, George H. . sp.	Milford, . . .	Milford.
Lovett, James R. . . .	Wollaston, . .	Wollaston.
Manning, J. Woodward, .	Reading, . . .	Reading.
Martin, Horace B. . .	Chelsea, . . .	Chelsea.
Nichols, Elijah B. . sp.	Dedham, . . .	Dedham.
Noble, Ivory B. . . .	Roxbury, . . .	13 Linwood Sq.
Parkhurst, Chas. W. sp.	Boston Highlands,	54 Alpine St.
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Ricketson, Oliver G. . .	Pittsburgh, Pa., .	182 Marlboro' St.
Riley, Edward B. . sp.	Winchester, . .	Winchester.
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Trufant, Walter E. . .	Abington, . . .	Abington.
Wright, George L. . .	North Andover, .	North Andover.

LOWELL SCHOOL OF DESIGN.

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Adams, W. L.	Shelburne Falls.	Hyde Park.
Aylward, Thos. D.	Milford,	Milford.
Baker, Geo. H.	Weymouth,	Weymouth.
Beal, Morton F.	Wellesley Hills,	Wellesley Hills.
Bolles, Courtlandt K.	Salem,	Salem.
Brainerd, Ida A.	Hyde Park,	Hyde Park.
Capen, Alice R.	Jamaica Plain,	Green St.
Carr, Annie K.	Cambridgeport,	Cambridgeport.
Carter, Willis S.	N. Woburn,	N. Woburn.
Chandler, Edward D.	Cambridge,	Cambridge.
Clement, E. A.	E. Boston,	131 Chelsea St.
Converse, M. D.	Woburn,	Woburn.
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Drew, Sarah A.	Cambridgeport,	Cambridgeport.
Dusseault, Eva M.	Somerville,	Somerville.
Edwards, L. F.	Jamaica Plain,	Garden St.
Eustis, Susie M.	Springfield,	43 John St.
Flagg, Lewis G.	Boston,	8 Beacon St.
Foss, Edwin C.	So. Boston,	576 Broadway.
French, Alice G.	Haverhill,	Haverhill.
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Kanada, Florence K.	Lowell,	Lowell.
Knowles, Florence M.	Roxbury,	81 Bower St.
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Mennig, Annie N.	Roxbury,	Roxbury.
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Munn, Herbert W.	Woburn,	Woburn.
Nawn, George H.	Roxbury,	2 Quincy St.
Newcombe, Agnes,	Brookline,	Brookline.
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Nute, Mina L.	Lowell,	Lowell.
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Richardson, Louisa,	Cambridgeport,	Cambridgeport.
Ricker, Everett W.	Jamaica Plain,	Jamaica Plain.
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Rowell, Marietta B.	Salem,	Salem.
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Simmons, Elizabeth J.	So. Boston,	383 W. 4th St.
Smith, Grace H.	Hyde Park,	Hyde Park.
Smith, James F.	Jamaica Plain,	Boylston Ave.
Spear, Frank O.	Jamaica Plain,	55 Seaverns Ave.
Springer, Fred. A.	Marlboro',	Marlboro'.
Storey, Carrie P.	Sharon,	Sharon.
Studley, Edward F.	Chelsea,	Chelsea.
Symonds, Clara A.	Boston,	85 W. Cedar St.
Tarbell, Lon F.	Jamaica Plain,	Alveston St.
Taylor, George L.	Everett,	Everett.
Tew, George A. D.	Worcester,	Congress St.
Tilley, William,	Hyde Park,	Hyde Park.
Tyler, Rebecca S.	Westboro',	Westboro'.

NAME.	HOME.	RESIDENCE.
Underwood, W. A.	Dorchester,	Hotel Northwood.
Ward, Abba L.	Charlestown,	40 Soley St.
Wason, Mary E.	San Buenaventura Cal	Somerville.
Webster, Clara E.	Boston,	188 Boylston St.
Webster, Mary K.	Manchester, N. H.,	68 Warrenton St.
Weeks, W. H.	Dorchester,	Berkeley St.
White, Mary A.	Chelsea,	Chelsea.
Whittier, Mary P.	Haverhill,	Haverhill.
Whitten, E. M.	Lowell,	Lowell.
Williams, Fred. N.	E. Pepperell,	Watertown.
Wilson, Emily H.	Needham,	Needham.
Winchester, May K.	Jamaica Plain,	Centre St.
Winkley, Carrie M.	Woburn,	Woburn.
Wyman, Ry,	Worcester,	Providence St.
Young, Haldimand P.	Dorchester,	William St.

SUMMARY.

Graduate Students,	14
Regular Students, fourth year,	19
" " third "	29
" " second "	57
" " first "	114
Special Students,	149
Students in the School of Mechanic Arts,	57
Students in the Lowell School of Practical Design,	91
	530
Deduct names counted twice,	14
Total,	516

COURSES OF INSTRUCTION.

The Massachusetts Institute of Technology provides a series of scientific and literary studies and practical exercises, embracing pure and applied mathematics, the physical and natural sciences, with their applications, drawing, the English language, history, political economy, international and business law, French and German, with other modern languages, if desired. 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 following regular courses, further details of which will be found on pages 31-45, have been established.

I. A Course in Civil and Topographical Engineering.
II. " " " Mechanical Engineering.
III. " " " Mining Engineering, or Geology and Mining.
IV. " " " Building and Architecture.
V. " " " Chemistry.
VI. " " " Metallurgy.
VII. " " " Natural History.
VIII. " " " Physics.
IX. General Courses (A, B, and C).

The first five of these courses are of a distinctly professional character, the one in Metallurgy is similar to that in Chemistry, but has more particular reference to the production and

working of the metals. The course in Natural History affords an appropriate general training for those whose ulterior object is the special pursuit of geology, mineralogy, botany, zoology, pharmacy, or rural economy. It is specially suitable for those who intend subsequently to enter the medical profession. The course in physics is based on the mathematical and physical sciences, and offers a suitable preparation for persons desirous of fitting themselves to teach physical science, as well as for those desiring to enter upon the pursuit of the various practical applications of Physics, as in electrical engineering, or in making physical tests of materials.

In addition to the foregoing, certain general courses [IX. A, B, and C] have been established for such as may not intend to adopt a distinctly scientific profession, and yet desire to obtain an education through studies of a predominantly scientific character.

These courses are especially recommended in the case of young men whose purpose it is to become merchants, manufacturers, or bankers, and who desire a preparation for active life, which shall be liberalizing in its tendencies, but without any influence to alienate them from the ideas, tastes, and habits which are appropriate to practical business pursuits.

Each of these courses contains a solid body of scientific study, and of scientific field or laboratory work. In the first, Physics, with the requisite Mathematics, predominates among the scientific studies; in the second, Chemistry, with the closely related sciences of Botany and Physiology; in the third, Geology, with Botany and Zoology, forming a thorough course in Biology, with field work and laboratory practice, especially with the microscope. While, in all the courses, it is intended to secure to the student a liberal culture, as well as the more strictly technical education which may be his chief object, in the courses under consideration, far more time will be devoted to the study of language, literature, history, and political, social, and industrial science than is found compatible with the requirements of the pro-

fessional courses. The time which, in the latter, is given to the special and technical study and work essential to the architect, the engineer, the naturalist, or the chemist will, in the courses under consideration, be given to more general studies which are of a nature to enlarge the views and enrich the life of the man of business.

All the regular courses of the Institute, whether professional or general, extend through four years, and for proficiency in any one of them the degree of S. B., Bachelor of Science, is conferred.

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

Advanced courses of study may be pursued, and the granting of the degree of Doctor of Science has been authorized by a vote of the Corporation.

Provision is also made for persons who desire to pursue special portions only of any of the regular courses.

At the request of the Woman's Education Association of Boston, and with their generous co-operation, special laboratories have been provided for the instruction of women. The design is to afford them facilities for the study of Chemical Analysis, Industrial Chemistry, Mineralogy, and Biology. The instruction is arranged for such students as may be able to devote their whole time to the work, as well as for those who, by reason of other engagements, can spend only a few hours a week in these exercises. Instruction will also be given to women in other subjects so far as suitable arrangements can be made for them.

The Institute also provides afternoon and evening courses of instruction, scientific and literary, open to both sexes. At present these courses are free, being supported by the Trustee of the Lowell Institute. Fuller details are given under "Free Courses of Instruction."

REGULAR COURSES.

ALL COURSES.—FIRST YEAR.

FIRST TERM.	SECOND TERM.
Algebra continued.	Plane and Spherical Trigonometry.
Solid Geometry.	General Chemistry.
General Chemistry.	Qualitative Analysis.
Chemical Laboratory.	Chemical Laboratory.
Rhetoric.	English History.
English Composition.	English Literature.
French.	French.
Mechanical Drawing.	Mechanical Drawing.
Military Drill.	Military Drill.

I. CIVIL ENGINEERING.

SECOND YEAR.

FIRST TERM.	SECOND TERM.
Elementary Surveying.	Advanced Surveying.
Field Practice.	Levelling.
Plotting from Notes.	Field Practice.
Topography.	Plans and Profiles.
Analytic Geometry.	Topography.
Descriptive Geometry.	Stereotomy.
Physics.	Differential Calculus.
Descriptive Astronomy.	Physics.
Modern History.	Physical Geography.
English Literature.	Modern History.
German.	English Literature.
	German.

THIRD YEAR.

FIRST TERM.	SECOND TERM.
Hydraulics and Hydraulic Engineering.	Hydraulics and Hydraulic Engineering.
Field Practice.	Field Practice.
Engineering Drawing.	Engineering Drawing.
Integral Calculus.	Topography.
General Statics.	Strength of Materials.
Physics; Lectures and Laboratory work.	Kinematics and Dynamics.
	Physics; Laboratory work.
Structural Geology.	Historical Geology.
Constitutional History.	Political Economy.
German.	German.

FOURTH YEAR.

FIRST TERM.	SECOND TERM.
Engineering Statics.	Details of Construction.
Bridges and Roofs.	Study of actual works.
Roads and Railroads.	Specifications and Contracts.
Sewerage of Cities and Towns.	Practice in Design.
Drainage and Irrigation.	History of Engineering.
Details of Construction.	Theory of Elasticity.
Study of actual works.	Dynamics completed.
Practice in Design.	Building Materials.
Strength of Materials.	Thesis Work.
Metallurgy.	

II. MECHANICAL ENGINEERING.

SECOND YEAR.

FIRST TERM.

Machinery and Millwork.
Machine Drawing.
Carpentry (shopwork).
Analytic Geometry.
Physics.
Modern History.
English Literature.
German.

SECOND TERM.

Machinery and Millwork.
Machine Drawing.
Pattern and Foundry Work (shopwork).
Differential Calculus.
Physics.
Physical Geography.
Modern History.
English Literature.
German.

THIRD YEAR.

FIRST TERM.

Steam Engineering.
Machine Drawing.
Steam Engineering Laboratory.
Blacksmithing (shopwork).
Integral Calculus.
General Statics.
Physics; Lectures, and Laboratory work.
Descriptive Astronomy.
Constitutional History.
German.

SECOND TERM.

Steam Engineering.
Machine Drawing.
Steam Engineering Laboratory.
Chipping and Filing (shopwork).
Perspective, Shades and Shadows.
Strength of Materials.
Kinematics and Dynamics.
Physical Laboratory.
Political Economy.
German.

FOURTH YEAR.

FIRST TERM.

Hydraulic Motors, and the determination of the rate of flow of water.
Machine Design and Drawing.
Abstracts from Memoirs.
Steam Engineering Laboratory.
Descriptive Geometry.
Blacksmithing (shopwork).
Strength of Materials.
Hydraulics.
Metallurgy.

SECOND TERM.

Steam Pumps and Pumping Engines.
Steam Engineering Laboratory.
Machine Design and Drawing.
Engine Lathe work (shopwork).
Hydraulics.
Theory of Elasticity.
Dynamics completed.
Building Materials
Thesis Work.

III. MINING ENGINEERING.—A.

SECOND YEAR.

FIRST TERM.

Blowpipe Analysis, Crystallography, and Determinative Mineralogy.
Qualitative Chemical Analysis.
Use of Surveying Instruments.
Surveying.
Field Practice.
Analytic Geometry.
Physics.
German.

SECOND TERM.

Quantitative Chemical Analysis, Lectures and Laboratory work.
Differential Calculus.
Physics.
Physical Geography.
Modern History.
English Literature.
German.

THIRD YEAR.

FIRST TERM.

Quantitative Chemical Analysis.
Mining Engineering, Sinking, Timbering, Hoisting, Pumping, Ventilating, &c.
Integral Calculus.
General Statics.
Physics; Lectures, and Laboratory work.
Structural and Chemical Geology.
Constitutional History.
German.

SECOND TERM.

Mining Engineering continued.
Assaying by Fire and by Wet Methods.
Quantitative Chemical Analysis.
Strength of Materials.
Kinematics and Dynamics.
Physical Laboratory.
Historical Geology.
Political Economy.
German.

FOURTH YEAR.

FIRST TERM.

Quantitative Chemical Analysis.
Mining Laboratory: — work upon Gold, Silver, Copper, and Lead Ores in quantity.
Metallurgy, Lectures.
Drawing.
Strength of Materials.
Dynamics completed.
Memoirs.

SECOND TERM.

Quantitative Chemical Analysis.
Mining Laboratory as in 1st term.
Metallurgy, Lectures.
Ore dressing, Lectures.
Welding and Tempering (shop-work.
Building Materials.
Thesis Work.

