THE

CORNELL UNIVERSITY

REGISTER

1883-84

ITHACA, N. Y.

PRESS OF J. J. LITTLE & CO.,
NOS. 10 TO 20 ASTOR PLACE, NEW YORK.

CONTENTS.

THE CALENDAR.

1883–4.

FALL TERM—1883.

September	18	Tuesday	Entrance Examinations begin.
September	20	Thursday	REGISTRATION for the Term.
September	21	Friday	Instruction begins.
November		Thursday and Friday	THANKSGIVING.
December	14	Friday	Term Examinations begin.
December	21	Friday	Term ends.

WINTER TERM—1884.

January	8	Tuesday	Entrance Examinations begin.
January	10	Thursday	REGISTRATION for the Term.
January	11	Friday	Instruction begins.
January	11	Friday	Founder's Day.
March	7	Friday	Woodford Prize Competition.
March	21	Friday	Term Examinations begin.
March	28	Friday	Term ends.

SPRING TERM—1884.

April	5	Saturday	REGISTRATION for the Term.
April	7	Monday	Instruction begins.
May	19	Monday	Commencement Essays due.

May	26	Monday	Theses for advanced degrees due.
June	2	Monday	Senior Examinations begin.
June	3	Tuesday	Examinations for Second Degrees.
June	6	Friday	Term Examinations begin.
June	14	Saturday	Term Examinations end.
June	16	Monday	Entrance Examinations begin.
June	17	Tuesday	Class Day.
June	18	Wednesday	Alumni Day. Annual Meeting of the Trustees.
June	19	Thursday	ANNUAL COMMENCEMENT.

FALL TERM—1884–5.

September	16	Tuesday	Entrance Examinations begin.
September	18	Thursday	REGISTRATION for the Term.
September	19	Friday	Instruction begins.

ORGANIZATION AND GOVERNMENT

FOUNDATION OF THE UNIVERSITY.

The existence of Cornell University is due to the bounty of the United States and of Ezra Cornell. On the second day of July, 1862, Congress passed an act granting public lands to the several States which should "provide at least one college where the leading object shall be, without excluding other scientific and classical studies, and including military tactics, to teach such branches of learning as are related to agriculture and the mechanic arts." Thirty thousand acres for each of its senators and representatives in Congress were appropriated to every State; and the share of the State of New York was nine hundred and ninety thousand acres in land scrip.

On the twenty-seventh of April, 1865, the Legislature of New York incorporated "The Cornell University," appropriating to it the income arising from the sale of this land scrip. The most important conditions were, that Ezra Cornell should give to the University five hundred thousand dollars; that the University should give instruction in branches relating to agriculture, mechanic arts, and military tactics; and that it should receive, without charge for tuition, one student annually from each assembly district. Mr. Cornell fulfilled the first requirement of the charter, and made an additional gift of more than two hundred acres of land, with buildings, to be used as a farm in connection with the department of agriculture.

The Act of Incorporation satisfies the condition of the congressional grant by providing for instruction in such branches of learning as are related to agriculture and the mechanic arts, and in military tactics, "in order to promote the liberal and practical education of the industrial classes in the several pursuits and professions of life." And it further declares that "such other

branches of science and knowledge may be embraced in the plan of instruction and investigation pertaining to the University, as the trustees may deem useful and proper."

The University, organized in accordance with the requirements of its charter, was opened on the seventh of October, 1868.

TRUSTEES.

The number of trustees, when the Board is full, is twenty-three. The eldest male lineal descendant of the Founder is, by the law of the State, a trustee, as are also seven others, the President of the University, the Governor of the State of New York, the Lieutenant-Governor, the Speaker of the Assembly, the Superintendent of Public Instruction, the President of the State Agricultural Society, and the Librarian of the Cornell Library.

Of the remaining fifteen, two are elected annually by the trustees and one by the alumni. The term of every trustee not *ex officio* is five years.

FACULTY.

The Faculty consists of professors, associate professors, and assistant professors, and is aided by non-resident professors and lecturers, and by instructors and examiners. It comprises the following special faculties: Agriculture; Architecture; Chemistry and Physics; Civil Engineering; History and Political Science; Ancient Classical Languages; Germanic Languages; Oriental Languages; Romance Languages; Mathematics; Mechanic Arts; Military Science; Natural History; Philosophy and Letters. The several special faculties constitute standing committees to which are referred questions relating to the departments under their control, but their action is subject to the approval of the general faculty.

STATE STUDENTS.

The ninth paragraph of the original Act of Incorporation provides for the admission of one student annually from each assembly district without payment of tuition. The number thus received, when all the scholarships are filled, is five hundred and twelve. These State Students are to be selected, by yearly competitive examinations, from the various academies and public schools of the State. It is the duty of the school commissioners of counties and of the boards of education of cities to hold and conduct such examinations, and to award the scholarships. As

the law requires the selection of "the best scholar," no distinction on account of sex is recognized in the competition. For further details regarding this subject, see instructions with regard to Scholarships, under the appropriate head below.

OPTIONAL AND SPECIAL STUDENTS.

It was one of the leading objects in founding the University to provide for the wants of those who, though earnest and industrious students, cannot complete a full four-year course. The class distinctions which are in most cases strictly observed elsewhere, are not regarded by the Faculty of the University as any obstacle to recitation and attendance upon lectures with any class which the student is prepared to join.

Special students are admitted for a limited period without examination. They must be twenty-one years old, and of approved character and attainments.

GRADUATE STUDENTS.

For purposes of advanced study the University extends its privileges to its own graduates, and to graduates of like standing from other colleges and universities, and it confers advanced degrees under conditions described elsewhere; but graduate students who are not candidates for a degree are received in any department, and for any length of time.

HIGHER EDUCATION OF WOMEN.

By an act of the trustees, passed in April, 1872, women are admitted to the University on the same terms as men, except that they must be seventeen years old. A separate building, the Sage College, has been erected and furnished for their residence. The entrance examinations and all the studies, except military science, are the same for women as for men.

RELIGIOUS SERVICES.

The University, established by a government which recognizes no distinction of religious belief, seeks neither to promote any creed, nor to exclude any. By the terms of its charter, persons of any religious denomination or of no religious denomination are equally eligible to all offices and appointments, and it is expressly ordered that "at no time shall a majority of the board of trustees be of any one religious sect, or of no religious sect."

In the University Chapel—the gift of the Hon. Henry W.

Sage—religious services are held, and discourses delivered by eminent clergymen selected from the various Christian denominations.

PHYSICAL CULTURE.

For the physical training and development of students there has been provided a Gymnasium, thoroughly equipped with baths and all necessary appliances for bodily culture. This is under the charge of an experienced physician, the Professor of Physical Culture and Director of the Gymnasium, who examines every student at his entrance and at stated intervals thereafter, learns the condition of his health, takes his physical measurements, and prescribes such exercises as may be required for his complete and symmetrical bodily development. The gymnasium is also open to all members of the University for voluntary exercise; but the Professor of Physical Culture is in constant attendance, and no student is suffered to indulge in hazardous or excessive athletic efforts, or to attempt any feat which in his individual case might be attended with risk. A supplementary gymnasium at the Sage College for the lady students, is conducted on the same general plan. In the physical training of the students the practical instruction in military science is found a valuable aid.

OFFICERS OF THE UNIVERSITY.

TRUSTEES.

Hon. ALONZO B CORNELL,	New York City	
The PRESIDENT of the University,	*Ex officio.*	
His Excellency the GOVERNOR of New York,	"	
His Honor the LIEUTENANT-GOVERNOR,	"	
The SPEAKER of the Assembly,	"	
The SUPERINTENDENT of Public Instruction,	"	
The PRESIDENT of the State Agricultural Society,	"	
The LIBRARIAN of the Cornell Library,	"	
Hon. HIRAM SIBLEY,	Rochester.	Term of office expires in 1884.
Hon. STEWART L. WOODFORD,	New York.	
Hon. SAMUEL D. HALLIDAY,	Ithaca.	
Hon. HENRY B. LORD,	Ithaca.	Term of office expires in 1885.
Hon. ERASTUS BROOKS,	New York.	
Hon. DOUGLAS BOARDMAN,	Ithaca.	
Hon. AMASA J. PARKER,	Albany.	Term of office expires in 1886.
Hon. JOSIAH B. WILLIAMS,*	Ithaca.	
MYNDERSE VAN CLEEF, Esq.,	Ithaca.	
Hon. SAMUEL CAMPBELL,	Oneida.	Term of office expires in 1887.
Hon. HENRY W. SAGE,	Ithaca.	
J. DEWITT WARNER, Esq.,	New York.	
Hon. GEORGE W. SCHUYLER,	Ithaca.	Term of office expires in 1888.
ALFRED S. BARNES, Esq.,	New York.	
JAMES F. GLUCK, Esq.,	Buffalo.	

* The Hon. Josiah B. Williams died Wednesday, September 26th, 1883, and George R. Williams, Esq., was elected in his place.

OFFICERS OF THE BOARD.

HENRY W. SAGE, ... Chairman
WILLIAM R. HUMPHREY. . . . . Secretary
EMMONS L. WILLIAMS, ... Acting Treasurer

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ANDREW D. WHITE, WILLIAM R. HUMPHREY,
HENRY W. SAGE, DOUGLAS BOARDMAN,
GEORGE W. SCHUYLER, MYNDERSE VAN CLEEF.
GEORGE R. WILLIAMS.

EMMONS L. WILLIAMS, Secretary.

FACULTY.

ARRANGED, WITH THE EXCEPTION OF THE OFFICERS OF THE FACULTY, IN THE ORDER OF SENIORITY OF APPOINTMENT.

THE HON. ANDREW DICKSON WHITE, LL.D., University Grounds
PRESIDENT, *Professor of History.*

THE REV. WILLIAM DEXTER WILSON, D.D., LL.D., L.H.D., 109 Cascadilla
REGISTRAR, *Professor of Moral and Intellectual Philosophy.*

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SECRETARY OF THE FACULTY, *Professor of Agricultural and Analytical Chemistry.*

BURT GREEN WILDER, B.S., M.D., 148 E. Buffalo St.
Professor of Physiology, Comparative Anatomy, and Zoölogy.

JAMES LAW, F.R.C.V.S., University Grounds
Professor of Veterinary Medicine and Surgery.

ALBERT NELSON PRENTISS, M.S., University Grounds
Professor of Botany, Horticulture, and Arboriculture.

JOHN LEWIS MORRIS, A.M., C.E., University Grounds
Sibley Professor of Practical Mechanics and Machine Construction.

THOMAS FREDERICK CRANE, A.M.. University Grounds
Professor of the Romance Languages and Literatures.

CHARLES ASHMEAD SCHAEFFER, A.M., Ph.D., 103 E. Seneca St.
Professor of General and Analytical Chemistry, and of Mineralogy.

FREDERICK LOUIS OTTO ROEHRIG, Ph.D., M.D., University Grounds
Professor of Sanskrit and Living Asiatic Languages, and Assistant Professor of French.

HIRAM CORSON, A.M., LL.D., Cascadilla Cottage
Professor of Anglo-Saxon and English Literature.

WATERMAN THOMAS HEWETT, A.M., Ph.D., 22 E. Buffalo St.
Professor of the German Language and Literature.

LUCIEN AUGUSTUS WAIT, A.B., University Grounds
Associate Professor of Mathematics.

ISAAC FLAGG, Ph.D., University Grounds
Professor of the Greek Language and Literature.

CHARLES CHAUNCY SHACKFORD, A.M., University Grounds
Professor of Rhetoric and General Literature.

THE REV. CHARLES BABCOCK, A.M., University Grounds
Professor of Architecture.

JAMES EDWARD OLIVER, A.M., 69 Heustis St.
Professor of Mathematics.

WILLIAM ARNOLD ANTHONY, Ph.B., 9 W. Buffalo St.
Professor of Physics and Experimental Mechanics.

ESTEVAN ANTONIO FUERTES, C.E., 170 E. State St.
Professor of Civil Engineering.

EDWIN CHASE CLEAVES, B.S., Cortland
Associate Professor of Freehand Drawing and Mechanical Drawing.

ISAAC PHILLIPS ROBERTS, M.Agr., University Grounds
Professor of Agriculture.

CHARLES LEE CRANDALL, C.E., 100 Hector St.
Assistant Professor of Civil Engineering.

IRVING PORTER CHURCH, C.E., Cor. E. Seneca and Quarry Sts.
Assistant Professor of Civil Engineering.

HORATIO STEVENS WHITE, A.B., 23 Quarry St.
Professor of the German Language and Literature.

JOHN HENRY COMSTOCK, B.S., University Grounds
Professor of Entomology and General Invertebrate Zoölogy.

WILLIAM RUSSELL DUDLEY, M.S., 108 Cascadilla
Assistant Professor of Botany.

GEORGE WILLIAM JONES, A.M., 17 Factory St.
Assistant Professor of Mathematics.

SAMUEL GARDNER WILLIAMS, A.M., Ph.D.,
Corner Green and Albany Sts.
Professor of General and Economic Geology.

HENRY SHALER WILLIAMS, Ph.D., 32 W. Green St.
Assistant Professor of Palæontology.

WILLIAM RUFUS PERKINS, A.B., 23 Quarry St.
Assistant Professor of History.

GEORGE SYLVANUS MOLER, A.B., B.M.E., 156 N. Aurora St.
Assistant Professor of Physics.

WILLIAM GARDNER HALE, A.B., University Grounds
Professor of the Latin Language and Literature.

JOHN BURKITT WEBB, C.E., 130 E. Buffalo St.
Professor of Applied Mathematics and Theoretical Mechanics.

SIMON HENRY GAGE, B.S., 148 Cascadilla
Assistant Professor of Physiology, and Lecturer on Microscopical Technology.

CHARLES FRANCIS OSBORNE, 58 Cascadilla.
Assistant Professor of Architecture.

THE REV. MOSES COIT TYLER, LL.D., L.H.D., 135 E. Seneca St.
Professor of American History.

SPENCER BAIRD NEWBURY, E.M., Ph.D., President White's
Assistant Professor of General Chemistry, Mineralogy, and Assaying.

HERBERT TUTTLE, A.M., University Grounds
Associate Professor of the History and Theory of Politics, and of International Law.

HENRY CARTER ADAMS, Ph. D., —— ——
Associate Professor of Political Economy.

WALTER SCRIBNER SCHUYLER, 1st Lieut. 5th Cav., U.S.A., Clinton House
Professor of Military Science and Tactics.

WALTER MARTIN MCFARLAND, Asst. Engineer, U.S.N., 23 Quarry St.
Assistant Professor of Mechanical Engineering.

EDWARD HITCHCOCK, JR., A.M., M.D., ——————
Acting Professor of Physical Culture and Director of the Gymnasium.

GEORGE WILLIAM HARRIS, Ph.B., 142 E. Seneca St.
Acting Librarian.

LECTURERS AND NON-RESIDENT PROFESSORS.

GOLDWIN SMITH, LL.D., L.H.D., Toronto, Canada
Lecturer on English Constitutional History.

CHARLES KENDALL ADAMS, LL.D., Ann Arbor, Mich.
Non-Resident Professor of English Constitutional History.

THE HON. ELLIS H. ROBERTS, LL.D., Utica
Lecturer on Political Economy.

THE HON. JOHN JAY KNOX, A.M., Washington, D. C.
Lecturer on Finance and Currency.

CHARLES DUDLEY WARNER, A.M., Hartford, Conn
Lecturer on Recent Literature.

INSTRUCTORS.

GEORGE LINCOLN BURR, A.B., 63 Eddy St.
Instructor and Examiner in Modern History.

FRED WILLIAM RICH, B.S., 31 Dryden Road
Instructor in Chemistry.

SAMUEL JACQUES BRUN, B.S., Osmond Place
Instructor in French.

JOHN CAREW ROLFE, A.B., 152 E. Seneca St.
Instructor in Latin.

JULIUS JOHN WILLIAM KRUEGER, 69 Heustis St.
Instructor in German.

HENRY WINCHESTER ROLFE, A.B., 69 Heustis St.
Instructor in Rhetoric and Composition.

FREDERICK ARTHUR HOLTON, B.S., 41 White Hall
Instructor in Chemistry.

FRANCIS ANDREW MARCH, JR., A.B., ——
Instructor in Anglo-Saxon and English Literature.

OTHER OFFICERS.

WESLEY NEWCOMB, M.D., 26 E. Seneca St.
Curator of the Newcomb Collection of Shells, and Medical Examiner.

FRANK EUGENE FURRY, B.S., 97 Cascadilla
Chemist to the Agricultural Experiment Station.

FRED LUCIUS KILBORNE, B.Agr., University Grounds
Anatomical Preparator.

BENJAMIN HERMON SMITH, Cortland
Director of the University Press.

GEORGE W. TAILBY, University Grounds
Foreman of the Farm.

MILES LORING CLINTON, 17 W. Buffalo St.
Foreman of the Machine Shop.

WILLIAM OGDEN KERR, 101 Cascadilla
Meteorological Observer.

GOTTLIEB HUGO HOFFMAN, 26 Morrill Hall
Special Mechanical Assistant

ALBERT FRANKLIN MATTHEWS, A.B., 43 White Hall
Master of the Chimes.

ERNEST EMORY RUSSELL, 26 Morrill Hall
Janitor.

SPECIAL FACULTIES.

The President of the University is *ex officio* Chairman of each of the special faculties. In the absence of the President, the Secretary of the special faculty, whose name is printed first in the list of its members, is the acting Chairman.

AGRICULTURE—Professor ROBERTS, Professors CALDWELL, COMSTOCK, LAW, PRENTISS, and S. G. WILLIAMS.

ARCHITECTURE—Professor BABCOCK, Professors FUERTES, OLIVER, CLEAVES, and OSBORNE.

CHEMISTRY AND PHYSICS—Professor SCHAEFFER, Professors ANTHONY, CALDWELL, MOLER, and NEWBURY.

CIVIL ENGINEERING—Professor FUERTES, Professors ANTHONY, BABCOCK, MORRIS, OLIVER, SCHAEFFER, WEBB, CHURCH, and CRANDALL.

HISTORY AND POLITICAL SCIENCE—Professor A. D. WHITE, Professors TYLER, WILSON, PERKINS, H. C. ADAMS, and TUTTLE.

ANCIENT CLASSICAL LANGUAGES AND LITERATURES—Professors FLAGG and HALE.

GERMANIC LANGUAGES AND LITERATURES—Professors H. S. WHITE and HEWETT.

ROMANCE LANGUAGES AND LITERATURES—Professors CRANE and RŒHRIG.

ORIENTAL LANGUAGES AND LITERATURES—Professors RŒHRIG and WILSON.

MATHEMATICS—Professor OLIVER, Professors ANTHONY, BABCOCK, FUERTES, MORRIS, WEBB, WAIT, and JONES.

THE SIBLEY COLLEGE OF MECHANIC ARTS—Professor MORRIS, Professors ANTHONY, BABCOCK, FUERTES, WEBB, WAIT, CLEAVES, and MCFARLAND.

MILITARY SCIENCE AND TACTICS—Professors SCHUYLER and WILSON.

