MASSACHUSETTS INSTITUTE OF TECHNOLOGY.

SEVENTH

ANNUAL CATALOGUE

OF THE

OFFICERS AND STUDENTS,

AND

PROGRAMME OF THE COURSE OF INSTRUCTION.

1871-72.

BOSTON:
PRESS OF A. A. KINGMAN.
1872.

MASSACHUSETTS INSTITUTE OF TECHNOLOGY.

SEVENTH

ANNUAL CATALOGUE

OF THE

OFFICERS AND STUDENTS,

AND

PROGRAMME OF THE COURSE OF INSTRUCTION.

1871-72.

BOSTON:
PRESS OF A. A. KINGMAN,
1872.

Extract from an Act of the General Court of Massachusetts, approved April 10, 1861, *to incorporate the Massachusetts Institute of Technology.*

"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.

The Institute shares the benefits of the Act of Congress of July 2d, 1862, giving Public Lands to the States in aid of instruction in Agriculture and the Mechanic Arts. Under an Act of the General Court of Massachusetts, approved April 27, 1863, the Institute receives from the State "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. . . . . Said Institute of Technology, in addition to the objects set forth in its Act of Incorporation [as above quoted], shall provide for instruction in military tactics."

Chapter 186, *Acts and Resolves of* 1863.

CORPORATION

OF THE

MASSACHUSETTS INSTITUTE OF TECHNOLOGY.

FOR THE YEAR 1871-72.

President,

JOHN D. RUNKLE.

Secretary,	Treasurer,
SAMUEL KNEELAND.	WILLIAM ENDICOTT, JR.

Committee on the School of Industrial Science,

JOHN A. LOWELL, *Chairman.*	JOHN D. PHILBRICK,
EDWARD ATKINSON,	HENRY B. ROGERS,
GEORGE T. BIGELOW,	WILLIAM B. ROGERS,
GEORGE B. EMERSON,	J. BAXTER UPHAM,
SAMUEL K. LOTHROP,	JOSEPH WHITE.

Committee on the Museum,

ERASTUS B. BIGELOW, *Chairman.*	FRED. W. LINCOLN,
JACOB BIGELOW,	JAMES L. LITTLE,
CHARLES H. DALTON,	M. D. ROSS,
JOSEPH S. FAY,	STEPHEN P. RUGGLES,
RICHARD C. GREENLEAF,	GEORGE W. TUXBURY.

Committee on the Society of Arts

MARSHALL P. WILDER, *Chairman.*	SAMUEL KNEELAND,
CHARLES L. FLINT,	HORACE McMURTRIE,
JAMES B. FRANCIS,	ALEXANDER H. RICE,
H. WELD FULLER,	EDWARD S. TOBEY.
J. C. HOADLEY,	

Committee on Finance,

JAMES M. BEEBE, *Chairman.*	J. WILEY EDMANDS,
J. INGERSOLL BOWDITCH,	JOHN M. FORBES,
JOHN CUMMINGS,	NATHANIEL THAYER.

On the Part of the Commonwealth,

HIS EXCELLENCY, GOVERNOR WILLIAM B. WASHBURN.

HON. REUBEN A. CHAPMAN, *Chief Justice of the Supreme Court.*

HON. JOSEPH WHITE, *Secretary of the Board of Education.*

OFFICERS OF INSTRUCTION.

President.

JOHN D. RUNKLE, PH.D., LL.D.

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

WILLIAM WATSON, PH.D.,
Professor of Mechanical Engineering.

JOHN B. HENCK, A.M.,
Hayward Professor of Civil and Topographical Engineering.

WILLIAM R. WARE, S.B.,
Professor of Architecture.

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

GEORGE A. OSBORNE, S.B.,
Professor of Mathematics, Astronomy, and Navigation.

ALFRED P. ROCKWELL, A.M.,
Professor of Mining Engineering.

EDWARD C. PICKERING, S.B.,
Thayer Professor of Physics.

SAMUEL KNEELAND, A.M., M.D.,
Professor of Zoölogy and Physiology.

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

JAMES M. CRAFTS, S.B.,
Professor of Analytical and Organic Chemistry.

ROBERT H. RICHARDS, Graduate of the Institute,
Professor of Mineralogy and Assaying, in charge of the Mining and Metallurgical Laboratory.

THOMAS STERRY HUNT, LL.D.,
Professor of Geology.

GEORGE H. HOWISON, A.M.,
Professor of Logic and the Philosophy of Science.

S. EDWARD WARREN, C.E.,
Professor of Descriptive Geometry, Stereotomy, and Drawing.

———— ———— ————
Professor of Modern Languages.

* The instruction in Botany is at present given by Prof. Ordway.

HENRY L. WHITING, U. S. Coast Survey,
Professor of Topography.

HENRY MITCHELL, A. M., U. S. Coast Survey,
Professor of Physical Hydrography.

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

LEWIS B. MONROE,
Professor of Vocal Culture and Elocution.

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

WM. RIPLEY NICHOLS, Graduate of the Institute,
Assistant Professor of General Chemistry.

CHARLES R. CROSS, Graduate of the Institute,
Assistant Professor of Physics.

ERNEST SCHUBERT,
Instructor in Free-Hand and Machine Drawing.

EUGENE LETANG,
Assistant in Architecture.

JOHN A. WHIPPLE,
Instructor in Photography.

WILLIAM E. HOYT, Graduate of the Institute,
Instructor in Civil Engineering and Drawing.

JULES LÉVY,
Instructor in French, Spanish and Italian.

E. C. F. KRAUSS,
Instructor in German.

EDWARD K. CLARK, Graduate of the Institute,
Instructor in Mechanical Drawing.

GAETANO LANZA, S.B., C.E.,
Instructor in Mathematics.

FOSTER E. L. BEAL, Graduate of the Institute,
Instructor in Mathematics.

G. RUSSELL LINCOLN, Graduate of the Institute,
Instructor in General Chemistry and Qualitative Analysis.

CHARLES F. STONE, Graduate of the Institute,
Instructor in Quantitative Analysis.

HOBART MOORE,
Instructor in Military Tactics.

DARWIN C. FOGG, *Janitor*

FACULTY.

JOHN D. RUNKLE, PH.D., LL.D., *President.*

WILLIAM WATSON, PH.D.

JOHN B. HENCK, A.M.

WILLIAM R. WARE, S.B.

WILLIAM P. ATKINSON, A.M.

GEORGE A. OSBORNE, S.B.

ALFRED P. ROCKWELL, A.M.

EDWARD C. PICKERING, S.B.

SAMUEL KNEELAND, A.M., M.D., *Secretary.*

JOHN M. ORDWAY, A.M.

JAMES M. CRAFTS, S.B.

ROBERT H. RICHARDS.

THOMAS STERRY HUNT, LL.D.

GEORGE H. HOWISON, A.M.

S. EDWARD WARREN, C.E.

WILLIAM R. NICHOLS.

CHARLES R. CROSS.

STUDENTS.

RESIDENT GRADUATES.

NAME.	RESIDENCE.	ROOM.
Foote, Edward H.	N. Somerville	N. Somerville.
Rollins, Edward W.	Concord, N. H.	6 Berkeley St.
Whittier, Randal	Boston	375 Columbus Ave.

REGULAR STUDENTS.

[The numbers affixed indicate that the student is pursuing special studies in the corresponding years, and the Roman numerals the professional courses.]

FOURTH YEAR.

NAME.	COURSE.	RESIDENCE.	ROOM.
Allen, Calvin F.	II.	Boston	66 Vernon St.
Brewster, Benjamin E.	III.	Boston	80 Walnut Ave.
Dodge, William B.	II.	Beverly	Beverly.
Emmerton, Frederic A.	V.	Salem	Salem.
Herrick, J. Amory	V.	Winchester	Winchester.
Hodge, James M.	III.	Plymouth.	19 Boylston Pl.
Locke, Bradford H.	III.	Charlestown	Charlestown.
Lothrop, Eben W., Jr.	III.	Chelsea	Chelsea.
Minot, Charles S.	V.	Jamaica Plain	Jamaica Plain.
Morse, Frank B.	III.	Boston	13 Worcester Sq.
Patch, Maurice B.	III.	Lowell	Lowell.
Phillipps, George	III.	Marshfield	15 Milford St.
Shepard, Walter (*A.B., Harvard College*)	II.	Dorchester	Harrison Square.
Soule, Rich'd H. (*A.B., Harvard College*)	I.	Brookline	Brookline.
Sparrow, Wm E., Jr.	II.	Mattapoisett	42 Oak St.
Stafford, Frederic H.	II.	Boston	55 Blue Hill Ave.
Ward, Clarence S.	III.	Bridgewater	15 Boylston Pl.

THIRD YEAR.

NAME.	COURSE.	RESIDENCE.	ROOM.
Austin, Amory (*A.B.*, *Harvard College*)	V.	Boston	11 Beacon St.
Barnes, William H.	II.	West Brookfield	Lynn.
Belden, Charles A.	II.	San José, Cal.	375 Columbus Ave.
Blodgett, George W.	II.	Boston	83 Chambers St.
Brotherton, William E.	V.	Cincinnati, O.	14 Carver St.
Cogswell, Henry P.	II.	Salem	Salem.
Dean, Ralph W.	V.	South Boston	185 K St.
Fabens, Samuel A., Jr.	II.	Marblehead	Marblehead.
Felton, Samuel M., Jr.	II.	Thurlow, Pa.	293 Columbus Ave.
Fisher, Frederick L.	II.	Medway	Medway.
Greenleaf, Edward H.	IV.	Boston	34 Chambers St.
Guild, Frederic, Jr.	VI.	Boston	666 Shawmut Ave.
Harris, William D.	II.	St. John, N. B.	117 Warren Ave.
Hartshorne, J. (*A.B.*, *Haverford College*)	V.	Philadelphia, Pa.	75 Essex St.
Hodges, Osgood (*A.B.*, *Harvard College*)	II.	Salem	Salem
Howes, Clar. L. (*A.B.*, *Amherst College*)	II.	Hanover	Hanover.
Jewett, William P.	II.	Cape Elizabeth, Me.	Charles St., Ward 16.
Leman, William T.	V.	Chelsea	Chelsea.
Lucas, Silas T.	II.	Syracuse, N. Y.	293 Columbus Ave.
Mansfield, Albert K.	I.	Lowell	77 Dartmouth St.
May, William C.	V.	Dorchester	Dorchester.
Parsons, Charles O.	III.	Shirley	6 Ferdinand St.
Phillips, Henry A.	IV.	Chicago, Ill.	293 Columbus Ave.
Ripley, Henry L.	II.	Kingston	Kingston.
Shailer, Robert A.	II.	Boston	2051 Washington St.
Stafford, Charles E.	III.	Boston	55 Blue Hill Ave.
Straw, Frank L.	II.	Hyde Park	Hyde Park.
Tinkham, Samuel E.	II.	Taunton	Malden.
Very, Frank W.	V.	Salem	Salem.
Wells, Webster	II.	New York, N. Y.	West Newton.
Whitman, Charles B.	III.	South Boston	573 Broadway.
Wood, Louis F.	V.	Newton	Newton.
Woodbury, Chas. J. H.	II.	Lynn	Lynn.

SECOND YEAR.

NAME.	RESIDENCE.	ROOM.
Allen, Samuel E.	Fall River	291 Columbus Ave.
Austin, Charles D.	Boston	380 Columbus Ave.
Baldwin, Loammi F.	Pomfret, Ct.	Peabody.
Barrows, Herbert	Reading	Reading.
Barrus, George H.	Reading	Reading.
Bee, Albert W.	San Francisco, Cal.	28 Milford St.
Blunt, William T.	East Somerville	East Somerville.
Boyden, Amos J.	Foxboro'	Foxboro'.
Brown, Elbridge L.	North Bridgewater	North Bridgewater.
Burrison, Henry K.	Boston	111 Saratoga St.
Colt, Samuel P.	Bristol, R. I.	17 Beacon St.
Crosby, Benjamin L.	Boston	10 Hawthorn St.
Cunningham, Charles G.	Readville.	Readville.
Dandridge, A. S., Jr.	Cincinnati, O.	23 Beacon St.
Doane, George E.	Middleboro'.	Middleboro'.
Dowse, William B.	Boston	11 Boylston Pl.
Emerson, Joseph S.	Hawaiian Is.	73 Shawmut Ave.
Foster, William	Brookline	Brookline.
Greene, William B., Jr.	Brookline	Clarendon House.
Hamilton, Edward R.	Boston	17 Forest St.
Haynes, Gideon F.	Charlestown	Charlestown.
Holbrook, Elliot	East Abington	East Abington.
Hongma, Aechirau	Fukuoka, Japan	114 Chandler St.
Howard, Charles P.	Hartford, Conn.	16 Chester Sq.
Jackson, Frank H.	Brighton	Brighton.
May, Frank A.	Boston	277 Warren St.
Means, Walter K.	Boston	92 Chauncy St.
Mudge, Henry N.	Holliston	Holliston.
Myrick, Willis H.	Dublin, N. H.	775 Tremont St.
Palmer, Frederic M.	South Boston	426 Broadway.
Perkins, Herbert B.	Ware	Watertown.
Pond, Frank H.	Woonsocket, R. I.	33 Appleton St.
Russ, Willis R.	Boston	11 Franklin Pl.
Shaw, Edward S.	Cambridge	Cambridge.
Silsbee, Francis H.	Salem	Salem.
Stevens, Harry W.	Cambridgeport	Cambridgeport.
Sweetser, Arthur W.	Cliftondale	Cliftondale.
Tucker, Benjamin R.	New Bedford	59 Temple St.
Ware, Robert C.	Marblehead	Marblehead.

FIRST YEAR.

NAME.	RESIDENCE.	ROOM.
Aspinwall, Thomas, Jr.	Brookline	Brookline.
Bakewell, Thomas H.	Pittsburg, Pa.	375 Columbus Ave.
Bowditch, Frederic C.	Brookline	Brookline.
Bowers, George	Chelmsford	87 Myrtle St.
Breed, Joshua B. F.	Louisville, Ky.	Lynn.
Browne, Edward C.	Salem	Salem.
Burnet, M. De Witt	Syracuse, N. Y.	357 Columbus Ave.
Bush, William H.	Portsmouth, N. H.	Portsmouth.
Church, Christopher A., Jr.	New Bedford	39 Bowdoin St.
Copeland, Charles E.	West Dedham	West Dedham.
Cunningham, Caleb L.	Readville	Readville.
Dabney, Frank	Fayal, Azores	34 Lambert St.
Dabney, Herbert	Fayal, Azores	34 Lambert St.
Dabney, William H.	Teneriffe	411 Beacon St.
Dane, Joseph A.	Salem.	Salem.
Dodge, Frank S.	Beverly.	Beverly.
Duncklee, Albert C.	Cambridge	Cambridge.
Dunn, George F.	Dover	Dover.
Dustan, R. Jaffray	Milton	Milton.
Eddy, George H., Jr.	Fall River	67 Appleton St.
Edes, William C.	Bolton	433 Dudley St.
Evans, Frank	Cincinnati, O.	13 Pelham St.
Farr, S. Millard	Brooklyn, N. Y.	6 Tyler St.
Faulkner, Lothrop H.	Plymouth	Plymouth.
Fay, Harrison P.	Southboro'	Southboro'.
Follansbee, Willard F.	Winchester	Winchester.
Frye, Charles R.	Salem	Salem.
Frye, George B.	Boston	27 St. James St.
Gammans, Elbert H.	Newton Centre	Newton Centre.
Grinnell, Arthur G.	New Bedford	114 Chandler St.
Hammatt, Edward A. W.	Belmont	Belmont.
Handy, Edward A.	Barnstable	28 Milford St.
Harris, Charles L.	Burlington, Iowa	16 Joy St.
Head, James H.	Brookline	Brookline.
Hibbard, Thomas	West Roxbury	West Roxbury.
Hier, George S.	Syracuse, N. Y.	357 Columbus Ave.
Hildabolt, John A.	Germantown, O.	28 Milford St.
Howe, James M., Jr.	Cambridge	23 Beacon St.
Hughart, John H. P.	Pittsburg, Pa.	375 Columbus Ave.