For Course III.— B, see next page.

III. GEOLOGY AND MINING.— B.

SECOND YEAR.

FIRST TERM.	SECOND TERM.
Blowpipe Analysis, Crystallography, and Determinative Mineralogy.	Quantitative Chemical Analysis, Lectures, and Laboratory work.
Qualitative Chemical Analysis.	Physics.
Use of Surveying Instruments.	Physical Geography.
Surveying.	Zoology.
Field Practice.	Palæontology.
Modern History.	Botany.
English Literature.	Modern History.
Physics.	English Literature.
German.	German.

THIRD YEAR.

FIRST TERM.	SECOND TERM.
Mining Engineering, Sinking, Timbering, Hoisting, Pumping, Ventilating, &c.	Mining Engineering continued.
Quantitative Chemical Analysis.	Assaying by Fire and by Wet Methods.
Zoology.	Quantitative Chemical Analysis.
Palæontology.	Industrial Chemistry.
Physics; Lectures, and Laboratory work.	Physical Laboratory.
Structural and Chemical Geology.	Historical Geology.
Constitutional History.	Political Economy.
German.	German.

FOURTH YEAR.

FIRST TERM.	SECOND TERM.
Quantitative Chemical Analysis.	Quantitative Chemical Analysis.
Mining Laboratory: — work upon Gold, Silver, Copper, and Lead Ores in quantity.	Mining Laboratory as in 1st term.
Metallurgy, Lectures.	Metallurgy, Lectures.
Drawing.	Ore dressing, Lectures.
Applied Physics.	Welding and Tempering (shop-work).
Memoirs.	Building Materials, Lectures.
	Thesis Work.

IV. ARCHITECTURE.

SECOND YEAR.

FIRST TERM.

Practical Construction.
Greek and Roman Architectural History.
The Orders and their applications.
Drawing.
Tracing and Sketching.
Analytic Geometry.
Physics.
Descriptive Geometry.
Modern History.
English Literature.
German.

SECOND TERM.

Practical Construction.
Mediæval and Modern Architectural History.
Perspective.
Drawing.
Sketching.
Differential Calculus.
Physics.
Physical Geography.
Modern History.
English Literature.
German.

THIRD YEAR.

FIRST TERM.

Original Design.
Sketching.
Integral Calculus.
General Statics.
Lithology.
Descriptive Astronomy.
Physics; Lectures, and Laboratory work.
Constitutional History.
German.

SECOND TERM.

The Decorative Arts; Stained Glass, Fresco Painting, Tiles, Terra Cotta, etc.
Original Design.
Sketching.
Surveying.
Strength of Materials.
Kinematics and Dynamics.
Stereotomy.
Physical Laboratory.
Political Economy.
German.

FOURTH YEAR.

FIRST TERM.

The History of Ornament.
Original Design.
Sketching.
Specifications; Carpentry, etc.
Strength of Materials.
Stability of Structures.
Heating and Ventilation.
Advanced French.

SECOND TERM.

The Theory of Architecture.
Style and Composition.
Original Design.
Problems in Construction.
Specifications; Contracts, etc.
Building Materials.
Thesis Work.
Advanced French.

V. CHEMISTRY.—A.

SECOND YEAR.

FIRST TERM.

Qualitative Analysis.
Blowpipe Analysis, Crystallography, and Determinative Mineralogy.
Analytic Geometry.
Physics.
Modern History.
English Literature.
German.

SECOND TERM.

Quantitative Analysis, Lectures, and Laboratory work.
Chemical Philosophy.
Differential Calculus.
Physics.
Modern History.
English Literature.
German.

THIRD YEAR.

FIRST TERM.

Quantitative Analysis, Laboratory work.
Quantitative Analysis, Special Methods.
Biology.
Work with the Microscope.
Physics; Lectures, and Laboratory work.
Constitutional History.
German.

SECOND TERM.

Quantitative Analysis, Laboratory work.
Industrial Chemistry, Lectures.
Drawing.
Assaying.
Physical Geography.
Physical Laboratory.
Political Economy.
German.

FOURTH YEAR.

FIRST TERM.

Organic Chemistry, Lectures.
Organic Chemistry, Laboratory work.
Metallurgy, Lectures.
Abstracts of Memoirs.
Applied Physics.
Optional Studies.

SECOND TERM.

Studies for this term, including Thesis work, will be specially assigned to each student.

For Courses B and C, see next page.

V. CHEMISTRY.—B and C.

SECOND YEAR.

FIRST TERM.	SECOND TERM.
Qualitative Analysis.	Quantitative Analysis, Lectures, and Laboratory work.
Blowpipe Analysis, Crystallography, and Determinative Mineralogy.	Chemical Philosophy.
Descriptive Astronomy.	Botany, Systematic and Structural.
Physics.	Physical Geography.
Modern History.	Physics.
English Literature.	Modern History.
German.	English Literature.
	German.

THIRD YEAR.

FIRST TERM.	SECOND TERM.
Quantitative Analysis, Laboratory work.	Quantitative Analysis, Laboratory work.
Quantitative Analysis, Special Methods.	Industrial Chemistry, Lectures.
Biology.	Drawing.
Physics; Lectures, and Laboratory work.	Assaying.
Structural and Chemical Geology.	Physical Laboratory.
Constitutional History.	Historical Geology.
German.	Political Economy.
	German.

FOURTH YEAR.—FIRST TERM.

COURSE B.	COURSE C.
Organic Chemistry, Lectures.	Organic Chemistry, Lectures.
Chemistry, Laboratory work.	Chemistry, Laboratory work.
Metallurgy, Laboratory work.	Industrial Chemistry, Laboratory work.
Metallurgy, Lectures.	Metallurgy, Lectures.
Abstracts of Memoirs.	Abstracts of Memoirs.
Applied Physics.	Applied Physics.
Optional Studies.	Optional Studies.

FOURTH YEAR.—SECOND TERM.

Studies for this term, including Thesis work, will be specially assigned to each student.

Candidates for the degree in Chemistry may elect either of the courses A, B, or C. Course A is for those who wish to continue the study of mathematics beyond the first year. Course B is for those who prefer a larger amount of the natural sciences; and course C for those whose aim is the pursuit of Industrial Chemistry.

VI. METALLURGY.

SECOND YEAR.

FIRST TERM.

Blowpipe Analysis, Crystallography, and Determinative Mineralogy.
Qualitative Chemical Analysis.
Descriptive Astronomy.
Physics.
Modern History.
English Literature.
German.
Drawing.

SECOND TERM.

Quantitative Analysis; Lectures, and Laboratory work.
Chemical Philosophy.
Botany.
Zoology and Palæontology.
Physical Geography.
Physics.
Modern History.
English Literature.
German.

THIRD YEAR.

FIRST TERM.

Quantitative Analysis, Lectures.
Quantitative Analysis, Laboratory work.
Biology.
Physics; Lectures, and Laboratory work.
Structural and Chemical Geology.
Drawing.
Constitutional History.
Zoology.
Palæontology.
German.

SECOND TERM.

Quantitative Analysis, Laboratory work.
Industrial Chemistry, Lectures.
Physical Laboratory.
Human Physiology.
Historical Geology.
Political Economy.
German.
Assaying.

FOURTH YEAR.

FIRST TERM.

Quantitative Analysis, Laboratory work.
Metallurgy.
Metallurgical Laboratory; — Work upon Gold, Silver, Copper, and Lead Ores in quantity.
Drawing.
Applied Physics.
Blacksmithing (shopwork).
Abstracts of Memoirs.

SECOND TERM.

Quantitative Analysis, Laboratory work.
Metallurgy and Ore-dressing.
Mining Laboratory as in 1st term.
Thesis Work.
Building Materials, Lectures.
Drawing.

VII. NATURAL HISTORY.

SECOND YEAR.

FIRST TERM.

Qualitative Analysis.
Blowpipe Analysis, Crystallography, and Determinative Mineralogy.
Free Hand Drawing.
Descriptive Astronomy.
Physics.
Modern History.
English Literature.
German.

SECOND TERM.

Quantitative Analysis; Lectures, and Laboratory work.
Botany.
Zoology and Palæontology.
Physical Geography.
Drawing.
Physics.
Modern History.
English Literature.
German.

THIRD YEAR.

FIRST TERM.

Quantitative Analysis, or Analytic Geometry.
Biology.
Cryptogamic Botany.
Structural and Chemical Geology.
Physics; Lectures, and Laboratory work.
Constitutional History.
Zoology and Palæontology.
German.

SECOND TERM.

Historical Geology.
Political Economy.
Study of Memoirs or Differential Calculus.
Anatomical Laboratory.
Human Physiology.
Physical Laboratory.
German.

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

FOURTH YEAR.

FIRST TERM.

Special work in
Zoology,
Biology,
Botany or Geology.
Drawing with the Microscope.
Original Investigation.
Physiological Chemistry.
Field Work.

SECOND TERM.

Laboratory Work.
History of Natural Sciences.
Industrial Geography, and Meteorology.
Original Investigation.
Field Work.
Thesis Work.

VIII. PHYSICS.—A.

SECOND YEAR.

FIRST TERM.

Physics, Lectures.
Physical Laboratory.
Analytic Geometry.
Descriptive Geometry
Qualitative Analysis.
Descriptive Astronomy.
Modern History.
English Literature.
German.

SECOND TERM.

Physics, Lectures.
Physical Laboratory.
Differential Calculus.
Quantitative Analysis, Lectures, and Laboratory Work.
Botany.
Physical Geography.
Modern History.
English Literature.
German.
General Physics. Reading, determined by particular work of each student.

THIRD YEAR.

FIRST TERM.

Physical Laboratory.
General Physics, Optics, or Acoustics.
Integral Calculus.
Applied Mechanics.
Biology.
Chemical Laboratory.
Constitutional History.
German.

SECOND TERM.

Physical Laboratory.
General Physics, Optics, or Acoustics.
Advanced Physics, Memoirs, etc.
History of Physical Sciences.
Applied Mechanics.
Chemical Philosophy.
Political Economy.
German.

FOURTH YEAR.

FIRST TERM.

Physical Laboratory.
General Physics, Electricity.
Lantern Projections.
History of Physical Sciences.
Practical Astronomy.
Applied Mechanics. Thermodynamics, Hydraulics, etc.
Chemical Laboratory, Chemical Applications of Physics.

SECOND TERM.

Physical Research.
General Physics, Acoustics, or Optics.
Advanced Physics, Memoirs, etc.
Principles of Scientific Investigation.
Advanced Mathematics.

VIII. PHYSICS.—B.

SECOND YEAR.

FIRST TERM.	SECOND TERM.
Physics, Lectures.	Physics, Lectures.
Physical Laboratory, General Laboratory Work, and Experimental Acoustics.	Physical Laboratory, General Laboratory Work, Acoustics, Simple Applications of Electricity.
Analytic Geometry.	Differential Calculus.
Descriptive Geometry.	Shopwork; Wood and Metal Turning.
Shopwork; Carpentry, Wood and Metal Turning.	Physical Geography.
Descriptive Astronomy.	Modern History.
Modern History.	English Literature.
English Literature.	German.
German.	General Physics, Theoretical Acoustics.
Machine Drawing.	Machine Drawing.

THIRD YEAR.

FIRST TERM.	SECOND TERM.
Physical Laboratory, Special Methods in Photometry.	Physical Laboratory, Electrical Measurements and Testing.
General Physics, Electricity, Photometry.	General Physics, Electricity.
Integral Calculus.	Advanced Physics, Memoirs, etc.
Applied Mechanics.	History of Physical Sciences.
Mechanical Engineering, Theory and Practice of Steam and other Engines.	Applied Mechanics.
Mechanical Laboratory, Use of Dynamometers, Indicators, etc.	Mechanical Engineering.
Constitutional History.	Mechanical Laboratory.
German.	Political Economy.
	German.

FOURTH YEAR.

FIRST TERM.	SECOND TERM.
Physical Laboratory, Electrical Testing and Construction of Instruments.	Physical Research.
General Physics, Applications to Telegraph, Telephone, Electric Lighting, etc.	General Physics, Applications of Electricity.
Photography.	Advanced Physics, Memoirs, etc.
History of Physical Science.	Principles of Scientific Investigation.
Mech. Eng. Laboratory.	Advanced Mathematics.
Applied Mechanics, Thermodynamics, Hydraulics, etc.	

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

IX. GENERAL COURSES.—A.

SECOND YEAR.

FIRST TERM.	SECOND TERM.
Physics.	Physics.
Descriptive Astronomy.	Physical Laboratory.
Scientific Reading to be assigned individually.	Differential Calculus, or Chemical Philosophy.
Analytic Geometry.	Physical Geography.
Work with the Microscope.	Industrial Chemistry. Lectures.
Modern History.	Modern History.
English Literature.	English Literature.
German.	Elements of Political Economy.
	German.

THIRD YEAR.

FIRST TERM.	SECOND TERM.
Physical Laboratory.	Physical Laboratory.
General Physics. Special work to be assigned.	General Physics. Special work to be assigned.
Integral Calculus and Applied Mechanics, or Structural and Chemical Geology.	History of Physical Science.
Constitutional History.	Applied Mechanics, or Historical Geology.
Political History of the United States.	International Law.
German.	Constitutional History of England.
Advanced French.	Political Economy.
	German.
	Advanced French.

FOURTH YEAR.