NATURAL HISTORY—Professor PRENTISS, Professors COMSTOCK, LAW, WILDER, S. G. WILLIAMS, WILSON, DUDLEY, GAGE, and H. S. WILLIAMS.

PHILOSOPHY AND LETTERS—Professor SHACKFORD, Professors CORSON and WILSON.

THE UNIVERSITY LIBRARY.

THE LIBRARY COUNCIL.

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The PRESIDENT of the University and the ACTING LIBRARIAN.

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Professors BABCOCK, CALDWELL, CRANE, and TYLER.

THE LIBRARY SERVICE.

Acting Librarian:

GEORGE WILLIAM HARRIS, Ph.B.

Cataloguers:

HORACE SAUERS KEPHART, A.B., and HARRY LYMAN KOOPMAN, A.B

Assistants:

PHILIP PRICE BARTON and ANDREW CURTIS WHITE, A.B.

THE MUSEUM OF NATURAL HISTORY.

THE MUSEUM COUNCIL.

Ex Officio:

The PRESIDENT of the University.

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WILLIAM R. HUMPHREY, Esq.

Of the Faculty:

Professors COMSTOCK, LAW, PRENTISS, TYLER, WILDER, S. G. WILLIAMS, WILSON, DUDLEY, GAGE, and H. S. WILLIAMS.

THE UNIVERSITY GYMNASIUM.

THE GYMNASIUM COUNCIL.*

* The members of the Gymnasium Council have not yet been selected.

UNIVERSITY PREACHERS, 1883–84.

(*On the Dean-Sage Foundation.*)

Sept. 30—The Rt. Rev. FREDERIC D. HUNTINGTON, D.D., Bishop of Central New York.

Oct. 7—The Rev. HENRY W. FOOTE, of King's Chapel, Boston, Mass.

Oct. 14—President E. G. ROBINSON, D.D., LL.D., of Brown University.

Oct. 21—The Rt. Rev. ROBERT W. B. ELLIOTT, D.D., Bishop of Western Texas.

Oct. 28—The Rev. JESSE B. THOMAS, D.D., of Brooklyn, N. Y.

Nov. 4—President HENRY A. BUTTZ, D.D., of Drew Theological Seminary.

Nov. 11—The Rev. BROOKE HERFORD, of Boston, Mass.

Nov. 18—The Rev. HOWARD CROSBY, D.D., LL.D., of New York City.

Nov. 25—The Rev. CHARLES W. HOMER, of Brooklyn, N. Y.

Dec. 2—The Rev. NEWMAN SMYTH, D.D., of New Haven, Conn.

April 13—The Rev. LYMAN ABBOTT, D.D., of New York City.

April 20—Professor WM. J. TUCKER, D.D., of Andover Theological Seminary.

April 27—The Rev. ROBERT COLLYER, of New York City.

May 4—The Rev. J. M. BUCKLEY, D.D., of New York City.

May 11—The Rev. THEODORE T. MUNGER, D.D., of North Adams, Mass.

May 18—The Rev. C. H. PARKHURST, D.D., of New York City

May 25—President AUGUSTUS H. STRONG, D.D., LL.D., of the Rochester Theological Seminary.

June 1—The Rev. HENRY WARD BEECHER, of Brooklyn, N. Y.

June 8—The Rev. Bishop EDWARD G. ANDREWS, D.D., of Washington, D. C.

June 15 (Baccalaureate Sermon)—The Rev. GEORGE R. VAN DE WATER, of Brooklyn, N. Y.

CATALOGUE OF STUDENTS.

RESIDENT GRADUATES.

Boyer, Lyman Fremont, B.S., History and Political Science
Brun, Hanna Wood (Otis), B.S., Natural History
Fay, Frederick Willis, A.B., Architecture
Ohio State University.
French, Charles Joseph, A.B., Architecture
Yale College.
Hainer, Julius Cæsar, B.S., Physics
Iowa Agricultural College.
Jennis, Allen Chesley, A.B., Electrical Engineering
Iowa State University.
Kephart, Horace Sauers, A.B., History and Political Science
Lebanon Valley College.
Matthews, Albert Franklin, A.B., History and Political Science
Messenger, Hiram John, Lit.B., Mathematics
Ormsby, Frank Worden, B.C.E., Mechanical Engineering
Peck, Ezra Jones, A.B., A.M., Classical Philology
Williams College.
Petit, Amelie Veronica, Ph.B., Ph.M., French and Drawing
Syracuse University.
Pitcher, Mary Merrill, A.B., Ancient Classical Lang. and Lit.
Preswick, Eugene Henry, B.S., Chemistry and Natural History
Prosser, Charles Smith, B.S., Natural History
Satterlee, James, B.S., M.S., Botany and Microscopy
Michigan Agricultural College.
Smith, Hermon Woodworth, B.S., Chemistry and Nat. History
Turner, Ebenezer Tousey, Jr., B.C.E., Electrical Engineering
Weed, Clarence Moores, B.S., Entomology
Michigan Agricultural College.

White, Andrew Curtis, A.B., Classical Philology
Hamilton College.
White, James Gilbert, A.B., Electrical Engineering
Pennsylvania State College.

LICENTIATE.

Chittenden, Frank Hurlbut, Chemistry

UNDERGRADUATES.

SENIORS.

Aikin, George David,	*Tioga, Pa.*,	Science and Letters
Avila, Arao Ferreira de,	*San Paulo, Brazil*,	Elect. Eng.
Ayres, Philip Wheelock,	*Villa Ridge, Ill.*,	Hist. & Pol. Sc.
Bassett, Emma Neal,	*Cooper's Plains*,	Philosophy
Bering, Wilson Morrison,	*Decatur, Ill.*,	Science & Letters
Boshart, Charles Fred,	*Lowville*,	Agriculture
Burrows, James Bering,	*Decatur, Ill.*,	Science & Letters
Carpenter, Fred Wisner,	*Owego*,	Civil Engineering
Cassedy, William Fraser,	*Newburg*,	Science and Letters
Chisholm, Charles Fillmore,	*Chazy*,	Philosophy
Coimbra, Anastacio Rodrigues de Aquino,	*Trez Ilhas, Brazil*,	Mechanic Arts
Coles, Franklin Albert,	*Glen Cove*,	Science and Letters
Collmann, Onnie Janssen,	*Freeport, Ill.*,	Science and Let.
Coman, Charles Walter,	*Kankakee, Ill.*,	Natural History
Cornell, Ida,	*Central Valley*,	Sc. and Letters
Cowles, Lewis Hutchinson,	*Cleveland, O.*,	Sc. and Letters
Curnow, George Trevilyan,	*Brooklyn*,	Mechanic Arts
Davidson, George Bruce,	*Scranton, Pa.*,	Sc. and Letters
Decker, Delbert Harvey,	*Fulton*,	Philosophy
De Forest, Harry Pelouze,	*Fulton*,	Science and Letters
Dietz, John Fanning,	*Schoharie*,	Science and Letters
Ditmars, George Ford,	*Ovid Centre*,	Science and Letters
Fish, Fred Starr,	*Cedarville*,	Science and Letters

Gainbee, Linnie,	*Fayette*,	Science and Letters
Grotecloss, Hattie Elizabeth,	*New York City*,	Natural Hist.
Grotecloss, John Hamilton,	*New York City*,	Sc. and Letters
Hasbrouck, Charles Alfred,	*Ithaca*,	Civil Engineering
Hettinger, Mathias,	*Freeport, Ill.*,	Sc. and Letters
Howard, William Turner,	*New York City*,	Optional
Huffcut, Ernest Wilson,	*Afton*,	Science and Letters
Kerr, Milton Royce,	*Mongaup Valley*,	Science
Krauss, William Christopher,	*Attica*,	Science and Letters
Lapham, Ludlow Eliakim,	*Penn Yan*,	Arts
Larned, William Henry,	*Poland*,	Civil Engineering
Lewis, George Washington,	*Buffalo*,	Arts
Lillis, Thomas Francis,	*Coventryville*,	Civil Engineering
Maguire, Edward,	*Seward*,	Science and Letters
McLoughlin, James,	*New York City*,	Sc. and Letters
Mead, Daniel Webster,	*Rockford, Ill.*,	Civil Eng.
Monroe, Elmon,	*Silver Creek*,	Arts
Morse, Everett Fleet,	*Algona, Iowa*,	Mechanic Arts
Murphy, Edward Charles,	*Phœnix*,	Civil Engineering
Oakes, Helen Mar,	*Steuben*,	Science and Letters
Patten, Henry Jay,	*Chicago, Ill.*,	Hist. and Pol. Sc.
Potter, Charles Anson,	*Ithaca*,	Science and Letters
Randolph, Cyrus,	*Decatur, Ill.*,	Hist. and Pol. Sc.
Robinson, Clarence Isaac,	*Mt. Vision*,	Chem. and Physics
Russell, Ernest Emory,	*Havana*,	Hist. and Pol. Science
Shaler, Ira Alexander,	*New York City*,	Civil Eng.
Shively, Harry Laurence,	*Indianapolis, Ind.*,	Science
Sibley, Herbert Delano,	*Randolph*,	Arts
Spurr, Marcia Edith,	*South Edmeston*,	Science
Stambaugh, John Tod,	*Youngstown, O.*,	Hist. & Pol. Sc.
Story, Elmer Gildersleeve,	*Schultzville*,	Science and Letters
Thorp, Charles Monroe,	*Oil City, Pa.*,	Philosophy
Tsumaki, Yorinaka,	*Tokio, Japan*,	Architecture
Tuthill, Lewis Henry,	*Corning*,	Arts
Van Ostrand, Byron Dean,	*Marion*,	Science and Letters
Walch, Charles John,	*Syracuse*,	Science and Letters
Waring, John,	*Ovid*,	Mechanic Arts
Webb, Walter Loring,	*Cortland*,	Civil Engineering
Weed, Oscar Dillwyn,	*North Rose*,	Arts

Welles, Nelson Ackley,	*Elmira*,	Agriculture
Williams, Timothy Shaler,	*Ithaca*,	Arts
Wilson, Charles Bundy,	*Geddes*,	Arts
Wyckoff, James Newton,	*Perry*,	Optional

JUNIORS.

Baker, Edward Everett,	*Cedar Hill*,	Science and Letters
Beattie, Laura Amanda,	*Wooster, Ohio*,	Optional
Benedict, Frederick Staples,	*Brockport*,	Architecture
Bennett, Burton Ellsworth,	*North Brookfield*,	Sc. and Letters
Bickford, Chauncey Howard,	*Belleville*,	Arts
Bliss, Russell Joseph,	*Peterboro*,	Philosophy
Bostwick, Edward Hermon,	*Ithaca*,	Science and Letters
Brooks, Edgar Gerson,	*Salt Lake City, Utah*,	Sc. and Let.
Bull. John, Jr.,	*Slaterville*,	Science and Letters
Case, Howard Emmet,	*Fulton*,	History and Pol. Sc.
Chappell, Fred Martin,	*Montezuma*,	Natural History
Church, Wilmer,	*High Falls*,	Mechanic Arts
Clock, Cora May.	*Ithaca*,	Science and Letters
Colin, Theodore Frederick,	*St. Petersburg, Russia*,	Elect. Eng.
Comstock, Anna Botsford,	*Ithaca*,	Natural History
Cooke, Russell Pardon,	*Chillicothe, Ohio*,	Architecture
Cooper, Edgar Howland,	*New York City*,	Civil Engin'ing
Corser, Mary Elwood,	*Minneapolis, Minn.*,	Optional
Cummings, Frederick Douglas,	*Tully*,	Science and Letters
Curtis, Charles Elbert,	*Ithaca*,	Civil Engineering
Dearstyne, Florence Evelyn,	*Sandy Hill*,	Science and Letters
Doolittle, Clarence Everett,	*Washington, D. C.*,	Elect. Eng.
Eidlitz, Robert James,	*New York City*,	Architecture
Elliott, Orrin Leslie,	*Centreville*,	Hist. and Polit. Sc.
Falkenau, Harry,	*Chicago, Ill.*,	Literature
Fisher, Bertrand Hand,	*Wellington, O.*,	Civil Engineer'g
French, Eldon Lewis,	*Housatonic, Mass.*,	Elect. Eng.
French, James Benton,	*New Hartford*,	Civil Engineering
Good, Arthur Carroll,	*Buffalo*,	Science and Letters
Halbert, Henry Daniel,	*Vanceburg, Ky.*,	Civil Eng.
Harris, Rollin Arthur,	*Jamestown*,	Civil Engineering

Hartzell, Albert Ankeny,	*Buffalo*,	Science and Letters
Hebersmith, Ernest, Jr.,	*San Francisco, Cal.*,	Nat. Hist.
Holman, Sidney Smith,	*Boston, Mass.*,	Optional
Hough, Elida Crofoot,	*Lowville*,	Arts
Jackman, Harry Morrison,	*Lock Haven, Pa.*,	Optional
Jones, Charles Sumner,	*Middlesex*,	Science and Letters
Kelley, Charles Lester,	*Arcadia*,	Civil Engineering
Kellogg, Harry Whiting,	*Shelburne, Mass.*,	Elect. Eng.
Lain, David Emmet,	*West Town*,	Electrical Eng.
Lima, Casimiro Eugenio Amoroso,	*Rio Janeiro, Brazil*,	Agriculture
McCall, James,	*Bath*,	Arts
Merry, Martha,	*Phœnix*,	Science and Letters
Mosscrop, Alfred Mitton,	*Brooklyn*,	Civil Engineering
Olin, Franklin Walter,	*Buskirk's Bridge*,	Civil Eng.
Olmsted, Henry Collier,	*Binghamton*,	Arts
Park, Charles Caldwell,	*Alleghany City, Pa.*,	Sc. and Let.
Penny, George Barlow,	*Haverstraw*,	Science and Letters
Powell, George Wilson,	*Reed's Corners*,	Civil Eng.
Raht, Carl August,	*Frisco, Utah*,	Optional
Raichle, Frank Godfrey,	*Buffalo*,	Electrical Engineering
Scofield, Frank Graham,	*Fishkill*,	Optional
Smith, Charlotte,	*Snith's Mills*,	Philosophy
Smith, Charles Henry,	*New Haven*,	Mechanic Arts
Smith, Jeannie Azilla,	*Bath*,	Science and Letters
Smith, Wilbur Hazleton,	*Little Valley*,	Arts
Smith, William Charles,	*Bath*,	Civil Engineering
Snow, Benjamin Warner,	*La Salle, Ill.*,	Chem. and Physics
Snyder, Charles Earl,	*Herkimer*,	Science and Letters
Steere, Asel, Jr.,	*South New Berlin*,	Sc. and Let.
Stevens, Stoddard More,	*Rome*,	Hist. and Pol. Science
Stowell, William Mix,	*Brighton*,	Mechanic Arts
Towl, Forrest Milton,	*Elmira*,	Civil Engineering
Van Sickle, John,	*Cayuga*,	Science and Letters
Van Vranken, George Williamson,	*Lisha's Kill*,	Optional
Ware, Richard,	*Washington, D. C.*,	Arts
Welby, Arthur Adlard,	*Rio Janeiro, Brazil*,	Civil Eng.
Weston, William Henry,	*Philadelphia, Pa.*,	Elect. Eng.
Whaley, James Higgins,	*Rome*,	Natural History
Willard, Julia Etta,	*Watertown*,	Literature

SOPHOMORES.

Atkinson, George Francis,	*Monroe, Mich.*,	Optional
Austin, Ennis Raymond,	*Owasco*,	Architecture
Baker, Charles Hinckley,	*Chicago, Ill.*,	Civil Engineering
Baker, Howard Winfield,	*Chicago, Ill.*,	Civil Engineering
Barney, William Grant,	*Elmira*,	Science and Letters
Barton, Philip Price,	*Lock Haven, Pa.*,	Hist. and Pol. Sc.
Beardsley, Harry Merchant,	*Elmira*,	Arts
Breed, Arthur Minier,	*Big Flats.*	Agriculture
Brodie, Hugh,	*Woodville*,	Science and Letters
Brundage, Charles Hubert,	*Penn Yan*,	Optional
Cadwallader, Frank Irish,	*Indianapolis, Ind.*,	Optional
Carolan, Herbert,	*San Francisco, Cal.*,	Sc. and Let.
Cassidy, Jessie Jane,	*Brooklyn*,	Architecture
Chapman, Ernest Albert,	*Groton*,	Science and Letters
Charpiot, Henry Charles,	*Denver, Col.*,	Science and Let.
Cole, George Llewellyn,	*Morrisville*,	Medical Preparatory
Converse, Frank Alvah,	*Woodville*,	Agriculture
Coville, Addison Luzerne,	*Oxford*,	Science and Letters
Curtis, Annie Neale,	*Boston, Mass.*,	Sc. and Letters
Darlington, William,	*West Chester, Pa.*,	Mechanic Arts
Day, William Asher,	*Wilbraham, Mass.*,	Mech. Arts
Devin, Abe,	*Des Moines, Iowa*,	Civil Eng.
Dodd, Eugene Emmett,	*Index, Mo.*,	Optional
Doud, Eli Horace,	*Chicago, Ill.*,	Literature
Dunham, Andrew Ellsworth,	*Sauquoit*,	Science and Letters
Dunham, Fredd Hall,	*Johnsonsburg*,	Sc. and Letters
Durand, Fred Coye,	*Westfield*,	Civil Engineering
Dusinberre, George Brown, Jr.,	*Geneva*,	Mechanic Arts
Ehle, Boyd,	*Fort Plain*,	Civil Engineering
Eilshemius, Louis Michel,	*Brooklyn*,	Agriculture
Eltinge, Maurice Wurts,	*New Paltz*,	Science and Letters
Emory, Arthur Theodore,	*Unadilla*,	Arts
Fitts, Fay Martin,	*Dresserville*,	Science and Letters
Funck, Theodore,	*Warrensburg, Mo.*,	Civil Eng.
Gadsby, Herbert Hume,	*Gilbertsville*,	Arts
Genung, Albert Smith.	*Ithaca*,	Optional
Gillette, Henry Taft,	*Villanova*,	Philosophy
Grant, Arthur Hastings,	*New York City*,	Civil Eng.