NAME.	RESIDENCE.	ROOM.
Huntington, William F.	Springfield	28 Milford St.
Jaqueth, Alfred J.	Liverpool, N. Y.	Newton Centre.
Jewett, Stanley P.	Cincinnati, O.	Salem.
Kinnicutt, Leonard P.	Worcester	94 Chestnut St.
Knowles, Joseph F.	New Bedford	39 Bowdoin St.
Lewis, Wilfred	Philadelphia, Pa.	53 Temple St.
Lincoln, Edwin H.	Brookline	Brookline.
Little, Arthur	Boston	2 Commonwealth Ave.
Marion, William C.	Burlington,	Burlington.
Mason, William A., Jr.	Cambridge	Cambridgeport.
Mitchell, Louis A.	Philadelphia	75 Essex St.
Mixter, Samuel J.	Boston	219 Beacon St.
Munroe, William R.	Lexington	Lexington.
Nickerson, William E.	East Somerville	East Somerville.
Okie, Fredrick E.	Linwood, Pa.	291 Columbus Ave.
Osgood, George	Cohasset	Cohasset.
Parks, Charles F.	Waltham	Waltham.
Peck, Louis W.	Providence, R. I.	21 Gray St.
Phipps, David W.	Boston	31 Leverett St.
Pierce, Frank H.	Hartford, Ct.	329 Tremont St.
Plimpton, Thomas D.	Walpole.	Walpole.
Prentiss, William A.	Holyoke	88 W. Springfield St.
Robinson, Thomas W.	Chicago, Ill.	24 Somerset St.
Robinson, William P.	Boston	7 Sheafe St.
Sargent, Frank T.	Malden	Malden.
Sargent, Welland F.	Sedgwick, Me.	9 Oliver Place.
Shepard, Horace B.	Dorchester	Beach St.
Sherlock, John C.	Cincinnati, O.	12 Bowdoin St.
Shockley, William H.	New Bedford	293 Columbus Ave.
Simonds, Harry	Lexington	Lexington.
Slade, Abbott E.	Fall River	67 Appleton St.
Smith, Morrill A.	Boston	15 St. James Ave.
Smith, Norris W.	Philadelphia, Pa.	291 Columbus Ave.
Staniford, Daniel, Jr.	Boston	76 Highland St.
Stanwood, James B.	Cincinnati, O.	Arlington.
Stevens, William C.	Philadelphia, Pa.	Newton.
Stoddard, George H.	Plymouth	237 W. Canton St.
Stone, Silas W.	Sherborn	East Holliston.
Stowe, Horace E.	Hudson	Hudson.
Taylor, Jacob M.	Brighton	Brighton.
Temple, Arthur W.	Reading	Reading.

NAME.		RESIDENCE.	ROOM.
Tenney, Frank P.		Manchester	Manchester.
Tufts, Charles F.		Somerville	Somerville.
Vásquez, Manuel J.		Panamá, U. S. C.	Allston.
Warren, Henry L. J.		Boston	16 Marlboro' St.
Watriss, A. Whiting		Cambridgeport	Cambridgeport.
Webster, William R.		Philadelphia, Pa.	291 Columbus Ave.
Wheelwright, Edmund M.		Boston	240 Warren St.
Whitney, Charles E.		Harvard	4 Chilton Pl.
Whittemore, Omar W.		Arlington	Arlington.
Willard, William P.		Boston	8 Oak St.
Woodrow, Frank H.		Cincinnati, O.	12 Bowdoin St.

STUDENTS NOT CANDIDATES FOR A DEGREE.

NAME.		RESIDENCE.	ROOM.
Abbot, Samuel L., Jr. 1, 2, 3		Boston	90 Mt. Vernon St.
Adams, Joseph S. 4	V.	Framingham	Framingham.
Adams, Nehemiah W. 2		St. Albans, Vt.	60 Clarendon St.
Arnott, James L. 2, 3	II.	Boston	81 Essex St.
Atkinson, Frank P. 2, 3, 4		Boston	156 W. Concord St.
Atkinson, Richard S. 1		Brookline	Brookline.
Barker, Joseph H. 3	II.	Cincinnati, O.	295 Columbus Ave.
Belden, George F. 1		San José, Cal.	375 Columbus Ave.
Bicknell, Frederic A. 3	IV.	Somerville	Somerville.
Bingham, Henry Martin 1		St. Johnsbury, Vt.	Cambridge.
Blaisdell, Hiram W. 3	II.	Concord	Concord.
Borden, Philip D., Jr. 3	II.	Fall River	114 Chandler St.
Bouvé, Walter L. 1, 2		Boston	40 Newbury St.
Brooks, Charles B. 2, 3, 4		Boston	130 Boylston St.
Briggs, John L. 3	IV.	Springfield	Jamaica Plain.
Buell, J. W., M.D. 3, 4	V.	New York, N. Y.	6 Harrison Ave.
Bush, Samuel D. (*A.B., Harvard College*) 3	IV.	Longwood	Longwood.
Cabot, John 1		Lawrence	Lawrence.
Cabot, Lincoln 2, 3	II.	Staten Island	Brookline.
Chadwick, Francis B. (*A.B., Harvard College*) 3	IV.	Boston	69 Beacon St.
Channing, Giov. E. 1, 3	IV.	Brookline	Brookline.
Copeland, Edward	V.	Reading	Reading.

NAME.		RESIDENCE.	ROOM.
Craig, Henry S. 2, 3 .	II.	Bradford	12 Berkeley St.
Crosby, W. O. 1, 2, 3, 4 . .		Georgetown, Col. . .	Cambridge.
Cushing, Richmond H. 1, 2 .		St. John, N. B. . .	369 Columbus Ave.
Dexter, Walter, 3 . .	IV.	Providence, R. I. . .	493 Tremont St.
Dubbs, Edgar J. 2. . . .		Franklin, Pa. . . .	83 Appleton St.
Eastman, Joseph B. 1 . . .		Concord, N. H. . .	83 Appleton St.
Eayrs, N. W. (*A.B.*, *Harvard College*) 3, 4	II.	Boston	84 Waltham St.
Elliot, George B. 2 . . .		Keene, N. H. . . .	17 Beacon St.
Elliot, George T. 2 . . .		Boston	49 Rutland Sq.
Field, James A. 3 . . .	I.	Beloit, Wis.	4 Boylston Pl.
Fish, Charles C. R. 2, 3	V.	Cambridgeport . . .	Cambridgeport.
Flanders, Sherman L. 2. .		Goffstown, N. H. . .	3 Ash Pl.
Gardner, James B. 2, 3	I.	Boston	3 Centre St.
Garlick, Anson K. 2 . . .		Youngstown, O. . .	83 Appleton St.
Haberstroh, Charles E. 1, 2		Boston	9 Vale St.
Hambly, John B. 1, 2 . .		Portsmouth, N. H. .	340 Tremont St.
Harris, E. A. 2, 3 . . .		St. John, N. B. . .	117 Warren Ave.
Hayes, Edmund 1, 2, 3	II.	Farmington, Me. . .	83 Chamber St.
Heaton, Edgar S. 1, 2 . .		Virden, Ill. . . .	586 Tremont St.
Holman, Frank L. 3 .	IV.	Newton	Newton.
Howe, Benjamin N. 1, 3. .		Lowell	Lowell.
Humphrey, William 3 .	II.	North Weymouth . .	47 W. Canton St.
Jackson, William L. 1, 2 .		Boston	84 Dudley St.
Johnston, Albert W. 3	II.	Charlestown . . .	Charlestown.
Kimball, William A. 3, 4	I.	Boston	21 Somerset St.
Knight, Edmund O. 2 . .		Youngstown, O. . .	83 Appleton St.
Lodge, Francis G. 2 . . .		Boston	1227 Washington St.
Lodge, Henry E. 3. .	II.	Boston	1227 Washington St.
Magee, Frank A. 2 . . .		Chelsea	Chelsea.
Merrick, William (*A.B.*, *Harvard College*) 3	IV.	Springfield	Jamaica Plain.
Montgomery, J. F. 3 . . .		Taunton	Taunton.
Morse, Henry H. 3 .	IV.	Dorchester	Field's Corner.
Osborne, Theodore M. (*A.B.*, *Harvard College*) 3, 4	II.	Peabody	Peabody.
Paine, Charles W. 1, 2 . .		South Weymouth. .	3 Ash Place.
Perry, Oliver H., Jr. 2 . .		Andover	Andover.
Porter, Theodore C. 3	II.	Duxbury	197 Sumner St.
Powel, John H. . .	III.	Newport, R. I. . .	6 Park Square.
Read, Charles F. 1, 2 . .		Boston	24 Dartmouth St.

NAME.		RESIDENCE.	ROOM.
Roby, Luther A. 1		Nashua, N. H.	622 Tremont St.
Rotch, Arthur (*A.B.*, *Harvard College*) 3	IV.	Boston.	3 Commonwealth Ave.
Sampson, Thomas H. 1, 2		Charlestown	Charlestown.
Scanlin, Henry M. 2, 3	II.	Milton	Milton.
Schwab, Emil 2, 3, 4	IV.	Hartford, Conn.	341 Tremont St.
Shove, Charles M. 2		Fall River	291 Columbus Ave.
Simpson, Charles A. 1		Framingham	Newtonville.
Stickney, Charles D. 1		Fall River	291 Columbus Ave.
Stone, Charles S. 3	IV.	Cambridge	Cambridge.
Stone, James E. 3	II.	Charlestown	Charlestown.
Swallow, Ellen H., (*A.B.*, *Vassar College*).	V.	Worcester	523 Columbus Ave.
Tappan, Roger, 3	II.	Topsfield	Boston.
Tominaga, Fuyouki 3	IV.	Yeddo, Japan	2059 Washington St.
Tompson, George M. 3	II.	Wakefield	Wakefield.
Tuxbury, Warren 3	IV.	Saco, Me.	1085 Washington St.
Ware, William R. (*A.B.*, *Harvard College*) 2,3	IV.	Baltimore	Milton.
Webber, Frank O. 1		Cambridge	Cambridge.
Weld, Clifford R. 1		Boston	Boston Highlands.
Williams, Charles A. 1, 2		Nashua, N. H.	622 Tremont St.
Williams, Francis H. 3, 4		Boston	15 Arlington St.
Young, Edward B. 2		Boston.	104 Appleton St.

SUMMARY.

Resident Graduates,	3
Students of the fourth year,	17
" " third	33
" " second year,	39
" " first "	91
" not candidates for a degree,	81
Total,	264

DATES.

School-year began	Monday, Oct. 2, 1871.
School-year ends	Saturday, June 1, 1872.
The next School-year will begin	Monday, Oct. 7, 1872.
Examinations for admission to the first year's class,	Monday, June 3, 1872. Thursday, Oct. 3, 1872.
Examinations for advanced standing,	Tuesday, June 4, 1872. Friday, Oct. 4, 1872.

GRADUATES IN 1868.

NAME.	RESIDENCE.	IN THE DEPARTMENT OF
Frank R. Firth	Boston	Civ. and Top. Engineering
Charles E. Greene	Cambridge	" "
William E. Hoyt	Portsmouth, N. H.	" "
Walter H. Sears	Plymouth	" "
Charles A. Smith	Newburyport	" "
Joseph Stone	Charlestown	" "
Ellery C. Appleton	Boston	Geol. and Min. Engineering
Nelson W. Conant	Louisville, Ky.	" "
Charles C. Gilman	Chelsea	" "
Robert H. Richards	Boston	" "
Bryant P. Tilden	Boston	" "
James P. Tolman	Boston	" "
Eli Forbes	Clinton	Science and Literature.

GRADUATES IN 1869.

NAME.	RESIDENCE.	IN THE DEPARTMENT OF
William R. Nichols	Boston	Chemistry.
Channing Whitaker	Lowell	Mechanical Engineering.
J. Rayner Edmands	Boston	" "
Howard A. Carson	Boston	Civ. and Top. Engineering.

GRADUATES IN 1870.

NAME.	RESIDENCE.	IN THE DEPARTMENT OF
Albert F. Hall	Charlestown	Mechanical Engineering.
Edward K. Clark	Bangor, Me.	Mechanical Engineering.
Daniel W. Willard	Jamaica Plain	" "
Russell H. Curtis	Jamaica Plain	Civil Engineering.
Sampson D. Mason	Concord	" "
Theodore F. Tillinghast	New Bedford	" "
Edmund K. Turner	Marblehead	" "
N. Fred. Merrill	Cambridgeport	Chemistry.
Charles W. Hinman	W. Concord, Vt.	Mining Engineering.
Charles R. Cross	Newburyport	Science and Literature.

GRADUATES IN 1871.

NAME.	RESIDENCE.	IN THE DEPARTMENT OF
Foster E. L. Beal	South Boston	Civil Engineering.
Henry M. Cutler	San José, Cal.	" "
Elmer Faunce	Kingston	Mining Engineering.
Edward H. Foote	North Somerville	Civil Engineering.
Frank L. Fuller	Grantville	" "
Henry M. Howe, (*A. B., Harvard College*)	Boston	Mining Engineering.
Albert H. Howland, (*A.M., Amherst College*)	West Barnstable	Civil Engineering.
G. Russell Lincoln	Philadelphia. Pa.	Mining Engineering.
William A. Pike	Dorchester	Civil Engineering.
George H. Pratt	Salem	Chemistry.
Edward W. Rollins	Concord, N. H.	Mining Engineering.
Walter W. Smith	Dayton, O.	Mechanical Engineering.
Charles F. Stone	Waltham	Mining Engineering.
Almarin Trowbridge, Jr.	Charlestown	Mechanical Engineering.
Isaiah S. P. Weeks	West Barnstable	Civil Engineering.
Randal Whittier.	Boston	Chemistry.

Two other students passed satisfactory examinations, but have not handed in their theses to the Faculty.

SCHOOL

OF THE

INSTITUTE OF TECHNOLOGY.

The Massachusetts Institute of Technology provides a four years' course 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, mental and political science, French, and German. The course is so selected and arranged as to offer a liberal and practical education in preparation for active pursuits, as well as a thorough training for the professions of the Civil, Mining, and Mechanical Engineer, Chemist, Metallurgist, Architect, Naturalist, and Teacher of Science. All the studies and exercises of the first and second years are pursued by the whole school. At the beginning of the third year, each student selects one of the following special courses of study:—

I. A Course in Mechanical Engineering.
II. " " " Civil and Topographical Engineering.
III. " " " Geology and Mining Engineering.
IV. " " " Building and Architecture.
V. " " " Chemistry.
VI. " " " Science and Literature.
VII. " " " Natural History.