FIRST TERM.	SECOND TERM.
Physical Laboratory.	Work in Physics to be specially assigned to each student.
General Physics.	Industrial Geography.
Applied Mechanics, or Philosophy of Science.	Business Law.
Special study in English History and Literature.	Advanced German.
Special studies in the Constitutional History of the United States.	Spanish, Italian, or advanced French continued.
Special studies in Finance.	Thesis Work.
Advanced German.	
Spanish, Italian, or advanced French.	

Some of the above-stated studies may be replaced by others, with the consent of the Faculty, whenever good reason can be shown for the substitution in any special case.

IX. GENERAL COURSES.—B.

SECOND YEAR.

FIRST TERM.	SECOND TERM.
Qualitative Analysis.	Quantitative Analysis.
Mineralogy.	Chemical Philosophy.
Drawing of Crystals.	Botany.
Physics.	Physics.
Descriptive Astronomy.	Physical Geography.
Modern History.	Modern History.
English Literature.	English Literature.
German.	Elements of Political Economy.
	German.

THIRD YEAR.

FIRST TERM.	SECOND TERM.
Organic Chemistry.	Organic Chemistry.
Reading in Chemistry to be assigned individually.	Human Physiology.
Biology.	Physical Laboratory.
Physical Laboratory.	History of Physical Science.
Structural and Chemical Geology.	International Law.
Constitutional History.	Constitutional History of England.
Political History of the United States.	Political Economy.
German.	German.
Advanced French.	Advanced French.

FOURTH YEAR.

FIRST TERM.	SECOND TERM.
Industrial Chemical Laboratory.	Work in Chemistry will be specially assigned to each student.
Special study in English History and Literature.	Industrial Geography.
Special studies in the Constitutional History of the United States.	Business Law.
Special studies in Finance.	Advanced German.
Advanced German, Italian, Spanish, or advanced French.	Italian, Spanish, or advanced French continued.
	Thesis Work.

Some of the above-stated studies may be replaced by others, with the consent of the Faculty, whenever good reason can be shown for the substitution in any special case.

IX. GENERAL COURSES.—C.

SECOND YEAR.

FIRST TERM.	SECOND TERM.
Mineralogy.	Botany.
Drawing of Crystals.	Zoology and Palæontology.
Physics.	Physical Geography.
Surveying.	Physics.
Topographical Drawing.	Topographical Drawing.
Descriptive Astronomy.	Chemical Laboratory.
Qualitative Analysis.	Modern History.
Modern History.	English Literature.
English Literature.	Elements of Political Economy.
German.	German.

THIRD YEAR.

FIRST TERM.	SECOND TERM.
Zoology and Palæontology.	Historical Geology.
Structural and Chemical Geology.	Map Drawing.
Field Geology.	Field Geology.
Biology.	Human Physiology.
Physical Laboratory.	Physical Laboratory.
Constitutional History.	History of Physical Science.
Political History of the United States.	International Law.
German.	Constitutional History of England.
Advanced French.	Political Economy.
	German.
	Advanced French.

FOURTH YEAR.

FIRST TERM.	SECOND TERM.
Laboratory Work in Geology.	Work in Geology and Mineralogy to be individually assigned.
Drawing with the Microscope.	Map Drawing.
Metallurgy.	Thesis Work.
Special study in English History and Literature.	Industrial Geography.
Special studies in the Constitutional History of the United States.	Business Law.
Special studies in Finance.	Advanced German.
Advanced German, Italian, Spanish, or advanced French.	Italian, Spanish, or advanced French continued.

Some of the above-stated studies may be replaced by others, with the consent of the Faculty, whenever good reason can be shown for the substitution in any special case.

ADVANCED COURSES.

The particular course of study which a candidate for the degree of Doctor of Science wishes to pursue must be submitted to the Faculty in writing, and must meet their approval.

The minimum term of residence of candidates for this degree will be two years; but 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.

Final examinations will be held, and the candidate will be required to present at least one printed thesis on some subject embraced in his course.

CONDITIONS OF ADMISSION.

Regular Courses. To be admitted as a regular student of the first year's class, the applicant must have attained the age of sixteen years, and must pass a satisfactory examination in: —

Arithmetic (including the metric system of weights and measures):

Algebra, through equations of the second degree, including Arithmetical and Geometrical Progressions, the Binomial Theorem with positive integral exponents, and Proportion;

Plane Geometry;

French — Elements of the grammar, and some practice in translation; *

English grammar, and composition;

Geography;

In general, the training given in the best high schools and academies will be suitable preparation for this school; but

* The grammar, particularly a thorough drill on the forms of the verbs, is the essential part of the preparation. Part I. of Otto's grammar with about fifty pages of translation represents, in general, the amount required.

applicants must be thoroughly prepared in the three Mathematical subjects above named.

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

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 a course in Natural History will find it advantageous to acquire also the elements of Greek.

To be admitted as a regular student of the second year's class, the applicant must be at least seventeen years of age, and, besides passing the examination for admission to the first year's class, must pass a satisfactory examination in the first year's studies; and a like rule applies to the case of applicants for admission into the classes of the succeeding years.

Graduates of Colleges will, in general, be presumed to have the requisite attainments for entering the third year as regular students, and may do so on satisfying the Faculty that they are prepared to pursue the proposed studies to advantage. Such students, if deficient in any of the scientific studies of the first two years, will have opportunities for making them up without extra charge, and will be required to pass an examination in them before entering upon the studies of the fourth year. Should they be already proficient in any of the general studies of the third and fourth years, they may be excused from attendance on the exercises in these subjects.

Special Students will be allowed to enter special divisions of either of the courses—as, for example, the classes of mathematics, chemistry, physics, drawing, engineering, metallurgy, architecture, natural history, etc.—on giving satisfactory evidence to the Faculty that they are prepared to pursue with advantage the studies selected. Information respecting the requirements for admission to each special course of study will be found in the Supplement to the Catalogue, which is printed each year, and which may be obtained on application to the Secretary. Examinations for the above-

mentioned class of students will be held at the times of the regular entrance examinations, as stated below.

An examination for admission to the first year's class will begin at 9 A. M., on the Thursday following the first Tuesday after May 28th, and continue two days. A second examination will begin at 9 A. M., on the Tuesday preceding the last Monday in September, and continue two days. Attendance on both days of either examination is required. Applicants for advanced standing must pass the entrance examination, as given above, and present themselves for further examination at 9 A. M., on the Thursday following the second entrance examination.

Applications for admission to the regular or special courses at other times than the above will be received only when sickness or some other equally good cause has prevented attendance on the days prescribed.

Advanced Courses. Graduates of the Institute may enter on these courses without examination. Bachelors of Arts, Science, or Philosophy, of any other Institution, may enter on giving satisfactory evidence, by examination or otherwise, that they are qualified to pursue the course selected.

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. A high value is set upon the educational effect of laboratory practice, drawing, and field work.

Written Examinations. Besides oral examination 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 farther instruction in the professional courses. In the first year all regular students conclude Algebra, and also study Solid Geometry, Plane and Spherical Trigonometry. In the following years, students in most of the courses receive instruction in Analytic Geometry, and in the Differential and Integral Calculus.

The Instruction in Modern Languages. While the special 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) is continued through the first year. German is commenced at the beginning of the second year, and continued through the third. To this extent these languages are studied by 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 through the first two years, in Rhetoric and Criticism, and in English Literature. Practice in English composition is required throughout the course. The study of the History of Eng-

lish Literature is accompanied by the critical reading of English texts.

The Instruction in History and Political Science. The studies of this department comprise the political and constitutional history of England; the history of the United States; the elements of international law; a full course in political economy, and special researches in Finance, embracing the subjects of taxation and public debts.

The Instruction in Drawing. During the first year, instruction is given to all regular students in the principles of 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. In subsequent years, Drawing is continued in connection with the professional studies.

The Instruction in Descriptive Geometry and Stereotomy. The exercises in Descriptive Geometry are of two kinds. In the lecture room, instruction with models and diagrams is combined with testing the student's knowledge as gained from a text-book. In the drawing room the student aims to construct such problems each week, from the lessons for that week, as shall, during the course, give him practice in all the usual operations belonging to the subject.

The Instruction in Stereotomy is given by means of lectures, and drawing exercises, illustrating a variety of problems in Stone Cutting, and in Engineering and Architectural construction.

The Instruction in Chemistry. In the laboratories provision is made for teaching General Chemistry, Qualitative Analysis, Quantitative Analysis, Organic Chemistry, Assaying, Determinative Mineralogy, Metallurgy, and Industrial Chemistry, the use of the blowpipe, as well as the use of the microscope, spectroscope, and other optical apparatus.

Instruction in General Chemistry is given to all regular students by recitations and lectures, and by practical exercises in the laboratory, where every one is provided with a

desk, and the necessary apparatus, and is required to perform, under the supervision of the professor, a large number of experiments, selected to illustrate the laws of chemical action, and the properties and relations of all the more important chemical elements. This is followed by a systematic course of instruction in Qualitative Analysis, with laboratory practice.

In the second year those who require a fuller knowledge of chemistry continue Qualitative Analysis, and take up Chemical Philosophy, and Mineralogy with the use of the blowpipe.

The principal subjects of study in the third and fourth years are Volumetric and Gravimetric Analysis, Organic Chemistry, Gas Analysis, Assaying, the Preparation of Chemical Products, Metallurgy, and Industrial Chemistry. A large portion of the time is allotted to work in the laboratories. In the third year lectures are given on Quantitative Analysis, and on Physiological and Industrial Chemistry. In the fourth year the lecture room exercises are devoted to Organic Chemistry and Metallurgy. During the last two years the student is required to make reference to standard works and original memoirs in English, French, and German. Both regular and special students are encouraged to undertake experimental researches, and are assisted in bringing them to useful results.

Arrangements will be made, as far as practicable, for the accommodation of students who wish to devote themselves to special subjects, such as Toxicology, Food and Water Analysis, Gas Analysis, Dyeing, Tanning, and other chemical arts.

Special provision has been made for giving women ample opportunities for laboratory work in Chemistry, Mineralogy, and Biology. Each study may be pursued by itself, or in connection with studies in other departments of the Institute.

The Instruction in Physics. During the second year the whole subject is discussed in a series of lectures which are attended by all the regular students. 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.

In the third year the student enters the *Rogers Laboratory of Physics*, learns to use various instruments for physical measurement, and verifies many of the fundamental laws of nature. The experiments are so chosen that some of them, for instance those with the microscope and spectroscope, 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 how to apply 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. In the fourth year a portion of the students carry on 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.

On alternate years a course of lectures will be given upon the scientific principles involved in the more recent applications of Electricity, including the Telegraph, the Telephone, Electric Lighting, and the transmission of power by electricity.

Candidates for a degree in Physics pursue the following courses: —

Microscopy.—Theory of the microscope; application to study of various objects; test-objects; modes of illumination applications of polarized light, use of micro-spectroscope measurement with different forms of micrometer; focal length and angular aperture of objectives; preparation of objects.

Photography.—Methods of photography and its connection with lithography and printing; preparation of baths; taking

glass negatives, lantern slides, paper positives; photographs of microscopic objects, of spectra, etc.

Lantern projections.—Sunlight, lime, magnesium, and electric lights; lanterns, condensers, and projecting lenses; projection of views, and of real objects; tanks, chemical and electric decompositions; projection of spectra.

Meteorology.—Atmospheric temperature, pressure, and moisture; velocity of the wind; magnetic elements; electricity of the air.

In addition to the laboratory work, students in this department receive instruction in General Physics throughout the third and fourth years, and gain a familiarity with standard works on various branches of the subject, both in their own and in foreign languages.

Advanced Physics.—As many of the students taking the course in Physics intend to make teaching their profession, a special course is prepared with this object in view, in which each student in turn prepares a particular subject, giving the result of his own or other researches, and presents it in the form of a scientific memoir or lecture.

Teachers of Physics, and others properly qualified, may enter the laboratory, and take the whole or any part of the above courses.

An alternative course in Physics has recently been established for the benefit of students wishing to enter upon any of the branches of Electrical Engineering. In this course especial instruction will be given concerning the various practical applications of Electricity to Land and Submarine Telegraphy, the Telephone, Electric Lighting, and the Electrical Transmission of Power. An extended course of laboratory instruction in electrical measurements will also be provided.

The Instruction in Theoretical and Applied Mechanics. This instruction, which is given to all regular students of the courses of Engineering and Architecture, is begun about December 1st of the third year. During the third year the subjects studied are 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, this latter subject occupying fully half the time devoted to Applied Mechanics in the third year, and being subsequently completed in the fourth year. In this course the methods of the differential and integral calculus are freely used whenever they are the most convenient.

In the fourth year's classes the subjects pursued by the students of each professional course are arranged with reference to the special wants of that course, and then two or more classes are taught together whenever the instruction to be given covers the same ground. 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, Thermodynamics, and special study of Dynamics.

The Laboratory of Applied Mechanics. The object of this laboratory is to furnish the students, as far as possible, the opportunity of becoming familiar with the strength and elastic properties of the materials used in construction by actual test. It is furnished with a testing machine of 50,000 pounds capacity, capable of determining the tensile strength and elasticity of specimens not more than thirty inches long; and also the transverse strength and stiffness of beams twenty-five feet long and under, as well as of many of the framing joints used in practice. The classes are divided into small sections, for the purpose of making tests with the machine. All the experiments are so chosen as to make the student better acquainted with the resisting properties of materials; 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-size pieces.

The Instruction in Civil Engineering is given by means of lectures and recitations, and by practice in the field and in the drawing rooms. The use of the various instruments for measuring lines and angles, and of the level, plane-table, etc., is taught mainly by actual work in the field. The field-work embraces the various kinds of land surveying, Topography, Hydrography, and the several operations with the level and transit 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 measurements of actual engineering structures, a large number of which are found in the immediate neighborhood of the Institute.