Gray, Macomb Byron,	*Cape Vincent*,	Sc. and Letters
Gray, William Emory,	*Williamsport, Pa.*,	Mech. Arts
Hagadorn, Charles Baldwin,	*Elmira*,	Civil Engineering
Hall, Charles Lee,	*Canisteo*,	Optional
Harrison, Joseph La Roy,	*North Adams, Mass.*,	Sc. and Let.
Hawley, Abraham Lincoln,	*Taylor*,	Civil Engineering
Hill, Robert Thomas,	*Comanche, Texas*,	Nat. History
Hinman, Delon Marcus,	*Denver, Col.*,	Civil Engineering
Hofield, Henry Rudolph,	*Lancaster*,	Civil Engineering
Howard, Frank Thurber,	*Ithaca*,	Arts
Howell, Jenny Kirk,	*Painted Post*,	Science and Let.
Howland, Harry Cole,	*Poughkeepsie*,	Arts
Howland, Herbert Slocum,	*Sherwood*,	Optional
Hubbard, Walter Stacy,	*Portville*,	Optional
Hull, Charles Henry,	*Ithaca*,	Hist. and Pol. Science
Hyatt, Louis Eugene,	*Lansingburg*,	Hist. and Pol. Sc.
Illston, Henry Benjamin,	*Ithaca*,	Optional
Ingalls, Owen Lovejoy,	*Peterboro*,	Civil Engineering
Kittredge, Helen,	*New York City*,	Sc. and Letters
Law, John Edwin,	*Ithaca*,	Medical Preparatory
Lima, Elias David Abinun de,	*New York City*,	Sc. and Letters
Loeser, Abraham,	*Buffalo*,	Agriculture
Lorber, Lewis James Edward Joseph,	*Ithaca*,	Arts
McCann, George,	*Elmira*,	Science and Letters
Merritt, Ernest George,	*Indianapolis, Ind.*,	Science
Mooney, Margaret Elizabeth,	*Ithaca*,	Science and Letters
Nef, John Jacob,	*Housatonic, Mass.*,	Mech. Arts
Newton, Frank Merrick,	*Homer*,	Science
Norton, Algernon Sidney,	*Cortland*,	Arts
Nourse, Sarah Cornelia,	*Ithaca*,	Science and Letters
Packard, Allyn Augustus,	*St. Louis, Mo.*,	Architecture
Paddock, Anna Maria,	*Auburn*,	Philosophy
Patterson, Webster,	*Wilmington, Del.*,	Mech. Arts
Pearce, Otis Ezra,	*North Hannibal*,	Architecture
Percival, Francis Rollin,	*Somers, Conn.*,	Medical Prep.
Perkins, Albertus Delos,	*Little York*,	Arts
Perkins, Elma,	*Addison Hill*,	Optional
Pierce, Charles Hopkins,	*Forestville*,	Optional
Pierce, George Henry,	*Branchport*,	Architecture

Ransom, Charles Wellington,	*Ellenburg*, Science and Letters
Rider, Ora Putnam,	*Parish*, Optional
Ridge, Daniel Wamsley,	*Bustleton, Pa.*, Optional
Riley, William Hermon,	*Wilmington, Del.*, Mech. Arts
Romney, Joseph Mac Auslin,	*Salt Lake City, Utah*, Sc. & Let.
Russell, Isaac Howard,	*Castile*, Optional
Rutledge, Arthur,	*Rockford, Ill.*, Civil Engineering
Ryder, Stephen,	*Carmel*, Science and Letters
Sackett, John Thomas,	*Brooklyn*, Science and Letters
Schlesinger, Mark Mayer,	*New York City*, Sc. and Letters
Seeley, Florence Corinne,	*Rochester*, Literature
Seymour, John Pliny,	*Ogdensburg*, Mechanic Arts
Shepard, Frank William,	*Medina, O.*, Civil Engineering
Sloan, Fred,	*Worcester*, Science and Letters
Smith, Eva Anna,	*West Winfield*, Sc. and Letters
Smith, Sidney Alvord,	*Herkimer*, Science and Letters
Sprague, Daniel Darius, Jr.,	*Holley*, Civil Engineering
Stanbrough, Lyman Truman,	*Owego*, Science and Letters
Stoner, Stanley,	*Griggsville, Ill.*, Sc. and Letters
Story, Charles Butts,	*Schultzville*, Science and Letters
Summers, Henry Elijah,	*Rochester*, Science and Letters
Sweet, Joseph Ferris.	*Throop*, Optional
Taylor, Hobart Chatfield,	*Chicago, Ill.*, Sc. and Letters
Thurber, Charles Herbert,	*Deckertown, N. J.*, Philosophy
Tyler, Edward,	*Ithaca*, Science and Letters
Upton, Wallace Lincoln,	*Clymer*, Electrical Engineering
Veiga, Saturnino Ferreira da, Jr.,	*Rio Janeiro, Brazil*, Civil Eng
Vischer, William Bentley,	*Wellington, O.*, Natural History
Weil, Alphonse David,	*San Francisco, Cal.*, Sc. and Let.
Wheeler, Amos,	*Ithaca*, Optional
Wheeler, Fred Russell,	*Buffalo*, Science and Letters
White, Charles David,	*Marion*, Natural History
Wightman, Edward Daniel,	*Eden*, Mathematics
Wing, Charles Benjamin,	*Willow Brook*, Civil Eng.
Wood, Phœbe Jane,	*Portville*, Science and Letters
Yawger, John Francis,	*Union Springs*, Science and Let.

FRESHMEN.

Allendorf, Elbert,	*Poughkeepsie*,	Sc. and Letters
Alexander, Charles Doster,	*Prattville, Ala.*,	Optional
Alvord, Lucy,	*Johnstown*,	Arts
Aspinwall, John Judson,	*Troy, Pa.*,	Civil Engineering
Barrows, Kate Magee,	*Watkins*,	Optional
Barton, Lyman Guy,	*Willsborough*,	Mechanic Arts
Bellinger, Lyle Fred,	*Ilion*,	Civil Engineering
Benham, Anna Louise,	*Cortland*,	Optional
Bennett, De Villo Levi,	*Wellington, Ohio*,	Elect. Eng.
Bishop, Robert Hallam,	*Trumbull's Corners*,	Philosophy
Bodine, Donaldson,	*Lodi*,	Science and Letters
Boynton, Edward Carlisle, Jr.,	*Newburg*,	Mechanic Arts
Briesen, Julius von, Jr.,	*New York City*,	Civil Eng.
Brill, Gerow Dodge,	*Poquog*,	Agriculture
Browning, Charles, Jr.,	*Chatham*,	Mechanic Arts
Burr, Lucius Franklin,	*St. Johnsville*,	Sc. and Letters
Carr, Henry Low,	*Paterson, N. J.*,	Med. Prep.
Casey, George Whitman,	*Auburn*,	Architecture
Champion, Edward Willet,	*Goshen*,	Science and Letters
Chrisman, Francis Leon,	*Harrisburg, Pa.*,	Hist. & Pol. Sc.
Clark, Harry Willard,	*N. Andover, Mass.*,	Elect. Eng.
Coar, Thomas Edward,	*New York City*,	Civil Eng.
Cogswell, Arthur Clark,	*Cleveland, Ohio*,	Civil Eng.
Cohn, Morris, Jr.,	*Cobleskill*,	Science and Letters
Coles, Howard Lawrence,	*New Rochelle*,	Science and Let.
Coley, Harrison,	*New Woodstock*,	Sc. and Letters
Colnon, Redmond,	*Potsdam*,	Civil Engineering
Cooper, William,	*Evans' Mills*,	Mechanic Arts
Coray, George Quincy,	*Provo City, Utah*,	Optional
Cornell, Arthur Leland,	*Albany*,	Civil Engineering
Cornell, Ezra,	*Ithaca*,	Optional
Corser, Helen Henrietta,	*Minneapolis, Minn.*,	Optional
Covell, Grant,	*Springfield, Pa.*,	Mechanic Arts
Coville, Frederic Vernon,	*Oxford*,	Arts
Cox, James Lincoln,	*Norwich*,	Mechanic Arts
Curtis, Charles William,	*Washington, D. C.*,	Civil Eng.
Cutter, William Parker,	*Washington, D. C.*,	Anal. Chem.

Day, James Hallack, Jr.,	*Saybrook, Ct.*, Civil Engineering
Deamer, John Ellsworth,	*Union City, Pa.*, Mech. Arts
Dennis, John Bartlett,	*Gardiner, Me.*, Science and Let.
Dibble, Arthur Jackson,	*Franklin*, Optional
Dimon, Henry Goldsmith.	*Riverhead*, Civil Engineering
Elliott, Elias Leavenworth,	*Glenora*, Chemistry and Physics
Everitt, John Elmer,	*Burlington, Pa.*, Medical Prep.
Flint, Buena Ventura Rufus,	*Rivas, Nicaragua*, Mech. Arts
Franklin, Frank George,	*Plover, Wis.*, Optional
Gifford, Arthur Warner,	*Little Utica*, Civil Engineering
Gillis, William Davis,	*Kinsman, Ohio*, Mechanic Arts
Gilmore, Victor Lee,	*New Iberia, La.*, Agriculture
Godard, Harlow, 2d,	*Richville*, Optional
Goodkind, Martin Henry,	*New York City*, Sc. and Letters
Greenawalt, William Eckert,	*Silver Spring, Pa.*, Civil Eng.
Gregory, Julia,	*Washington, D. C.*, Sc. and Let.
Haley, William Daniel,	*Mongaup Valley*, Optional
Hall, William Russell,	*Oates' Island, Tenn.*, Sc. & Let.
Harris, Gilbert Dennison,	*Jamestown*, Optional
Harris, William Mason,	*Owego*, Civil Engineering
Hart, Emmet Ellsworth,	*Little Valley*, Civil Engineering
Hays, Harry Thomas,	*Decatur, Ill.*, Sc. and Letters
Hebard, Fred Whitmore,	*Woodville*, Philosophy
Hebbard, William Sterling,	*Rochester*, Architecture
Hedden, Edward,	*Ithaca*, Civil Engineering
Hegewald, Arthur Frederick,	*New Albany, Ind.*, Mech. Arts
Hess, Frank Judson,	*Rochester*, Optional
Himes, Albert James,	*Oswego*, Civil Engineering
Horr, Charles William,	*Wellington, Ohio*, Sc. and Let.
Horrmann, Charles,	*Stapleton*, Agriculture
Hungerford, Mary Gavina,	*Ithaca*, Optional
Jenkins, Ralph,	*Newburg*, Medical Preparatory
Jones, Clinton Irving,	*Groton*, Optional
Keating, Langford Spencer,	*Buffalo*, Science and Letters
Kelsey, Sidney Eugene,	*Stockholm Depot*, Civil Eng.
Kingsley, George Pomroy,	*Freeport, Ill.*, Optional
Kuykendall, Benjamin, Jr.,	*Towanda, Pa.*, Sc. and Letters
Lawrence, Theodore Finch,	*Chester*, Civil Engineering
Lee, Charles Kleber,	*Galveston, Texas*, Optional

Lemcke, John Frederick,	*Cedar Grove, N. J.*,	Med. Prep.
Lent, Albert Swift,	*Wellsboro, Pa.*,	Optional
Lockwood, William Augustus,	*Fairport*,	Agriculture
Lynde, Arthur Lincoln,	*Antwerp*,	Civil Engineering
Maguire, Patrick James,	*Chateaugay*,	Optional
Marshall, George Montanye,	*Towanda, Pa.*,	Philosophy
Mathews, Edward William,	*Maynard*,	Civil Engineering
Mattison, John Albert,	*Sand Bank*,	Science and Letters
Maxon, Frank Ernest,	*Watertown*,	Civil Engineering
McAllister, Charles Albert,	*City Island*,	Mechanic Arts
McCall, Frank Ellas,	*Bath*,	Arts
McCargo, Grant,	*Hulton, Pa.*,	Civil Engineering
McConnell, Edgar Bozde,	*Logansport, Ind.*,	Optional
McCulloch, Robert Lawton,	*Stevens' Point, Wis.*,	Sc. & Let.
Mead, Georgie Everett,	*Brewster*,	Optional
Meehan, John William,	*Fairport*,	Civil Engineering
Meloy, Fredrika Williams,	*Portville*,	Optional
Mercereau, Edward Keeler,	*Union*,	Civil Engineering
Merwin, Milton Knapp,	*Utica*,	Mechanic Arts
Miller, George Congdon,	*Elmira*,	Science and Letters
Moon, Jessie Hawkins,	*Newport*,	Optional
Moore, Frank Meredith,	*Syracuse*,	Philosophy
Moore, Veranus Alva,	*Parish*,	Science and Letters
Neale, Charles Thompson, Jr.,	*Pittsburg, Pa.*,	Mechanic Arts
Nettleton, James Burritt,	*Medina, Ohio*,	Architecture
Norton, Albert Julius,	*Utica*,	Architecture
Norton, George Harvey	*East Pembroke*,	Civil Eng.
O'Toole, James,	*Waterville*,	Science and Letters
Olmstead, Edward,	*Waverly*,	Medical Preparatory
Otis, Lois Macy,	*Sherwood*,	Science and Letters
Oviatt, Bordman Lambert,	*Shushan*,	Medical Preparatory
Oviatt, David Brainerd,	*Shushan*,	Mechanic Arts
Pelton, Gilbert Brace,	*Ilion*,	Civil Engineering
Perkins, Ella Gertrude,	*Addison Hill*,	Optional
Phillips, Albert,	*Newark, N. J.*,	Architecture
Pitcher, John Beardsley,	*Little Meadows, Pa.*,	Civil Eng.
Potter, Grant,	*Ithaca*,	Mechanic Arts
Pound, Cuthbert Winfred,	*Lockport*,	Optional

Pratt, George Lincoln,	*Fulton*,	Optional
Proctor, Alfred Stainbank,	*Denver, Col.*,	Civil Engineering
Race, Lewis Leyman,	*Decatur, Ill.*,	Science and Letters
Randall, Norman Benjamin,	*Stockport*,	Mechanic Arts
Richards, George Blackwell,	*Leavenworth, Kansas*,	Sc. & Let.
Roberts, Perry Buchanan,	*Ithaca*,	Optional
Romer, William Johnstone,	*Ithaca*,	Optional
Runner, Emma Avaline,	*Ithaca*,	Science and Letters
Russell, James Earl,	*Hamden*,	Optional
Rutherford, Robert Elmer,	*Binghamton*,	Optional
Ryan, Harris Joseph,	*Halifax, Pa.*,	Electrical Eng.
Ryther, George De Groot,	*Carthage*,	Mechanic Arts
Saal, George Frederick,	*Cleveland, Ohio*,	Sc. and Letters
St. John, Richard Collier,	*St. Catharine's, Canada*,	Civil Eng.
Sands, Herbert,	*Clyde*,	Civil Engineering
Sanford, Charles Van Wyck,	*Warwick*,	Science and Letters
Sanford, Ezra Terry,	*Warwick*,	Agriculture
Sargent, Erle Hoxsie,	*Medina, Ohio*,	Optional
Schaaf, Rudolph George,	*Newark, N. J.*,	Civil Eng.
Schreiner, John Charles, Jr.,	*Allegheny City, Pa.*,	Civil Eng.
Scribner, Erwin Earnest Eliphalet,	*Scriba*,	Science and Letters
Selmser, Kate Eveline,	*Waterloo*,	Optional
Sheldon, Morris Woodworth,	*Hornellsville*,	Optional
Smith, Edward Leroy,	*Binghamton*,	Science and Let.
Smith, Fred Bigelow,	*Tioga, Pa.*,	Optional
Smith, Harry Ezra,	*Pike*,	Mechanic Arts
Smith, Milton,	*Ellenville*,	Science and Letters
Smith, Wayland Hyatt,	*Philadelphia, Pa.*,	Optional
Stanbrough, Frank Truman,	*Owego*,	Civil Engineering
Stedman, John Moore,	*Brockport*,	Natural History
Sterling, Guy,	*Gambier, O.*,	Civil Engineering
Sternberger, Edwin,	*New York City*,	Sc. and Letters
Stewart, Neil, Jr.,	*York*,	Civil Engineering
Stone, Frank Elmer,	*Livonia*,	Civil Engineering
Stone, Walter Hitchcock,	*Sandusky, O.*,	Mechanic Arts
Sweet, Robert Vaughn,	*Throop*,	Medical Preparatory
Tarbell, Ed,	*North Lansing*,	Agriculture
Taylor, John Rodgers Meigs,	*Omaha, Neb.*,	Architecture

Taylor, John Waring,	*Corinth, Miss.*,	Sc. and Letters
Thomson, Fred William,	*Alexandria Bay*,	Optional
Thomson, John Fuller,	*Alexandria Bay*,	Sc. and Let.
Tomlinson, Thomas Wilbur,	*Logansport, Ind.*,	Optional
Turnbull, Thomas, Jr.,	*Syracuse*,	Optional
Van Meter, Charles Farragut,	*Rochester*,	Optional
Vedder, Herman Klock,	*St. Johnsville*,	Civil Engineering
Vega, Eugene Arsenio,	*Santander, Spain*,	Chem. & Phy.
Walton, William Heckman,	*Buffalo*,	Optional
Warner, Albert Rollin,	*Wellington, Ohio*,	Sc. and Let.
Warner, Monroe,	*Pulaski*,	Civil Engineering
Warner, Ralph Cossitt,	*Portville*,	Optional
Warner, Wilbert Charles,	*Sandy Creek*,	Natural History
Webb, Wirt Dickson,	*Syracuse*,	Civil Engineering
Weber, George Frederick,	*Lysander*,	Science and Letters
Wheeler, Metellus Clinton Woodbury,	*Peoria, Ill.*,	Mechanic Arts
White, Horace,	*Syracuse*,	Science and Letters
Wilbur, Royal Edwards,	*Carthage*,	Science and Letters
Wilkinson, Theodore Kirkland,	*Syracuse*,	Literature
Willard, Frederick Bush,	*Geneseo*,	Optional
Williams, Chauncey Grant,	*Ithaca*,	Electrical Engineering
Williams, Otis Lincoln,	*Ithaca*,	Electrical Engineering
Wilson, James Fountain,	*Menomonee, Wis.*,	Philosophy
Wright, Ellsworth David,	*Ithaca*,	Arts

SPECIAL STUDENTS.*

Byrne, Sarah,	*Englewood, Ill.*,	History & Lit.
Cameron, Edward Arthur,	*St. Louis, Mo.*,	Architecture
Copeland, Cecil Arthur,	*Monroe, Wis.*,	Veterinary Sc.
Galbraith, Lois Carrie,	*White House, Pa.*,	Literature
Green, William Clinton,	*Rochester*,	Architecture
Hand, Mary Jane,	*Addison*,	Natural History
Iles, Emma Elizabeth,	*Rochester*,	Chem. & Nat. History
Jermyn, John Samuel,	*Penshurst, Australia*,	Med. Prep.

* See page 37.

Nettleton, George William,	*Medina, Ohio.*	Architecture
Peck, Eugenia Caldwell,	*Homer,*	History and Literature
Ramsden, Ella Elizabeth,	*Dansville,*	History and Pol. Sc.
Simpson, Harold Granger,	*Columbus, O.,*	Hist. and Pol. Sc.
Tenney, Henry Allen,	*Worcester, Mass.,*	Mechanic Arts
Ward, George Henry,	*San Francisco, Cal.,*	Mech. Arts

SUMMARY.

Resident Graduates,		21
Licentiate,		1
Undergraduates,		
Seniors,	66	
Juniors,	70	
Sophomores,	113	
Freshmen,	176	
Special,	14	
	439	
Total,		461

ADMISSION AND CLASSIFICATION.

ENTRANCE EXAMINATIONS.

Examinations in all the subjects required for admission to the University are held *three* times in the year, as follows: 1. In June, at the end of the Spring term, Monday, Tuesday, and Wednesday preceding Commencement Day. 2. In September, at the beginning of the Fall term. 3. In January, at the beginning of the Winter term. The days will be found indicated in the Calendar. Special examinations of candidates for admission can be held at other times only by permission of the Faculty.