These courses differ widely, but certain general studies are common to them all. It is intended to secure to every student whatever his special course of study, a liberal mental develop-

ment and general culture, as well as the more strictly technical education which may be his chief object. The course in Science and Literature, and the course in Natural History, differ from the others in having a less distinctly professional character. The former offers a sound education, based on the sciences and modern literature, and furnishes, with its wide range of elective studies, a suitable preparation for any of the departments of active life, or for teaching science. The course in Natural History affords an appropriate general training for those whose ulterior object is the special pursuit of Geology, Mineralogy, Botany, Zoology, or of Medicine, Pharmacy, or Rural Economy.

The Institute also provides courses of evening instruction in the main branches of knowledge above referred to, for persons of either sex who, being unable to study during the day, desire to avail themselves of systematic evening lessons or lectures. At present these courses are supported by the Trustee of the Lowell Institute, as explained on p. 50.

CONDITIONS OF ADMISSION.

To be admitted to the first year's class the student must have attained the age of sixteen years, and must pass a satisfactory examination in arithmetic, algebra *through* equations of the second degree, plane geometry, English grammar, and geography. In general, the training given at the best High Schools, Academies, and Classical Schools, will be a suitable preparation for the studies of this School.

In order to enter the second year's class, the student must be at least seventeen years of age, and must pass a satisfactory examination upon the first year's studies, besides passing the examination for admission to the first year's class; and a like rule applies to the case of students seeking 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 department which they purpose to enter that they are prepared to pursue their studies to advantage. Such students, if deficient in any of the scientific studies of the first two years' course, will have opportunity 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.

A knowledge of the Latin language is not required for admission; but the study of Latin is strongly recommended to persons who propose to enter this School. Those who intend to take the course in Natural History will find it advantageous also to acquire the elements of Greek.

Examinations for admission to the first year's class will be held on Monday, June 3, 1872, and on Thursday, Oct. 3, 1872, beginning at 9 A. M., precisely. The candidates will assemble at the Institute Building, Boylston Street, Boston. The examinations for advanced standing will take place on Tuesday, June 4, 1872, and on Friday, Oct. 4, 1872, beginning at 9 A. M. Applicants for admission are earnestly advised to present themselves at the regular examinations; but under special circumstances, they may present themselves at other times.

Persons not candidates for a degree will be allowed to enter special divisions of either of the courses,—as, for example, the classes of mathematics, of engineering, of chemistry, of physics, of natural history, of architecture, or of mining and metallurgy, — on giving satisfactory evidence to the Faculty that they are prepared to pursue such studies with advantage.

COURSE OF INSTRUCTION.

FIRST YEAR.

Mathematics. Algebra, after quadratic equations and including logarithms. Solid Geometry. Mensuration. Plane Trigonometry. Applications of Trigonometry to Navigation.

Physics. Mechanics of solids, liquids, and gases. Sound.

Chemistry. Experimental study of General Inorganic Chemistry.

English. Rhetoric and Composition. Modern History and Literature.

French. Grammar and Translation.

German. Grammar and Translation.

Descriptive Geometry. Problems of position relative to the Point, the Right Line, and the Plane.

Mechanical Drawing. Use of instruments, water-colors, and India-ink. Graphical construction of problems in Geometry, Trigonometry, and Descriptive Geometry.

Free-hand Drawing. With chalk and crayons. Machinery. Ornamentation.

Physiology and Hygiene. Lectures.

SECOND YEAR.

Mathematics. Spherical Trigonometry. Analytic Geometry of two and three dimensions. First Principles of the Differential and Integral Calculus.

Descriptive Astronomy. The Earth. The Sun. Time. Gravitation. The Moon. Planets. Comets. Nebulæ. Constellations.

Surveying. Field-work. Plotting surveys. Computing areas. Plans.

Physics. Light. Heat. Magnetism. Electricity.

Chemistry. Qualitative Analysis. Organic Chemistry.

Physical Geography. Physical and Industrial Geography.

English. English Philology. Composition. Modern History and Literature.

French. Grammar and Translation.

German. Grammar and Translation.

Descriptive Geometry. Projections, Perspective, Shades, and Shadows.

Mechanical Drawing. Geometric, Perspective, and Isometric Drawing.
Free-hand Drawing. Machinery. Ornamentation. Landscape.

After the semi-annual examination, those who intend to study the courses in Chemistry, Science and Literature, or Natural History, will be allowed to take instead of Surveying, Analytic Geometry, or Calculus, equivalents selected from the following subjects:

Botany. Systematic and Structural.
English. English Philology. English Literature and History of 18th Century. Critical reading of English writers. Composition.
Chemistry. Organic Chemistry. Chemical Philosophy.
Physical Geography. Physical and Industrial Geography.

THIRD YEAR.

I. COURSE IN MECHANICAL ENGINEERING.

Machinery. Cinematics. Principles of Mechanism. Measurement of the Dynamic Effect of Machines. Regulating Apparatus, as Brakes, Fly-Wheels, Governors, etc. Friction and Rigidity. Materials, Construction, and Strength of Machinery. Action of Cutting Tools.
Mathematics. Differential and Integral Calculus. Analytic Mechanics.
Applied Mechanics. Dynamics of Solids. Hydrostatics and Hydrodynamics.
Descriptive Geometry. Applications to Masonry, Carpentry, and Machinery.
Metallurgy. Metallurgical Processes, Constructions, and Implements.
Drawing. Machinery.

Zoology. Outlines of Zoology.
Physics. Laboratory Practice.
Geology. Physiographic Geology. Lithology. Outline of Geological History. Dynamical Geology.
English. Composition. Logic. History of English Literature.
Constitutional History. England and the United States.
French. (Spanish may be substituted.)
German.

II. COURSE IN CIVIL AND TOPOGRAPHICAL ENGINEERING.

Engineering. Survey, Location, and Construction of Roads, Railways, and Canals. Measurement and Computation of Earth-work and Masonry. Supply and Distribution of Water. Drainage. Hydrographical Surveying. River and Harbor Improvements. Field-Practice.

Topography. As practised by the U. S. Coast Survey.

Mathematics. Differential and Integral Calculus. Analytic Mechanics.

Applied Mechanics. Stress. Stability, Strength, and Stiffness.

Spherical Astronomy. Higher Geodesy. Latitude and Longitude.

Descriptive Geometry. Applications to Masonry and Carpentry.

Drawing. Plans, Profiles, Elevations, Sections, etc.

Zoology. Outlines of Zoology.

Physics. Laboratory Practice.

Geology. Physiographic Geology. Lithology. Outline of Geological History. Dynamical Geology.

English. Composition. Logic. History of English Literature.

Constitutional History. England and the United States.

French. (Spanish may be substituted.)

German.

III. COURSE IN MINING ENGINEERING.

Engineering. Survey and Construction of Roads and Railways. Measurement of Earth-work and Masonry. Hydraulics. Drainage. Field-practice.

Mineralogy. Descriptive and Determinative. Crystallography. Use of the Blowpipe.

Assaying. Wet and Dry Ways.

Chemistry. Laboratory Practice in Quantitative Analysis.

Metallurgy. Metallurgical Processes, Constructions, and Implements.

Mathematics. Differential and Integral Calculus. Analytic Mechanics.

Applied Mechanics. Stress. Stability, Strength, and Stiffness.

Drawing. Sections and Maps. Mines. Metallurgical Apparatus.

Zoology. Outlines of Zoology.

Physics. Laboratory Practice.

Geology. Physiographic Geology. Lithology. Outline of Geological History. Dynamical Geology.
English. Composition. Logic. History of English Literature.
Constitutional History. England and the United States.
French. (Spanish may be substituted.)
German.

IV. COURSE IN BUILDING AND ARCHITECTURE.

Architectural Design. The Elements of Design. The Principles of Composition. Exercises. The Study of Executed Works.
Construction. Building Materials and Processes. The Study of Works in Progress.
Drawing. Plans, Elevations, Sections, and Details. Ornament. Sketching from Buildings.
Mathematics. Differential and Integral Calculus. Analytic Mechanics.
Applied Mechanics. Stress. Stability, Strength, and Stiffness.
Descriptive Geometry. Applications to Masonry and Carpentry

Zoology. Outlines of Zoology.
Physics. Laboratory Practice.
Geology. Physiographic Geology. Lithology. Outline of Geological History.
English. Composition. Logic. History of English Literature.
Constitutional History. England and the United States.
French. (Spanish may be substituted.)
German.

V. COURSE IN CHEMISTRY.

Industrial Chemistry. Study of Chemical Manufactures. Glass, Pottery, Acids, Gas, etc. The Arts of Dyeing, Calico-Printing, Tanning, etc.
Chemistry. Laboratory Practice in Quantitative Analysis.
Metallurgy. Metallurgical Processes, Constructions, and Implements.
Assaying. Wet and Dry Ways.
Mineralogy. Descriptive and Determinative. Crystallography. Use of the Blowpipe.
Botany. Vegetable Physiology. Classification.

Drawing. Chemical or Metallurgical Apparatus. Plans of Works.

Zoology. Outlines of Zoology.
Physics. Laboratory Practice.
Geology. Physiographic Geology. Lithology. Outline of Geological History. Dynamical Geology.
English. Composition. Logic. History of English Literature.
Constitutional History. England and the United States.
French. (Spanish may be substituted.)
German.

VI. COURSE IN SCIENCE AND LITERATURE.

History. Guizot—Histoire Générale de la Civilisation en Europe.
Drawing. Subjects determined by each student's choice of studies.

Zoology. Outlines of Zoology.
Physics. Laboratory Practice.
Geology. Physiographic Geology. Lithology. Outline of Geological History. Dynamical Geology.
English. Logic. Critical Reading of English Writers. Earlier English Literature. Composition.
Constitutional History. England and the United States.
French. Advanced Course. (Spanish may be substituted.)
German. Advanced Course.

The foregoing studies are required, and of the following the student must select at least two : —

Mathematics. Differential and Integral Calculus. Analytic Mechanics.
Chemistry. Laboratory Practice in Quantitative Analysis.
Botany. Vegetable Physiology. Classification.
Descriptive Geometry. Applications to Masonry, Carpentry, and Machinery.
Physics. Physical Research.
Architecture. Architectural Design.
Engineering Courses. Subjects at the option of the student.

VII. COURSE IN NATURAL HISTORY.

Geology. Physiographic Geology. Lithology. Outline of Geological History. Dynamical Geology.

Botany. Vegetable Physiology. Classification.
Mineralogy. Descriptive and Determinative. Use of the Blowpipe.
Chemistry. Laboratory Practice in Quantitative Analysis.
Microscopy. Practical Exercises on Organic Structures.
Drawing. Free-Hand, of Animal and Vegetable Structures.

Zoology. Outlines of Zoology.
Physics. Laboratory Practice.
English. Composition. Logic. History of English Literature.
Constitutional History. England and the United States.
French. (Spanish may be substituted.)
German.

FOURTH YEAR.

I. COURSE IN MECHANICAL ENGINEERING.

Engineering. Resistance of the Materials used in Construction. Estimation of the Strength of Structures of Wood, Stone, and Iron. Foundations, Beams, Girders, Columns, Roofs, etc.
Thermodynamics. Mechanical theory of Heat.
Machines. Strength and Proportions of the Parts of a Machine. Hand Machinery,—Cranes, Derricks, Pumps, Turn-tables, etc.
Motors. Hydraulic Motors. Water-wheels. Water-Pressure Engines. Power and Strength of Boilers. Steam Engines,—Stationary, Locomotive, Marine. Air and Gas Engines.
Building Materials. Woods, Stones, Bricks, Mortars, Cements, Stucco, Paints.
Descriptive Geometry. Applications to Masonry, Carpentry, and Machinery. Modelling.
Drawing. Machines. Working Plans and Projects of Machinery, Mills, etc.
Physics. Practical experiments in Weighing and Measuring, Strength of Materials, Heat, and Steam.

English. Composition. English Literature.
History and Philosophy of Science.
Political Economy. Elements of Business Law.
Mental Science.
French. (Italian may be substituted.)
German.

II. COURSE IN CIVIL AND TOPOGRAPHICAL ENGINEERING.

Engineering. Structures of Wood, — Framing, Trusses, Girders, Arches, Roofs, Bridges. Structures of Stone, — Foundations, Retaining Walls, Arches, Bridges. Structures of Iron,—Foundations, Beams, Girders, Columns, Roofs, Bridges. Field-practice.

Physical Hydrography. As practised by the U. S. Coast Survey.

Machinery and Motors. Hand Machinery. Water-wheels. Boilers. Steam-engines.

Building Materials. Woods, Stones, Bricks, Mortars, Cements, Stucco, Paints

Physics. Practical Experiments in Weighing and Measuring, Strength of Materials, Flow of Liquids and Gases.

Descriptive Geometry. Applications to Masonry and Carpentry.

Drawing. Plans, Profiles, Elevations, Sections, etc.

English. Composition. English Literature.

History and Philosophy of Science.

Political Economy. Elements of Business Law.

Mental Science.

French. (Italian may be substituted.)

German.

III. COURSE IN MINING ENGINEERING.

Mining. The Useful Minerals. Modes of occurrence. Prospecting. Boring. Blasting. Sinking Shafts,—Timbering, Walling, and Tubbing. Driving Levels. Methods of Mining. Ventilation. Lighting. Winding Machinery. Ladders and Man-Engines. Underground Transportation. Pumps. Dressing and Concentration of Ores,—Crushers, Stamps, Washers, Amalgamators, etc. Details of American Mining.

Machinery and Motors. Hand Machinery. Water-wheels. Boilers. Steam-engines.

Engineering. Resistance of the Materials used in Construction. Estimation of the Strength of Structures of Wood, Stone, and Iron. Foundations, Beams, Girders, Columns, Roofs, etc.

Chemistry. Quantitative Analysis. Laboratory Practice.

Geology. Historical Geology. Palæontology. Detailed study of American Geology. Laboratory Practice.

Metallurgy. Lectures and Laboratory Practice in Ore Dressing and Smelting.

Physics. Practical Experiments in Weighing and Measuring, Strength of Materials, Microscopy, Spectroscopy.

Building Materials. Woods, Stones, Bricks, Mortars, Cements, Stucco, Paints.

Drawing. Geological Maps and Sections. Plans and Sections of Mines, Quarries and other open Workings. Mining Machinery and Implements.

English. Composition. English Literature.
History and Philosophy of Science.
Political Economy. Elements of Business Law.
Mental Science.
French. (Italian may be substituted.)
German.

IV. COURSE IN BUILDING AND ARCHITECTURE.

Architectural Design. Exercises in Composition. History of Architecture. The other Arts of Design.

Professional Practice. Specifications. Contracts. Estimating and Measuring. Superintendence.

Drawing. Architecture, Landscape, and the Human Figure. Lithography and Etching. Modelling. Drawing from Memory.

Engineering. Structures of Wood, Stone, and Iron. Foundations, Walls, Arches, Domes, Beams, Trusses, Girders, Roofs.

Descriptive Geometry. Applications to Masonry and Carpentry.

Physics. Practical Experiments in the Strength of Materials, Photometry, Ventilation, Warming, Acoustics.

Building Materials. Woods, Stones, Bricks, Mortars, Cements, Stucco, Paints.