The regular course in Civil Engineering embraces Roads, Railroads, Bridges, Rivers, Harbors, Canals, Water Supply and Sewerage, Drainage and Irrigation. In the lower classes the student is held closely to the best text-books, but, as he advances, he works more and more without these aids; and during the last part of his course, while he makes constant reference to the best and latest engineering books of this and other countries, he is, at the same time, brought into continual and direct contact with actual works in process of construction, and is made to see the exact connection between his theoretical acquirements and the real engineering practice of the day. In this manner he not only becomes familiar with the practical details of construction, but a new interest is given to the purely theoretical part of his studies.

The Instruction in Mechanical Engineering is given by means of lectures and recitations, and by practice in the drawing rooms, and in the Laboratory of Steam Engineering. Occasional excursions are made to enable the students to witness running machinery and manufacturing processes. Monographs and reports by experts are freely used in the instruction that is given in this department.

The instruction in Machinery and Millwork treats of working drawings made from the machine, and of working

drawings for placing machinery in manufactories. The students practice, for a limited time, the production of each of these distinctly different classes of drawings in styles that are peculiarly easy to be read. This instruction also treats of motions that occur in machines, of elementary problems in machine design, of the production, measurement, and distribution of power, and of the arrangement of machinery and shafting in manufactories. The students solve a limited number of practical problems in the Kinematics of Machinery, in Elementary Machine Design and in the Arrangement of Machinery and Shafting.

The instruction in Steam Engineering treats of the fundamental laws of thermodynamics, and their application to steam and other heat engines, of the combustion of fuel, of steam generators and their construction, of the mechanism of the steam engine, and of the characteristic features of typical steam, and other heat engines. In connection with this instruction the students design portions of a steam engine.

The instruction in Hydraulic Motors treats chiefly of turbines, of apparatus for testing them, of methods of testing them, of the results of tests, and of rules for proportioning turbines. Designs of portions of turbines are required of students. The instruction of the Determination of the Rate of Flow of Water treats of experiments, apparatus, and formulæ that relate to the rate of flow of water over weirs, in short open canals of rectangular section, or through submerged orifices, or diverging tubes.

The instruction in Steam Pumps and Pumping Engines treats chiefly of modern machinery for pumping water. Prominent Pumping Engines are visited by the students, and tests that do not require extensive preparations are occasionally made.

This department is indebted to the Deane Steam Pump Co., of Holyoke, Mass., for a typical boiler-feed-pump of their usual manufacture, skillfully sectioned for use as apparatus of instruction.

The practice in Drawing is carried on in conjunction with

the lectures, and text-book study. It comprises tracing, copying, sketching from the structure, machine or motor, scale drawing from sketches, and the representation by curves of the results of experiments or of mathematical investigations; to which is added the reproduction of drawings by the "Blue Process."

The Laboratory of Steam Engineering affords an opportunity of becoming acquainted, by experiment, with fundamental laws which underlie the practice of Steam Engineering. It also provides practice in adjusting, testing, and managing steam machinery and apparatus.

The Instruction in Mining is given to students of the third year by a course of eighty 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 drawings, and by 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.

In the fourth year ore-dressing and metallurgy are taken up in a course of sixty lectures. This is accompanied by a series of continuous practical exercises in the concentration and smelting of ores in the Mining and Metallurgical laboratories.

The professors in this department hope to give each student of Mining and Metallurgy at least one chance during his course of study to join a party organized for visiting some of the more interesting mining regions.

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. These laboratories furnish to students in Mining and Metallurgy the means for studying experimentally the various processes of ore-dressing and smelting. Ores of different kinds may be here subjected, on a small scale, to the same modes of treatment as have been adopted at the best mining and metallurgical establishments.

The mining laboratory is supplied with two suites of milling apparatus: —

I. A five-stamp battery, a set of amalgamating plates, a mercury saver, a circular buddle for concentrating tailings, an Atwood's amalgamator, and an amalgamating pan.

II. A Blake crusher, crushing rolls with automatic sizing screens, a Spitzkasten, four automatic machine jigs, an elevator, an Evans table or rotary buddle, a settling tank, and a centrifugal pump, which throws the water from the settling tank back to the feed tank; the same water is thus used over and over again, to avoid loss in slimes.

This laboratory also contains the following auxiliary apparatus: —a steam engine and boiler, a Whelpley & Storer pulverizer, an edge-stone mill, a Bogardus mill, a Root blower, and a Sturtevant blower. The metallurgical laboratory contains a blast furnace, a reverberatory smelting furnace, a roasting furnace, a furnace for cupellation, furnaces for fusion, crucible and muffle assay furnaces, a blacksmith's forge, a melting kettle, and an eliquation furnace. Students are admitted to this laboratory only after having passed through the Quantitative Analysis prescribed for the third year.

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 perliminary 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. Each student is assisted in working his ore by his classmates, who have an opportunity in this way to run the boiler, engine, machines, and furnaces.

The Institute is from time to time receiving ores of gold, silver, lead, copper, antimony, zinc, iron, etc., from various localities. These ores are worked, and reports sent to those who contribute them; and it is hoped that, by the co-operation of those who wish to have examinations made, the laboratory will continue to receive the necessary amount and variety of ores.

Models, etc., relating to the Engineering courses. The collections under this head consist of models in wood, in metal, and in plaster, besides lithographs, photographs, and drawings collected in the United States and in Europe.

They illustrate the following subjects: — General descriptive Geometry, Linear Perspective, Shades, Shadows and Reflections, Masonry and Stone Cutting, Joints, Girders and Trusses for Wood and Iron Structures, Furnaces and Boilers, Steam and Water Motors, Machines and their details.

The Instruction in Architecture. It is the object of this department to give to its students the instruction and discipline that cannot be obtained in architects' offices. The course is, however, practical as well as theoretical, and, besides the scientific study of construction and materials, it comprises the study of building processes, and of professional practice and procedure, as well as that of composition and design, and of the history of the art. It is so arranged as to meet the wants not only of young men who purpose to pursue a comprehensive course of architectural study but of those who are looking only for such an elementary training as shall qualify them for positions as draughtsmen.

The more strictly professional work begins in the second year, the first half of which is given to the study of the Five

Orders and their applications, and to Greek and Roman Architectural history. At the same time the students are familiarized with the material elements of their future work by a course in Practical Construction illustrated by visits to buildings, lectures and problems. In the last half of the year the historical studies are continued, and the mediæval period, from the fall of the Roman Empire to the fall of Constantinople, and the modern period, including that of the Renaissance, are taken up.

During the third and fourth years the students are constantly practiced in original design. Each set of drawings is examined and criticised before both classes.

Special exercises are also had in shades, shadows, perspective, and the perspective of shadows, and in tracing and sketching, and drawing upon the blackboard, and in sketching, measuring, and drawing out buildings already erected.

Special students in Architecture are received, after passing the regular entrance examinations, into a special course, occupying two years, and embracing all the subjects mentioned in the scheme presented below. Such students may also take any other studies which they are found prepared to pursue to advantage. The fee for this special course is two hundred dollars a year, the same as for the regular courses.

SPECIAL COURSE.

FIRST YEAR.

FIRST TERM.	SECOND TERM.
Elements of Architectural Design.	Problems in Design.
Sketching and water color.	Style and Composition.
Sketching, black and white.	Specifications and Contracts.
Mechanical Drawing.	Building Materials.
Practical Construction.	Schools, Theatres, Churches.
German.	Practical Construction.

SECOND YEAR.

FIRST TERM.	SECOND TERM.
Problems in Design.	Problems in Design.
Sketching.	Style and Composition.
Specifications.	Specifications and Contracts.
Greek and Roman Architectural History.	Mediæval and Modern Architectural History.
History of Ornament.	Arts Allied to Architecture.
Experimental Physics.	Building Materials.
Rhetoric and English Composition.	Schools, Theatres, Churches.
Chemical Lectures.	Problems in Construction.
	English History and Literature.

The Architectural Museum. Several thousand photographs, 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 gift: —

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 *Ecole des Beaux-Arts* in Paris: — *Esquisses-Esquisses*, *Projets Rendus*, *Projets d'ordre*, *Projets de Construction*, *Grand Prix de Rome*, *Envoi de Rome*.

The publications of the Royal Institute of British Architects, and of the *Société Centrale des Architectes*, in Paris, have been presented by the authorities of these institutions, The library contains nearly four hundred volumes.

A 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, along 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 Instruction in Natural History. This is given with the aid of the collection and library of the Boston Society of Natural History, which, by an agreement between the Society and the Institute, are freely open to the students. These collections rank among the first in the country for extent and value, and in many departments are unsurpassed; the library is rich in works on Natural Science, many of them finely illustrated, and embraces the leading American and European journals and periodicals on Natural History. It is believed that the facilities thus afforded to the students of the Institute are ample for the most thorough instruction in Zoology, Palæontology, and other branches of Natural Science.

Botany is required in some of the courses as affording the proper and natural introduction to the study of Biology, Zoology, and Palæontology, and as being the science best calculated to train the mind for close observation, accurate description, and systematic classification. The instruction is given by lectures, recitations, and practical exercises in the examination of living plants. The numerous conservatories in Boston and vicinity furnish the means of studying hand specimens in many of the natural orders, and the wild flowers of early spring are usually obtained before the end of the school year.

The Biological laboratory has been furnished with a variety of microscopes and accessory apparatus, and affords uncommon facilities for both preparatory and advanced study. There is a choice collection of preparations, but attention is directed mainly to fresh tissues and live specimens. The working library of the professor in charge, which contains

many valuable monographs as well as the more comprehensive works, is at the service of the students.

The Instruction in Mineralogy. Determinative Mineralogy is taught by the study of crystalline forms and the physical properties of minerals, and use of the blowpipe, and by the handling of specimens.

The collection of minerals in use for instruction is placed in the study room of the Mining department, and is thus ready for reference at any time.

The Instruction in Zoology 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 genera which characterize various formations.

The handling and drawing of specimens by the student is an essential feature of the method of instruction. The lectures of the instructor are devoted largely to explanatory demonstrations of the specimens which the students are at the same time drawing.

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.

I. Forty-five lessons in Physical Geography, including Dynamical Geology, are given during the second term of the second year. It is the aim of these lessons 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 bear-

ing upon navigation, the construction and maintenance of roads, and various works of improvement. The instructions of this term are likewise an important preparation for the studies in Structural and Historical Geology of the next year.

II. Thirty exercises in Structural Geology, including a systematic course in Lithology, are next given during the first term of the third year. Oral instruction and laboratory work are combined, 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. Fifteen lessons in Chemical Geology and the history of crystalline formations are then given, which comprise 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. Forty-five lessons in Historical Geology are then given during the second term of the third year. In these 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 Meteorology and Industrial Geography provides for an advanced course of study in the fourth year.

It includes the outlines and industrial applications of meteorological science, also the influences of geographical positions, physical features, climates, etc., upon the resources of countries, and upon the character and prosperity of nations.

The Instruction in Shop Work. Shops or 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.

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. Students in the course of Mechanical Engineering are required to devote a considerable amount of time to work in Carpentry, Wood Turning, Pattern Making, Moulding, and Casting, Forging, Chipping and Filing, and Planing and Turning the metals, the design being to learn the principles, and not to manufacture articles for sale or use.

Students in other departments will be allowed to take shop work when the time can be arranged so as not to interfere with their regular studies.

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 instruction 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 twenty dollars. The uniform must be worn at drill, and, being inconspicuous, may be worn at other times if the student chooses. 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.

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

Excursions. In aid of the practical studies of the school, and as a means of familiarizing students with the actual details of work, they are required, in term time, to make visits of inspection to machine-shops, engines, mills, furnaces, and chemical works, and to important buildings and engineering constructions within convenient reach.

In the vacations more extended excursions are made for the survey of mines and geological features, and for the study of metallurgical works and noted specimens of engineering.

Parties of students have in this way visited mines, furnaces, and engineering works in Nova Scotia, Vermont, New York, New Hampshire, Massachusetts, Rhode Island, Pennsylvania, Colorado, Missouri, and the Lake Superior copper and iron regions.

During the session of 1881–82 visits were made to the exhibitions, manufactories, and schools named below.

The exhibition of the Massachusetts Charitable Mechanics Association, the exhibition of the New England Manufacturers and Mechanics Institute, the Babcock and Wilcox Boiler Co., the Bay State Sugar Refinery, and an experimental Hydro-Carbon Furnace, all at Boston, Mass.; the Steam Boiler and Engine Works of Kendall & Roberts, at Cambridgeport, Mass.; the U. S. Arsenal at Watertown, Mass.; the wreck produced by a boiler explosion at Lynn, Mass., the Wheelock Steam Engine Co., the Worcester Free Institute of Technology, and the Washburn & Moen Manufacturing Co., all at Worcester, Mass.; the Holyoke Water Power Co., the Holyoke Machine Co., the Deane Steam Pump Works, the Testing Flume, the Prentiss Wire Works, and the Whiting Paper Manufactory, all at Holyoke, Mass.;

the U. S. Arsenal, at Springfield, Mass.; the Corliss Steam Engine Works, the Brown & Sharp Manufacturing Co., and the Harris-Corliss Engine Works, all at Providence, R. I.; the Pratt & Whitney Machine Co., the Weed Sewing Machine Co., the Hartford Machine Screw Co., the Billings & Spencer Drop-Forging Co., The Hartford Engineering Co., and the Colt's Armory, all at Hartford, Conn.; the Willimantic Linen Co., at Willimantic, Conn.; the Silk Mills of the Cheney Brothers, at South Manchester, Conn.; the Sheffield Scientific School, and the Winchester Repeating Arms Co., both at New Haven, Conn.; the Meriden Britannia Co., and the Meriden Cutlery Co., both at Meriden, Conn.