Candidates must be of good moral character and at least *sixteen* years of age, or, if women, *seventeen.*

Candidates for admission will obtain permits for examination at the Registrar's office, and the results of examinations may be ascertained from the Registrar.

I. The Primary or English Entrance Examinations.

All candidates for admission, except those provided with certificates or diplomas as specified below, are examined as follows:

1. In *English Grammar;* Whitney's Essentials of English Grammar is the standard. A short composition is required as a test of the candidate's knowledge of spelling, punctuation, the use of capitals, and elementary English construction.

If the candidate prefers, the subject for this composition will be assigned by the examiner from one of the books named below, and the knowledge of the subject matter shown will be duly regarded.

In 1883: Shakespeare's Julius Caesar, Bunyan's Pilgrim's Progress, Scott's Ivanhoe, Gray's Elegy.

In 1884: Shakespeare's Coriolanus, Thackeray's Henry Esmond, Irving's Sketch-Book, Longfellow's Evangeline.

In 1885: Shakespeare's Merchant of Venice, Scott's Lady of the Lake, Hawthorne's Twice-Told Tales, Lowell's Vision of Sir Launfal.

2. In *Geography*, political and physical; as much as is contained in Harper's School Geography, or in Warren's Common School Geography.

3. In *Physiology;* as presented in the smaller text-books upon the subject, exclusive of the nervous system and the names of bones and muscles.

4. In *Arithmetic*, including the metric system of weights and measures; as much as is contained in the larger text-books.

5. In *Plane Geometry;* as much as is contained in the first five books of Chauvenet's Treatise on Elementary Geometry, or in the first five books of Wentworth's Elements of Plane and Solid Geometry, or in the first six books of Newcomb's Elements of Geometry, or in the first six books of Hamblin Smith's Elements of Geometry.

6. In *Algebra*, through quadratic equations, and including radicals and the theory of exponents; as much as is contained in the first fourteen chapters of Loomis's Treatise on Algebra, or in Olney's Elementary Course in Algebra, or in the first five sections of Robinson's University Algebra, or in the first twenty-six chapters of Hamblin Smith's Elementary Algebra.

In Arithmetic, and in the fundamental operations of Algebra, such as multiplication and division, the management of brackets, the solving of numerical and literal equations of the first and second degree, the combining and simplifying of fractions and radicals, the interpretation and use of negative quantities and of 0 and ∞, the putting of problems into equation—the student should have distinct notions of the meaning and the reason of all that he does, and be able to state them clearly in his own language; he should also be able to perform all these operations, even when somewhat complex, with rapidity, accuracy, and neatness; and to solve practical problems readily and completely. In his preparatory study he is advised to solve a great many problems, and to state and explain the reasons for the steps taken. In Geometry he should learn the definitions accurately, whether in the language of the text-book or not, and in proving a theorem or solving a problem he should be able to prove every statement made, and to go back step by step till he rests upon the primary definitions and axioms. He should be able to apply the princi-

ples of geometry to practical and numerical examples, to construct his diagrams readily with rule and compass, and to find for himself the solutions of simple problems and the demonstrations of simple theorems. Besides oral recitation, he is advised to write out his demonstrations, having equal regard to the matter and to the form of his statements; and when written he may carefully study them to make sure, first, that he has a complete chain of argument, and, secondly, that it is so arranged that without defect or redundance one step follows as a logical consequence of another.

These examinations are held in the following order:

First Day.—9 A. M., Arithmetic; 11 A. M., Geography; 3 P. M., English Grammar.

Second Day.—9 A. M., Plane Geometry; 11.30 A. M., Physiology; 2.30 P. M., Algebra through Quadratics.

In place of these examinations certain certificates or diplomas are received as follows:

1. *Certificates* issued by the *Regents of the University* of the State of New York are accepted in place of the examinations in English Grammar, Geography, and Arithmetic.

2. *Certificates* issued by the *Superintendent of Public Instruction* of the State of New York, and *Diplomas* issued by the State normal schools, and by those academies and high schools of the State of New York whose requirements for graduation have been approved by the Faculty, and whose course of study requires Physiology and Plane Geometry, are accepted in place of the examinations in all the subjects named above *except Algebra*.

3. *Diplomas* issued by the *Regents* to graduates from the high schools and academies of the State of New York are accepted in place of the examinations in all the subjects named above.

Optional students are admitted to the University upon passage of the English Entrance or Primary Examinations; and for admission to the courses in *Agriculture*, *Architecture*, *Civil Engineering*, *Electrical Engineering*, and *Mechanic Arts*, only the Primary Examination is required.

II. Examinations for Admission to the Other Courses.

For admission to any other of the regular courses of study examinations *in addition to the Primary Examination* are required, as follows:

To the Courses in Science, Science and Letters, Mathematics, Chemistry and Physics, and Analytical Chemistry.

In addition to the English Entrance, an examination in *any one* of the following subjects:

1. In *French*, the principles of French Grammar, the translation of French at sight, the translation of English into French, and the equivalent of two of Bôcher's modern French plays and Lacombe's Petite Histoire du Peuple Français;

2. In *German*, the whole of Whitney's German Grammar, the translation of German at sight, the translation of English into German, and one hundred pages of Whitney's Reader, including two of the longer prose extracts or an equivalent;

Any deficiency in the preparatory French or German may be made up, as extra work, by reciting with the regular classes in the University.

Or the student may offer in *Mathematics*, Solid Geometry and Conic Sections, as much as is contained in Newcomb's Elements of Geometry; Advanced Algebra, as much as is contained in Olney's University Algebra, or in Newcomb's Algebra; and Trigonometry, Plane and Spherical, as much as is contained in Wheeler's Elements of Trigonometry, or in the unstarred portions of Oliver, Wait, and Jones's Treatise on Trigonometry.

To the Course in Natural History:

In addition to the Primary Examinations, as follows: 1. In *French* or *German*, as above. 2. In *Plane Trigonometry*, as above. 3. In *Latin*, four books of Cæsar's Commentaries or an equivalent, with a good knowledge of the grammar. 4. In *Greek*, the alphabet and enough of the language to enable the student to recognize, analyze, and form scientific technical terms.

To the Two-Year Course Preparatory to the Study of Medicine:

In addition to the Primary Examinations, as follows: 1. In *Plane Trigonometry*, as above. 2. In *Latin*, as above. 3. In *Greek*, as above.

To the Courses in Literature, Philosophy, and History and Political Science:

In addition to the Primary Examinations, as follows: 1. In *French* or *German*, or *Mathematics*, as above. 2. In *Latin*, as below. 3. In *Grecian* and *Roman History*, as below.

To the Course in Arts:

In addition to the Primary Examinations, as follows:

1. In *Greek*, candidates are expected to have read at least one hundred pages of Attic prose, and three books of Homer: they are examined (1) critically on what they have read; (2) in translating easy Greek at sight; and (3) in translating English into Greek.

2. In *Latin*, candidates are examined (1) in the following authors, with questions on subject-matter, constructions, and the formation and inflection of words: Cæsar, four books of the Gallic war, Virgil, the Eclogues and six books of the Æneid, with the prosody, Cicero, six Orations, including the four against Catiline; (2) in the translation at sight of passages of average difficulty from Cæsar and Cicero; and (3) in the translation into Latin of a piece of connected English based upon the principles and vocabulary contained in the first forty lessons of Allen's Introduction to Latin Composition.

3. In *Grecian* and *Roman History*, and the outlines of ancient geography; Fyffe's Primer of Greece, Creighton's Primer of Rome, and Tozer's Primer of Classical Geography will indicate the amount and method of study desired.

These additional examinations are held on the *third day*, as follows:

Third Day—8 A. M., Solid Geometry; 8 A. M., French; 9 A. M., Greek; 10.30 A. M., German; 10.30 A. M., Advanced Algebra; 2.30 P. M., Latin; 2.30 P. M., Trigonometry.

The examination in Grecian and Roman History is held at 8 A. M. on the *second day* of the examinations.

ADMISSION WITHOUT EXAMINATION.

Any person at least twenty-one years of age, and having satisfactory attainments, may be admitted by vote of the Faculty, without examination, *as a Special Student*, on the recommendation of the professor in charge of any department in which he is to take a large part of his work. Such students cannot be candidates for a degree or licentiate certificate; and their admission must be renewed every year.

CANDIDATES FROM OTHER COLLEGES.

Certificates of honorable dismissal from other colleges are re-

ceived in place of the *Primary Examinations* only, and when offered by candidates who *have passed at least one term's examinations* at the institution granting such dismissal. No person, whether from another college or not, is admitted to *advanced* studies except after examination as above stated.

ASSIGNMENT TO CLASSES.

Every student who intends to complete any one of the four year courses and graduate is assigned, on his admission to the University, to some one of the four annual classes; and no student will be allowed to pass from one to another of these classes until the work of the preceding year has been satisfactorily done.

Students who do not intend to complete any one of the four-year courses and graduate, are registered as "optional" in one of the four annual classes; but any student who has been registered as optional will be permitted to register in any one of the regular courses, on his completion of the work required for the standing which he proposes to take in that course.

ADMISSION TO ADVANCED STANDING.

Any student who has had in another college, or elsewhere, an equivalent to one or more of the years of any of the regular courses may, on presenting evidence satisfactory to the Faculty of his ability to go on with the class he proposes to enter, be admitted to an advanced standing in that course, at his admission to the University.

ADMISSION TO GRADUATE STUDY.

Students are admitted to graduate study after having taken a baccalaureate degree in the University, or on presenting the diploma of an equivalent degree conferred elsewhere; they are at liberty to attend lectures, recitations, or other exercises of undergraduates, and to use the library, museums, etc. They are expected to pursue some study of advanced character under the direction of a professor or of a special faculty.

RESIDENCE AND GRADUATION.

TERMS AND VACATIONS.

The Academic year is divided into three terms, and there are three vacations.

Commencement comes on the third Thursday in June.

The Fall Term begins on the Tuesday following the thirteenth day of September, and ends on the Friday after the sixteenth day of December, making a term of thirteen weeks and four days.

The Winter Term begins on the Tuesday next after the second day of January; except when, in leap year, that Tuesday would be the third day of January, in which case it will begin on the Tuesday after the third.

The Spring vacation extends from the noon of the Friday next after the twenty-third of March until the second Saturday following.

The Spring Term begins on the second Saturday after the close of the Winter Term; the instruction begins on the Monday following, and continues until Commencement; making in all thirty-six weeks of term-time in the academic year.

The beginning and ending of terms and vacations of each year, and other matters of detail relating to them, may be found in the Calendar.

REGISTRATION EACH TERM.

At the beginning of every term each student must obtain a Certificate of Registration before joining any class or attending any lecture; and no student, after having once been admitted to the University, will be allowed to register after the close of Registration Day, except on recommendation of the Committee on Absences, or by special permission of the Faculty.

EXERCISES OF THE TERM.

A printed schedule of the University exercises is issued each term. Every student must take the equivalent of at least fifteen hours of recitations a week, exclusive of military drill. Two and a half hours of laboratory work, or three hours of drafting or shop-work, are regarded as the equivalent of one recitation.

The regular examinations in all studies are held at the end of each term. Failure at examination entails forfeiture of position in the class, or exclusion from the course, or, in some cases, from the University. The *Course Book* affords the student an opportunity of preserving a record of his examinations.

PAYMENTS TO THE UNIVERSITY.

The fee for tuition is $25 a term, payable within ten days after registration.

Tuition is free to *State students*, to *resident graduates*, and to students pursuing the prescribed course in *Agriculture*, and *intending to complete* that course.

Every person taking laboratory work in chemistry, physics, zoölogy, or entomology must deposit with the Treasurer security for the materials to be used in the laboratory. Students residing in the University buildings must pay their room-bills one term in advance. All the members of the University are held responsible for any injury done by them to its property.

EXPENSES OF RESIDENCE.

The following is a fair estimate of the yearly expenses:

Tuition, $25 a term, - - - - -	$ 75.00
Room, board, lights, fuel, and laundry, about - -	200.00
Text-books, etc., about - - - - -	25.00
Total, - - - - -	$300.00

The cost for board, rent of furnished room, fuel, and lights at the Sage College varies from $5 to $6.50 a week. A student occupying alone one of the best rooms pays $6.50 a week. If two occupy such a room together, the price is $5.75. Those occupying less desirable rooms, with two in a room, pay $5 a week each. The entire building is warmed by steam, and, in most cases, the sleeping apartment is separate from the study.

The expense of living in Ithaca varies, for board, room, fuel, and lights, from $4 to $7 a week. By the formation of clubs, students may reduce their expenses to $2.50 or $3.50 a week for board.

GRADUATION.

All the courses leading to a degree require four years for their completion.

Any student who has been admitted to an advanced standing on his admission to the University, must pass the examinations required for that standing at the first opportunity after his admission. Or, after having been in the University for a year or more, and having sustained a good character, maintained a high standing in his classes, and approved himself for scholarship, such student may, by a vote of the Faculty, be admitted to some definite standing, such as his scholarship will entitle him to—the Faculty by this act accepting his studies elsewhere as equivalent to what he would have done here, if he had entered the University at the beginning of his collegiate course.

I. THE DEGREE OF BACHELOR.

The degrees of Bachelor of Arts, of Literature, of Philosophy, of Agriculture, of Architecture, of Civil Engineering, and of Mechanical Engineering are conferred after the satisfactory completion of the corresponding courses. The degree of Bachelor of Philosophy is also conferred after the satisfactory completion of the course in History and Political Science.

The degree of Bachelor of Science is conferred after the satisfactory completion of any one of the following courses: Science, Science and Letters, Chemistry and Physics, Analytical Chemistry, Electrical Engineering, Mathematics, and Natural History. The particular course is specified in the diploma.

The degree of Bachelor of Veterinary Science is conferred only after the completion of a full course of four years in that department.

No person may take more than one degree the same year.

Graduation Thesis.

Each student, before taking a degree, must submit to the Faculty a satisfactory oration, poem, or essay on some subject in

science, literature, or art, and deposit a copy in the Library. A successful thesis written for final honors may, at the student's option, be presented as his thesis for graduation.

A fee of $5, to cover expenses of graduation, degrees, etc., is charged to each person taking the baccalaureate degree. This fee must be paid before the degree is conferred.

Certificate of Licentiate.

Licentiate certificates and certificates of proficiency are conferred upon students who have pursued a special branch of knowledge and made distinguished proficiency therein. They are given upon the recommendation of the respective Faculties.

II. ADVANCED DEGREES.

Courses of study for graduates leading to advanced degrees are provided for in the following departments: Chemistry and Physics, Mathematics, Natural History; History and Political Science; Comparative Philology, Ancient Classical Languages and Literatures, Modern European Languages and Literatures, Oriental Languages and Literatures; Philosophy and Letters. Persons wishing to take an advanced degree in any of the above departments must apply to the Faculty to be admitted as candidates.

1. The Degree of Master.

The degree of Master of Arts or Master of Science is conferred on those who have taken the corresponding baccalaureate degree here, or wherever the requirements for that degree are equal to those of this University, on the following conditions:

1. The candidate must spend at least one year at the University in a course of study marked out for him by the Faculty, must present a satisfactory thesis, and pass an examination.

2. The same degrees are conferred without residence on graduates of this University only, on conditions the same as above except that the degree is not given until three years after the baccalaureate degree has been conferred.

3. Graduates of this University may become candidates for either of the above second degrees by passing such additional examinations as are required for the corresponding first degree.

The degree of Master of Science is conferred on graduates in Philosophy on the same conditions as on graduates in Science.

2. The Degree of Civil Engineer.

The degree of Civil Engineer is conferred (1) on bachelors of Civil Engineering, after two years of study and practice, on passing the requisite examination and presenting a satisfactory thesis; (2) on those who have completed the five-year course.

3. The Degree of Doctor.

The degree of Doctor of Veterinary Medicine is conferred on bachelors of Veterinary Science, after two years of additional study, on passing the requisite examination.

The degree of Doctor of Philosophy is conferred on graduates of this University, and of other universities and colleges whose requirements for the baccalaureate degree are equal to those of this University, on the following conditions:

1. In order to become a candidate the applicant must have, over and above what is required for graduation in the course in Philosophy, a knowledge of Greek equal to that required for admission to the course in Arts.

2. The candidate must spend at least two years at the University pursuing a course of study marked out by the Faculty.

3. He must, at least six weeks before commencement, present a meritorious thesis upon some subject included in the course, and pass the requisite examination.

The degree of Doctor of Science is conferred on graduates of this University, and of other universities and colleges whose requirements for the baccalaureate degree are equal to those of this University, on the following conditions:

1. In order to become a candidate the applicant must have: a knowledge of Latin and Greek at least equal to that required for admission to the course in Natural History; a knowledge of French and German equal to that required for graduation in Science; a knowledge of mathematics, of science, of literature, and of philosophy equal to that required for graduation in Philosophy.

2. The candidate must spend at least three years, two of them at this University, in the study of not less than two scientific subjects approved by the Faculty, in one or more of the departments of Chemistry and Physics, Mathematics, and Natural History.

3. He must pass an examination upon these subjects, showing in one of them special attainments, and must present a meritorious

thesis based on special investigations, or make some other contribution to science.

Candidates for the degree of Doctor must print their theses and deposit ten copies in the Library. Candidates for other advanced degrees must deposit one copy.

No student in a graduate course is allowed to take two degrees for the same course, to take any inferior degree for any part of the study that leads to a higher one, or to be a candidate for more than one degree at the same time.

Candidates for a second degree must make application to the Registrar and present their theses at least twenty days before Commencement. The examinations for advanced degrees are held the second week before Commencement.

The fee charged for a second degree is $10, and must in all cases be paid to the Treasurer before the degree is granted.

COURSES OF STUDY.

GENERAL COURSES.

THE COURSE IN ARTS.

Leading to the Degree of Bachelor of Arts.

FRESHMAN YEAR.

FALL TERM.—Grecian history, 2; Greek, 3; Latin, 4; rhetoric, 2; geometry and conic sections, 5; military drill, 2; hygiene, six lectures.

WINTER TERM.—Roman history, 2; Greek, 3; Latin, 4; rhetoric, 2; algebra, 5.

SPRING TERM.—Roman history, 2; Greek, 3; Latin, 4; rhetoric, 2; trigonometry, 5; military drill, 2.

SOPHOMORE YEAR.

FALL TERM.—Greek, 3; Latin, 4; essays and declamations, 1; military drill, 2; *optional*, 7.

WINTER TERM.—Greek, 3; Latin, 4; essays and declamations, 1; *optional*, 7.

SPRING TERM.—Greek, 3; Latin, 4; military drill, 2; essays and declamations, 1; *optional*, 7.

JUNIOR YEAR.

FALL TERM.—Essays, 1; psychology, 2; *optional*, 12.

WINTER TERM.—Essays and orations, 2; moral philosophy, 2; *optional*, 11.

SPRING TERM.—Essays and orations, 2; logic, 3; *optional*, 10.

SENIOR YEAR.

FALL TERM.—Literature and oratory, 3; history of philosophy, 3; *optional*, 9.

WINTER TERM.—Literature and oratory, 3; military science, 2; *optional*, 12.