English. Composition. English Literature.
History and Philosophy of Science.
Political Economy. Elements of Business Law.
Mental Science.
French. (Italian may be substituted.)
German.

V. COURSE IN CHEMISTRY.

Chemistry. Quantitative Analysis. Organic Analysis. Gas Analysis. Preparation of Chemical Products. Special Researches.
Physics. Use of the Microscope, Spectroscope, Saccharimeter. Photometry. Electrical Measurements.
Geology. Historical Geology. Palæontology. Detailed Study of American Geology. Laboratory Practice.
Building Materials. Woods, Stones, Bricks, Mortars, Cements, Stucco, Paints.
Drawing. Apparatus used in the Arts.
Botany. Vegetable Physiology. Economic Botany.

English. Composition. English Literature.
History and Philosophy of Science.
Political Economy. Elements of Business Law.
Mental Science.
French. (Italian may be substituted.)
German.

VI. COURSE IN SCIENCE AND LITERATURE.

Physics. Special Researches.
Geology. Historical Geology. Palæontology. Detailed Study of American Geology. Laboratory Practice.
Botany. Vegetable Physiology. Economic Botany.
Drawing. Subjects determined by each student's choice of studies.

English. Critical Reading of English Writers. Earlier English Literature. Composition.
History and Philosophy of Science.
Political Economy. Elements of Business Law.
Mental Science.
French. Advanced Course. (Italian may be substituted.)
German. Advanced Course.

The foregoing studies are required, and of the following the student must select at least two : —

Chemistry. Quantitative Analysis. Organic Analysis.

Zoology. Comparative Anatomy. Any special Department of Zoology at the option of the student. Laboratory Practice.
Engineering Courses. Subjects at the option of the student.
Thermodynamics. Mechanical Theory of Heat.

VII. COURSE IN NATURAL HISTORY.

Zoology. Comparative Anatomy. Any Special Department of Zoology at the option of the Student. Laboratory Practice.
Geology. Historical Geology. Palæontology. Detailed Study of American Geology. Laboratory Practice.
Physics. Use of the Microscope, Spectroscope, Saccharimeter.
Botany. Vegetable Physiology. Economic Botany.
Chemistry. Quantitative Analysis. Organic Analysis. Toxicology.

English. Composition. English Literature.
History and Philosophy of Science.
Political Economy. Elements of Business Law.
Mental Science.
French. (Italian may be substituted.)
German.

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. The progress of each student is tested by frequent oral examinations. 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 the oral examinations in connection with the ordinary exercises, written examinations are held from time to time, particularly in those departments in which the oral examination of the students is necessarily too infrequent to be exclusively relied upon.

Near the close of the months of January and May, general examinations are held,—that of January embracing the subjects studied during the first half-year, that of May covering the studies of the whole year. Each examination on a distinct subject is marked on a scale of 100, and the marks of each student are reported to his parent or guardian. These returns are intended to enable the parent or guardian to judge of his son's or ward's proficiency in each department of instruction. 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. A student who fails to pass the May examination in any subject will not be permitted to enter upon the studies of the following year without passing a new examination.

The Instruction in Chemistry. In the chemical laboratories provision is made for teaching General Chemistry, Qualitative Analysis, Quantitative Analysis, Assaying, Determinative Mineralogy, the Use of the Blowpipe, Metallurgy, and Industrial Chemistry. The department occupies five ample laboratories,

a chemical lecture-room, and a recitation-room, besides rooms for apparatus, balances, and storage.

In the first year, instruction is given in General Chemistry by exercises which combine a recitation and an illustrated lecture, and by weekly lessons in the laboratory, where every student is provided with a desk and the necessary apparatus, and is required to perform, under the supervision of the professors, a large number of experiments selected to illustrate the laws of chemical action and the properties of all the important chemical elements. In the second year, a systematic course of instruction in Qualitative Analysis is given, by laboratory practice and by oral and written examinations. Instruction is also given, during the first term of the year, in the elements of Organic Chemistry. In the second term students who intend to pursue the regular courses in Chemistry, Natural History, and Science and Literature, will study the principles of Chemical Philosophy, and will have practice in solving chemical problems.

In the third and fourth years the principal subjects of study are Quantitative Analysis, Organic Chemistry, the Preparation of Chemical Products, Assaying, Mineralogy, the Use of the Blowpipe, Metallurgy, and Industrial Chemistry. Competent students are encouraged to undertake special researches, and are assisted in bringing them to useful results. A separate laboratory has been fitted up for the use of advanced students.

The Instruction in Physics. During the first two years 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, and especial attention is given to the explanation of the methods which have been used in the most extended investigations of general physical laws. In all cases the theoretical discussion of the question is followed by a full account of its practical applications.

The Institute possesses an extensive collection of physical apparatus. The lectures are also illustrated by a very large number of photographs on glass, which are projected upon a screen by means of the calcium light.

The Physical Laboratory. In the third year the students enter the physical laboratory and learn to use the different instruments and to perform a variety of experiments. Special attention is paid to the testing of physical laws, by comparing the observed and computed results.

In the fourth year they carry on systematic investigations of particular subjects, or pursue such portions of the following courses as have a direct bearing on their professional studies.

Strength of Materials. Flexure of beams and girders; breaking weight and laws of elasticity.

Weighing and Measuring. Comparison of scales; calibrating tubes; use of dividing engine; making standards of weight and volume.

Laws of Gases and Vapors. Mariotte's law; expansion by heat; pressure of steam at different temperatures.

Flow of Liquids and Gases. Coefficients of efflux; weirs; effusion and transpiration of gases; velocity of air and water currents; flow under different pressures.

Microscopy. Methods of viewing various objects; magnifying powers; focal lengths; polariscope; micrometers; mounting objects dry and in balsam; making cells; cutting and grinding sections; injecting tissues.

Spectroscopy. Application to chemical analysis; electric spectra of metals and gases; constructing normal maps of the solar spectrum; measurement of indices of refraction and wave-lengths.

Photometry. Candle power of gas; comparison of burners; ratio of light to consumption.

Electrical Measurements. Measurement of quantity, electromotive force and resistance; testing electro-magnets; compari-

son of different batteries; application to submarine telegraphy; detection of faults in the cable.

Teachers of physics, and others properly qualified, may enter the laboratory and take the general course, or any of the above special courses.

The Instruction in Mechanical Drawing. The use of mathematical instruments and of water-colors and India-ink, is taught during the first two years in connection with the study of Geometry, Trigonometry, Surveying, Descriptive Geometry, and Perspective. During the third and fourth years instruction is given, under the supervision of the several professors, in the making of the sketches and drawings used in their respective departments.

Every student has a separate drawing table assigned to him, which he may occupy either for drawing or study when not engaged in other exercises. The instruction in drawing is given at stated hours.

Besides an abundant collection of engraved and lithographed copies, the students have the use of an excellent series of manuscript drawings, mostly French, and of models of machinery, carpentry, and engineering works.

The Instruction in Free-Hand Drawing. During the first two years, drawing upon the blackboard and with the pencil and crayons is taught according to the system of Mr. Hendrickx, in use in the public schools of Belgium, and lately adopted in the French normal schools. This method, which in Europe is applied chiefly to ornamentation, has been successfully extended in this School to working drawings of machinery and engineering works, as well as of architectural ornament and details. These exercises are thus made auxiliary to those in mechanical and architectural drawing. The style of work is simple, and the treatment of form somewhat conventional; but it enables the student to acquire, even in the short time devoted to it, a method of delineating objects which is of great

efficiency and practical value, and which forms an excellent introduction to more artistic study. The application of this method to isometric and perspective drawing concludes this part of the course.

A collection of drawings illustrative of this system has recently been presented to the Institute by the municipal authorities of the Commune of St. Josse-ten-Noode, Brussels.

The Instruction in Descriptive Geometry. The course in Descriptive Geometry for the first two years embraces the subjects of orthographical, isometric, and spherical projections, perspective, and shades and shadows. During the third and fourth years it comprehends the practical problems which occur in the construction of stone work, carpentry, and machinery, such as the making of zinc and pasteboard patterns for arches, domes, and staircases, for the articulations of timber, and for the parts of machines.

Problems are given from time to time, and, when the subjects admit, the graphical solutions are applied to solids in wood or in plaster, prepared expressly for this purpose.

Sets of modelling tools have been provided, and practical exercises in stone cutting are given; these consist in executing from rough pieces of plaster models of portals, arches, domes, staircases, bridges, etc., with the aid of drawings and patterns previously prepared by the students themselves: in this way the collections have been increased to some extent, and it is thought that the practical skill and familiarity with the details of construction thus acquired, will be of service to the student in the subsequent practice of his profession.

Moulding in plaster is also taught to a limited extent.

The Instruction in Mechanical Engineering. Besides the ordinary lectures and recitations, there are in this department two distinct kinds of instruction; the first is that given in the drawing rooms in making sketches and finished drawings of

machinery from models; the second is the practical instruction by projects. These projects, given in connection with the lectures and complementary to them, are of three kinds. The projects of the first kind comprise those in applied Cinematics, having for their object to determine, from the graphical representation of the motion, the form adapted to each piece of mechanism. They include the construction of cams, eccentrics, link work, and all kinds of gearing. Projects of the second kind are exercises in the construction of parts of machines, such as axles, cranks, valves, pistons, and finally of complete machines, from numerical data. Projects of the third kind are not given until the students have been made acquainted with the doctrine of the strength of materials, so as to be able to find the dimensions of pieces to resist flexure, shearing, torsion, etc. They consist of original designs for machines, involving the determination of the strength, dimensions, and proper proportions of the several parts by calculation.

The following are some of these projects: —

Project for a travelling crane to be employed in the construction of a stone bridge; for a hydraulic foundery crane to raise twenty tons; for a turbine, having given the fall and the volume of water; for a set of boilers for a pumping engine of 300 horse power; for a rolling mill driven by a steam engine.

These projects comprise: —

The plans, elevations and sections of the machines; the working-drawings of the details, and a memoir containing the description and theory of the machines; the estimation of the resistances; the calculation of the strength and proper proportions of the parts, and the reasons for the particular dispositions adopted.

Much value is attached to these last exercises, and the whole of the previous work is made tributary to them.

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 meas-

uring lines and angles, and of the level, is taught mainly by actual work in the field; first, in ordinary surveying and levelling; then in laying out curves, both circular and parabolic; and afterwards in the survey of a railway line, and in staking it out ready for construction. These surveys are plotted and represented on finished plans. The necessary computations of areas, earth-work, etc., are also made. In most of the remaining subjects peculiar to this department, as set down in the courses of the third and fourth years, Rankine's Civil Engineering is used as a text-book; and the aim is to enable the student, by means of suitable explanations, illustrations, and examples, to acquire a thorough working knowledge in these branches. The department has a good stock of excellent field instruments. An *Observatory*, erected upon the Institute building, from which a large number of U. S. Coast Survey stations are visible, is used in the instruction in triangulation and geodesy. Observations are also made for the determination of the meridian, and of latitude and longitude.

The Instruction in Topography is mainly given in the field by means of the Plane-Table, as perfected and used in the United States Coast Survey. The maps are completed in the drawing rooms, where instruction is given in the conventional modes of shading and topographical illustration.

The Instruction in Physical Hydrography is begun by practice in water surveys. After the student has become familiar with the data and the means of obtaining them, applications are made to the construction of breakwaters, docks, wharves, and other harbor improvements, as well as to the dyking and reclaiming of lands, to the location and construction of canals, and to the rectification of rivers.

The Instruction in Mineralogy. Determinative Mineralogy is taught by the study of crystalline forms, and the physical

properties of minerals, and by the use of the blowpipe; and Descriptive Mineralogy by the actual handling of specimens.

The Instruction in Geology and Mining. The examination of ores, veinstones, rocks, and fossils, the drawing of geological sections, mining machinery, and plans of mines, and the practical study of the various processes of mining and the details of geology, particularly of American geology, make up the characteristic work of this department. The general aim of the instruction is to give the student an exact knowledge of the subjects discussed, and to develop his judgment and powers of observation. Dana's Geology is used as a text-book. Those subjects for which no suitable manuals are accessible are discussed in lectures. The practical course of ore dressing and smelting in the Mining and Metallurgical Laboratory, affords unusual facilities for acquiring a familiar knowledge of the treatment of ores, such as can be got under ordinary circumstances only at the mines. During the vacations, students are expected to visit mines, and report upon them with drawings and explanatory memoirs.

During the past summer the mining students of the Institute, under charge of several of the professors, spent nearly two months in the mining regions of Colorado and Utah, studying in a practical way the nature of the ores and ore deposits, the methods of working, the various appliances, and, in general, the details of mining, ore-dressing, and reduction, as seen in those territories. Each student was required to submit a detailed report, with drawings, on the mine or other work specially assigned for his study.

It is intended to visit in this way other mining regions, as circumstances may render it possible.

The very valuable scientific library and the large and well-selected geological collection of the late Prof. Henry D. Rogers of the University of Glasgow, presented to the Institute by Mrs. Rogers, are of special benefit to the students in Geology and Mining. This collection is made up chiefly of fossils and

rock specimens from American localities. Accompanying this collection are a large number of diagrams and maps of great value for the lecture room.

A typical set of models of mining machinery, chiefly from Freiberg, Saxony, is used in the course of instruction. They are designed mainly to illustrate the principles of the various processes of mining and ore dressing, but combine also the latest improvements in machines. They show, in detail, the methods of working under ground by underhand and overhand stoping, the timbering and walling of shafts and levels, the arrangements of pumps, man-engines, ladder-ways, hoisting-ways, the sinking of shafts, etc. The machines for ventilation, as well as those for ore-dressing, are working models, with all their parts made proportional. The latter illustrate all the stages of the concentration of ores. It is proposed, as opportunity offers, to add to this collection other similar models. The collection of ores and vein stones is constantly receiving additions from the various mining regions.

The Mining and Metallurgical Laboratory. In this Laboratory the student of Mining and Metallurgy is furnished the means for studying experimentally the various processes of ore-dressing and smelting, by subjecting all kinds of ores to precisely the same treatment, and by the same appliances as are in use at the best mines and metallurgical works of this and other countries.

To this end, the laboratory already contains the most approved ore-dressing and mill machinery for gold and silver ores now in use in California and Nevada, consisting of an ore crusher, a five-stamp battery, an amalgamating pan, a separator, and a concentrator; and the equipment will be completed by the addition of roasting and smelting furnaces, and all the machinery necessary for treating all kinds of ores.

The experimental work of the laboratory is carried on by the students under the immediate supervision of an Instructor. A sufficiently large quantity of ore is assigned to each student,

who first samples it, and determines its character and value by analysis and assays, and makes such other preliminary examinations as serve to indicate the proper method of treatment. He then treats the given quantity, makes a careful examination of the products at each step of the process, ascertains the amount of power, water, chemicals, fuel, and labor expended, and thus learns approximately the effectiveness and economy of the method adopted.

The Institute has now on hand about eleven tons of gold and silver ores, representing over seventy different mines in Colorado and Utah, which were collected by the Institute party of professors and students during their recent trip to these territories. These ores will be worked, and reports sent to those who so generously contributed them; and it is hoped that by such coöperation the laboratory will continue to receive the necessary amount and variety of ores.