The visits in Western Massachusetts and Connecticut were made under the auspices of the S. M.E. Society, a society of which all instructors and students in the Department of Mechanical Engineering may be members.

In addition to those named, numerous places have been visited by small parties for the purpose of inspecting and testing boilers, engines, and machinery.

OCCASIONAL LECTURES.

In addition to the instruction given by the permanent corps of teachers, gentlemen in active life who are eminent in their respective professions will, from time to time, be invited to give courses of lectures on subjects of practical importance.

THE BOSTON PUBLIC LIBRARY.

The professors and students of the Institute are allowed the full use of this library, which now contains over 415,000 volumes. Its reading-room is supplied with the best scientific and technical as well as literary publications, of different countries, and new books of value are promptly bought on proper application to the authorities of the Library. No college or school in the country has better facilities in these

respects than those which the Trustees of the Boston Public Library have given to the officers and students of the Institute of Technology.

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 benefit of this scholarship, is to be a graduate of the English High School in the city of Boston.

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

ADVANCED SCHOLARSHIPS.

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

DEGREES AND DIPLOMAS.

The degrees corresponding to the regular courses are as follows: —

I. A Degree in Civil and Topographical Engineering.
II. " " " Mechanical Engineering.
III. " " " Mining Engineering, or in Geology and Mining.
IV. " " " Building and Architecture.
V. " " " Chemistry.
VI. " " " Metallurgy.
VII. " " " Natural History.
VIII. " " " Physics.
IX. " " " The General Course.

To be entitled to any one of these degrees, 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.

Persons who have been admitted to departments of instruction in the school may, should they so desire, be examined for a degree, and, if found qualified to pass, under the prescribed conditions, they will be entitled to the appropriate diploma.

The examinations for Degrees are held in the month of May. The title of the degree in each of the courses is S.B., or Bachelor of Science, in ————————.

The degree of S.D., or Doctor of Science, is awarded for proficiency in complete Advanced Courses of study.

Besides the diplomas of the Regular and Advanced Courses, certificates of attainment in special subjects are given to such students as, on examination, are found to have the required proficiency in them.

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 in February. On legal holidays, and on the Friday and Saturday following Thanksgiving day, the exercises of the school are suspended.

Bond or Deposit. Every student is required, on entering the school, either to give a bond for two hundred dollars to

pay all charges accruing under the regulations of the school, or to deposit, if he prefer so to do, the sum of two hundred dollars with the Bursar, to be accounted for at the end of the school-year, or whenever the depositor leaves the school, in case he leaves it before the end of the year. This deposit must be renewed at the beginning of each year. The bond must be executed by two bondsmen, satisfactory to the Bursar, one of them being a citizen of Massachusetts; and it must be filed within ten days after the date at which the student joins the school.

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 broken, or used up 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.

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 4.30 P.M., except during the interval for dinner. 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 offense, and renders the offender liable to immediate expulsion.

Residence and Expenses. As the exercises of the school begin at nine o'clock in the morning, and end at half-past four or 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.

SCHOOL OF MECHANIC ARTS.

A school of Mechanic Arts, in which special prominence is given to *manual* instruction, has been established for those who wish to enter upon industrial pursuits rather than to become scientific engineers.

This school is designed to afford such students as have completed the ordinary grammar-school course an opportunity 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 shop work is conducted upon a plan designed at the Imperial Technical School of Moscow, Russia, and carried out there with most satisfactory results. A similar system has also been very advantageously pursued in the Ambachtsschule in the principal cities of Holland. Its exact and systematic method affords the direct advantages 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 shop courses of the school are as follows:—

First year: I, Carpentry and Joinery; II, Wood Turning; III, Pattern Making; IV, Foundry Work.

Second year: I, Iron Forging; II, Vise Work; III, Machine Tool Work.

The course includes two years of theoretical and practical studies combined, and students who successfully complete it will receive a certificate. Students will be received for shorter times, and for special portions of the course. When it is desired, such provisions will be made for advanced and specific shop work as is consistent with due attention to the regular classes.

By favor of the Massachusetts Charitable Mechanics Association the exercises of the school, excepting shop work, are now held in the new building of the Association on Huntington Avenue.

Applicants for the regular course must be at least fifteen years of age, and must pass a satisfactory examination in Arithmetic, Geography, and English Composition.

The tuition is $150 a year, with no extra charge for the use of tools, or materials, used in the regular exercises. Special students, taking the same amount of shop work only as the regular class shop work, will be charged less. The stu-

dent is entitled to the products of his work. A monthly return of absences is made to the parent or guardian.

FIRST YEAR.

FIRST TERM.	SECOND TERM.
Shop Work.—Carpentry.	Shop Work.—Wood Turning, Pattern Making, Foundry Work.
Algebra commenced.	Plane Geometry.
English Composition.	English Composition.
Mechanical and Free hand Drawing.	Mechanical and Free hand Drawing.

SECOND YEAR.

FIRST TERM.	SECOND TERM.
Shop Work,— Forging.	Shop Work.—Vise Work, Machine Tool Work.
Algebra completed.	Geometry.
Elementary Physics.	Physics.
English Composition.	English Composition.
Mechanical Drawing.	Mechanical Drawing.
French.	French.

The beginning and ending of the school-year and the days of entrance examinations are the same as in the School of Industrial Science. See Calendar, page 2.

SCHOLARSHIPS OF THE MASS. CHARITABLE MECHANICS ASSOCIATION.

The two scholarships, founded by this Association, are awarded to sons of present or past members of the Association, on recommendation by the President and Secretary of the Association.

The scholarship entitles the student to free tuition in the School of Mechanic Arts.

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 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 these courses 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 1882–83 are on the following subjects: —

I. *Electric Lighting.* A course of twelve lectures by Professor Charles R. Cross, on Mondays, at 7.30 P. M., commencing January 8.

II. *Elements of Analytic Geometry.* A course of twelve lectures by Professor J. D. Runkle, on Mondays and Fridays, at 7.30 P. M., commencing Dec. 4.

III. *Advanced Studies in French.* (Grammar and Translation.) A course of twelve lectures by Professor Jules Luquiens, on Mondays and Fridays, at 7.30 P. M., commencing December 8.

IV. *Discussion of Some of the Principal Hand-Book Rules.* A course of twelve lectures by Professor Gaetano Lanza, on Tuesdays and Fridays, at 7.30 P. M., commencing December 8.

V. *Machine Drawing and Allied Subjects.* A course of twelve lectures by Professor Channing Whitaker, on Mondays, at 7.30 P. M., commencing December 11.

VI. *European History.* A course of twelve lectures by Professor W. P. Atkinson, on Tuesdays and Fridays, at 7.30 P. M., commencing January 16.

VII. *Modern French Books, Reviews and Readings.* A course of twelve lectures *in French* by Professor Jules Luquiens, on Mondays and Fridays, at 7.30 P. M., commencing February 5.

VIII. *Mediæval Architecture.* (Illustrated by Stereopticon.) A course of twelve lectures by Professor T. M. Clark, on Tuesdays and Fridays, at 7.30 P. M., commencing February 6.

LOWELL SCHOOL OF PRACTICAL DESIGN.

The Trustee of the Lowell Institute has made provision for a course of free instruction in Practical Design for Manufactures, open to a limited number of pupils of both sexes. Students are received at the beginning of the school-year in September, and are taught the art of making patterns for Prints, Ginghams, Delaines, Silks, Laces, Paper Hangings, Carpets, Oil Cloths, etc.

The course embraces: — 1, Technical manipulations; 2, Copying and variation of designs; 3, Original designs or composition of patterns; 4, The making of working drawings, and finishing designs. The course is a three years' course.

The hours of working are from 9 A. M. to 5 P. M., with an interval for dinner every day except Saturday, when the rooms are closed at 12 M.

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, formerly Director of the Atelier Lebert in Paris, and for fifteen years designer at the Pacific Mills. Mr. Kastner is a nephew and pupil of M. Jean Baptiste Lebert, *Dessinateur*, of Mulhouse in Alsace.

The school is constantly provided with samples of all the novelties in textile fabrics from Paris, such as Brocade Silks, Ribbons, Alpacas, Armures, and fancy woolen goods. A weaving department is connected with the school, and provided with a Gingham Loom, a fancy Loom for Cotton and Worsted figured goods, a Jacquard Loom for Silks, Ribbons, and two Woolen Looms, 24 Harness for fancy Casimirs, illustrating the practical applications of designs for woven goods. During the year pupils will visit Print Works, Carpet Mills, etc.

Applicants for admission to the above course are required to bring specimens of their work, exhibiting an acquaintance with Free-hand Drawing, principally flowers from nature and ornamental scrolls, and some familiarity with the use of drawing instruments. Applications should be made to Mr. Charles Kastner.

GRADUATES AND THEIR OCCUPATIONS.

The Roman numerals in the column marked "Course" denote the Course in which the Graduate received the Degree of S. B.

1868.

NAME AND ADDRESS.	COURSE.	OCCUPATION.
ELLERY C. APPLETON, Allentown, Pa.	III.	Civil Engineer, Lehigh Coal and Navigation Co.
WHITNEY CONANT, 443 W. 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., Iowa.	III.	Chief Engineer Central Iowa Railroad.
CHARLES E. GREENE, Ann Arbor, Mich.	I.	Prof. of Civil Engineering, University of Michigan.
ALBERT F. HALL, Boston, Mass.	II.	Draughtsman in the employ of the George F. Blake Mfg. Co.
WILLIAM E. HOYT, Rochester, N. Y.	I.	Chief Engineer of Rochester and Pittsburgh R. R. Co.
ROBERT H. RICHARDS, Boston, Mass.	III.	Prof. of Mining Engineering, Mass. Institute of Technology.
WALTER H. SEARS, 35 Congress St., Boston.	I.	Chief Engineer Winchester Water Works.
CHARLES A. SMITH, St. Louis, Mo.	I.	Prof. of Civil and Mechanical Engineering at Washington University.
JOSEPH STONE, Lawrence, Mass.	I.	Supt. Worsted Dept., Pacific Mills.
BRYANT P. TILDEN, Junction Carleton Co., Minn.	III.	Resident Engineer, N. P. R. R.
JAMES P. TOLMAN, West Newton.	III.	In Business.

NAME AND ADDRESS.	COURSE.	OCCUPATION.
	1869.	
WILLIAM H. BAKER, Las Vegas, New Mexico.	I.	Chief Engineer's office, A. T. and S. F. R. R.
HOWARD A. CARSON, Malden, Mass.	I.	Civil Engineer, 68 Devonshire St., Boston.
J. RAYNER EDMANDS, Cambridge, Mass.	II.	In charge of Time Service at the Observatory of Harvard University.
WM. RIPLEY NICHOLS, Boston, Mass.	V.	Professor of General Chemistry, Mass. Institute of Technology.
CHANNING WHITAKER, Boston, Mass.	II.	Professor of Mechanical Engineering, Mass. Inst. of Technology.
	1870.	
* EDWARD K. CLARK,	II.	Died Sept. 10, 1878.
CHARLES R. CROSS, Sci. and Lit. Boston, Mass.		Professor of Physics, Mass. Institute of Technology.
RUSSELL H. CURTIS, Rock Island, Ill.	I.	Lawyer.
CHARLES W. HINMAN, 32 Hawley St., Boston, Mass.	III.	State Inspector of Gas.
SAMPSON D. MASON, Brainard, Minn.	I.	Principal Assistant Engineer N. P. R. R.
N. FREDERICK MERRILL, Salem, Mass.	V.	Chemist.
THEODORE F. TILLINGHAST, Warren St., Boston.	I.	In Private Business.
EDMUND K. TURNER, Boston, Mass.	I.	Asst. Superintendent and Chief Engineer, Fitchburg Railroad.
DANIEL W. WILLARD, 57 Broadway, N. Y. City.	II.	Architect.
LAWRENCE F. J. WRINKLE, Virginia City, Nevada.	III.	Mining Engineer.
	1871.	
FOSTER E. L. BEAL, Ames, Iowa.	I.	Prof. of Zoology and Comparative Anatomy, Agr. College.
ADDISON CONNOR, Superior, Wis.	I.	Engineer on Northern Pacific R. R.
* HENRY M. CUTLER.	I.	Died May 16, 1877.
* ELMER FAUNCE,	III.	Died July 6, 1882.

NAME AND ADDRESS.	COURSE.	OCCUPATION.
EDW. H. FOOTE, 10 No. Market St., Boston, Mass.	I.	In Business.
FRANK L. FULLER, 7 Exchange Pl., Boston, Mass.	I.	Civil Engineer.
HENRY M. HOWE, 292 Pearl St., New York, N.Y.	III.	Mining Engineer of Orford Nickel and Copper Co.
ALBERT H. HOWLAND, 12 West St., Boston, Mass.	I.	Civil Engineer.
G. RUSSELL LINCOLN, Steelton, Dauphin Co., Pa.	III.	Chemist at the Pennsylvania Steel Works.
WILLIAM A. PIKE, Minneapolis, Minn.	I.	Professor of Engineering, University of Minnesota.
GEORGE H. PRATT, So. Boston, Mass.	V.	Chemist at the Bayside Alkali Works.
EDWARD W. ROLLINS, Denver, Colorado.	III.	Broker.
WALTER W. SMITH, Dayton, Ohio.	II.	Builder of Steam Pumps and Hydraulic Machinery (Smith, Vaile & Co.).
CHARLES F. STONE, Waltham, Mass.	III.	Lawyer.
* ALMARIN TROWBRIDGE, JR.,	II.	Died Dec. 5, 1878.
ISAIAH S. P. WEEKS, Missoula, Montana.	I.	Division Engineer, Missoula Div. N. P. R. R.
RANDALL WHITTIER, Portland, Me.	V.	In Business.