SPRING TERM.—Literature and oratory, 1; *optional*, 11; thesis.

Students electing *chemistry* must continue the study through the two terms.

THE COURSE IN LITERATURE.

Leading to the Degree of Bachelor of Literature.

FRESHMAN YEAR.

FALL TERM.—Grecian history, 2; French *or* German, 3; Latin, 4; rhetoric, 2; geometry and conic sections, 5; military drill, 2; hygiene, six lectures.

WINTER TERM.—Roman history, 2; French *or* German, 3; Latin, 4; rhetoric, 2; algebra, 5.

SPRING TERM.—Roman history, 2; French *or* German, 3; Latin, 4; rhetoric, 2; trigonometry, 5; military drill, 2.

SOPHOMORE YEAR.

FALL TERM.—Anglo-Saxon, 3; French *or* German, 5; Latin, 4; essays and declamations, 1; physiology, 3; military drill, 2.

WINTER TERM.—Anglo-Saxon, 3; French *or* German, 5; Latin, 4; essays and declamations, 1; *optional*, 3.

SPRING TERM.—Anglo-Saxon, 3; French *or* German, 5; Latin, 4; essays and declamations, 1; botany, 3; military drill, 2.

JUNIOR YEAR.

FALL TERM.—Early English, 3; English literature, general course, 3; Italian *or* Spanish, 2; essays, 1; psychology, 2; Latin, modern languages, *or* science, 4.

WINTER TERM.—Early English, 3; English literature, general course, 3; Italian *or* Spanish, 2; essays and orations, 2; moral philosophy, 2; Latin, modern languages, *or* science, 4.

SPRING TERM.—Early English, 3; English literature, general course, 3; Italian *or* Spanish, 2; essays and orations, 2; logic, 3; Latin, modern languages, *or* science, 4.

SENIOR YEAR.

FALL TERM.—English literature, special course, 2; literature and oratory, 3; history of philosophy, 3; Latin, modern languages, *or* science, 7.

WINTER TERM.—English literature, special course 2; literature and oratory, 3; philosophy of history, 3; military science, 2; Latin, modern languages, *or* science, 7.

SPRING TERM.—English literature, special course, 2; literature and oratory, 1; American law, 5; Latin, modern languages, *or* science, 4; preparation of thesis.

THE COURSE IN PHILOSOPHY.

Leading to the Degree of Bachelor of Philosophy.

FRESHMAN YEAR.

FALL TERM.—French *or* German, 5; Latin, 4; rhetoric, 2; geometry and conic sections, 5; military drill, 2; hygiene, six lectures.

WINTER TERM.—French *or* German, 5; Latin, 4; rhetoric, 2; algebra, 5.

SPRING TERM.—French *or* German, 5; Latin, 4; rhetoric, 2; trigonometry, 5; military drill, 2.

SOPHOMORE YEAR.

FALL TERM.—French *or* German, 3; essays and declamations, 1; analytical geometry, 5; experimental mechanics and heat, 3; zoölogy, lectures and laboratory work (vertebrates), 3; military drill, 2.

WINTER TERM.—French *or* German, 3; essays and declamations, 1; electricity and magnetism, 3; chemistry, lectures, 3; zoölogy, lectures and laboratory work (invertebrates), 3; Latin, modern languages, mathematics, *or* science, 3.

SPRING TERM.—French *or* German, 3; essays and declamations, 1; acoustics and optics, 3; chemistry, lectures, 3; botany, 3; military drill, 2; Latin, modern languages, mathematics, *or* science, 3.

JUNIOR YEAR.

FALL TERM.—English literature, 3; essays, 1; physics *or* chemistry, laboratory work, 3; geology, 3; psychology, 2; languages, mathematics, *or* science, 4.

WINTER TERM.—English literature, 3; essays and orations, 2; descriptive astronomy, 3; physics *or* chemistry, laboratory work, 3; moral philosophy, 2; mathematics, languages *or* science, 3.

SPRING TERM.—English literature, 3; essays and orations, 2; physical astronomy, 3; physics *or* chemistry, laboratory work, 3; logic, 3; languages, mathematics, *or* science, 2.

SENIOR YEAR.

FALL TERM.—Literature and oratory, 3; history of philosophy. 3; *optional*, 9.

WINTER TERM.—Literature and oratory, 3; philosophy of history, 3; military science, 2; *optional*, 9.

SPRING TERM.—Literature and oratory, 1; American law, 5; *optional*, 6; preparation of thesis.

Students in Philosophy may take the Grecian and Roman history of the first year as an extra study and receive credit therefor towards graduation.

THE COURSE IN SCIENCE.

Leading to the Degree of Bachelor of Science.

FRESHMAN YEAR.

FALL TERM.—French, 5, and German, 3, *or* German, 5, and French, 3; rhetoric, 2; geometry and conic sections, 5; military drill, 2; hygiene, six lectures.

WINTER TERM.—French, 5, and German, 3, *or* German, 5, and French, 3; rhetoric, 2; algebra, 5; linear drawing, 2.

SPRING TERM.—French, 5, and German, 3, *or* German, 5, and French, 3; trigonometry, 5; descriptive geometry, text and drawing, 4; military drill, 2.

SOPHOMORE YEAR.

FALL TERM.—French *or* German, 3; essays and declamations, 1; analytical geometry, 5; experimental mechanics and heat, 3; zoölogy, lectures and laboratory work (vertebrates), 3; military drill, 2.

WINTER TERM.—French *or* German, 3; essays and declamations, 1; electricity and magnetism, 3; chemistry, lectures, 3; zoölogy, lectures and laboratory work (invertebrates), 3; chemistry *or* zoölogy (invertebrates), laboratory work, 3.

SPRING TERM.—French *or* German, 3; essays and declamations, 1; acoustics and optics, 3; chemistry, lectures, 3; blowpipe analysis, 2; botany, 3; military drill, 2.

JUNIOR YEAR.

FALL TERM.—English literature, 3; essays, 1; physics, laboratory work, 3; organic chemistry, 2; geology, 3; *optional* five

hours, of which at least three must be given to one of the following sciences: *botany*, *chemistry* (including *mineralogy*), *zoölogy*.

WINTER TERM.—English literature, 3; essays and orations, 2; descriptive astronomy, 3; physics, laboratory work, 3; economic geology, 3; *optional*, three hours, which must be given to one of the following sciences: *botany*, *chemistry*, *zoölogy*.

SPRING TERM.—English literature, 3; essays and orations, 2; physical astronomy, 3; physics, laboratory work, 3; *optional*, five hours, of which at least three must be given to one of the following sciences: *botany*, *chemistry*, *geology*, *zoölogy*.

SENIOR YEAR.

FALL TERM.—*Optional*, fifteen hours, of which at least eight must be given to two of the following sciences (three or five hours to each): *botany*, *chemistry*, *geology*, *zoölogy*.

WINTER TERM.—Political economy, 2; military science, 2; *optional*, thirteen hours, subject to the same conditions as in the fall term.

SPRING TERM.—Constitution of the United States, twelve lectures; *optional*, eleven hours, subject to the same conditions as in the fall term; preparation of thesis.

The optional hours not required for science in the junior and senior years may be devoted to either scientific, literary, historical, or philosophical subjects. In electing their studies in science for the junior and senior years, students must take at least the minimum given throughout the year of each science chosen.

Students taking the physics of the senior year must have had the calculus of the sophomore year; those taking the geology of the senior year must have had the blowpipe determination of minerals of the sophomore year.

THE COURSE IN SCIENCE AND LETTERS.

Leading to the Degree of Bachelor of Science.

FRESHMAN YEAR.

FALL TERM.—French, 5, and German, 3, *or* German, 5, and French, 3; rhetoric, 2; geometry and conic sections, 5; military drill, 2; hygiene, six lectures.

WINTER TERM.—French, 5, and German, 3, *or* German, 5, and French, 3; rhetoric, 2; algebra, 5.

SPRING TERM.—French, 5, and German, 3, *or* German, 5, and French, 3; rhetoric, 3; trigonometry, 5; military drill, 2.

SOPHOMORE YEAR.

FALL TERM.—French *or* German, 3; essays and declamations, 1; physiology, 3; experimental mechanics and heat, 3; zoölogy, lectures and laboratory work (vertebrates), 3; modern languages, mathematics *or* science, 2; military drill, 2.

WINTER TERM.—French *or* German, 3; essays and declamations, 1; electricity and magnetism, 3; chemistry, lectures, 3; zoölogy, lectures and laboratory work (invertebrates), 3; modern languages, mathematics, *or* science, 2.

SPRING TERM.—French *or* German, 3; essays and declamations, 1; acoustics and optics, 3; chemistry, lectures, 3; botany, 3; modern languages, mathematics, *or* science, 2; military drill, 2.

JUNIOR YEAR.

FALL TERM.—English literature, 3; essays, 1; psychology, 2, geology, 3; *optional*, 7.

WINTER TERM.—English literature, 3; essays and orations, 2; descriptive astronomy, 3; moral philosophy, 2; *optional*, 6.

SPRING TERM.—English literature, 3; essays and orations, 2; physical astronomy, 3; logic, 3; *optional*, 5.

SENIOR YEAR.

FALL TERM.—Literature and oratory, 3; history of philosophy, 3; *optional*, 9.

WINTER TERM.—Literature and oratory, 3; philosophy of history, 3; military science, 2; *optional*, 9.

SPRING TERM.—Literature and oratory, 1; American law, 5; *optional*, 6; preparation of thesis.

SPECIAL AND TECHNICAL COURSES.

THE COURSE IN AGRICULTURE.

Leading to the Degree of Bachelor of Agriculture.

FRESHMAN YEAR.

FALL TERM.—French *or* German, 5; rhetoric, 2; geometry and conic sections, 5; freehand drawing, 3; military drill, 2; hygiene, six lectures.

WINTER TERM.—French or German, 5; rhetoric, 2; algebra, 5 freehand drawing, 3.

SPRING TERM.—French *or* German, 5; rhetoric, 2; trigonometry, 5; agricultural chemistry, lectures and laboratory work, 3; military drill, 2.

SOPHOMORE YEAR.

FALL TERM.—French *or* German, 3; experimental mechanics and heat, 3; agricultural chemistry, 5; zoölogy, lectures and laboratory work (vertebrates), 3; anatomy, laboratory work, 2; military drill, 2.

WINTER TERM.—French *or* German, 3; electricity and magnetism, 3; agricultural chemistry, lectures, 4; chemistry, qualitative analysis, 5; anatomy, laboratory work, 2.

SPRING TERM.—French *or* German, 3; acoustics and optics, 3; land surveying, 4; botany, lectures, 3, field-work, 2; blowpipe analysis and determinative mineralogy, 2; military drill, 2.

JUNIOR YEAR.

FALL TERM.—Botany, compositæ and gramineæ, 3; arboriculture and landscape gardening, 2; geology 3; veterinary anatomy and physiology, 5; botany *or* chemistry, laboratory work, 3.

WINTER TERM.—Chemistry, quantitative analysis, 6; vegetable physiology, 3; vegetable histology, 2; veterinary pathology, sanitary science and parasites, 5.

SPRING TERM.—Chemistry, quantitative analysis, 7; entomology, lectures, 2, laboratory work, 2; veterinary medicine and surgery, 5.

SENIOR YEAR.

FALL TERM.—Agriculture, lectures, 5, field-work, 3; fungi and algæ, 4; principles of horticulture, 2; entomology, laboratory work, 3.

WINTER TERM.—Agriculture, lectures, 5, field-work, 2; systematic and applied botany, 3; botany *or* chemistry, laboratory work, 5; military science, 2.

SPRING TERM.—Agriculture, lectures, 3, field-work, 3; building materials and construction, 2; American law, 5.

THE COURSE IN ARCHITECTURE.

Leading to the Degree of Bachelor of Architecture.

FRESHMAN YEAR.

FALL TERM.—French *or* German, 5; rhetoric, 2; geometry and conic sections, 5; freehand drawing, 3; linear drawing, 1; military drill, 2; hygiene, six lectures.

WINTER TERM.—French *or* German, 5; rhetoric, 2; algebra, 5; freehand drawing, 3; projection and tinting, 1.

SPRING TERM.—French *or* German, 5; trigonometry, 5; descriptive geometry, text and drawing, 4; botany, 3; military drill, 2.

SOPHOMORE YEAR.

FALL TERM.—French *or* German, 3; composition and elocution, 1; analytical geometry, 5; descriptive geometry, text and drawing, 6; experimental mechanics and heat, 3; military drill, 2.

WINTER TERM.—French *or* German 3; composition and elocution, 1; calculus, 5; drawing, 3; electricity and magnetism, 3; chemistry, lectures, 3.

SPRING TERM.—French *or* German, 3; composition and elocution, 1; drawing, 1; acoustics and optics, 3; chemistry, lectures, 3; blowpipe analysis and determinative mineralogy, 2; building materials and construction, 3; military drill, 2.

JUNIOR YEAR.

FALL TERM.—Mechanics, strength of materials, 3; shades, shadows, and perspective, 3; drawing, 3; Egyptian, Greek, and Roman architecture, 3; designing, 4.

WINTER TERM.—Mechanics, trusses, 3; Byzantine and Romanesque architecture, 5; designing, 3; construction, 2; economic geology, 3.

SPRING TERM.—Mechanics, arches, 3; freehand drawing, 3; Gothic architecture, 5; designing, 3; construction, 2.

SENIOR YEAR.

FALL TERM.—Renaissance architecture, 3; decoration, 3; designing, 6; stereotomy, 3.

WINTER TERM.—Modern architecture, 3; designing, 7; stereotomy applied to stone-cutting, 5; military science, 2.

SPRING TERM.—Acoustics, ventilation, warming, professional practice, measuring, contracts, specifications, etc., 5; designing, 7.

THE COURSE IN ANALYTICAL CHEMISTRY.

Leading to the Degree of Bachelor of Science.

FRESHMAN YEAR.

FALL TERM.—French, 5, and German, 3, *or* German, 5, and French, 3; rhetoric, 2; geometry and conic sections, 5; military drill, 2; hygiene, six lectures.

WINTER TERM.—French *or* German, 5; rhetoric, 2; algebra, 5; chemistry, lectures, 3, laboratory work, 3.

SPRING TERM.—French *or* German, 5; rhetoric, 2; trigonometry, 5; chemistry, lectures, 3, laboratory work, 3; military drill, 2.

SOPHOMORE YEAR.

FALL TERM.—Analytical geometry, 5; experimental mechanics and heat, 3; organic chemistry, 2; chemistry, laboratory work, 8; military drill, 2.

WINTER TERM.—Electricity and magnetism, 3; chemistry, laboratory work, 15.

SPRING TERM.—Acoustics and optics, 3; physics, laboratory work, 3; chemistry, laboratory work, 9, blowpipe analysis, 3; military drill, 2.

JUNIOR YEAR.

FALL TERM.—Chemical philosophy, 3; chemistry, laboratory work, 9; mineralogy, 3; geology, 3.

WINTER TERM.—Chemical philosophy, 3; chemistry, laboratory work, 9; assaying, 3; economic geology, 3.

SPRING TERM.—Chemical philosophy, 3; chemistry, laboratory work, 15.

SENIOR YEAR.

FALL TERM.—Chemistry, laboratory work, 18.

WINTER TERM.—Chemistry, laboratory work, 15; military science, 2.

SPRING TERM.—Chemistry, laboratory work, 15; preparation of thesis.

THE COURSE IN CHEMISTRY AND PHYSICS.

Leading to the Degree of Bachelor of Science.

FRESHMAN YEAR.

FALL TERM.—French, 5, and German, 3, *or* German, 5, and French, 3; rhetoric, 2; geometry and conic sections, 5; military drill, 2; hygiene, six lectures.

WINTER TERM.—French, 5, and German, 3, *or* German, 5, and French, 3; rhetoric, 2; algebra, 5.

SPRING TERM.—French, 5, and German, 3, *or* German, 5, and French, 3; rhetoric, 2; trigonometry, 5; military drill, 2.

SOPHOMORE YEAR.

FALL TERM.—French *or* German, 3; essays and declamations, 1; analytical geometry, 5; experimental mechanics and heat, 5; chemistry, laboratory work, 3; military drill, 2.

WINTER TERM.—French *or* German, 3; electricity and magnetism, 3; chemistry, lectures, 3; laboratory work, 8.

SPRING TERM.—French *or* German, 3; acoustics and optics, 3, chemistry, lectures, 3, blowpipe analysis, 3; botany, 3; military drill, 2.

JUNIOR YEAR.

FALL TERM.—Organic chemistry, 2; mineralogy, 3; chemistry and physics, laboratory work, 9; *optional, science*, 3.

WINTER TERM.—Chemical philosophy, 3; metallurgy, 2; chemistry and physics, laboratory work, 9; *optional, science*, 3.

SPRING TERM.—Chemical philosophy, 3; chemistry and physics, laboratory work, 11; *optional, science*, 3.

SENIOR YEAR.

FALL TERM.—Chemical journals, 1; history of philosophy, 3; chemistry and physics, laboratory work, 10; *optional, science*, 3.

WINTER TERM.—Chemical journals, 1; metallurgy, 2; chemistry and physics, laboratory work, 9; military science, 2; *optional, science*, 3.

SPRING TERM.—Chemical journals, 1; chemistry and physics, laboratory work, 12; preparation of thesis.

Of the laboratory work of the junior and senior years not less than four hours must be given to chemistry each term, and not less than four hours to physics.

THE COURSES IN CIVIL ENGINEERING.

I. A FOUR-YEAR COURSE.

Leading to the Degree of Bachelor of Civil Engineering.

FRESHMAN YEAR.

FALL TERM.—French *or* German, 5; rhetoric, 2; geometry and conic sections, 5; freehand drawing, 3; military drill, 2; hygiene, six lectures.

WINTER TERM.—French *or* German, 5; rhetoric, 2; algebra, 5; freehand drawing, 3; linear drawing, 2.

SPRING TERM.—French *or* German, 5; trigonometry, 5; descriptive geometry, text and drawing, 4; botany, 3; military drill, 2.

SOPHOMORE YEAR.

FALL TERM.—French *or* German, 3; analytical geometry, 5; descriptive geometry, text and drawing, 6; experimental mechanics and heat, 3; military drill, 2.

WINTER TERM.—French *or* German, 3; calculus, 5; pen topography, 2; tinting and shading, 2; electricity and magnetism, 3; chemistry, lectures, 3.

SPRING TERM.—Calculus, 5; land surveying, 4; acoustics and optics, 3; chemistry, lectures, 3; blowpipe analysis, 1; technical essays, 1; military drill, 2.

JUNIOR YEAR.

FALL TERM.—Calculus, 5; mineralogy, 2; shades, shadows, and perspective, 3; topographical mapping and sketching, 2; lettering, 1; kinematics, *or* physics, laboratory work, 3; technical essays, 1.

WINTER TERM.—Mechanics of engineering, 5; detail drawing and graining, 2; physics, laboratory work, 3; metallurgy, 2; economic geology, 3; technical essays, 1.

SPRING TERM.—Mechanics of engineering, 5; railroad surveying, 5; colored topography, 3; lettering, 2; technical essays, 1.