Descriptive Geometry and Engineering Models. The collections of this museum consist of models in wood, in metal, and in plaster, besides lithographs, photographs, and manuscript drawings, chiefly selected from the best collections of France, Germany and Switzerland, and, in some instances, made expressly for the school. They are arranged for convenience in the following groups. Some of these groups contain one or two hundred models, others only a few typical ones; it is, however, proposed to add from time to time such as may be required for the purposes of instruction.

Descriptive Geometry and its Applications. A set of models in relief, illustrating the various problems of Descriptive Geometry, arranged upon sets of planes at right angles to each other, and containing the corresponding graphical solutions; a set of models illustrating linear perspective, and the theory and practice of shades, shadows, and reflections; plaster models showing the intersections of cylinders, cones, and surfaces of revolution with each other, the penetrations made in each surface and the

common solid; models of brass and silk threads to illustrate the course on developable and warped surfaces.

Masonry and Stone Cutting. Models representing groined and cloistered arches, domes, staircases, etc., with detached voussoirs; models of right and oblique bridges, with their approaches and other accessory works.

Carpentry. Models of joints and mouldings; models of wooden and iron roof trusses, including a model illustrating Polonceau's system of iron roofs, centres for bridges, girders, etc.; models, wooden, of bridges.

Iron Bridges. A set of models illustrating the most recent constructions in iron bridges, beautifully executed by Bock, of Dresden.

Experimental Mechanics. Casts of Saint Vennant's models, showing the changes of forms which bodies of various shapes undergo, when subjected to forces causing flexure and torsion; a full sized model of the liquid vein observed and measured by Poncelet and Lesbros, in their hydraulic experiments. These models are duplicates of those made for the *Conservatoire des Arts et Métiers*, at Paris.

Graphical Representation. Model representing the mean temperature of a place for the twenty-four hours of each day of the twelve months of the year; topographical models, showing contour lines, with accompanying topographical drawings.

Mechanism. Models showing the different methods of laying out teeth of wheels in the various cases of racks, outside and inside gearing, etc.; bevel and skew bevel wheels; an instrument for laying out teeth devised by Schröder; models of pulleys and wrapping connectors, belts, and chains; models of parallel motions, including Watts' parallelogram, applied to land and marine engines; Seward's parallel motion, fitted to the engines of the Gorgon, etc.; models of non-circular, and screw wheels; endless screws; wheels in trains; epicyclic trains; Ferguson's paradox; equation clock; system of Lahire, etc.;

models of cams; of silent feed motions; regulating apparatus, *i. e.*, apparatus for stopping, reversing or modifying the motions of machines — these include governors, friction cones and clutches, reversing gear, Oldham's coupling, etc.

Resistance of the Materials used in Construction. A set of models illustrating the best forms of beams for resisting flexure, torsion, and compression under various conditions of stress; to which is added an apparatus for testing the deflections caused by loads applied in any manner to test their strength or stiffness.

Construction of Machines. These consist of a number of highly finished models of the parts of machines, such as screws, chains, hooks, riveting, axles, plumber blocks, steps and supports for shafts, wheels, pulleys, cranks, eccentrics, cross-heads, connecting rods, working beams, valves, pistons, etc.

Lifting Engines. Including the following working models:— Crab engine; Fairbairn's plate iron dock crane; hydraulic press.

Hydraulic Motors. A model of the water pressure engine at Alt Mordgrube, in Freiberg, Saxony, with the pumps and apparatus for draining mines; a model of Poncelet's water wheel; Fourneyron's turbine; Jonval's turbine; also Swain's and Leffel's inward flow turbines.

Steam Engines. Boilers and fire grates; steam cylinders, pistons, valves, etc.; slide valves and the mechanism, showing the distribution of the steam; variable cut-off valves — Stephenson link motion; models of steam engines of various forms.

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, pursued in connection with the Department of Civil Engineering, 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 calculated to meet the wants not only

of young men who propose to pursue a comprehensive course of architectural study, but of those who are looking only for such elementary training as shall qualify them for positions as salaried draughtsmen.

In addition to the exercises which directly accompany and illustrate this instruction, a series of independent exercises in original design, consisting of problems in architecture and ornament, will be given out from time to time to students who are sufficiently advanced in their studies to take part in them with profit. No student can receive the Diploma in Architecture, unless, besides pursuing the regular studies of the third and fourth years, he has presented a proper number of such original designs of a suitable degree of merit. As these studies leave but little time for preparing these works, it will be necessary for most students either to take time for them after their other studies are finished, or to extend all their work over a longer period.

Students proposing to enter this Department are recommended to make themselves familiar with the elements of Descriptive Geometry, so that they may join the class that has begun this study at the end of the previous year, and to spend a few months in an architect's office, copying and tracing, that they may have some acquaintance with the use of their instruments. A knowledge of Free Hand Drawing is even more desirable.

The Boston Society of Architects "wishing to do its part in the work of professional education," has established, by consent of the Corporation of the Institute, two prizes, of the value of fifty dollars each, one for the best work in the class of design, and one for the best work in the class of construction, during the year.

The prize in design was last year awarded to Mr. Frank Spinning, of Dayton, O. The prize in construction was not awarded.

The Architectural Museum. A large number of photographs, prints, drawings, and casts, have been collected for this Department, by means of a special fund raised for the purpose. This collection includes a number of English and French water-colors, mostly of architectural subjects, several lithographic publications issued by architectural students in England and on the continent, and photographs from the competition drawings for the Foreign Offices, the Law Courts, and the National Gallery in London, and others from French competitions for public buildings, and from the *Concours* of the *Ecole des Beaux-Arts.*

The collection of casts comprises both architectural details and specimens of carving and sculpture illustrating various periods of art. It includes a large and valuable collection of sculptures from the choir of Lincoln Cathedral, and contains also several models of temples and other buildings, lent to the School by the Boston Athenæum. To these has recently been added a large number of examples for drawing and modelling from the Kreling Art School, Nuremburg.

To these collections the following additions have been made by gift: —

A considerable collection of photographs and lithographs of great interest, presented to the Institute by French and English architects, taken from their own works and from their drawings, including photographs of the details of the New Opera House in Paris, presented by Mr. Charles Garnier.

A complete series of drawings, mostly presented by 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*, *Projet d'ordre*, *Projet de Construction*, *Grand Prix de Rome*, *Envoi de Rome.*

Specimens of modern English and American stained glass and tile-work, partly purchased, and partly presented by the

makers, with cartoons and drawings illustrating the processes of manufacture.

The publications of the Royal Institute of British Architects, and of the Architectural Institute of Scotland, and the miscellaneous papers of the Architectural Publication Society, have been presented by the authorities of these institutions.

The collection of drawings includes sets of actual working drawings, both English and American, with details and specifications, partly gifts, and partly loaned.

The Instruction in Natural History. This will be given with the aid of the collections 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 Zöology, Palæontology, and other branches of Natural Science. This instruction will be given by the Professors of the Institute in the lecture room of the Natural History Society, whose building is upon the same square.

The Instruction in Military 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. During the first two years all students are required to attend twice a week an exercise in military tactics, unless specially excused. For these exercises they are organized as a battalion of two companies. Arms and equipments are lent to

the School by the State. The matter of attendance at drill is under the control of the Secretary of the Faculty; but excuses of general application can only be granted by the Faculty.

Excursions for the Inspection and Study of Machines, Processes of Manufacture, Buildings, Works of Engineering, Geological Sections, Quarries, and Mines. 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 to make visits of inspection to machine-shops, engines, mills, mines, furnaces, and chemical works, and to important buildings and engineering constructions within convenient reach.

Recent Excursions. To the Norway Iron and Steel Works, the Bay State Rolling Mill, the Boston Fire Brick Co.'s Works, the New England Pipe Works, Downer's Petroleum Refinery, Alger's Iron Works, Ship Yards, and to Hinckley & Williams' Locomotive Works, in Boston; to the New England Glass Co.'s Works in East Cambridge; to the Revere Copper Co.'s Rolling Mills, and the Iron Works in Canton; to the Merrimac Manufacturing Co.'s Mills and Print Works, the Carpet Mills, the Lowell Machine Shop, and to the Manufactory of Card Clothing, in Lowell; to the Washburn and Moen Manufacturing Co.'s Wire Works, and to the Arcade Malleable Iron Works, in Worcester; to the Nashua Manufacturing Co.'s Cotton Mills, and to the Nashua Iron Co.'s Forging and Steel Tire Rolling Works, at Nashua, N. H.; to the Corliss Steam Engine Co.'s Works, and to the Gorham Silver Plating Works, in Providence, R. I.; to the Watertown Arsenal in Watertown; to a quarry in Quincy; to Marblehead Neck, several times, as assistants in a Geological Survey; to the Iron Works at Carondelet, the Iron Mountain, and Pilot Knob in Mo.; to the Mines and Metallurgical and Reduction Works, at Central City, Nevada, Black Hawk, Caribou, Georgetown, and Golden City, in Colorado Territory; to the Black Hills and Iron Regions of Wyoming Territory; and to the Emma and other mines in Little Cottonwood Cañon, in Utah Territory.

THE SOCIETY OF ARTS.

One of the primary objects of the founders of the Institute of Technology, as shown by the extract from the charter given on page 2, was the establishment of a Society of Arts. This Society was organized in 1861, and now numbers 350 members. It holds regular meetings at its rooms in the Institute Building, on the second and fourth Thursdays of each month from November to May inclusive. At these meetings are presented communications on various subjects of applied science, with the exhibition of machines and apparatus illustrating important inventions in the mechanic and useful arts. Students of the School may be present at these meetings, by permission of the Secretary of the Institute.

THE THOMAS SHERWIN SCHOLARSHIP.

This Scholarship 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 of 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."

THE BOSTON PUBLIC LIBRARY.

The professors and students of the Institute are allowed the full use of this extensive library. Copies of the complete catalogues of the Library are kept at the Institute for convenience

of reference, and the Library Building is near at hand. The Library now contains 165,000 volumes; and its reading-room is supplied with all the best scientific and technical periodical publications. 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 put at the disposal of the officers and students of the Institute of Technology.

DIPLOMAS AND CERTIFICATES.

The diploma or certificate is intended to be not only a reward to the student for his diligence and attainments, but an assurance to the public of his knowledge and skill in the particular department of science to which it relates.

The degrees or diplomas corresponding to the seven regular courses or departments of the School are as follows: —

I. A Degree in Mechanical Engineering.
II. " " " Civil and Topographical Engineering.
III. " " " Geology and Mining Engineering.
IV. " " " Building and Architecture.
V. " " " Chemistry.
VI. " " " Science and Literature.
VII. " " " Natural History.

To be entitled to either of these degrees, the student must pass a satisfactory examination in all the studies and exercises prescribed for his department in the courses of the third and fourth years; and in all the studies of the previous years in which he has not already passed a satisfactory examination. He must, moreover, prepare a dissertation on some subject included in the 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. He will be required, also, to have sufficient familiarity with French and German to be able to read without difficulty works in these languages relating to science and the arts.

The examinations for degrees are held in the month of May, and are partly oral and partly in writing.

The title of the degree given by the Institute is "Graduate of the Massachusetts Institute of Technology in the Department of ————————."

Besides the degrees or diplomas covering the complete courses of study above referred to, certificates of attainment in special subjects will be given to such students as on examination are found to have attained the required proficiency in them.

REGULATIONS OF THE SCHOOL.

School-year. The School-year begins on the first Monday in October, and ends on the Saturday preceding the first Monday in June. On legal holidays the exercises of the School are suspended.

Entrance Examinations. These are held on the first Monday in June, and the Thursday preceding the first Monday in October.

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 Secretary of the Institute, 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 Secretary of the Institute, 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.

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, on the average, from six to eight dollars a week; and the cost of books, drawing instruments, and paper, from twenty-five to thirty dollars a year.

Fees. The regular fee for each year is $150, payable by students who have given bonds, $100 at the beginning, and $50 at the middle (first Monday in February) of the School-year. For one-half, or any less fraction of the School-year, the fee is $100. Students who pursue a partial course pay, in general, the full fee. The fees for special students vary according to the character of the study chosen, and cannot be specified, except for such special courses as from time to time may be advertised.

Attendance. Students are expected to attend all the exercises of the class to which they belong. Special students are expected to attend all the exercises of the course or courses of study which they have chosen. A weekly return of absences and tardinesses is made by the Secretary of the Faculty to the parent or guardian of every student not of age. Tardiness consists in entering a lecture-room, drawing room, or laboratory, more than five minutes after the hour designated for the beginning of the exercise. All students, except special students, are expected to devote themselves to the work of the School between the hours of 9, A. M., and 5, P. M. (4 1-2

P. M. in winter), except during the interval for dinner. There are no exercises on Saturday afternoon, and the building is 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. They are required to avoid all running, loud talking, whistling, or other noise in the halls and passages of the building. 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 good order of the School, if repeated after admonition, will be followed by the dismissal of the offender.

FREE COURSES OF INSTRUCTION.

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

This department of the School will embrace a number of distinct courses, more or less varied from year to year by the omission or interchange of particular subjects, but including in their entire scope instruction in mathematics, physics, chemistry, geology, natural history, physiology, the English and other modern languages and literatures, navigation and nautical astronomy, architecture, and engineering.

The programme of subjects, and the extent of the several courses, will be made known in October of each year.

As it is the object of this branch of the School to provide substantial teaching, rather than merely popular illustration of the subjects, 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, where the course is of a nature demanding preparation, stating the extent of their preliminary training.
3. The number of students in each class is necessarily limited. The selection will be made under the direction of the Faculty.

The courses for 1871–72 are on the following subjects: —

A course of ten lectures on English Writers of the 18th and 19th Centuries, by Prof. Atkinson, on Wednesdays, at 7½ P. M. beginning November 15, 1871.

A course of eighteen lectures on Progressive Development of Life in Geological Ages, by Prof. Kneeland, on Tuesdays and Fridays, at 7½ P. M., beginning November 14.

A course of eighteen lessons in Elementary German, by Instructor Krauss, on Mondays and Thursdays, at 7½ P.M., beginning November 13.

A course of eighteen lessons in Elementary French, by Instructor Lévy, on Mondays and Thursdays, at 7½ P.M. beginning January 22, 1872.

A course of twenty lectures in Elementary Chemistry, by Professors Richards and Nichols, on Tuesdays and Fridays, at 7½ P. M., beginning January 16.

A course of twenty-four Laboratory Exercises in Chemical Manipulations, by Professors Richards and Nichols, on Wednesdays and Saturdays, at 2½ P.M., beginning February 3.

A course of twenty-four Laboratory Exercises in Physics, by Prof. Pickering, on Wednesdays and Saturdays, at 2½ P.M., beginning February 3.

INDEX.

1871–72, First Half (Oct.—Feb.) of 1st and 2d Years.