1872.

C. FRANK ALLEN, Topeka, Kas.	I.	A. T. & S. F. R. R.
B. E. BREWSTER, Cheyenne, Wyoming Ter.	III.	Cattle Breeding.
WILLIAM B. DODGE, Columbus, Ohio.	I.	Scale and Gas Inspector Pittsburgh, Cincinnati and St. Louis R. R., Steubenville, O.
FREDERIC A. EMMERTON, Joliet, Ill.	V.	Chemist at the Joliet Iron and Steel Co.'s Works.
JAMES A. HERRICK, Pittsburgh, Pa.	V.	General Supt. Spang Steel and Iron Co.

NAME AND ADDRESS.	COURSE.	OCCUPATION.
JAMES M. HODGE, Greenup, Ky.	III.	Mining and Civil Engineer, Eastern Ky. R. R.
BRADFORD H. LOCKE, Central City, Col.	III.	Mining Engineer.
CHARLES S. MINOT, Harvard Medical School, Boston, Mass.	V.	Instructor in Oral Anatomy and Pathology.
WALTER SHEPARD, Dorchester, Mass.	I.	Assistant Engineer, Boston and Albany R. R.
RICHARD H. SOULE, Williamsport, Pa.	II.	Supt. of the Motive Power, S.S.E. and C. Div. North Central Railway, and P. & E. Div. Penn. R.R.
CLARENCE S. WARD, 62 Sears' Building, Boston, Mass.	III.	Lawyer.

1873.

AMORY AUSTIN, 55 Kilby 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, Ohio.	V.	Second National Bank.
* SAMUEL A. FABENS, JR.,	I.	Died March 14, 1875.
SAMUEL M. FELTON, JR., Boston, Mass.	I.	General Manager, N. Y. & N. E. R. R.
FREDERICK L. FISHER, Medway, Mass.	I.	Insurance Agent and Broker, 35 Kilby St., Boston; and Medway, Mass.
FREDERICK GUILD, JR., Sci & Lit. 93 Boylston St., Boston, Mass.		Whittier Machine Co., 1176 Tremont St.
WILLIAM D. HARRIS, Aylmer, P. Q., Canada.	I.	Resident Engineer, Pontiac, Pacific Junction R. R.
CLARENCE L. HOWES, Hanover, Mass.	I.	Physician.
WILLIAM P. JEWETT, Colorado Springs, Col.	I.	Civil Engineer, Colorado Springs, Col.
WILLIAM A. KIMBALL, 91 Franklin St., New York City.	II.	In Business.
* WILLIAM C. MAY,	V.	Died March 11, 1878.

NAME AND ADDRESS.	COURSE.	OCCUPATION.
FRANK B. MORSE, Murphys, Cal.	I.	Supt. Oro Plata Mining and Milling Co.
HENRY A. PHILLIPS, Toledo, Ohio.	IV.	Chief Engineer, Toledo, Cincinnati & St. Louis R. R.
GEORGE PHILLIPPS, Marshfield, Mass.	III.	Superintendent of an Antimony Mine.
ELLEN H. RICHARDS, Boston, Mass.	V.	Inst'r in Chemistry in the Woman's Laboratory of the Mass. Institute of Technology.
HENRY L. RIPLEY, Care Horatio Adams, Box 2526, Boston, Mass.	I.	Lieut. U. S. Army, 24th Infantry.
ROBERT A. SHAILER, Milwaukee, Wis.	I.	Engineer, Department of Bridges and other Structures, C. M. & St. P. R. R.
C. EDWARD STAFFORD, Steelton, Dauphin Co., Pa.	III.	Supt. Open Hearth Furnace, Steel Department, Penn. Steel Works.
SAMUEL E. TINKHAM, Boston, Mass.	I.	Asst. in City Engineer's Department.
FRANK W. VERY, Allegheny, Pa.	V.	Assistant Astronomer, Allegheny Observatory.
WEBSTER WELLS, Boston, Mass.	I.	Instructor in Mathematics, and Bursar Mass. Inst. of Tech.
RANDALL WHITTIER,	I.	(See Record of Class of 1871.)
FRANCIS H. WILLIAMS, 100 Boylston St., Boston, Mass.	V.	Physician.
LOUIS F. WOOD, 56 Broad St., Boston, Mass.	V.	Chemical and Color Manufacturer.

1874.

HERBERT BARROWS, 35 Bedford St., Boston.	I.	Chauncy Rubber Co.
GEORGE H. BARRUS, Reading, Mass.	II.	Expert Steam Engineer, 79 Milk St., Boston, Mass.
WILLIAM T. BLUNT, 2828 Washington Ave., St. Louis, Mo.	I.	Assistant Engineer, U. S. Mississippi Commission.
GEORGE E. DOANE, Middleboro', Mass.	I.	Of the firm of J. & G. E. Doane.

NAME AND ADDRESS.	COURSE.	OCCUPATION.
WILLIAM B. DOWSE, 14 Hamilton and 290 Franklin Sts., Boston, Mass.	IV.	Of the firm of Chauncy Rubber Co., Mfgs. of Rubber Clothing.
JOSEPH S. EMERSON, Honolulu, Hawaiian Islands.	I.	Civil Engineer.
ELIOT HOLBROOK, Providence, R. I.	I.	Civil Engineer, 283 Westminster St.
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, Kansas.	III.	Stock raising.
* WILLIS H. MYRICK,	II.	Died Oct. 17, 1875.
HERBERT B. PERKINS, No. 13 Cours de Rive, Geneva,	I.	Travelling, Switzerland.
FRANK H. POND, 709 Market St., St. Louis, Mo.	II.	Mechanical Engineer, Pond Engineering Co.
EDWARD S. SHAW, 10 Kirkland Pl., Cambridge, Mass.	I.	Consulting Engineer and Expert in Bridges.
FRANCIS H. SILSBEE, Lawrence, Mass.	II.	Draughtsman, Pacific Mills.
* ARTHUR W. SWEETSER,	I.	Died Oct. 17, 1875.
ROBERT C. WARE, Beach Bluff, Mass.	Sci. & Lit.	Unemployed.
STEPHEN H. WILDER, 65 W. 3d St., Cincinnati, Ohio.	Sci. & Lit.	Lawyer.

1875.

SAMUEL E. ALLEN, 65 Chauncy St., Boston.	I.	Agent for the Nashawanuck Manufacturing Co.
JAMES L. ARNOTT, 91 Franklin St., New York, N. Y.	Sci. & Lit.	In Business.
AMOS J. BOYDEN, 218½ Walnut St., Philadelphia, Pa.	IV.	In charge of Philadelphia office of Messrs. Cabot and Chandler.
MOSES D. BURNETT, Ocala, Marion Co., Fla.	III.	Of the firm of Robinson, Burnett & Co., Milling Business.

NAME AND ADDRESS.	COURSE.	OCCUPATION.
HENRY K. BURRISON, Boston, Mass.	I.	Instructor in Drawing in the Mass. Institute of Technology.
CHRISTOPHER A. CHURCH, Lewisburg, Greenbriar Co., W. Va.	I.	Sheep farming.
FRANK S. DODGE, Cor. of Ashland Ave. and 31st St., Chicago, Ill.	I.	With Union Iron and Steel Company.
EDGAR S. DORR, Mt. Auburn, Mass.	I.	Employed in the Sewer Dept., Boston, Mass.
WILLIAM C. EDES, San Francisco, Cal.	I.	Assistant Engineer on the Southern Pacific Railroad.
CHAS. W. GOODALE, Charlestown, Pima Co., Arizona.	III.	Supt. of Boston and Arizona Smelting and Reduction Works.
EDWARD A. W. HAMMATT, 22 Broadway, Lowell, Mass.	I.	Assistant Engineer in office of Proprietors Locks and Canals.
EDW. A. HANDY, Care Palmer, Sullivan & Co., City of Mexico, Mexico.	I.	Civil Engineer.
* JAMES H. HEAD,	II.	Died August 18, 1875.
THOMAS HIBBARD, 40 State St., Boston, Mass.	II.	Mechanical Engineering.
* WILLIAM F. HUNTINGTON,	I.	Died August 7, 1877.
LEONARD P. KINNICUTT, Cambridge, Mass.	V.	Assistant in Chemistry at Harvard University.
JAMES A. KNAPP, Abington, Mass.	II.	Of the firm of J. B. Knapp & Son, Manufacturers Boots and Shoes.
WILFRED LEWIS, Philadelphia, Pa.	II.	Mechanical Engineer, with Wm. Sellers & Co., Philadelphia, Pa.
SAMUEL J. MIXTER, 180 Marlboro' St., Boston, Mass.	VIII.	Assistant in Anatomy, Harvard Medical School.
BENJAMIN A. OXNARD, Brooklyn, N. Y.	III.	Superintendent of Fulton Sugar Refinery.
THOMAS D. PLIMPTON, Hyde Park, Mass.	II.	Employed in the Manufacture of Woolen Goods.
WILLIAM A. PRENTISS, Holyoke, Mass.	Sci.& Lit.	Of the firm of Geo. W. Prentiss & Co., Manufacturers Iron Wire.
FRANCIS T. SARGENT, New York, N. Y.	II.	Proprietor of the Sand-blast process.
WELLAND F. SARGENT, Pullman, Ill.	I.	In charge of Civil Engineering Dept. Pullman Palace Car Co., Kensington, Ill.

NAME AND ADDRESS.	COURSE.	OCCUPATION.
WILLIAM H. SHOCKLEY, Mt. Diablo, Candalaria, Esmeralda Co., Nev.	III.	Supt. Mt. Diablo Mill and Mining Co.
JAMES B. STANWOOD, Mt. Auburn, Cincinnati, Ohio.	II.	Head Draughtsman and Engineer with Lane & Bodley.
H. L. J. WARREN, Crescent City, Del Norte Co., Cal.	III.	Mining Engineer, Big Flat Gravel Mining Co.
WILLIAM R. WEBSTER, Athens, Pa.	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 Pl., Boston.
WILLIAM P. ATWOOD, Lowell, Mass.	V.	Chemist at the Hamilton Print Works.
THOMAS W. BALDWIN, Bangor, Maine.	I.	City Engineer and Superintendent of Sewers.
WALTER B. BARROWS, Middletown, Conn.	VII.	Instructor in Botany and Assistant in Natural History, Wesleyan University.
AARON D. BLODGETT, 63 Kilby St., Boston, Mass.	II.	Electrician.
JOSHUA B. F. BREED, 1026 Fourth Ave., Louisville, Ky.	I.	Resident Engineer Louisville, New Albany and St. Louis R. R.
HARRY T. BUTTOLPH, Buffalo, N. Y.	I.	Draughtsman, City Engineer's office.
WILLIAM O. CROSBY, Boston, Mass.	VII.	Instructor in Geology and Palæontology in Mass. Inst. of Tech.
FREDERICK K. COPELAND, Ottumwa, Iowa.	I.	Supt. of the Ottumwa and Kirkville R. R.
WILLIS E. DAVIS, San Francisco, Cal.	Sci. and Lit.	Employed by Davis & Cowell, Manufacturers of Santa Cruz Lime.
* CLARENCE L. DENNETT,	II.	Died June 5, 1878.
CHARLES R. FLETCHER, Boston, Mass.	V.	Lecturer on Chemistry in Boston University, and Mass. State Assayer.
JOHN R. FREEMAN, Lawrence, Mass.	I.	Principal Assistant Engineer, Essex Water Power Co.

NAME AND ADDRESS.	COURSE.	OCCUPATION.
FRANCIS E. GALLOUPE, 317 Marlboro' St., Boston.	II.	Mechanical Engineer.
* ROBERT H. GOULD,	VI.	Died Nov. 19, 1878.
JOHN B. HENCK, JR., London, Eng.	VIII.	In Telephone Business.
FRANK W. HODGDON, Arlington, Mass.	I.	Asst. Engineer with the Harbor and Land Commiss'rs of Mass.
SUMNER HOLLINGSWORTH, So. Braintree, Mass.	II.	Superintendent of Paper Mills.
SILAS W. HOLMAN, Boston, Mass.	VIII.	Asst. Professor of Physics, Mass. Institute of Technology.
ALFRED E. HUNT, Pittsburgh, Pa.	III.	Asst. Manager Black Diamond Steel Works.
WILLIAM W. JACQUES, 109 Court St., Boston, Mass.	VIII.	Electrician of the American Bell Telephone Co.
SAMUEL JAMES, JR., Kokomo, Col.	III.	Supt. Aftermath Mine.
ALFRED C. KILHAM, Springfield, Mo.	II.	Employed in repair shops of St. Louis & San Francisco R. R.
THEODORE J. LEWIS, 2224 Greene St., Phil., Pa.	II.	With the Standard Steel Works, 220 So. Fourth St.
ALBERT H. LOW, Box 2524, Leadville, Col.	V.	Assayer.
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 Broadway, No. Somerville, Mass.	V.	Chemist.
D. W. PHIPPS, 209 Washington St., Boston.	Phil.	Counsellor at Law.
CHARLES F. PRICHARD, Dedham, Mass.	II.	Superintendent of the Dedham and Hyde Park Gas Works.
HENRY RAEDER, JR., Aurora, Ill.	I.	Asst. Engineer of C. B. & Q. R. R.
CHARLES L. RICH, Island Pond, Vt.	I.	Principal of High School.
* T. W. ROBINSON,	III.	Died Nov. 3, 1880.