SENIOR YEAR.

FALL TERM.—Mechanics of engineering, 5; spherical astronomy, 5; practical astronomy, night observations, 2; Egyptian, Greek, and Roman architecture, *or* physics, laboratory work, 3; stereotomy and original problems, 3; civil engineering, 2; technical essays, 1.

WINTER TERM.—Hydraulics, 5; higher geodesy, 5; bridge stresses, 2; stone-cutting and original problems and practice, 5; technical essays, 1; military science, 2.

SPRING TERM.—Hydraulic motors, 2; civil engineering, 3; engineering economy, 2; bridge stresses, 5; hydrographic surveying, chart-making, and geodesy, field-work, 3; technical essays, 1; preparation of thesis.

Students in the courses in civil engineering are required to write essays upon professional subjects; and these essays are

read and discussed at the weekly meetings of the Civil Engineering Association.

II. A FIVE-YEAR COURSE.

Leading to the Degree of Civil Engineer.

The first four years are the same as in the four-year course. The choice of *optionals* in the fifth year is subject to the approval of the head of the department.

Students in the fifth year pay no tuition fees and have all the privileges of resident graduates.

FIFTH YEAR.

FALL TERM.—Riparian rights and law of contracts, 3; bridge construction and details, 3; projects, designs, and specifications, 3.

Optional, 9: Grecian history, 2; modern history, 3; psychology, 2; American history, 3; physiology and zoölogy, 6; languages, 2; technical reading, 2; renaissance architecture, 3; chemistry, laboratory work, 3; engineering, laboratory work, 3; physics, laboratory work, 3; rock drills and air compressors, 3; the steam-engine, 3; mining projects, 3; geology, 3; mineralogy, 3; mathematics, 3.

WINTER TERM.—River and harbor improvements, 3; advanced astronomy and geodesy, 3; technical reading, 2; projects, designs, and specifications, 2.

Optional, 8: Roman history, 2; American history, 3; political economy, 2; languages, 2; pure or applied mathematics, 5; zoölogy, 3; metallurgy, 3; chemistry, laboratory work, 3; engineering, laboratory work, 3; physics, laboratory work, 3; Romanesque architecture, 3; the steam-engine, 3; mining projects, 2; geology, 3.

SPRING TERM.—Sanitary engineering, 3; locomotive machines, etc., 3; projects, designs, and specifications, 2.

Optional, 6: Roman history, 2; modern history, 2; American history, 3; languages, 3; pure or applied mathematics, 4; historical or technical reading, 3; geology, 3; chemistry, laboratory work, 3; engineering, laboratory work, 3; physics, laboratory work, 3; Gothic architecture, 3; pumps and small machinery 2: mining projects, 4; arch ribs, 3; geodesy, field-work.

THE COURSE IN ELECTRICAL ENGINEERING.

Leading to the Degree of Bachelor of Science.

FRESHMAN YEAR.

FALL TERM.—French *or* German, 5; rhetoric, 2; geometry and conic sections, 5; freehand drawing, 3; military drill, 2; hygiene, six lectures.

WINTER TERM.—French *or* German, 5; rhetoric, 2; algebra, 5; freehand drawing, 3; instrumental drawing, 2.

SPRING TERM.—French *or* German, 5; trigonometry, 5; descriptive geometry, text and drawing, 4; rhetoric, 2; military drill, 2.

SOPHOMORE YEAR.

FALL TERM.—French *or* German, 3; analytical geometry, 5; experimental mechanics and heat, 3; descriptive geometry, text and drawing, 6; military drill, 2.

WINTER TERM.—French *or* German, 3; calculus, 5; electricity and magnetism. 3; chemistry, lectures, 3; shop-work, 3.

SPRING TERM.—Calculus, 5; acoustics and optics, 3; chemistry, lectures, 3; mechanical drawing, 3; shop-work, 3; military drill, 2.

JUNIOR YEAR.

FALL TERM.—Calculus, 5; physics, laboratory work (mechanics, measurements), 3; chemistry, laboratory work, 3; mechanism, 3; shop-work, 3.

WINTER TERM.—Mechanics of engineering, 5; physics, laboratory work (electricity, general experiments), 3; chemistry, laboratory work, 3; mechanism, 3; shop-work, 3.

SPRING TERM.—Mechanics of engineering, 5; physics, laboratory work (acoustics and optics), 5; chemistry, laboratory work, 3; mechanical drawing, 3.

SENIOR YEAR.

FALL TERM.—Mechanics of engineering, 5; physics, lectures and laboratory work (testing of instruments and determinations of constants), 6; steam-engine, 3; mechanical drawing, 3.

WINTER TERM.—Physics, lectures and laboratory work (dynamo machines and electrical motors, tests of efficiency), 5; steam-engine, 3; hydraulics, 5; mechanical drawing, 4; military science, 2.

SPRING TERM.—Physics, lectures and laboratory work, (photometry, tests of electric lamps, telegraph instruments, telegraph lines, and cables), 9; mechanical drawing, 3; preparation of thesis.

THE COURSE IN MATHEMATICS.

Leading to the Degree of Bachelor of Science.

FRESHMAN YEAR.

FALL TERM.—French *or* German, 5; rhetoric, 2; geometry and conic sections, 5; freehand drawing, 3; military drill, 2; hygiene, six lectures.

WINTER TERM.—French *or* German, 5; rhetoric, 2; algebra, 5; freehand drawing, 3; linear drawing, 2.

SPRING TERM.—French *or* German, 5; rhetoric, 2; trigonometry, 5; descriptive geometry, text and drawing, 4; military drill, 2.

SOPHOMORE YEAR.

FALL TERM.—Analytical geometry, 5; mathematical essays, 1; experimental mechanics and heat, 3; descriptive geometry, text and drawing, 6; essays and declamations, 1; military drill, 2.

WINTER TERM.—Calculus, 5; projective geometry, French textbook, 4; mathematical essays, 1; electricity and magnetism, 3; chemistry, 3; essays and declamations, 1.

SPRING TERM.—Calculus, 5; mathematical essays, 1; acoustics and optics, 3; chemistry, 3; botany, 3; essays and declamations, 1; military drill, 2.

JUNIOR YEAR.

FALL TERM.—Calculus and analytical geometry, 5; mathematical essays, 1; physics, laboratory work, 3; shades, shadows, and perspective, 3; essays, 1; *optional, not mathematics*, 3.

WINTER TERM.—Differential equations, 5; descriptive astronomy, 3; mathematical essays, 1; physics, laboratory work, 3; essays and orations, 2; *optional, not mathematics*, 3.

SPRING TERM.—Differential equations and finite differences, 5; physical astronomy, 3; mathematical essays, 1; physics, laboratory work, 3; essays and orations. 2: *optional, not mathematics*, 3.

SENIOR YEAR.

FALL TERM.—Imaginaries and elliptic functions, 3; mécanique analytique, 2; quaternions, *or* modern methods in analytical ge-

ometry, *or* applied mathematics, 4; mathematical essays, 1; English literature, 3; *optional, not mathematics*, 3.

WINTER TERM.—Imaginaries and elliptic functions, 3; mécanique analytique, 2; quaternions, *or* modern methods in analytical geometry, *or* applied mathematics, 4; mathematical essays, 1; English literature, 3; military science, 2; *optional, not mathematics*, 3.

SPRING TERM.—Imaginaries and elliptic functions, 3; mécanique analytique, 2; mathematical essays, 1; English literature, 3; Constitution of the United States, twelve lectures; *optional, not mathematics*, 3; preparation of thesis.

THE COURSE IN NATURAL HISTORY.

Leading to the Degree of Bachelor of Science.

FRESHMAN YEAR.

FALL TERM.—French, 5, and German, 3, *or* German, 5, and French, 3; rhetoric, 2; chemistry, laboratory work, 3; freehand drawing, 3; military drill, 2; hygiene, six lectures.

WINTER TERM.—French, 5, and German, 3, *or* German, 5, and French, 3; rhetoric, 2; chemistry, lectures, 3; freehand drawing, 3.

SPRING TERM.—French, 5, and German, 3, *or* German, 5, and French, 3; chemistry, lectures, 3, laboratory work, 3; freehand drawing, 2; military drill, 2.

SOPHOMORE YEAR.

FALL TERM.—French *or* German, 3; essays and declamations, 1; experimental mechanics and heat, 3; physiology, 3; zoölogy, lectures and laboratory work (vertebrates), 3; anatomy, laboratory work, 2; anatomical technology, 1; military drill, 2.

WINTER TERM.—French *or* German, 3; essays and declamations, 1; electricity and magnetism, 3; zoölogy, lectures and laboratory work (invertebrates), 3; laboratory work in physiological anatomy and histology, 5; microscopical technology, 1.

SPRING TERM.—French *or* German, 3; essays and declamations, 1; acoustics and optics, 3; blowpipe analysis, 1; botany, lectures, 3, field-work, 2; anatomy, laboratory work, 2; museum methods and experimental technology, 1; military drill, 2.

JUNIOR YEAR.

FALL TERM.—Essays, 1; psychology, 2; physics, laboratory

work, 2; chemistry, organic, *or* laboratory work, 2; mineralogy, 2; botany, 2; compositæ and gramineæ, lectures and laboratory work, 3; geology, 3.

WINTER TERM.—Essays and orations, 1; descriptive astronomy, 3; physics, laboratory work, 2; systematic and applied botany, *or* vegetable physiology, 3; vegetable histology, 2; economic geology, 3; laboratory work, 2.

SPRING TERM.—Essays and orations, 1; logic, 3; physical astronomy, 3; entomology, lectures, 2; geology, laboratory or field work, 3; *optional*, 4, in any two of the following subjects: physics, laboratory work, 2; botany, higher cryptogams, 2; comparative anatomy of the brain, 2; entomology, laboratory or field work, 2.

SENIOR YEAR.

FALL TERM.—History of philosophy *or* modern history, 3; botany, fungi, 4; palæontology *or* geology, laboratory and field work, 3; *optional*, 6, which may be devoted to any branch of natural history, including veterinary science.

WINTER TERM.—Modern history, 3; systematic and applied botany *or* vegetable physiology, 3; palæontology, lectures, 2, laboratory work, 3; military science, 2; *optional*, 5, which may be devoted to any branch of natural history, including veterinary science.

SPRING TERM.—Modern history, 2; palæontology, laboratory work, 3; *optional*, 9, which may be devoted to the preparation of a thesis, or to any branch of natural history, including veterinary science.

A TWO-YEAR COURSE PREPARATORY TO THE STUDY OF MEDICINE.

Not Leading to a Degree.

FRESHMAN YEAR.

FALL TERM.—French, 5; freehand drawing, 3; experimental mechanics and heat, 3; zoölogy, lectures and laboratory work (vertebrates), 3; physiology, 3; military drill, 2; hygiene, six lectures.

WINTER TERM.—French, 5; electricity and magnetism, 3; chemistry, lectures, 3, laboratory work, 3; zoölogy, lectures and laboratory work (invertebrates), 3.

SPRING TERM.—French, 5; acoustics and optics, 3; chemistry lectures, 3; botany, lectures, 3, laboratory work, 2; military drill, 2.

SOPHOMORE YEAR.

FALL TERM.—German, 5; psychology, 2; organic chemistry, 2; anatomy, physiology, and hygiene of domestic animals, 5; anatomical technology, 1; anatomy, laboratory work, 2; military drill, 2.

WINTER TERM.—German, 5; vegetable physiology, 3; veterinary pathology, parasites, and sanitary science, 5; microscopical technology, 1; histology, laboratory work, 2; vegetable physiology, laboratory work, 2.

SPRING TERM.—German, 5; medical chemistry, 3; comparative anatomy of the brain, 2; anatomy, laboratory work, 2; museum methods and experimental technology, 1; veterinary medicine and surgery, 5; military drill, 2.

Upon the completion of this course, or its equivalent, the student is entitled to a certificate countersigned by the professor of physiology. These certificates usually exempt the holders from one of the three years of study under the direction of a physician, commonly required for graduation in medicine.

THE COURSE IN HISTORY AND POLITICAL SCIENCE.

Leading to the Degree of Bachelor of Philosophy.

The first two years of this course are regarded as mainly introductory to the studies which peculiarly belong to the general subjects of the course. Students who have completed the first two years in either of the courses in Arts, Literature, or Philosophy, may be admitted to full standing as juniors in the course in History and Political Science on passing a satisfactory examination in the History required in the first two years in this course.

Besides the prescribed work, lectures are given on important topics connected with the general subjects of the course by non-resident professors and lecturers; and these lectures, whenever given, must be attended by all the students in the course.

FRESHMAN YEAR.

FALL TERM.—French *or* German, 5; Latin, 4; rhetoric, 2; geometry and conic sections, 5; military drill, 2.

WINTER TERM.—French *or* German, 5; Latin, 4; rhetoric, 2; algebra, 5.

SPRING TERM.—Pre-historic times, 2; French *or* German, 5; Latin, 4; rhetoric, 2; plane trigonometry, 3; military drill, 2.

SOPHOMORE YEAR.

FALL TERM.—Grecian history, 2; English history, 3; French, 3; German, 3; essays and declamations, 1; Greek, Latin, modern languages, mathematics, *or* natural sciences, 3; military drill, 2.

WINTER TERM.—Roman history, 2; English history, 3; French, 3; German, 3; essays and declamations, 1; Greek, Latin, modern languages, mathematics, *or* natural sciences, 3.

SPRING TERM.—Roman history, 2; English history, 3; French, 3; German, 3; essays and declamations, 1; theory of probabilities and statistics, 3; military drill, 2.

JUNIOR YEAR.

FALL TERM.—American history, 3; English constitutional history, or systematic politics, 5; mediæval and modern history, 3; psychology, 2; sanitary science, labor laws, and penal discipline, or *optional*, 2.

WINTER TERM.—American history, 3; modern history, 3; political economy, 2; moral philosophy and political ethics, 2; essays and orations, 2; *optional*, 3.

SPRING TERM.—American history, 3; modern history, 2; political economy, 2; logic, 3; essays and orations, 2; *optional*, 3.

SENIOR YEAR.

FALL TERM.—American history, 3; modern history, 3; English constitutional history, or systematic politics, 5; history of philosophy and the natural sciences, 3.

WINTER TERM.—American history, 3; modern history, 3; philosophy of history, 3; international law, 5; military science, 2.

SPRING TERM.—American history, 3; modern history, 2; American law and jurisprudence, 5; finance and political economy, 5; preparation of thesis.

THE COURSE IN MECHANIC ARTS.

Leading to the Degree of Bachelor of Mechanical Engineering.

FRESHMAN YEAR.

FALL TERM.—German, 5; geometry and conic sections, 5; free-hand drawing, 3; shop-work, 3; military drill, 2.

WINTER TERM.—German, 5; algebra, 5; freehand drawing, 3, instrumental drawing, 2; shop-work, 3.

SPRING TERM.—German, 5; trigonometry, 5; descriptive geometry, text and drawing, 4; shop-work, 3; military drill, 2.

SOPHOMORE YEAR.

FALL TERM.—German, 3; rhetoric, 2; analytical geometry, 5 experimental mechanics and heat, 3; shop-work, 3; military drill, 2.

WINTER TERM.—German, 3; rhetoric, 2; calculus, 5; electrici ty and magnetism, 3; mechanical drawing, 2; shop-work, 3.

SPRING TERM.—Calculus, 5; mechanical drawing, 4; building materials, 3; shop-work, 3; military drill, 3.

JUNIOR YEAR.

FALL TERM.—Calculus and analytical geometry, 5; descriptive geometry, text and drawing, 6; mechanism, 3; shop-work, 3.

WINTER TERM.—Mechanics of engineering, 5; mechanism, 3; physics, laboratory work, 3; chemistry, lectures, 3; shop-work, 3.

SPRING TERM.—Mechanics of engineering, 5; mechanical drawing, with shades, tinting, and perspective, 3; physics, laboratory work, 3; chemistry, lectures, 3; shop-work, 3.

SENIOR YEAR.

FALL TERM—Mechanics of engineering, 5; mechanical and working drawings, 3; physics, laboratory work, 3; steam-engine, 3; shop-work, 3.

WINTER TERM.—Mechanical drawing, 4; steam-engine, 3; metallurgy, 2; experimental work with indicators, governors, pumps, and injectors, 3; shop-work, 3; military science, 2.

SPRING TERM.—Graphical statics, 3; the use of instruments and field work, 3; chemistry, 3; technical reading and preparation of thesis, 3; shop-work, 3.

GRADUATE COURSE.

FALL TERM.—Machines for regulating, counting, etc., 3; mechanical *or* physical experiments, *or* chemistry, 3; riparian laws, contracts, patent-office laws, etc., 2. *Optional*, 7.

WINTER TERM.—Machine for change of form, 3; mechanica *or* physical experiments, *or* chemistry, 3; technical reading, 2 *Optional*, 7.

SPRING TERM.—Locomotive machines, hoists, cranes, etc., 3; mechanical *or* physical experiments, *or* chemistry, 3; shop systems and accounts, 2. *Optional*, 7.

The optional studies are hydraulics, assaying, blow-pipe analysis and mineralogy, chemistry (laboratory work), physics, (acoustics and optics), motors other than steam, architecture, civil engineering, shop-work, mathematics, botany, French, rhetoric, history, literature.

GENERAL DEPARTMENTS OF INSTRUCTION.

Any person wishing more detailed information than is given in the Register as to courses of study, methods of instruction, etc., may address the professor in charge of the department to which his inquiries relate.

AGRICULTURE.

I. APPLIED AGRICULTURE.

The requirements for admission to the course in Agriculture are such as to put the advantages which it offers within the reach of every young man who has made good use of the instruction afforded in the public schools. The instruction is given by lectures and recitations, illustrated with the aid of the Auzoux models and various other collections belonging to the University. Besides the class-room exercises, the student devotes as much time as can be spared to practice in the botanical, chemical, and veterinary laboratories, as well as in the fields and barns.

In Applied Agriculture, five hours a week, during the senior year, are devoted to technical instruction in all its leading, and most of its minor, branches. The student is also required to spend three hours a day, two days in each week, in field work, and in the handling and feeding of domestic animals; and if this amount of practice does not prove sufficient to make him familiar with the various operations of the farm, additional time is required during the summer vacation.

The instruction by lectures begins with the senior year, and continues through the three terms of that year.

Fall Term: Wheat—culture, varieties, preparation of the soil,

seeding, injurious insects, harvesting, threshing, marketing; Swine—the history of breeds, feeding, general management, piggeries; Farm Buildings—location, plans, material, construction, repairs and preservation, contracts, liabilities of contractors; Fields—shape and size; Fences and Gates—construction, number, kind, repairs, durability of wood used; Farm and public roads, bridges, and culverts—location, construction, repairs; Farms—selection and purchase with regard to remoteness or nearness to markets, agricultural capabilities, roads, improvements, schools, and society; Titles, deeds, judgments, and mortgages; Farm-Yard Manures—composition, manufacture, preservation, application; Commercial Fertilizers—composition, application, utility.