	Year of Class	9 — 10	10 — 11	11 — 12	12 — 1	2.30 — 3.30	3 30 — 4.30
Monday	First	I. II. Mathematics	III. IV. Mathematics	. . . I. English . . .	. . . II. English . . .	. . { II. III. Draw	i n g . . . . .
	Second	. . . Drawing . . .	. I. Desc. Geometry .	. II. Desc Geometry .	. . . . Physics	I. Chemical . . . . . Physical	Manipulation . . . . Geography . . . . .
Tuesday	First	. . . . .	. . . Chemistry . . .	. . . I. French . . .	. . . II. French . . .	. . . . . Draw	i n g . . . . .
	Second	. . . . French	. . I. Mathematics . .	. II. Mathematics .	. . . Drawing . . .	. . . . . Chemical	Analysis . . . . .
Wednes.	First	I. II. Mathematics	. . . I. French . . . III. IV. Mathematics	. . . II. French . . .	} Military Drill . . .	. . . . { I. II. Draw III. Chemical	i n g . . . . . Manipulation . . . .
	Second	. . . . German	. . . . English	Organic Chemistry		Draw	i n g .
Thulsday	First	. I. II. Mathematics .	III. IV. Mathematics	. . . I. English . . .	. . . II. English . . .	. . . . { I. III. Draw	ing . . . . .
	Second	. . . Drawing . . .	. I. Desc. Geometry .	II. Desc. Geometry	. . . . Physics	II. Chemical . . . . German	Manipulation . . . . .
Friday	First	. . . . English	. . . Chemistry . . .	. . . I. French . . .	. . . II. French . . .	. . . . . Draw	i n g . . . . .
	Second	. . . . French	. . I. Mathematics . .	. II. Mathematics .	. . . . English	. . . . . Chemical	Analysis . . . . .
Sat'day	First	. . Mathematics . .	} I. Military Drill . .	. . . . .	. . . . .	. . . . .	. . . . .
	Second	. . . . German		. . . . .	. . . . .	. . . . .	. . . . .

1871--72, Second Half (Feb.—June,) of 1st and 2d Years.

	Year of Class	9 — 10	10 — 11	11 — 12	12 — 1	2.30 — 3.30	3.30 — 4.30
Monday	First	. . . Drawing . . .	. I. II. Mathematics . . II. English	III. IV. Mathematics . . . I. English . . .	. . . . Physics	. . . II. III. Drawing . . . . . I. Chemical	Manipulation . . . .
	Second	. . . Drawing . . .	I. Desc. Geometry .	. . . Astronomy . . .	III. Chemical Philos.	. . . . . I. II. Surveying . . . . . . III. Physical Geography or Botany .	
Tuesday	First	. . . Drawing . . .	. . . Chemistry . . .	. . . I. French . . .	. . . II. French . . .	. . . I. II. Drawing . . . . . III. Chemical	Manipulation . . . .
	Second	. . . . French	. . I. Mathematics . . . . III. English . . .	. II. Mathematics .	. . . . Physics	. . . . III. Chemical	Analysis . . . . .
Wednes.	First	. I. II. Mathematics .	III. IV. Mathematics	. . . Physics	} Military Drill . . .	. . . I. French. . . .	. . . II. French . . .
	Second	. . . . German	. . . . English	III. Chemical Philos.		. . . . . I. II. Surveying . . . . . III. Physical Geography or Botany . .	
Thursday	First	. . . II. English . . . . . I. Drawing. . .	I. II. Mathematics . . II. Drawing . . .	III. IV. Mathematics . . . I. English . . .	. . Physiology . . .	. . . I. French . . .	. . . II. French . . .
	Second	. . . Drawing . . .	. I. Desc. Geometry	. . . Astronomy . . .	. . . . Physics	. . . . . Chemical	Analysis . . . . .
Friday	First	. . . I. German . . .	. . II. German . . .	. . . . Physics	. . Physiology . . .	. . . . I. III. Drawing . . . . . II. Chemical	Manipulation . . . .
	Second	. . . . French	. I. Mathematics . . . III. English	. II. Mathematics . III. Chemical Philos.	. . . . English	. . . . German	. . . . .
Saturday	First	. . Mathematics . .	} Military Drill.	. . . . .	. . . . .	. . . . .	. . . . .
	Second	. . . . German		. . . . .	. . . . .	. . . . .	. . . . .

1871–72, First Half of Third Year.

	COURSES IN	9 — 10	10 — 11	11 — 12	12 — 1	2.30 — 4.30
MONDAY	Mechanical Engineering	Calculus	Drawing	Mechanical Engineering		Machine Drawing
	Civil Engineering	do	do	Spherical Astron.		Plan Drawing
	Chemistry	Drawing	Quant. Analysis	Laboratory Practice		Blowpipe and Mineralogy
	Geology and Mining	Calculus	do	Drawing	Physical Manip.	do
	Building and Architecture	do	Drawing	do	do	Architectural Design
	Science and Literature	do	Quant. Analysis	Physical Manipulation		Drawing
TUESDAY	Mechanical Engineering	Calculus	French	German	Drawing and Perspective	Mechanism
	Civil Engineering	do	do	do	do	Civil Engineering
	Chemistry	Drawing	do	do	do	Laboratory Practice
	Geology and Mining	Calculus	do	do	do	Civil Engineering
	Building and Architecture	do	do	do	do	Drawing
	Science and Literature	do	do	do	do	Laboratory Practice
WEDNES'Y	Mechanical Engineering	Drawing	Drawing	History	Physical Manip.	Laboratory Practice
	Civil Engineering	do	do	do	do	do
	Chemistry	Metallurgy	do	do	do	Drawing
	Geology and Mining	do	do	do	Drawing	do
	Building and Architecture	Drawing	do	do	do	Architectural Practice
	Science and Literature	do	do	do	do	Laboratory Practice
THURSDAY	Mechanical Engineering	Calculus	English (U.S.Const)	Stereotomy	Mech. Engineering	Constructive Mechanism
	Civil Engineering	do	do	do	Spherical Astron.	Civil Engineering
	Chemistry	Drawing	do	Blowpipe and Mineralogy		Drawing
	Geology and Mining	Calculus	do	do		Civil Engineering
	Building and Architecture	do	do	Stereotomy	Drawing	Drawing
	Science and Literature	do	do	Physical Manipulation		do
FRIDAY	Mechanical Engineering	Calculus	French	German	Drawing	Mechanism
	Civil Engineering	do	do	do	do	Civil Engineering
	Chemistry	Drawing	do	do	do	Laboratory Practice
	Geology and Mining	Calculus	do	do	Physical Manip.	Civil Engineering
	Building and Architecture	do	do	do	do	Drawing
	Science and Literature	do	do	do	do	Laboratory or Physics
SATURDAY	Mechanical Engineering	English	Physical Manip.			
	Civil Engineering	do	do			
	Chemistry	do	do			
	Geology and Mining	do				
	Building and Architecture	do				
	Science and Literature	do				

Students may join a Spanish Class Tuesdays and Fridays, 4—5 P. M.

1871–72, Second Half of Third Year.

	COURSES IN	9 — 10	10 — 11	11 — 12	12 — 1	2.30 — 4.30
MONDAY	Mechanical Engineering	Mechanics	Geology	Stereotomy	Mech. Engineering	Drawing
	Civil Engineering	do	do	do	Physical Manip.	Plan Drawing
	Chemistry	Drawing	do	Laboratory Practice		Laboratory Practice
	Geology and Mining	Mechanics	do	Assaying		Drawing
	Building and Architecture	do	do	Stereotomy		Architectural Design
	Science and Literature	do	do	Physical Manipulation		Drawing
TUESDAY	Mechanical Engineering	Mechanics	French	German	Geology	Machinery and Mill-work
	Civil Engineering	do	do	do	do	Civil Engineering
	Chemistry	Drawing	do	do	do	Laboratory Practice
	Geology and Mining	Mechanics	do	do	do	Civil Engineering
	Building and Architecture	do	do	do	do	do
	Science and Literature	do	do	do	do	Laboratory Practice
WEDNES'Y	Mechanical Engineering	Drawing	Machine Drawing	History	Physical Manip.	Machine Drawing
	Civil Engineering	Physical Manip	Drawing	do	Drawing	Drawing
	Chemistry	Indust. Chemistry	Quant. Analysis	do	Physical Manip.	Laboratory Practice
	Geology and Mining	do	do	do	do	do
	Building and Architecture	Drawing	Drawing	do	do	Architectural Practice
	Science and Literature	Indust. Chemistry	Quant. Analysis	do	do	Laboratory Practice
THURSDAY	Mechanical Engineering	Mechanics	English (U.S.Const)	Stereotomy	Mech. Engineering	Constructive Mechanism
	Civil Engineering	do	do	do	Drawing	Civil Engineering
	Chemistry	Drawing	do	Laboratory Practice		Drawing
	Geology and Mining	Mechanics	do	Assaying		Civil Engineering
	Building and Architecture	do	do	Stereotomy	Drawing	do
	Science and Literature	do	do	Physical Manipulation		Drawing
FRIDAY	Mechanical Engineering	Mechanics	French	Mech. Engineering	German	Machinery and Mill-work
	Civil Engineering	do	do	Drawing	do	Civil Engineering
	Chemistry	Drawing	do	do	do	Laboratory Practice
	Geology and Mining	Mechanics	do	do	do	Civil Engineering
	Building and Architecture	do	do	do	do	do
	Science and Literature	do	do	do	do	Laboratory or Physics
SATURDAY	Mechanical Engineering	Physical Manip				
	Civil Engineering	Civil Engineering				
	Chemistry	Physical Manip				
	Geology and Mining	do				
	Building and Architecture	do				
	Science and Literature	do				

Students may join a Spanish Class Tuesdays and Fridays, 4—5 P. M.

1871–72, First Half of Fourth Year.

	COURSES IN	9—10	10—11	11—12	12—1	2.30—4.30
MONDAY	Mechanical Engineering	Mechanical Manipulation		Stereotomy (Modelling)		Machine Drawing
	Civil Engineering	Civil Engineering	Drawing	do		Drawing
	Chemistry	Drawing	Quant. Analysis	Laboratory Practice		Laboratory Practice
	Geology and Mining	do	do	Laboratory Practice	Geology	do
	Building and Architecture	do	Drawing	Stereotomy (Modelling)		Architectural Design
	Science and Literature	do	Quant. Analysis	Physical Research		do
TUESDAY	Mechanical Engineering	English	Mech. Engineering	Natural History	French	Mechanism
	Civil Engineering	do	Drawing	do	do	Drawing
	Chemistry	do	do	do	do	Laboratory Practice
	Geology and Mining	do	Engineering	do	do	do
	Building and Architecture	do	do	do	do	Modelling
	Science and Literature	do	Drawing	do	do	Laboratory Practice
WED'SDAY	Mechanical Engineering	Mechanical Manipulation		Machine Drawing.	Political Economy	Drawing
	Civil Engineering	Civil Engineering	Drawing	Drawing	do	do
	Chemistry	Metallurgy	do	do	do	Laboratory Practice
	Geology and Mining	do	do	Mining	do	do
	Building and Architecture	Drawing		Drawing	do	Architectural Practice
	Science and Literature	do		do	do	Laboratory Practice
THURSDAY	Mechanical Engineering	Natural History	Mech. Engineering	Drawing	Drawing	Drawing
	Civil Engineering	do	Drawing	do	do	do
	Chemistry	do	do	Laboratory	Practice	Laboratory Practice
	Geology and Mining	do	Engineering	Lab. Practice.	Geology	do
	Building and Architecture	do	do	Stereotomy	Drawing	Drawing
	Science and Literature	do	Drawing	Phys. Research	Philosophy	Laboratory Practice
FRIDAY	Mechanical Engineering	Drawing	Mech. Engineering	French	German	Mechanism
	Civil Engineering	do	Drawing	do	do	Drawing
	Chemistry	do	do	do	do	Laboratory Practice
	Geology and Mining	do	Engineering	do	do	do
	Building and Architecture	do	do	do	do	Drawing
	Science and Literature	do	Drawing	do	do	do
SATURDAY	Mechanical Engineering	Drawing	German			
	Civil Engineering	do	do			
	Chemistry	do	do			
	Geology and Mining	Mining	do			
	Building and Architecture	Drawing	do			
	Science and Literature	do	do			

Students in either of the courses may join an Italian class, on Wednesdays, from 11 to 12, A. M., and Fridays, from 3 to 4, P. M.

1871--72, Second Half of Fourth Year.

	COURSES IN	9 — 10	10 — 11	11 — 12	12 — 1	2.30 — 4.30
MONDAY	Mechanical Engineering	Machine Drawing	Thermodynamics	Drawing		Machine Drawing
	Civil Engineering	Civil Engineering	Drawing	Weigh. and Meas.	Drawing	Drawing
	Chemistry	Quant. Analysis.	Organic Chemistry	Laboratory Practice		Laboratory Practice
	Geology and Mining	do.	do	Laboratory Practice	Geology	do
	Building and Architecture	Drawing	Drawing	Drawing		Architectural Design
	Science and Literature	do	Organic Chemistry	Physical Research		do
TUESDAY	Mechanical Engineering	English	Machinery, Motors	Drawing	Drawing	Mechanism
	Civil Engineering	do	do	do	do	Drawing
	Chemistry	do	Microscopy	do	do	Laboratory Practice
	Geology and Mining	do	Machinery, Motors	Weigh. and Meas.	do	do
	Building and Architecture	do	Strength Materials	Drawing	do	Modelling
	Science and Literature	do	Machinery, Motors	do	do	Laboratory Practice
WEDNESY	Mechanical Engineering	Drawing		Machine Drawing	Political Economy	Drawing
	Civil Engineering	Civil Engineering	Drawing	Weigh. and Meas.	do	do
	Chemistry	Indust. Chem.	do	Drawing	do	Laboratory Practice
	Geology and Mining	do	Weigh. and. Meas.	Mining	do	do
	Building and Architecture	Drawing		Drawing	do	Architectural Practice
	Science and Literature	Quant. Analysis		do	do	Laboratory Practice
THURSDAY	Mechanical Engineering	Drawing	Machinery, Motors	Drawing	Physiology	Drawing
	Civil Engineering	do	do	do	do	do
	Chemistry	do	Drawing	Lab. Practice	do	Laboratory Practice
	Geology and Mining	do	Machinery, Motors	Geology	do	do
	Building and Architecture	do	Strength Materials	Drawing	do	Drawing
	Science and Literature	do	Machinery, Motors	Philosophy	do	Laboratory Practice
FRIDAY	Mechanical Engineering	Drawing	Thermodynamics	German	Physiology	Mechanism
	Civil Engineering	Civil Engineering	Drawing	do	do	Drawing
	Chemistry	Drawing	Microscopy	do	do	Laboratory Practice
	Geology and Mining	do	Mining	do	do	do
	Building and Architecture	do	do	do	do	Drawing
	Science and Literature	do	Drawing	do	do	do
SATURDAY	Mechanical Engineering	Drawing	German			
	Civil Engineering	do	do			
	Chemistry	do	do			
	Geology and Mining	Mining	do			
	Building and Architecture	Drawing	do			
	Science and Literature	do	do			

Students in either of the courses may join an Italian class, on Wednesdays, from 11 to 12 A. M., and Fridays, from 3 to 4, P. M.

LIST OF MEMBERS

OF THE

SOCIETY OF ARTS

OF THE

MASSACHUSETTS INSTITUTE OF TECHNOLOGY,

JANUARY 1, 1872.

HONORARY MEMBER.

Prof. Daniel Treadwell, Cambridge, Mass.

LIFE MEMBERS.

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

Baker, William E. . "
*Bancroft, E. P. . "
Beebe, James M. . "
Bigelow, E. B. . . "
Bowditch, J. I. . . "
Bowditch, Mrs. J. I. "
Brimmer, Martin. . "
Browne, C. Allen . "
Bullard, W. S. . . "

Colby, Gardner . . "
Cummings, John . . Woburn.