NAME AND ADDRESS.	COURSE.	OCCUPATION.
CHARLES A. SAWYER, 1640 Indiana Ave., Chicago, Ill.	Sci. & Lit.	Attorney at Law. 110 Dearborn St., Chicago, Ill.
THEODORE E. SCHWARZ, Georgetown, Col.	III.	Mining Engineer and Expert.
JULIUS H. SUSMANN, 42 Upton St., Boston, Mass.	III.	In Business.
WALTER D. TOWNSEND, Yokohama, Japan.	III.	With the American Clock and Brass Co.
CHARLES N. WAITE, Manchester, N. H.	V.	Chemist at the Manchester Mills.
HENRY M. WAITT, Minneapolis, Minn.	I.	Instructor in Civil Engineering, University of Minnesota.
ROBERT C. WARE,	Phil.	(See record of Class of 1874.)
HENRY B. WOOD, 2828 Washington St., St. Louis, Mo.	I.	Assistant Engineer U. S. Survey of the Miss. River.

1877.

JOHN ALDEN, Pacific Mills, Lawrence, Mass.	V.	Chemist at the Pacific Mills.
GEORGE BARTOL, Cleveland, Ohio.	III.	Employed at the Otis Iron and Steel Works.
CHARLES S. BACHELDER, Napa City, Cal.	V.	Collection Teller in the Pacific Bank.
J. WILLIAMS BEAL, Hanover P. O., So. Scituate, Mass.	IV.	Architectural Draughtsman.
WILLIAM H. BEECHING, Boston, Mass.	II.	In the Cork Business, 61 Blackstone St., Boston.
HENRY H. CARTER, 55 St. James St., Roxbury, Mass.	I.	Asst. Engineer, Improved Sewerage of Boston.
GEORGE W. CAPEN, Canton, Mass.	IV.	Architect.
WILLIAM E. CHAMBERLIN, New York.	IV.	Draughtsman, McKim, Mead & White.
* GEORGE R. CHAPMAN,	II.	Died Jan. 21, 1879.
LINUS FAUNCE, Norwood, Mass.	II.	With N. Y. & N. E. R. R. Co.
CHARLES H. FISHER, Canton, Mass.	II.	Foreman in Knitting Shop.
* WILLIAM C. FLINT,	III.	Died June 14, 1881.

NAME AND ADDRESS.	COURSE.	OCCUPATION.
PIERCE P. FURBER, Colorado Springs, Col.	IV.	In charge of work for Peabody & Stearns, Architects.
MARTIN GAY, W. New Brigh'n, Staten Isl., N.Y.	I.	Leveller in Department of Public Works of New York City.
JOSEPH P. GRAY, Grand St., Lowell, Mass.	I.	Asst. Engineer in office of Proprietors of Locks and Canals on Merrimack River.
EDMUND GROVER, San Marcial, New Mexico.	I.	Asst. to the Engineer of Bridges and Buildings, Atchison, Topeka and Santa Fé R. R.
RICHARD A. HALE, Lawrence, Mass.	I.	Assistant Engineer with the Essex Water Power Co.
JOHN E. HARDMAN, Lake George, York Co., N. B.	III.	With the Hibbard Antimony Co.
HENRY D. HIBBARD, Nashua, N. H.	III.	Chemist to the Nashua Iron and Steel Co.
WALTER JENNEY, 56 G St., So. Boston, Mass.	III.	Chemist at Stephen Jenney & Co.'s Coal Oil Works.
JOSEPH KIRK, Box 174, Rondout, N. B.	II.	Engineer for Wallkill Portland Cement Co.
GEORGE W. KITTREDGE, Steubenville, Ohio.	I.	Maintenance of Way Dept. P. C. & St. L. R. R.
CHARLES F. LAWTON, New Bedford, Mass.	I.	Engineer Dept. A. & P. R. R., Arizona.
BENJAMIN C. MUDGE, 28 Lynde St., Salem, Mass.	I.	With the Dean Steam Pump Co. of Holyoke.
CECIL H. PEABODY, Champaigne, Ill.	II.	Asst. Prof. of Mechanical Engineering and Physics, Illinois Industrial University.
ARTHUR L. PLIMPTON, 7 Hawthorn St., Roxbury, Mass.	I.	Asst. on Engineering Corps of Improved Sewerage of Boston.
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.	Chemist, with the Silver Spring Bleaching and Dyeing Co.
GEORGE F. SWAIN, Boston, Mass.	I.	Instructor in Civil Engineering, Mass. Institute of Technology.

NAME AND ADDRESS.	COURSE.	OCCUPATION.
FRANK E. WIGGIN, Cordoba, Argentine Republic.	I.	National Observatory.
FREDERICK W. WOOD, Steelton, Dauphin Co., Pa.	III.	Supt. of Blast Furnaces, Pennsylvania Steel Co.

1878.

WILLIAM B. ALLBRIGHT. Chicago, Ill.	V.	Chemist, with N. K. Fairbank, 18th and Blackwell Sts., Chicago.
CHARLES M. BAKER, 117 Com'w'lth Av., Boston, Mass.	IV.	With Baker & Morrill, 40 Equitable Building, Boston.
TAKUMA DAN, Osaka, Japan.	III.	Professor of Chemistry, Osaka University.
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 on the Chicago, Burlington & Quincy R. R.
FRANK H. MORGAN, Springfield, Mass.	V.	Chemist, with Newell Bros. Manufacturing Co.
EVERELL J. NICHOLS, Burlington, Iowa.	I.	Engineer Corps, C. B. & Q. R. R.
FREDERICK H. PRENTISS, 16 Bulfinch St., Boston.	II.	Mechanical Engineer.
JAMES RITCHIE, Burlington, Iowa.	I.	Asst. Engineer, C. B. & Q. R. R.
JAMES W. ROLLINS, JR., West Roxbury, Mass.	I.	Chief Engineer, Atlantic & Danville R. R., Waverly, Sussex Co., Va.
CHARLES D. SWAIN, 368 Main St., Charlestown, Mass.	Sci. & Lit.	House Physician, Boston City Hospital.
PETER SCHWAMB, Arlington Mass.	II.	Draughtsman, Hinckley Locomotive Co., 439 Albany St., Boston.
FREDERIC P. SPALDING, 471 Middlesex St., Lowell, Mass.	I.	Employed in the City Engineer's office, Boston, Mass.
ISAAC M. STOCK, Boston, Mass.	I.	Chief Engineer, Boston & Lowell R. R.
EDMUND TANEY, Washington, D. C.	I.	With the U. S. Coast and Geodetic Survey.

NAME AND ADDRESS.	COURSE.	OCCUPATION.
LINWOOD O. TOWNE, Reed, Col.	III.	Mining Engineer, Chemist and Assayer.
EMILE F. WILLIAMS, 230 Washington St., Boston, Mass.	I.	In Business.
JAMES G. WOOLWORTH, Providence, R. I.	V.	Chemist, with Silver Spring Bleaching and Dyeing Co.

1879.

WALTER S. ALLEN, Boston, Mass.	V.	Asst. in Quantitative Analysis, Mass. Institute of Technology.
SAMUEL T. BRALEY, Rutland, Vt.	II.	Draughtsman, Howe Scale Co.
JOHN W. CABOT, Johnstown, Penn.	III.	Asst. Supt. Bessemer Steel Dept., Cambria Iron Co.
HARRY H. CAMPBELL, Steelton, Dauphin Co., Penn.	III.	Bessemer Dept. Penn. Steel Co.
FRED. S. COFFIN, Auburndale, Mass.	III.	With Stoddard, Lovering & Co., 10 Milk St., Boston, Mass.
W. OTIS DUNBAR, Altoona, Penn.	II.	Signal Department Penn. R. R.
GEO. W. FABENS, Burlington, Iowa.	I.	Employed on the Chicago, Burlington and Quincy R. R.
CHARLES S. GOODING, Brookline, Mass.	II.	In Business.
ERNEST G. HARTWELL, 1131 Tremont St., Boston, Mass.	IV.	Draughtsman E. & G. G. Hook & Hastings, Church-organ B'ld'rs.
RAPHAEL M. HOSEA, Burlington, Iowa.	I.	On Engineer corps of the Chicago, Burlington and Quincy R. R.
HORACE J. HOWE, Brainerd, Minn.	I.	Chief Engineer's office, N. P. R. R.
FRED. B. KNAPP, Cambridge, Mass.	I.	Supt. of Buildings and Instructor in Surveying and Drawing, Harvard University.
FRED. H. LANE, Chambersburg, Penn.	II.	Superintendent of the Chambersburg Woolen Mills.
FRED. R. LORING, Ithica, N. Y.	VII.	Assistant in Chemistry, Cornell University.
WM. W. MACFARLANE, Philadelphia, Penn.	V.	Chemist, Quaker City Dye Works.

NAME AND ADDRESS.	COURSE.	OCCUPATION.
ARTHUR H. METCALF, Pawtucket, R. I.	II.	Mechanical Engineer.
EDWIN C. MILLER, 611 Washington St., Boston, Mass.	II.	With Henry F. Miller, Piano Manufacturer.
EDWARD H. OWEN, JR., Lowell, Mass.	II.	Mill Engineer, Lowell Machine Shop.
WILLIAM H. PICKERING, Boston, Mass.	VIII.	Assistant in Physics, Mass. Institute of Technology.
GEORGE F. RIGGS, Pawnee City, Neb.	I.	Transitman, B. & M. R. R. in Neb.
FRANK G. STANTIAL, Melrose, Mass.	V.	In charge of A. Cochrane & Co.'s Ammonia Works, E. Cambridge, Mass.
WM. S. STEARNS, Cincinnati, Ohio.	I.	Asst. Supt. Stearns & Foster's Cotton Factory.
ARTHUR M. WAITT, Aurora, Ill.	II.	Employed in Mechanical Eng.'s office, Chic. Bur. & Quincy R.R.

1880.

GEORGE H. BARTON, Honolulu, Hawaiian Is.	III.	Government Survey, Sandwich Is.
CHAS. H. BROWN, Zacatecas, Mexico.	I.	Mexican National Construction Co.
EDWIN E. CHASE, Central City, Col.	I.	U. S. Deputy Surveyor.
FREDERICK W. CLARK, Boston, Mass.	III.	Asst. in the Mining and Metallurgical Laboratory, Mass. Institute of Technology.
GEORGE W. HAMILTON, Jacksonville, Texas.	I.	Engineering Dept. Texas Trunk R. R.
LORING R. MILLEN, New York, N. Y.	III.	Assayer.
WILLIAM T. MILLER, 611 Washington St., Boston, Mass.	Elective.	With Henry F. Miller, Piano Manufacturer.
* NATHANIEL C. SMALL,	V.	Died July 14, 1880.

1881.

IRA ABBOTT, Windsor Hotel, Montreal, Ca.	I.	Vice President Toronto Bridge Co.

NAME AND ADDRESS.	COURSE.	OCCUPATION.
JOHN H. ALLEN, Pueblo, Col.	III.	Assayer, Pueblo Smelting and Refining Co.
JAMES S. ATKINSON, Hogansville, Ga.	II.	Supt. Cotton Improvement Co.
AMOS BINNEY, *A. B.*, Providence, R. I.	V.	Chemist, Silver Spring Bleaching and Dyeing Co.
DAVID S. BISSELL, Pittsburgh, Penn.	III.	In the Iron Business.
FRANK H. BRIGGS, 3 Merchants Row, Boston, Mass.	IX.	In Business.
FRANK E. CAME, Leavenworth, Kansas.	I.	Transitman, L. T. & S. W. R. R.
FRANK D. CHASE, Rochester, N. Y.	III.	Municipal Gas Light Co.
BENJAMIN G. COLLINS, Rochester, N. Y.	II.	Municipal Gas Light Co.
HARRY H. CUTLER, 19 W. Cedar St., Boston, Mass.	II.	Steam Apparatus, 82 Water St.
F. GRAEF DARLINGTON, Zanesville, Ohio.	IX.	Engineer of maintenance of way, M.V.Div., P. C. & St. L. R. R.
JOHN DUFF, JR. 14 Sheafe St., Charlestown, Mass.	V.B.	Asst. in Mining Laboratory, Mass. Institute of Technology.
MARIE O. GLOVER, *A. B.*, 321 Gates Ave., Brooklyn, N. Y.	V.	Chemist with Dr. E. R. Squibb.
DAVID S. GODDARD, Steelton, Pa.	III.	Chemist, Penn. Steel Co.
WALTER J. KOEHLER, Pueblo, Col.	V.B.	Chemist, Pueblo Smelting and Refining Co.
EDWIN J. LEWIS, JR., Adams St., Dorchester, Mass.	IV.	Draughtsman, Peabody & Stearns.
WM. B. LINDSAY, *A. B.*, Boston, Mass.	V.	Chemist with H. A. Gould, Aniline Dyes, 98 Milk St.
JAMES LUND, 27 Sever St., Charlestown, Mass.	V.	Asst. in Quantitative Analysis, Mass. Institute of Technology.
GEORGE A. MOWER, West Newton, Mass.	II.	Steam Apparatus, 82 Water St., Boston.
WEBSTER NORRIS, Johnstown, Pa.	III.	Chemist, Cambria Iron Co.