Winter Term: Farm Accounts; Principles of Stock-breeding—law of similarity, of variation as caused by food, habit and climate, atavism, relative influence of male and female, prepotency, sex, in-and-in breeding, crossing and out-crossing, grading up or breeding in line; Races and Breeds—pedigrees, leading breeds of neat animals treated as to history, markings, characteristics, and adaptation to uses, soil, climate, and locality; Breeding, feeding, and management of cattle; Butter, cheese, and milk dairies, and beef production; Sheep Husbandry treated in detail same as cattle.

Spring Term: The Horse—breeds and breeding, education, care, driving, stables; Farm Drainage—mapping of drains, material, construction, utility; Plows and plowing; Farm Implements and Machinery—use, care, and repairs; Corn, oat, barley, and flax culture; Grasses and forage plants; Weeds and their eradication; Business customs, rights, and privileges; Notes, contracts, and obligations; Employment and direction of laborers.

University Farm.

The Farm consists of 120 acres of arable land, the larger part of which is used for experimental purposes and the illustration of the principles of agriculture. Nearly all the domestic animals are kept to serve the same ends. Those portions of farm and stock not used for experiments are managed with a view to their greatest productiveness. Statistics of both experiments and management are kept on such a system as to show at the close of each year the profit or loss not only of the whole farm but of each crop and group of animals. Of the two barns with

which the farm is equipped, one is largely devoted to the needs of the Horticultural Department; the other, containing steam-engine, feed-cutter, stationary thresher, and other necessary appliances, furnishes accommodation for the general crops and stock, and for experimental work.

II. AGRICULTURAL CHEMISTRY.

The study of Agricultural Chemistry comprises lectures and analytical practice in the laboratory. The lectures, seventy-five in number, embrace the following general subjects:

The general principles of chemical science, accompanied by introductory laboratory work; the chemistry of the elements and their compounds that constitute soils, plants, and animals; investigators in agricultural chemistry, their methods and means of working, and the literature of agricultural chemistry; the chemistry of vegetable life, and the production of vegetable substance in general; the physical and chemical properties and agricultural resources of the soil; tillage, drainage, etc., and amendments and manures; the composition of crops and other materials used for fodder; animal chemistry and nutrition; fermentation and putrefaction; milk and its manufactured products and residues; food, water, and air in their relations to human and animal life; the chemical analysis of fodder and food; farm crops and their manufactured products and residues.

The analysis of agricultural materials and products is treated in a course of chemical practice, as described under the head of Analytical Chemistry.

III. ECONOMIC ENTOMOLOGY.

The course comprises lectures, laboratory work, and field practice. There are two lectures per week during the spring term. In these lectures the characters of the orders, sub-orders, and the more important families are discussed; and especial attention is given to the study of the species which are of economic importance.

The laboratory and field work extends through two terms. In this part of the course the student is taught to determine species; and to make and prepare for publication original observations on the habits and structure of insects. For further details regarding the instruction in Entomology see this subject under the general head of Natural History.

Entomological Cabinet and Laboratory.

The entomological cabinet contains, in addition to many exotic insects, specimens of a large proportion of the more common species of the north-eastern United States. These specimens are arranged in two collections: one biological, containing specimens illustrative of the metamorphoses and habits of insects; the other systematic, in which the species are arranged so as to show their zoölogical affinities.

The Laboratory is equipped with a set of Auzoux models, microscopes, breeding cages, and other apparatus necessary for practical work in entomology.

IV. HORTICULTURE.

The instruction comprises two courses of lectures during the fall term, supplemented by experimental or practical work.

Junior Year: A course of lectures upon arboriculture and landscape gardening.

Senior Year: A course of lectures upon the principles of horticulture.

Additional time is given to experimental work in the garden or conservatories. The instruction in botany, both in the laboratory and in the several courses of lectures, is intended to afford a scientific basis for the special instruction given in horticulture.

Special students in agriculture, not candidates for a degree, are received for one, two or three years. Such students must devote at least two-thirds of their time to studies immediately connected with agriculture.

V. VETERINARY SCIENCE.

The regular course for students in Agriculture, Natural History, etc., embraces: five lectures a week during an entire academic year; laboratory work on the bones, clastic models, pathological preparations, and parasites of domestic animals; clinical instruction on cases occurring in practice.

Fall Term: Lectures on the anatomy and physiology of the animals of the farm. Attention is given to the principles of hygiene as affected by genus, breed, climate, soil, exposure, buildings, ventilation, drainage, food, and water; to the varying anatomical peculiarities which imply special aptitude for particular

uses; to the data for determining age; to the principles of breeding, of shoeing, etc.

Winter Term: Lectures on general comparative pathology; on specific fevers and other contagious diseases; on the parasites and parasitic diseases of domestic animals; and on constitutional diseases. An important feature in this course is the subject of veterinary sanitary science and police, embracing, as it does, the prevention of animal plagues by legislative and individual action; the improvement of unhealthy localities; and the destruction of animal poisons and parasites which are intercommunicable between man and the domestic animals.

Spring Term: Lectures on the local diseases of the various systems of organs in the different animals, and on veterinary surgery.

Opportunities are afforded to students who desire it to pursue the study of Veterinary Medicine and Surgery farther than is provided for in the regular courses of study.

Veterinary Museum.

The Museum embraces the following collections:

1. The Auzoux veterinary models, comprising clastic models of the horse, showing the relative position of over three thousand anatomical parts; models and limbs, sound and with detachable pieces and their morbid counterparts, illustrating changes in diseases of the bones, joints, muscles, etc.; a set of obstetrical models, showing the virgin and gravid uterus in different animals, and the peculiarities of the female pelvis and its joints; models of the gastric cavities of domestic animals; an extensive set of models of jaws, showing the indications of age as well as of vicious habits and diseases; models and equine teeth in sections, showing structure and the changes effected by wear.

2. Skeletons of the domestic animals, articulated and unarticulated.

3. A collection of diseased bones, illustrating the various constitutional diseases which impair the nutrition of these structures, together with the changes caused by accidental injuries and purely local disease.

4. Skulls of domestic animals, prepared to illustrate the surgical operations demanded in the different genera.

5. Jaws of farm animals, illustrating the growth and wear of the teeth, age, dentinal tumors, caries, etc.

6. A collection of specimens of teratology, consisting of monstrous foals, calves, and pigs.

7. A collection of tumors and morbid growths removed from the different domestic animals.

8. Some hundreds of specimens of parasites from domestic animals.

9. A collection of calculi from the digestive and urinary organs, etc., of farm animals.

10. Foreign bodies taken from various parts of the animal economy.

11. A collection of surgical instruments used in veterinary practice.

12. A collection of medicinal agents.

13. In addition, a large number of diagrams, the property of Professor Law, available in illustration of different points in anatomy, physiology, and pathology.

For the Course in Agriculture see page 50.

ARCHITECTURE.

The Course in Architecture is so arranged as to give the student instruction in all subjects which he should understand in order to enter upon the practice of the art.

The instruction is given by means of lectures and practical exercises. Its object is not merely to develop the artistic powers of the student, but to lay that foundation of knowledge without which there can be no true art. Drawing is taught during the first two years, and afterwards thoroughly used and applied in mechanics, stereotomy, and designing.

Architectural mechanics occupies a part of each term for one year. The lectures are each supplemented by at least two hours of work on problems. In developing the subjects and in solving problems, analytical methods are used, but for practical use special attention is paid to the application of graphical statics.

The study of the history of architecture and the development of the various styles runs through five terms. The lectures are illustrated by photographs, engravings, drawings, casts, and models.

Proper attention is paid to acoustics, ventilation, heating, decoration, contracts, and specifications. The whole ground of education in architecture, practical, scientific, historical, and æsthetic, is covered as completely as is practicable in a four-year course.

"Satisfactory attainments" for "speoial students" in Architect ure will be as follows: Proficiency in all the branches of a good common-school education, in algebra and geometry, and in instrumental drawing. They must present themselves promptly at the beginning of the fall term of each year, and will not be admitted at any other time.

EQUIPMENT.

The White Architectural Library contains over one thousand volumes, and the photographic gallery nearly two thousand prints, all accessible to the student. Several hundred drawings, and about two hundred models in wood and stone, have been prepared to illustrate the constructive forms and peculiarities of the different styles.

For the Course in Architecture see page 52.

FREEHAND DRAWING.

Instruction in Freehand Drawing is given by means of lectures and general exercises from the blackboard, from flat copies, and from models. The work embraces a thorough training of the hand and eye in outline drawing, elementary perspective, model and object drawing, drawing from casts, and sketching from nature.

The effort is not to make mere copyists, but to render the student familiar with the fundamental principles underlying this art, and to enable him to represent any object correctly and rapidly. The course is largely industrial, and the exercises are arranged, as far as possible, with special reference to the drawing required in the work of the different departments.

All students in the departments of Agriculture, Architecture, Civil Engineering, Electrical Engineering, Mechanic Arts, Mathematics, and Natural History devote two hours a day to freehand drawing during the first two terms of the freshman year; and students in Architecture, in addition, two hours a day during one term of the junior year. Students in the other courses may take drawing as an optional study.

EQUIPMENT.

The department has a large collection of studies of natural and conventional forms, both shaded and in outline; of geometrical models, and of papier-maché and plaster casts, including a num-

ber of antique busts, casts of parts of the human figure, studies from nature, and examples of historical ornament.

CHEMISTRY AND PHYSICS.

I. PHYSICS.

The instruction comprises a general course of lectures designed as an introduction to the study of the subject, an elementary laboratory course designed to give a general knowledge of the science, and an advanced laboratory course.

The general course occupies one year, the exercises consisting of two experimental lectures and one recitation weekly. The subjects are pursued as follows: fall term, experimental mechanics and heat; winter term, electricity and magnetism; spring term, acoustics and optics. A knowledge of mathematics through plane trigonometry is required for registration in either of the subjects; and for registration in electricity and magnetism or in acoustics and optics, a knowledge of experimental mechanics and heat is also required.

The general course is required of all students except those in History and Political Science, Arts, and Literature; but those in Mechanic Arts do not take acoustics and optics.

The elementary laboratory course consists of a series of simple experiments arranged to perfect and fix the student's knowledge of physical facts and laws, and at the same time give him some experience in physical manipulation. The course occupies seven and a half hours a week (equivalent to three hours of lectures) for one year. Considering the very elementary character of the general course, this is the minimum time that can be devoted to the work with profit to the student. The elementary laboratory course is required of all students in Mechanic Arts, Chemistry and Physics, Science, and Mathematics, and parts of it are required of those in Civil Engineering and Natural History.

Students are admitted to the laboratory to pursue only such subjects as they have completed in the general course of lectures.

The advanced laboratory course consists of a series of experiments for the establishment of physical laws and the determination of constants. Many of these experiments involve the most refined methods of measurement. Students entering this course are expected to devote to it at least seven and a half hours a

week. They may enter for one or more terms at their option, and may, within certain limits, elect the line of work they wish to pursue. Special students will devote a part of their time to an original investigation.

The elementary laboratory course described above is required for admission to the advanced course. A knowledge of analytical geometry and calculus will also be found very useful.

Apparatus.

Ample rooms expressly designed for laboratory work are available. The collection includes a fine gravity escapement clock, a chronograph for measuring tenths of seconds, and another for measuring short intervals of time to the ten-thousandth of a second, two cathetometers, a dividing engine, a large spectrometer reading to seconds, a set of apparatus for electrical measurements, a set of apparatus for heat measurements, Bjerkness's apparatus to show the analogy between magnetic phenomena and the phenomena of bodies vibrating in a fluid, besides a large collection of illustrative apparatus.

II. DESCRIPTIVE AND THEORETICAL CHEMISTRY.

The instruction begins with lectures on inorganic chemistry in the winter term of the sophomore year, and continues through two terms. Three lectures a week are given on the theoretical principles and the general study of the chemistry of inorganic bodies. During the fall term of the junior year, a course of lectures is given on the chemistry of organic bodies. In addition to the final examination at the end of the term, occasional examinations are held during the term, of which no previous notice is given, the students being expected to hold themselves in readiness for such an examination at all times.

For laboratory instruction in this branch of the subject a course of introductory practice is given in the spring term of the sophomore year. This course is required of students in Science, and of those in Chemistry and Physics, in Analytical Chemistry, and in Agriculture; it is required, further, of all students who take chemical practice as an optional study, in the beginning of their practice, except those who can give only the minimum time (seven and a half hours a week) for two or three terms, and who for sufficient reasons desire to devote all that time to chemical

analysis. This introductory practice consists in the performance by the student of a series of experiments illustrating the more important general principles of the science. The details of the manipulation of each experiment are carefully described, but the results to be obtained are not given. For the better cultivation of the student's powers of observation he is required to observe and describe these results for himself, and trace their connection with the principles which they are intended to illustrate.

The instruction in theoretical chemistry is continued in the courses in Chemistry and Physics, and in Analytical Chemistry by recitations in chemical philosophy, and by lectures on organic chemistry.

• For the Course in Chemistry and Physics see page 53.

III. MINERALOGY AND METALLURGY.

Blowpipe Analysis.—During the spring term of the sophomore year, instruction is given in qualitative blowpipe analysis, and in determinative mineralogy. The course is designed to enable the student to avail himself of the simple and effective means which the blowpipe affords in determining the nature of unknown substances. The work in determinative mineralogy comprises the identification of minerals by observation of their hardness, fusibility, blowpipe reactions, etc., and constitutes a necessary preparation for the study of systematic mineralogy and lithology. The laboratory of blowpipe analysis and mineralogy in the new chemical and physical building is supplied with all necessary conveniences for the aid of students in this department.

Mineralogy.—The study of systematic mineralogy is pursued during the fall term of the junior year, and comprises lectures, conferences, and the study of specimens. The study of crystallography forms an important part of the course in mineralogy, and includes lectures illustrated by a complete set of glass models, as well as laboratory practice in the identification of crystalline forms from blocks and actual specimens. Exceptional advantages for the study of mineralogy are offered by the large and well-arranged Silliman collection of minerals, which is accessible to students at all times. A complete and carefully selected students' collection affords abundant material for work in determinative mineralogy. Special attention is given to the more important metallic ores, as a preparation for the studies of economic geology and metallurgy.

Assaying.—A thorough course of practice in assaying is given during the winter term of the junior year. Students are required to determine the value of gold, silver, and other metals contained in ores sufficient in number to make them familiar with the most approved methods in use in the West and in European mining regions. The assay of gold and silver bullion, as practiced in the national mints, forms a part of the course. The assay laboratory in the new building is equipped with every requisite for work in this branch, such as furnaces, tools, balances, etc.

Metallurgy.—During the winter term of the junior year two lectures a week are devoted to metallurgy. These lectures are intended to give the students in the technical courses a general idea of fuels, ores, and the most important methods of extracting the metals which are especially used in construction, the metallurgy of iron naturally claiming the most attention.

Optional Work.—Students pursuing courses in which blowpipe analysis, mineralogy, and assaying are not required, and who desire to pursue these studies as optional work, can take them only during the terms to which they are assigned in the schedule of the technical courses, and in the order indicated above. Thus, no one is admitted to work in blowpipe analysis who has not attended the lectures on inorganic chemistry; further, no one is admitted to the advanced class in mineralogy or assaying, or to the class in lithological laboratory work in the geological department, who has not completed one term's work in blowpipe analysis.

IV. AGRICULTURAL AND ANALYTICAL CHEMISTRY.

The general subject of Agricultural Chemistry is treated in a series of about seventy-five lectures, for an account of which see page 67.

The course in Analytical Chemistry, beginning in the sophomore year, comprises qualitative and quantitative analysis both in the wet way and in the dry way (blowpipe analysis and assaying), and is adapted in respect to length and completeness to the course of study the student is pursuing.

In Chemistry and Physics the qualitative analysis in the wet way and the blowpipe analysis are taken in the first two terms, beginning with the winter term of the sophomore year; this work may or may not, according to the proficiency attained in

these two terms, extend into the following term. In connection with the quantitative analysis, which occupies at least a large part of the time devoted to laboratory work in the junior and senior years of this course, some practice in qualitative analysis is continued.

The quantitative work begins with general practice in the determination of bases and acids by gravimetric and volumetric methods, after which follow the analysis of minerals, ores and technical products in the wet way, and dry assaying, organic, ultimate, and proximate analysis, the analysis of gaseous mixtures, the chemical examination of water and articles of food, spectroscopic analysis, the preparation of substances, and, finally, the thesis for graduation, to which most of the time of the last two terms of the course should be devoted.

In the course in Agriculture, the analytical part of agricultural chemistry begins in the fall term of the sophomore year, and comprises analysis in the wet way and with the blowpipe; it is confined to those substances that may occur in agricultural materials and products. The qualitative analysis should be completed in two terms of this year, so that all the time given to the subject in the junior and senior years may be devoted to quantitative analysis. This quantitative work begins, as in Chemistry and Physics, with general practice in the determination of bases and acids by gravimetric and volumetric methods. The chemical examination of fertilizers, soils, and agricultural products occupies the remainder of the course.

In the Medical Preparatory Course, a short course of qualitative and quantitative analysis in the wet way is given, which may carry the student far enough to qualify him to examine animal liquids by chemical methods for assistance in the diagnosis of disease. The amount of practice necessary for acquiring merely the rudiments of chemical analysis renders it impracticable to accomplish more than this in the time allotted in the course. Students intending to study medicine who have more time for chemical practice can take a longer and more thorough course, which includes a better foundation in quantitative work, and a wider application of the proficiency thus gained to the chemical examination of animal substances and articles of food and drink, and to medical jurisprudence.

Chemical Laboratory.

The new building for the department of Chemistry and Physics, completed during the summer of 1883, and now fully occupied, contains a museum, a library, laboratories, and lecture-rooms, and is thoroughly equipped with the most recent and approved appliances for the proper prosecution of the work of the department.

For the Course in Analytical Chemistry see page 53.

CIVIL ENGINEERING.

The instruction is given by means of lectures and recitations, with drafting, and field and laboratory work. The field work embraces the usual operations and the more recent methods of land, railroad, and subterranean surveying, together with hydrography and geodetic practice; and since 1874 the department of Civil Engineering has been engaged in the surveys of the hydrographic basin of central New York, as a contribution to the geodetic surveys of the United States Government.

Laboratory work is provided in chemistry, mineralogy, metallurgy, geology, physics, and civil engineering.

The students of this department receive instruction in an extended course of mechanics, as applied to engineering, and their professional preparation comprises the following subjects: the location and construction of railroads, canals, and water-works; the construction of foundations, in water and on land, and of superstructures and tunnels; the surveys, improvements, and defenses of coasts, harbors, rivers, and lakes; the determination of astronomical co-ordinates; the application of mechanics, graphical statics, and descriptive geometry to the constructions of the various kinds of right and oblique arch bridges, roofs, trusses and suspension bridges; the design, construction, and application of wind and hydraulic motors, air, electric, and heat engines, and pneumatic works; the drainage of towns and the reclaiming of lands; the preparation of plans and specifications, and the proper selection and tests of the materials used in constructions. As a part of their instruction, students have frequent practice in the preparation of papers on subjects of professional importance.

An elementary course of lectures is given in engineering and mining economy, finance, and jurisprudence.