Dalton, Chas. H. . Boston.
Dupee, James A. . "

Edmands, J. Wiley . "
*Eldredge, E. H. . "
Endicott, Wm., Jr. . "

Fay, Joseph S. . . "
Fay, Mrs. Sarah S. . "
Forbes, John M. . . Boston.
Forbes, Robert B. . "
Foster, John . . . "

Gaffield, Thomas . . "
*Gardner, G. A. . . "
Gardner, John L. . "
Gookin, Samuel H. . "
*Grant, Michael . . "
Greenleaf, R. C. . . "
Grover, Wm. O. . . "

Hemenway, Mrs. M. "
Hoadley, J. C. . . Lawrence.
*Huntington, Ralph . Boston.

Johnson, Samuel, Jr. "

Kidder, H. P. . . "
Kuhn, Geo. H. . . "

Lawrence, James . "
Lee, Henry . . . "
Lee, John C. . . . "
* Lee, Thomas . . "
Little, James L. . . "

* Deceased.

Lowell, John A. . . Boston.
Lyman, Geo. W. . "

Matthews, Nathan . "
McGregor, James . "
Mudge, E. R. . . . "

Nichols, Lyman . . "
Norcross, Otis . . "

*Pierce, Carlos . . Canada.
Preston, Jonathan . Boston.
Pratt, Mrs. William . "
Pratt Miss . . . . "

Richardson, Geo. C. . "
Richardson, J. B. . "
Rogers, Henry B. . "
Rogers, William B. . "
Ross, M. Denman . W. Roxbury.
Ross, Waldo O. . . "
Ruggles, S. P. . . Boston.

Savage, James . . Boston.
Sayles Henry . . "
Sayles, Mrs. Willard "
*Sears David . . "
Shaw, Mary S. . . "
*Skinner, Francis . "
*Stetson, Joshua . "

Thayer, Nathaniel . "
Thorndike, John H.. "
Tobey, Edward S. . "
*Turner, J. M. . . "

Upton, George B. . "

Walcott, J. H. . . "
Wales, Geo. W. . . "
Wales, T. B. . . . "
Wales, Miss . . . "
*Whitney, Joseph . "

ASSOCIATE MEMBERS.

Adams, James . . Charlestown.
Allen, James T. . . W. Newton.
Ames, Isaac . . . Boston.
Amory, T. C. . . . "
Anderson, Luther W. Quincy.
Appleton, Thos. G. . Boston.
Atkinson, Chas. F. . Cambridge.
Atkinson, Wm. P. . "
Atwood, Nath'l E. . Provincet'n.
Austin, Edward . . Boston.
Avery, Charles E. . "

Bacon, John . . . "
Barnard, James M. . "
Batchelder, John M. Cambridge.
Beal, James H. . . Boston.
Bigelow, A. O. . . "
Bigelow, G. F. . . "
Bigelow, Geo. T. . "
Bigelow, Jacob . . "
Billings, Hammatt . "
Bishop, Chas. J. . . "
Blagden, Geo. W. . "
Blaney, Henry. . . "
Bôcher, Ferdinand . "
Bolles, M. Shepard . "

Bond, George W. . W. Roxbury.
Bond, W. S. . . . "
Boott, William . . Boston.
Bourne, William . . "
Bouvé, T. T. . . . "
Bowditch, Ernest W. Brookline.
Bowditch, Wm. I. . "
Boyd, Thomas . . Cambr'geport.
Braman, G. T. W. . Boston.
Braman, Jarvis D. . "
Brown, Orren L. . "
Browne, Causten . . "
Buckingham, C. E. . "

Cabot, Edward C. . "
Cabot, Samuel . . "
Carpenter, Geo. O. . "
Carroll, Arthur . . W. Newton.
Carruth, Charles . Boston.
Chandler, Thos. H. . "
Clapp, Otis F. . . "
Clapp, Wm. W. . . "
Clarke, E. H. . . "
Clinch, John M. . . "
Cobb, Freeman . . "
Coffin, G. Winthrop "

Copeland, R. M. . Boston.
Crafts, N. Henry . "
Crosby, Alpheus . . Salem.
Cummings, Nath'l . Boston.
Cumston, Charles M. "
Cushing, Thomas . "

Dana, Edward A. . "
Danforth, I. W. . . "
Danforth, James H. . "
Daniell, Moses G. . Roxbury.
Davenport, Henry . Boston.
Davies, Daniel . . "
Davis, Barnabas . . "
Davis, F. J. . . . Waltham.
Deane, Charles . . Cambridge.
Delano, Jos. C . . New Bedford.
Denny, Henry G. . Boston.
Derby, George . . "
Dewson, F. A. . . "
Dexter, George M. . "
Dix, John H. . . . "
Dixwell, J. J. . . . "
Doane, Thomas . . "
Dresser, Jacob A. . "
Dunklee, B. W. . . "

Eddy, R. H. . . . "
Eliot, Chas. W. . . Cambridge.
Emerson, Geo. B. . Boston.
Endicott, Henry . . "
Ewell, A. F. . . . "

Farley, Noah W. . "
Farmer, Moses G. . "
Fitch, Jonas . . . "
Flint, Charles L. . "
Follen, Charles . . "
Forbes, Franklin . Clinton.
Francis, James B. . Lowell.
Frothingham, Saml. . Boston.
Fuller, H. Weld . . "

Gerry, James H. . "
Gibbens, Joseph M. . "
Goddard, Benjamin "
Goddard, Nathaniel "
Grandgent, L. H. . "
Gray, Horace . . . "
Greenough, Wm. W. "
Gregg, Samuel . . "
Guild, Chester, Jr. . "
Guild, Henry . . "

Hagar, D. B. . . . Salem.
Hale, Edward E. . Boston.
Hall, Andrew T. . "
Hall, Charles B. . . "
Hall, Thomas . . . "
Hallem, William . Waltham.
Hamblett, James, Jr. Boston.
Haven, Franklin . . "
Hayes, A. A. . . . Longwood.
Heard, John T. . . Boston.
Henck, John B. . . Brookline.
Henshaw, John A. . Cambridge.
Herschel, Clemens . Boston.
Hewins, Edmund H. "
Higginson, J. A. . . "
Hill, Hamilton A. . "
Hilton, William . . "
Hitchcock, Thos. B. "
Holmes, Jabez S. . "
Holmes, O. W. . . "
Homans, C. D. . . "
Hooper, Samuel . . "
Houghton, Charles . "
Hovey, James . . Chelsea.
Hovey, J. F. . . . Boston.
Howe, S. G. . . . "
Hubbard, Charles T. "
Hunt, Ephraim . . Reading.
Hyde, George B. . Boston.
Hyde, Henry D. . "

Jackson, Francis H. "
Jackson, J. B. S. . "
Jackson, Patrick T. . "
Jasper, Gustavus A. . "
Jenks, J. W. P. . . Middleboro'
Jenks, Lewis E. . . Boston.
Jewett, D. B. . . . Boston.
Johnson, J. Q. A. . "
Joslin, Gilman . . "

Keep, N. C. . . . "
Kehew, John . . . "
Kilburn, E. J. . . . "
Kneeland, Samuel . "

Lamb, Salem T. . . "
Langley, H. P. . . "
Lathrop, John . . "
Lawrence, A. A. . "
Leach, John B. . . "
Lee, Francis L. . . "
Lee, Thomas J. . . "

Leuchars, R. B. . . Boston.
Lewis, Charles W. . Charlestown.
Lewis, Wm. K. . . Boston.
Lincoln, F. W. . . "
Little, James L., Jr. "
Little, John M. . . "
Loring, Frank W. . "
Lothrop, Sam'l K. . "
Lowe, N. M. . . . "
Lowell, John . . . "
Lyman, Theodore . Brookline.
Lynch, Charles S. . Boston.

Marble, G. R. . . "
Markoe, G. F. H. . "
Marshall, H. N. . . "
Marshall, J. F. B. . "
Martin, A. C. . . . Cambridge.
Mason, Robert M. . Boston.
May, F. W. G. . . Dorchester.
May, John J. . . . "
McBurney, Charles . Boston.
McMurtrie, Horace . "
McPherson, W. J. . "
Merrill, N. F. . . . Cambridge.
Minns, Thomas . . Boston.
Montgomery, Hugh . "
Moore, Alex. . . . "
Morris, Thomas D. . "
Morse, John T. . . "
Morse, Samuel T. . "
Munroe, William . "

Nash, Franklin . . "
Nichols, James R. . Haverhill.
Norton, Jacob . . Boston.
Nott, Gordon H. . Hyde Park.
Nourse, Thorndike . Boston.

Ordway, John M. . W. Roxbury.

Page, Edward . . Boston.
Page, W. H. . . . "
Parsons, Wm. . . "
Paul, J. F. . . . . "
Payson, J. P. . . . Chelsea.
Peabody, O. W. . . Boston.
Perry, O. H. . . . "
Philbrick, Edward S. "
Philbrick, John D. . "
Pickering, B. C. . . "
Pickering, H. W. . "
Pierce, S. S. . . . "
Plumer, Avery . . "

Pope, Edward E. . Boston.
Potts, J. Thorpe . . "
Pratt, George W. . "
Pratt, T. Willis . . "
Putnam, C. G. . . "
Putnam, J. P. . . "

Quincy, Edmund . Dedham.
Quincy, Josiah . . Boston.

Read, Wm. . . . "
Reed, B. T. . . . "
Remington, W. H. . "
Revere, Joseph W. . "
Rice, Alexander H. . "
Richards, R. H. . . "
Ritchie, E. S. . . . Brookline.
Robbins, James M. . Milton.
Robbins, Royal E. . Boston.
Rotch, Benj. S. . . "
Ruggles, John . . "
Runkle, John D. . Brookline.
Russell, LeBaron . Boston.

Salisbury, D. Waldo "
Sawyer, Edward . Newton.
Sawyer, Timothy T. Charlestown.
Sawyer, Warren . . Boston.
Schubert, Ernest . "
Scott, Isaac R. . . Waltham.
Sears, David . . . Boston.
Sears, George O. . "
Sears, Philip H. . . "
Shedd, J. Herbert . "
Sherwin, Thos. . . Dedham.
Shimmin, Chas. F. . Boston.
Shurtleff, A. M. . . "
Shurtleff, N. B. . . "
Sinclair, Alex. D. . "
Smith, Chauncy . . Cambridge.
Smith, H. Julius . . Boston.
Snell, Henry I. . . "
Snow, S. T. . . . "
Sonrel, Antoine . . "
Sprague, Chas. J. . "
Stearns, Jos. B. . . "
Stevens, Benj. F. . "
Stimpson, Fred. E. . "
Stimpson, Jas. H. . "
Storer, Frank H. . "
Storer, H. R. . . . "
Storer, Jacob J. . . "
Strater, Herman, Jr. . "
Sturgis, John H. . "

Sullivan, Richard . Boston
Sweetzer, Isaac . . "

Thompson, Newell A. "
Thompson, Wm. H. "
Thornton, J. Wingate "
Trowbridge, John . Cambridge.
Tufts, John W. . . Boston.
Tuxbury, Geo. W. . "

Upham, J. B. . . "
Urbino, S. R. . . . "

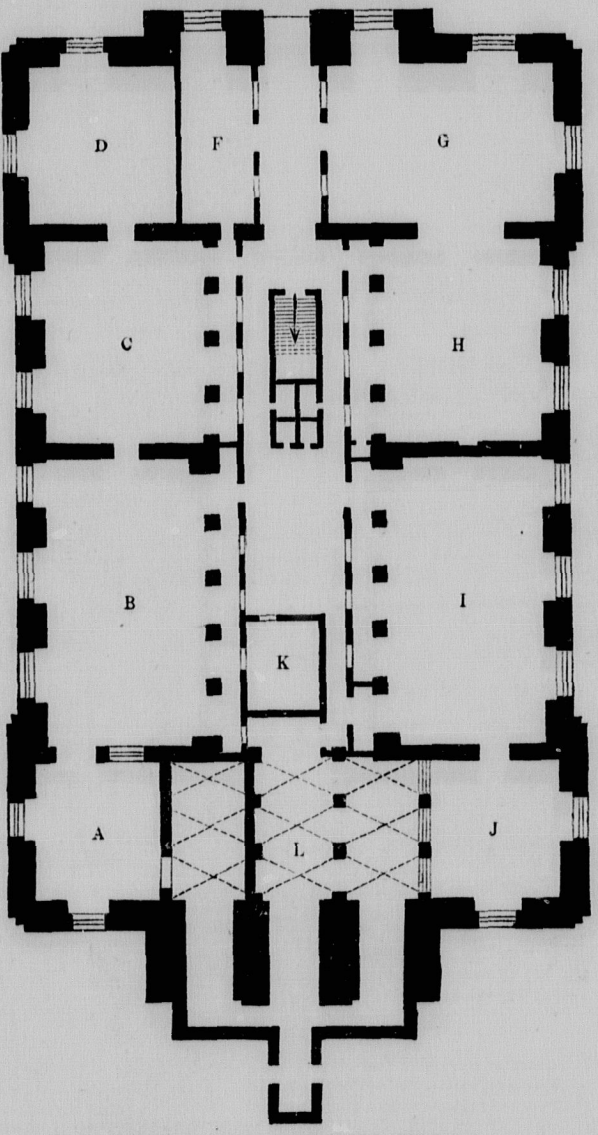
Van Brunt, Henry . "
Vila, Jos., Jr. . . . "

Walling, Henry F. . "
Walworth, J. J. . . "
Ware, Chas. E. . . "
Ware, Wm. R. . . "
Warren, Cyrus M. . Brookline.
Warren, Geo. W. . Boston.
Warren, Joseph H. . "
Warren, Sam'l D. . "

Waters, C. H. . . . Clinton.
Waterston, R. C. . Boston.
Watson, R. S. . . Milton.
Watson, Wm. . . Boston.
Webster, A. . . . Waltham.
Wederkirch, C. A. . N. Adams.
Weeden, Wm. N. . Boston.
Weld, Stephen M. . "
Wellington, Darius . "
Weston, David M. . "
Whipple, Edwin P. . "
Whitman, Herbert T. "
Whitmore, Wm. H. . "
Whitney, Henry . . "
Whiton, David . . "
Wickersham, Wm. . "
Wilder, Marshall P. Dorchester.
Williams, H. W. . . Boston.
Winthrop, Robert C. "
Wood, John F. . . "
Woodward, Frank L. "
Woolson, Moses . . "
Wright, John H. . . "
Wyman, Morrill . . Cambridge.