Evelyn M. Ordway, Jamaica Plain, Mass.	V.	Asst. in Chemistry and Biology, Mass. Institute of Technology.
Theodore Parker, Burlington, Iowa.	I.	Engineer's office, C. B. & Q. R. R.
Nathaniel W. Shed. Nashua, N. H.	V.	Chemist with the Nashua Iron and Steel Co.
William R. Snead, 122 Chestnut St., Louisville, Ky.	IV.	Snead & Co., Architectural Iron Works.
Harold E. Stearns, Wyoming, Ohio.	II.	Stearns & Foster, Cincinnati.
Edward R. Warren, P. O. Box 263, Colorado Springs, Col.	VII.	Student, Colorado College.
Charles M. Wilkes, 7 Ashburton Pl., Boston, Mass.	IV.	Asst. Engineer of improved Sewerage of Boston.
Arthur Winslow, 907 Walnut St., Philadelphia, Pa.	III.	Asst. Geologist, 2d Geological Survey of Pa.

1882.

Clara P. Ames, Boston, Mass.	V.	Asst. in the Woman's Laboratory, Mass. Institute of Technology.
Thomas B. Carson, Iowa City, Iowa.	II.	Not heard from.
Edward F. Ely, *A. B.*, Boston, Mass.	IV.	Asst. in Applied Mechanics, Mass. Institute of Technology.
George Faunce, Jr., *A. B.*, Mansfield Valley, Allegheny Co., Pa.	III.	Asst. Supt. of Pennslyvania Lead Company's Works.
Harry A. Foss, Jamaica Plain, Mass.	II.	Student of Patent Law.
Charles A. French, 334 Marlboro' St., Boston, Mass.	III.	Private assistant to Prof. Wolcott Gibbs, Harvard University.
Howard V. Frost, Arlington, Mass.	V.	Asst. in General Chemistry and Qualitative Analysis, Mass. Institute of Technology.
Edward G. Gardiner, Baring Bros., London, Eng.	VII.	Student, Leipsig, Germany.
Francis P. Hall, Columbia St., Dorchester, Mass.	V.	Private Asst. to Prof. W. R. Nichols, Mass. Inst. of Tech.
George L. Heins, Minneapolis, Minn.	IV.	Draughtsman with L. S. Buffington, Architect.

CHARLES D. JENKINS, 66th St., So. Boston, Mass.	V.	Asst. State Inspector of Gas for Massachusetts.
JAMES W. JOHNSON, Chelsea, Mass.	I.	Asst. Engineer Winchester Water Works.
JOHN F. LOW, Chelsea, Mass.	V.	Employed in the Tile Works of J. & J. G. Lowe.
HARRY G. MANNING, Wakefield, Mass.	II.	With Geo. H. Barrus, Expert Steam Engineer, 79 Milk St., Boston.
GEORGE W. MANSFIELD, Greenville, N. J.	III.	Chemist Daft Electric Light Co.
FRANK C. MORRISON, Engineer's office, Lehigh Valley R. R., Bethlehem, Penn.	I.	Transitman, Lehigh Valley R. R.
JAMES P. MUNROE, Lexington, Mass.	III.	Secretary's Clerk, Mass. Institute of Technology.
CARRIE L. RICE, Denver, Col.	V.	Asst. in the Denver High School.
WILLIAM T. RIPLEY, Rutland, Vt.	II.	With Ripley Brothers, Marble Dealers.
HENRY F. ROSS, Jamaica Plain, Mass.	III.	In Business.
JOHN H. ROSS, Jamaica Plain, Mass.	Elective.	In Business.
GRENVILLE T. SNELLING, New York, N. Y.	IV.	Private Asst. of Prof. W. R. Ware, Columbia College.
WALTER B. SNOW, Watertown, Mass.	II.	Asst. in Mechanical Engineering, Mass. Institute of Technology.
ANTHONY C. WHITE, Boston, Mass.	VIII.	Asst. Electrician New England Weston Electric Light Co.

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.

LOWELL SCHOOL OF PRACTICAL DESIGN.

LIST OF PERSONS WHO HAVE RECEIVED A CERTIFICATE, AND THEIR PRESENT SITUATIONS.

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.
H. J. Green, ...	Teacher of Drawing, South Boston.
Howard Hinckley, . . .	Hamilton Woolen Co., N. Y.
James B. Folsom, . . .	Hartford Carpet Co., Thompsonville, Ct.
Mary I. Jefferson, . . .	Manchester Print Co., Boston.
Alexander Johnston, . .	Pacific Mills, Lawrence.
Elizabeth Mendum, . . .	Manchester Print Co., Boston.
Henry Morse, ...	Artist.

1876.

Charles H. Cowdrey, . .	Hamilton Mfg. Co., Boston, Mass.
Edgar Eames, ...	Pacific Mills, Boston.
Silas R. Eaton, ...	Pacific Mills, Boston.
Carrol S. Faunce, . . .	Pacific Mills, Boston.
Minnie C. Ricker, . . .	Hamilton Print Manufacturing Co.
Ernest R. Pierce, . . .	Pacific Mills, Lawrence.

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, . . .	At home. Philadelphia.
Annie D. Stimers, . . .	At home. New York.
John H. Tarbell, ...	Donnell Mfg. 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,	Pacific Mills, Lawrence.
Charles A. Washburne,	Amsterdam Carpet Co. Amsterdam, N.Y.
Reuben Winslow,	Merrimac Print Co., Boston.

1879.

George Albro,	Pacific Mills, New York, N. Y.
Elizabeth C. Bott,	At home. Boston.
Eva M. Close,	Forbes Lithograph Co., Boston.
Charles C. Cox,	Forbes Lithograph Co., Boston.
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,	Lowell Carpet Co., Lowell.
Helen Smiley,	Teacher in Drawing, Waterville, Me.
Florence Starbuck,	Crayon Artist, Jamaica Plain.
*Frank P. Woods,	Mystic Print Works, Medford.

1880.

Marie Therese Baker,	Oil Cloth Designer, Newton.
Lizzie F. Burnes,	Oriental Print Works, 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,	Oriental Print Works, Boston.
Henry S. White,	Lancaster Mills, Clinton.

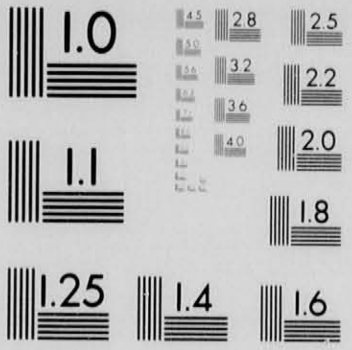
1881.

James B. Boardman,	Oriental Print Works, Boston.
Leila D. Collins,	At home.
Abbie A. French,	Teacher of Drawing.

Grace A. French,	Teacher of Drawing.
Ella C. Frost,	Lowell Carpet Co., Boston.
Gustave B. Kiander,	Lowell Carpet Co., Boston.
Clara Leeman,	Arlington Mills, Lawrence.
John T. McBarron,	Mystic Carpet Co., Boston.
Louisa M. Ordway,	At home. Jamaica Plain, Mass.
Fidelia Sheldon,	At home.
Frank L. Tainter,	Lowell Carpet Co., Boston.
Albert F. Urban,	American Print Works, Boston.
Lucy W. Valentine,	Lowell Carpet Co., Boston.
Edward F. Whitmore,	Putnam Woolen Co., Putnam, Conn.

1882.

Mabel J. Boyd,	Mystic Carpet Mills, Medford.
Henry F. Bryant,	Forbes Lithographic Co.
Emma F. Dowd,	Manchester Print Works.
Lucius E. Shattuck,	Arnold Print Works.
Reuben Simmons,	Arnold Print Works.
Charles Gowing,	Pacific Mills.
Walter T. Dana,	Lowell Carpet Mills.
George D. Rice,	Marysville, California.
Alex. B. Clough,	Merrimac Print Works.
Henry S. White,	Lancaster Mills, Clinton.
Arthur A. Haserick,	Arlington Mills, Lawrence.
Winthrop E. Benner,	Lovering Cotton Mills, Taunton.
Arthur S. Leland,	Methuen Woolen Mills.
Ida C. Rogers,	Glasgow Gingham Mills, S. Hadley Falls.
John Scott,	Assistant in Weaving Department, Mass. Institute of Technology.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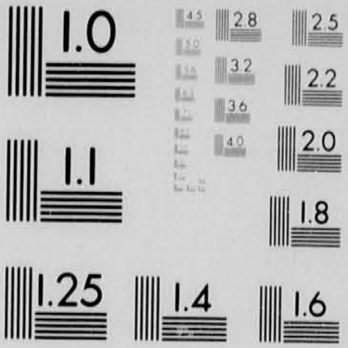
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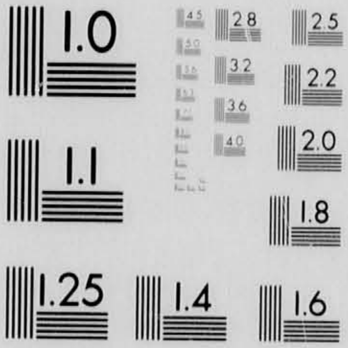
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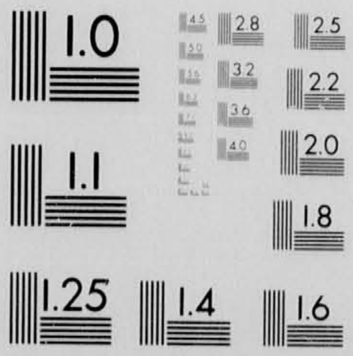
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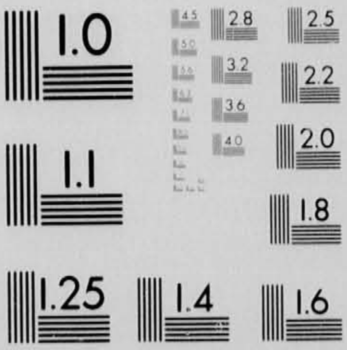
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M.I.T. ANNUAL CATALOGUES AND BULLETINS
1882/83

02 OF 02

THE SOCIETY OF ARTS
OF THE
MASSACHUSETTS INSTITUTE OF TECHNOLOGY.

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

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President.

FRANCIS A. WALKER, LL.D.

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N. M. LOWE. HAMILTON A. HILL.

Secretary.

SILAS W. HOLMAN.

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Brimmer, Martin . Boston.
Browne, C. Allen . "
Bullard, W. S. . . "

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Forbes, Robert B. "
Foster, John . . "

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Greenleaf, R. C. . "
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Hyde, Henry D. . "

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van Praag, Judah . "

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Ware, Chas. E. . "
Ware, Wm. R. . . New York.
Warren, Cyrus M. Brookline.
Warren, Geo, W. . Boston.
Warren, Joseph H. "
Warren, Sam'l D. . Boston.
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Watson, R. S. . . Milton.
Watson, Wm. . . Boston.
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Whitaker, Channing "
Whitman, Herbert T. "
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Whiton, David . . "
Whitwell, W. S. . "
Wilder, Marshall P. Dorchester.
Williams, F. H. . Boston.
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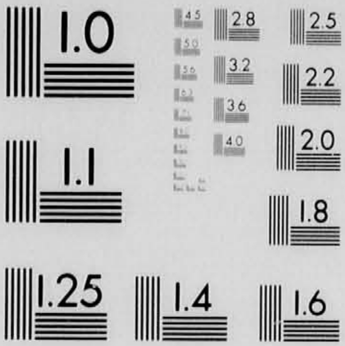
Winthrop, Robert C. "
Woodbury, C. J. H. Lynn.
Wyman, Morrill . Cambridge.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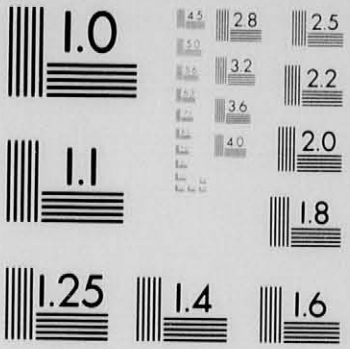
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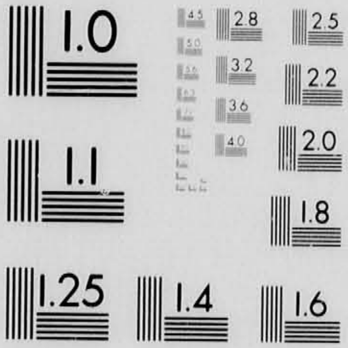
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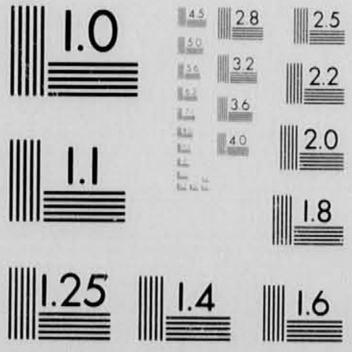
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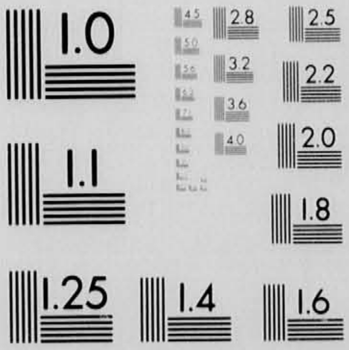
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