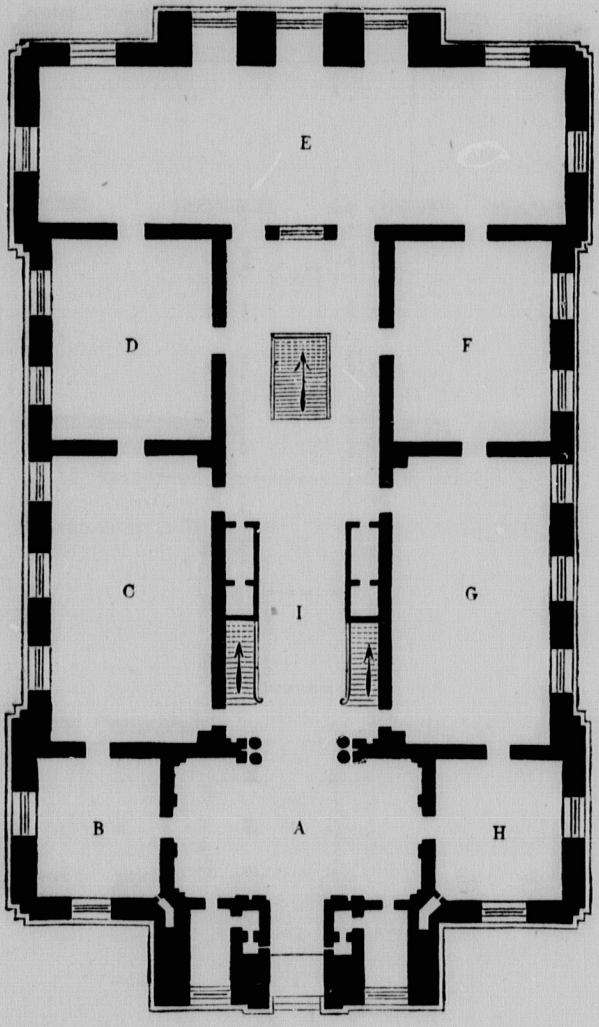
This view of the Institute Building is from a cut kindly furnished by Hon. Horace Capron, Commissioner of Agriculture, Washington, D.C.

BASEMENT FLOOR.



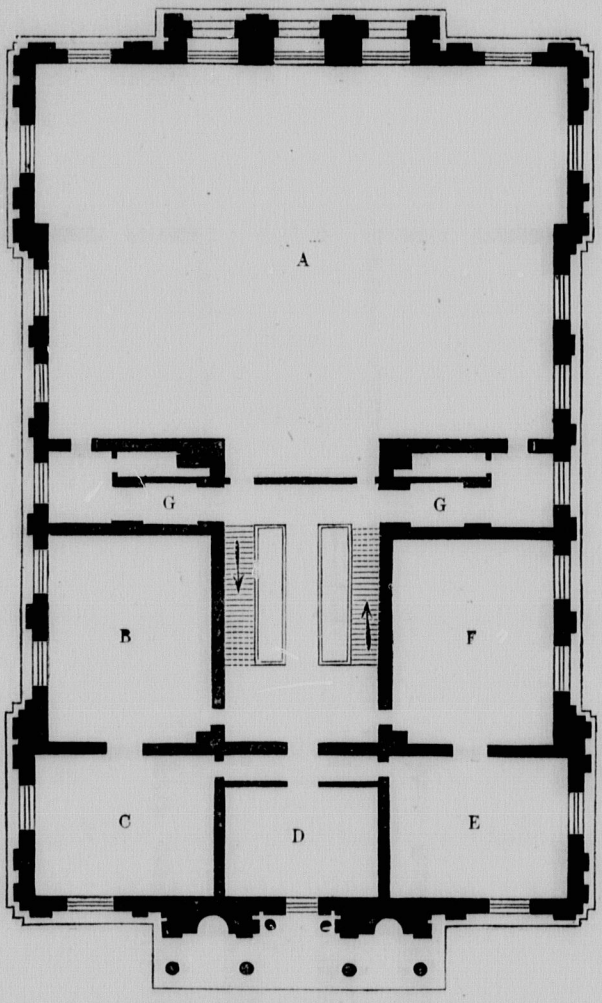
A. Professors' Chemical Laboratory, 25′ 0″ by 22′ 11″.
B. General and Qualitative Chemical Laboratory, 49′ 7″ by 34′ 0″
C. Quantitative Chemical Laboratory, 35′ 8″ by 34′ 0″.
D. Quantitative Chemical Laboratory, 26′ 4″ by 24′ 0″.
F. Professor Crafts' Private Laboratory, 34′ 0″ by 13′ 0″.
G. Mining Laboratory, 40′ 2″ by 27′ 10″.
H. Metallurgical Laboratory, 35′ 8″ by 24′ 0″.
I. Chemical Lecture Room, 49′ 7″ by 34′ 0″.
J. Mineralogical and Blowpipe Laboratory, 25′ 0″ by 22′ 11″.
K. Daily Chemical Supply Room, 14′ 6″ by 12′ 0″.
L. Engine and Boiler Room, 42′ 2″ by 25′ 0″.

FIRST STORY FLOOR.



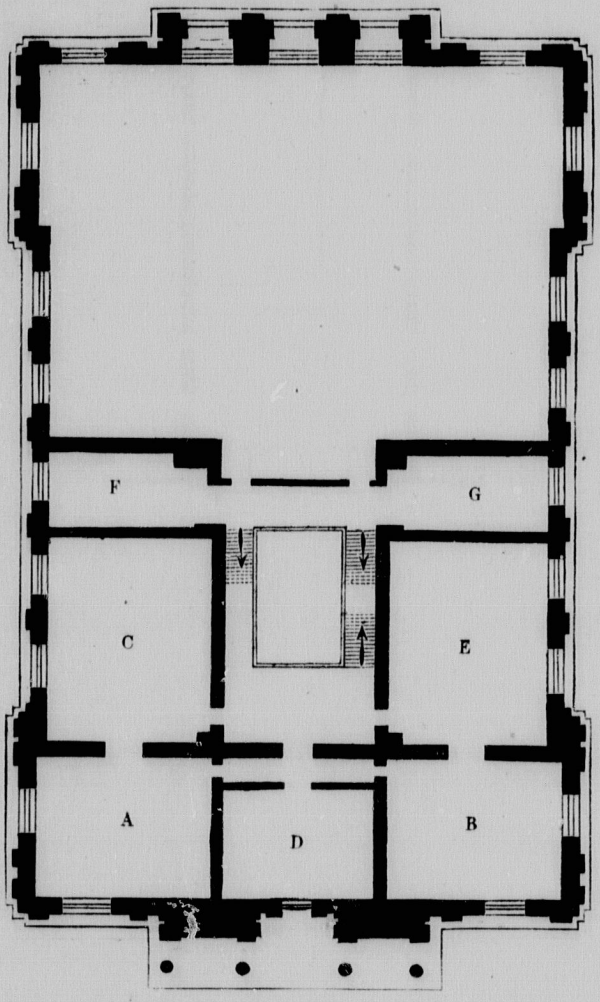
A. Entrance Hall, 42′ 2″ by 25′ 0″.
B. President's Office, 25′ 0″ by 22′ 11″.
C. Physical Lecture Room, 49′ 7″ by 28′ 3″.
D. Physical Laboratory and Apparatus Room, 35′ 8″ by 28′ 3″.
E. Physical Laboratory and Apparatus Room, 92′ 0″ by 27′ 10″.
F. Mining and Geological Lecture Room, 35′ 8″ by 28′ 3″.
G. Society of Arts Room, 49′ 7″ by 28′ 3″.
H. Secretary's Office, 25′ 0″ by 22′ 11″.
I. Stairway Hall, 87′ 3″ by 26′ 10″.

SECOND STORY FLOOR.



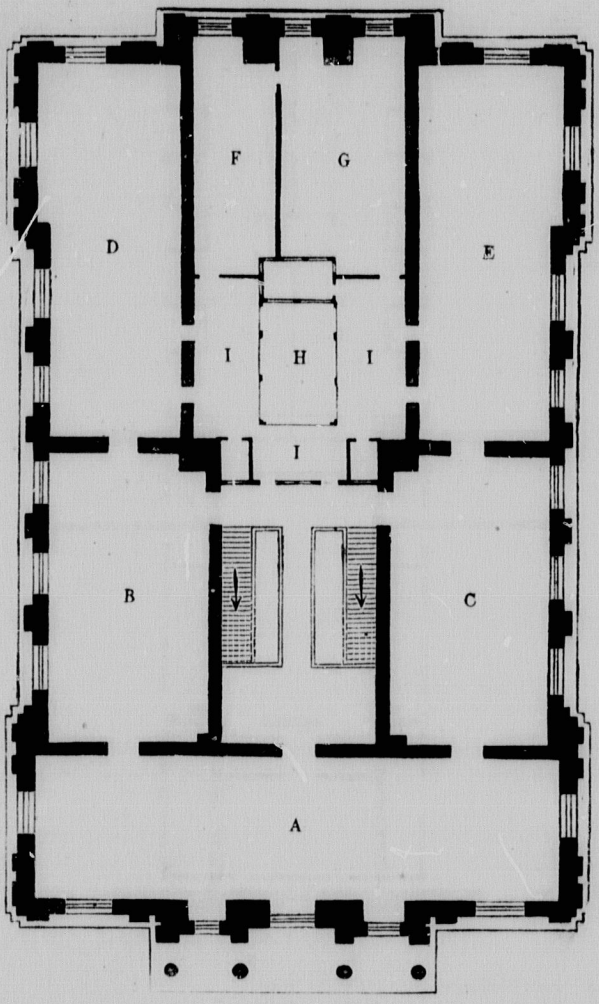
A. Great Lecture Hall, 92′ 0″ by 65′ 5″.
B. Mathematical Lecture Room, 34′ 9″ by 28′ 3″.
C. Civil Engineering Lecture Room, 32′ 2″ by 25′ 0″.
D. Modern Language Lecture Room, 26′ 2″ by 20′ 6″.
E. English Lecture Room, 32′ 2″ by 25′ 0″.
F. Mathematical and Astronomical Lecture Room, 34′ 9″ by 28′ 3″.
G. G. Passage Ways to the Great Hall.

HALF STORY FLOOR.



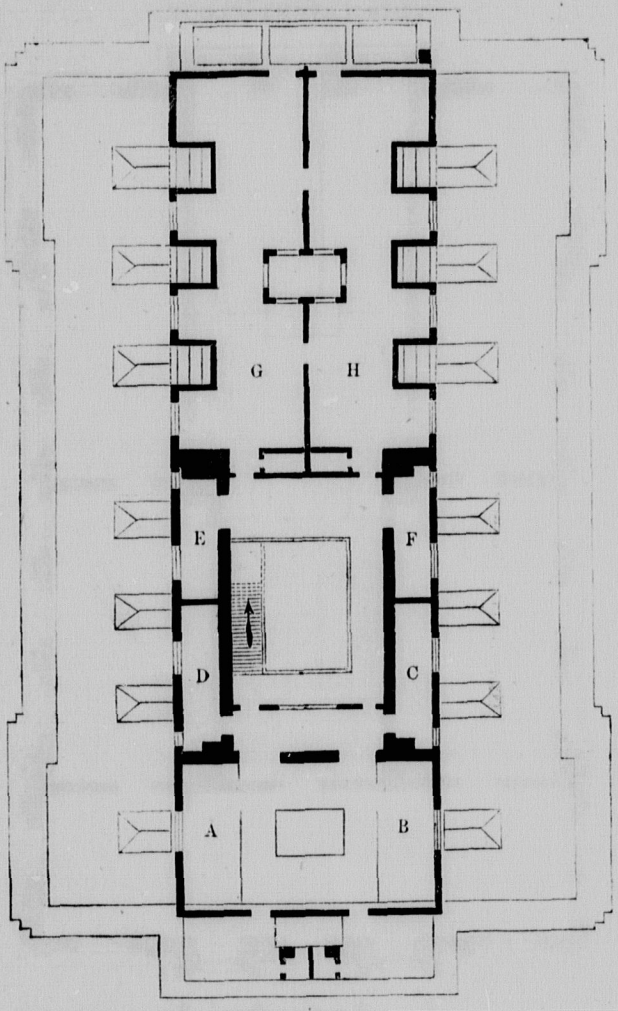
A. Architectural Museum, 32′ 2″ by 25′ 0″.
C. Architectural Museum, 34′ 9″ by 28′ 3″.
E. Reading and Study Room, 34′ 9″ by 28′ 3″.
B. Architectural Library and Study Room, 32′ 2″ by 25′ 0″.
D. Natural History Lecture Room, 28′ 2″ by 20′ 6″.
F. Prof. Atkinson's Study, 28′ 3″ by 14′ 2″.
G. Prof. Osborne's Study, 28′ 3″ by 14′ 2″.

THIRD STORY FLOOR.

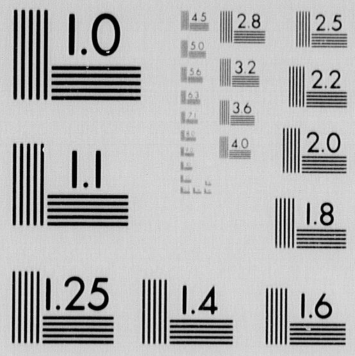


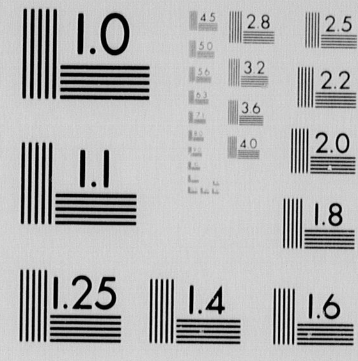
A. Second Year's Drawing Room, 92′ 0″ by 25′ 0″.
B. Fourth Year and Architects' Drawing Room, 49′ 7″ by 28′ 3″.
C. First Year's Drawing Room, 49′ 7″ by 28′ 3″.
D. Third Year's Drawing Room, 65′ 5″ by 26′ 0″.
E. First Year's Drawing Room, 65′ 5″ by 26′ 0″.
F. Mechanical Engineering Lecture Room, 37′ 0″ by 17′ 0″.
G. Mathematical and Descriptive Geometry Lecture Room, 37′ 0″ by 23′ 0″.
H. Model Room, 21′ 0″ by 13′ 0″.
I. I. I. Passage Ways.

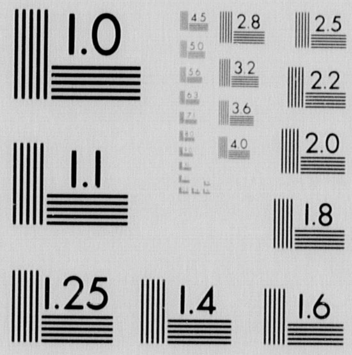
FOURTH STORY FLOOR.

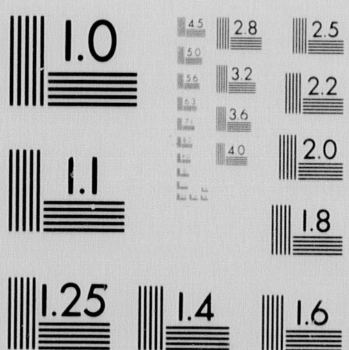


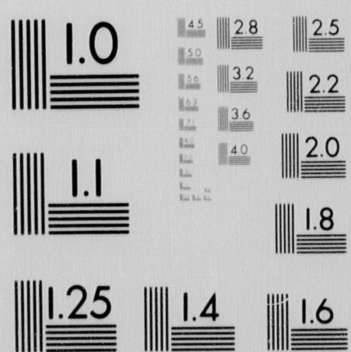
A. Prof. Watson's Study, 24′ 5″ by 11′ 6″.
B. Prof. Henck's Study, 24′ 5″ by 11′ 6″.
C. Prof. Runkle's Study, 24′ 9″ by 7′ 6″.
D. Profs. Richards' and Nichols' Study, 24′ 9″ by 7′ 6″.
E. Assistants' Study, 24′ 9″ by 7′ 6″.
F. Prof. Rockwell's Study, 24′ 9″ by 7′ 6″.
G. Photographic Laboratory. 65′ 5″ by 21′ 10″.
H. Drawing Room, 65′ 5″ by 21′ 10″.


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


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


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


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


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