To meet the growing demand for special training, the five-year course has been arranged, allowing considerable option and diver-

sity of studies to students wishing to pursue special lines of study in bridge architecture, or in railroad, mining, topographical, sanitary, geographical, electrical, or industrial engineering.

The five-year course also offers lines of continuous study of a historical, literary, and scientific character, which may alternate with the prescribed studies, and with architecture, general science, and technology.

As stated elsewhere, students in these courses are required to write essays upon professional subjects.

Equipment.

The special library of the department possesses many valuable works, among them the extensive publications recently presented to it by the French government; and in addition, the resources of the general library are available for the purposes of the department. The engineering laboratories contain various machines, models, and appliances for engineering investigations.

The engineering museums contain the following collections, which receive regular additions from a yearly appropriation:

1. The Muret collection of models in descriptive geometry and stone-cutting.

2. The De Lagrave general and special models in topography, geognosy, and engineering.

3. A nearly complete collection of the Schroeder models in descriptive geometry and stone-cutting, with some of the Olivier models, and others made at the University.

4. The Grund collections of bridge and track details, roofs, and trusses, supplemented by similar models by Schroeder and other makers.

5. A complete railroad bridge of one-hundred-foot span, the model being one-fourth of the natural scale.

6. The Digeon collection of working models in hydraulic engineering.

7. Several collections of European photographs of engineering works during the process of construction; and many other photographs, diagrams, and models.

8. Instruments of precision for astronomical work: a Troughton & Simms's transit, a universal instrument by the same makers reading to single seconds, three sextants, two astronomical clocks, chronographs, chronometers, two small equatorials, the larger of

four and a half inch aperture, made by Alvan Clark, and other instruments necessary to the equipment of a training observatory.

9. For geodetic work, a secondary base-line apparatus, made under the direction of the Coast and Geodetic Survey, and all the portable astronomical and field instruments needed, including sounding machines, deep-water thermometers, heliotropes, etc.

10. Among the coarser field instruments nearly every variety of engineers' transits, theodolites, levels, compasses, omnimeters, and tacheometers, with a large number of special instruments, such as planimeters, pantographs, elliptographs, arithmometers, tachometers, pocket altazimuths and sextants, hypsometers, and meteorological instruments of all descriptions.

For the Course in Civil Engineering see page 54.

ELECTRICAL ENGINEERING.

The rapid development of the applications of electricity has created a demand for thoroughly trained engineers conversant with electrical science, especially by companies carrying on telegraphy, electrical lighting, electrical supply and transmission of power, electroplating, or the manufacture of electrical machinery and apparatus. Recognizing this demand, at the beginning of the past academic year the trustees of Cornell University began to receive students desiring to fit themselves to enter this new and constantly extending field. While the general studies of the new course are mainly those of the departments of Civil and Mechanical Engineering, the special studies of the course embrace the theory of electricity, the construction and testing of telegraph lines, cables, and instruments, and of dynamo-machines, and the methods of electrical measurements, electrical lighting, and the electrical transmission of power.

Equipment.

The University possesses a very extensive collection of electrical apparatus, including resistance coils, galvanometers, condensers, and other apparatus for measurements, from Elliott Brothers of London, Siemens & Halske of Berlin, and other makers; the special instruments by Deprez, Siemens & Halske, Professors Ayrton and Perry, and Sir William Thompson, for measuring the currents and potentials of dynamo-machines; two large and several small dynamo-machines; electric lamps of several makers; telegraph and telephone instruments; besides

magnetometers, dynamometers for measuring power used in driving dynamos, photometers, and other accessory apparatus. Telegraph and telephone lines are available for making tests, and electric light circuits upon the University grounds enable the student to make his experiments under the conditions that obtain in actual practice.

In the new Physical Laboratory every facility is provided for the use of electrical apparatus under the most favorable conditions, and a workshop attached to the laboratory provides for the construction of special instruments for investigations.

For the Course in Electrical Engineering see page 57.

MARINE ENGINEERING.

At the request of the University, an officer of the engineer corps of the United States Navy has been detailed for the purpose of giving instruction in Marine Engineering. Special work in this subject, under the general direction of the department of mechanic arts, may therefore be taken by such students as desire it.

MINING ENGINEERING.

Although no department of Mining Engineering has yet been formally established, all the main instruction required by a mining engineer is now given, as follows: the professor of civil engineering and his associates pay special attention to the needs of those intending to connect themselves with the mining industries, giving lectures on tunneling and on the theory and practice of such constructions as are common to the professions of civil and mining engineer; the professor of mechanical engineering and his associates pursue a like course, giving instruction in mining machinery; the professors of general chemistry and mineralogy, and of analytical chemistry, give instruction in metallurgy, assaying, chemical analysis, and cognate subjects; the professors of geology and palæontology give instruction in the theory and classification of ores, and in those branches relating to chemical geology.

HISTORY AND POLITICAL SCIENCE.

I. HISTORY.

The aim in the courses of instruction in History is to present, in logical and chronological sequence:

1. *General History, Ancient, Mediæval, and Modern*, with especial reference to the political and social development of the leading nations.

2. *The Constitutional History of England*, as that which has most strongly influenced our own.

3. *The Comparative Constitutional and Legislative History of various modern states*, as eliciting facts and principles of use in solving American problems.

4. *The History, Political, Social, and Constitutional, of the United States*, with a systematic effort to stimulate the student to original research into the sources of our national history.

5. *The Philosophy of History*, as shown by grouping the facts and thoughts elicited in these various courses.

1. General History.

The instruction in General History extends through the four years, as follows:

1. General Ancient, Grecian, and Roman History, beginning with the spring term of the freshman year and continuing through the three terms of the sophomore year.

2. Mediæval History: General History of the social and political development of Europe during the Middle Ages, mainly by instruction in general English history during the sophomore year, and by special lectures in the junior year.

3. Modern History: (*a*) 1883-4, The history of Germany: fall term, the period of the Reformation; winter term, from the Reformation to the French Revolution; spring term, the nineteenth century. (*b*) 1884–5, The history of France: fall term, from the close of the Middle Ages to the French Revolution; winter term, the French Revolution; spring term, the Napoleonic and recent periods.

In connection with the above there are lectures on important points and periods in the history of other modern nations.

Instructors: President White, Professor C. K. Adams, Assistant Professor Perkins, and Mr. Burr.

2. English History.

The instruction in general English History is given by recitations from text-books during the entire sophomore year. This is followed by courses of lectures to the upper classes on the growth and principles of the constitution, the aim being to present the great bases of law and policy on which the structure of the English government rests. The early Saxon institutions are described at some length; and the lectures follow the development of the system from this germ through its leading phases down to modern times. Special attention is paid, during the whole course, to such topics as illustrate the institutions and constitutional history of the United States.

Instructors: Professors Goldwin Smith and Tuttle, and Assistant Professor Perkins.

3. Comparative Constitutional and Legislative History.

This subject is treated, as far as possible, in the courses of lectures upon Modern History in the junior year, and in a special course of lectures during the senior year.

Instructors: President White and Professor C. K. Adams.

4. American History.

The study of American History extends through the junior and senior years, and for each of those years is a continuous subject. The topics to which particular attention is paid are the following: The native races, especially the Mound-builders and the North-American Indians: the alleged Pre-Columbian discoveries: the origin and enforcement of England's claim to North America, as against competing European nations; the motives and methods of English colony-planting in America in the seventeenth and eighteenth centuries; the development of ideas and institutions in the American colonies, with particular reference to religion, education, industry, and civil freedom; the grounds of inter-colonial isolation and of inter-colonial fellowship; the causes and progress of the movement for colonial independence; the history of the formation of the national constitution; the origin and growth of political parties under the constitution; the history of slavery as a factor in American politics, culminating in the civil war of 1861 65.

In the presentation of these topics, the student is constantly directed to the original sources of information concerning them.

and to the true methods of historical inquiry. The effort is also made to use American literature as a means of illustrating the several periods of American History.

Instructor: Professor Tyler.

5. Philosophy of History.

The lectures on this subject are given in the winter term of the senior year. Their object is to trace the origin and progress of civilization, and to point out the causes and institutions, civil, social, and religious, which have tended to advance, or to retard its progress. The first half of the course treats of general principles, and the last, of the historic progress of civilization, beginning with the settlement of the Aryan nations in Europe.

Instructor: Professor Wilson.

II. POLITICAL AND SOCIAL SCIENCE.

The division includes the following topics:

1. *Political Economy and Finance.*
2. *Systematic Politics.*
3. *International Law.*
4. *American Law and Jurisprudence.*

1. Political Economy.

The instruction in Political Economy is given by recitations from text-books in the elements of the science during the winter and spring terms of the junior year; and by a course of lectures during the spring term of the senior year, in which practical questions arising in the study of industrial society receive attention. A course of lectures upon the science of finance, embracing a study of the comparative financial administration of constitutional nations and the various sources of public revenue, is given during the senior year. During the present year there will also be given a special course of lectures upon the American revenue system, and another upon the currency and banking of the United States. All these courses of lectures are to be supplemented by private reading.

Instructors: Professor Wilson, Associate Professor H. C. Adams, and Lecturers Roberts and Knox.

2. Systematic Politics.

The aim of the instruction in this course is to present both the philosophical and the practical side of the subject in a logical

order of treatment. It comprises the two general topics of theoretical and practical politics.

Theoretical politics treats of primitive societies, the growth of states, forms of government, history of political literature and speculation, and the philosophy of the state. Practical politics treats of states in their concrete relations, and includes such subjects as constitutional organization, legislation, administration and civil service methods, justice, revenue, military systems, and a comparative survey of existing governments. The historical and the analytical methods are both used, and the object of the course is to make the student acquainted in a scientific sense with the true principles of political organization and practice, as well as with the existing institutions of the great civilized states.

Instructor: Professor Tuttle.

3. International Law and Diplomacy.

The instruction in this department consists of a course of lectures given during the winter term of the senior year. The course treats, among other subjects, of the history and literature of the law of nations, rules of war, neutrality, prize, embassy, forms of diplomacy, history of American diplomacy, together with descriptions of some of the more famous international disputes in which the United States have been concerned.

Instructor: Professor Tuttle.

4. American Law and Jurisprudence.

The course consists of about forty lectures. The first three are devoted to the more general relations of man to government; then follow twelve lectures on the constitution of the United States, and five on the origin and development of international law; then lectures on the rights of persons and of property, with a general discussion of the nature of contracts, partnerships, and corporations; then lectures on crime and criminal law, and the course concludes with four lectures on the legal maxims relating to sovereignty, legislation, customary law, and the judiciary.

Instructor: Professor Wilson.

For the Course in History and Political Science see page 61.

LANGUAGES.

I. THE ANCIENT CLASSICAL LANGUAGES.

An outline of the course of reading in the Classics is given below. Greek belongs to the course in Arts, and Latin to the courses in Arts, Literature, Philosophy, and History and Political Science. The distribution in regard to the number of years of required and optional study may be seen by consulting the tabulated statements of those courses. The number of weekly exercises with all undergraduate classes in Greek is three, and in Latin four, with the exceptions noted below. Instruction in Greek and Latin composition accompanies the study of the authors; lectures are occasionally substituted for recitations; and the examinations regularly comprise the translation of passages not previously seen by the student.

GREEK.

FRESHMAN YEAR.

FALL TERM.—Plato's Apology of Socrates; Grecian antiquities.

WINTER and SPRING TERMS.—Homer and Herodotus; the history of Greek literature.

SOPHOMORE YEAR.

FALL TERM.—Thucydides.

WINTER and SPRING TERM.—Euripides, Æschylus, Aristophanes (one play of each).

JUNIOR YEAR.

FALL TERM.—Plato continued.

WINTER and SPRING TERMS.—Sophocles.

SENIOR YEAR.

FALL TERM.—Selections from the Attic orators.

WINTER and SPRING TERMS.—Dramatic poets, continued; selections from the Lyric and Bucolic poets.

For graduate work in Greek see below.

LATIN.

FRESHMAN YEAR.

FALL TERM.—Livy.

WINTER TERM.—Cicero's De Amicitia; the Odes of Horace (Book I).

SPRING TERM.—The Odes (Books II–IV) and Epodes of Horace

SOPHOMORE YEAR.

FALL TERM.—The Agricola, Germania, and Dialogus of Tacitus; Roman antiquities.

WINTER TERM.—Terence; the Satires of Horace (Book I); the history of Roman literature (text-book and lectures).

SPRING TERM.—The Satires (Book II) and Epistles of Horace; the history of Roman literature.

JUNIOR YEAR.

FALL TERM.—The Annals or the Histories of Tacitus; *three-hour optional course.* The Georgics of Virgil: *one-hour optional course of lectures.*

WINTER TERM.—Juvenal: *three-hour optional course.* Cicero's Letters: *one-hour optional course of translation at sight, with lectures.*

SPRING TERM.—Catullus, Tibullus, Propertius: *three-hour optional course.* Persius: *one-hour optional course of lectures.*

SENIOR YEAR.

FALL TERM.—Plautus; Quintilian: *three-hour optional course.* The comparative philology of Greek and Latin: *one-hour optional course of lectures.*

WINTER TERM.—Lucretius: *three-hour optional course.* The comparative philology of Greek and Latin: *one-hour optional course of lectures, in continuation of the work of the fall term.*

SPRING TERM.—The Letters of Pliny the Younger: *three-hour optional course.* Early Latin inscriptions and literature: *one-hour optional course of lectures, in continuation of the work of the fall and winter terms.*

A graduate class, working under the direction of the professors of Greek and Latin, meets weekly. The work of the present year is as follows:

In Greek, Homeric philology, subdivided thus: etymology and definition of words peculiar to Homer and the epic dialect; etymology of Homeric word-forms; metrical peculiarities; syntactical constructions peculiar to Homer; Homeric antiquities including mythology; textual criticism and bibliography.

In Latin, Latin accent, and the critical reading of Plautus, with special reference to the following: metre and prosody grammar; etomology of words and forms peculiar to Plautus textual criticism; the history of early Latin comedy.

II. GERMANIC LANGUAGES.

The first two years in German are specially intended, besides preparing the student for progressive and independent work in the language, to give those who have not a classical training some grammatical discipline, and an insight into the growth and relations of Indo-Germanic speech. Instruction is also given to optional classes in the more advanced study of the Germanic languages.

GERMAN.

During the whole of the freshman year Whitney's Grammar and Reader are used, accompanied by Ahn's (Fischer's) exercises in writing German. In the fall term a knowledge of the inflections is gained, the strong verbs are begun, and stories and ballads are translated, with daily exercises in writing. In the winter term the strong verbs are completed, the syntax of nouns, the uses of the moods, and the arrangement of sentences are studied, with advanced translation and the writing of German. In the spring term, with advanced translation and writing, exercises in translation at sight are also given, and the relation of English to German is traced by the application of Grimm's law, in connection with the special study of etymology.

In the fall term of the sophomore year one of Schiller's or Goethe's dramas is studied, followed in the winter term by extracts from Goethe's or Schiller's prose. In the winter term a course in scientific German is also offered, as an alternative. In the spring term Goethe's Hermann und Dorothea, Lessing's Minna von Barnhelm, or some similar work, is read. The work of the fall term is chiefly philological, while in the winter and spring terms more attention is paid to literary biography and reading at sight.

During the junior and senior years occur lectures and recitations, with optional classes, on German history, literature, and mythology, and courses are given varying from year to year, embracing the works of the leading authors. Classes are also formed in composition and conversation, and recent dramatic literature and the works of living novelists are read.

OTHER GERMANIC LANGUAGES.

Special instruction is offered in Gothic, Old and Middle High German, and the Scandinavian and Netherland languages.

In Gothic, the text-books are Heyne's and Bernhardt's editions of Ulfilas and Braune's Grammar; in Old German, Braune's Althochdeutsches Lesebuch, with lectures on the early German alliterative poetry and the later forms of German verse. In Middle High German the epic, lyric, and didactic poetry is studied, with the addition of prose selections. The Netherland languages are pursued with special reference to the explanation of English forms and idioms, and works in modern Dutch and Flemish are read.

The Scandinavian languages are taught chiefly by means of German text-books. In Icelandic, use is made of Wimmer's Altnordische Grammatik, and Vigfusson and Powell's Icelandic Prose Reader, and lectures are given on Scandinavian history and literature.

III. ROMANCE LANGUAGES.

French.

Joynes-Otto's Elementary French Course is studied during the fall term of the freshman year. Translation is begun in the same term and continued in connection with grammatical exercises throughout the year. The amount read is the equivalent of two of Bôcher's Modern French plays and Lacombe's Petite Histoire du Peuple Français. In the sophomore year two courses are offered, one in general literature, embracing both the modern and classical periods; and one in modern French, with special reference to its use in practical and scientific studies. In the first course are read such works as Mérimée's Colomba, Molière's Les Femmes Savantes, and Voltaire's Siècle de Louis XIV; one hour a week in the winter term is devoted to composition, and one in the spring term to conversation. In the second course are read such works as Garigue's Simples Lectures sur les Sciences, les Arts et l'Industrie, and the periodical, La Nature.

Optional courses are given during the junior and senior years in Old French and in recent literature and literary history.

Italian.

During the first year Ricci's Italian Principia is used with Lardelli's Letture Scelte and Manzoni's I Promessi Sposi. In the second year selections are read from Dante's Inferno, and from Boccaccio and Petrarch.

Spanish.

Knapp's Grammar of the Modern Spanish Language is used during the fall term; and Knapp's Modern Spanish Readings in the winter and spring terms.

IV. ORIENTAL LANGUAGES.

None of the languages here included are required for any baccalaureate degree conferred by the University. The Professor of Sanskrit and Living Asiatic Languages gives, in addition to special instruction, lectures bearing upon ethnographical philology and general linguistic science.

MATHEMATICS AND ASTRONOMY.

The instruction offered by this department is designed to meet the wants of all classes of students. Undergraduates in all the regular courses except Natural History have the Mathematics of the first year, namely, geometry, algebra, and trigonometry; those in Mechanic Arts, Architecture, and Civil Engineering have two or four terms of analytical geometry and calculus; those in most of the general scientific courses have analytical geometry and astronomy; and all students have the privilege of electing these and the higher branches. The full course given below is designed for those intending to teach Mathematics, or to use it as an instrument of investigation.

According to the subject taught, there are one, two, three, or five exercises a week, consisting of lectures and recitations, with the solution of problems or with other written exercises; and much of the later work is from French or German text-books.

In all the classes frequent reviews and examinations are held during the term, besides the regular examination at its close. These preliminary examinations cover previous as well as current work, and test the student's command of general principles and methods as well as of details. They are given without notice.

To graduates and special students, instruction is offered in the theory of numbers, quantics, and celestial mechanics.

For the Course in Mathematics see page 58.

MECHANIC ARTS.

In 1870 the Hon. Hiram Sibley, of Rochester, N. Y., provided for the erection of a suitable building for the department of Mechanic Arts. He also gave ten thousand dollars for increasing its

equipment of tools, machines, etc., and has since made a further gift of thirty thousand dollars for the endowment of the professorship of Practical Mechanics and Machine Construction. Still later he provided the means for erecting and fitting up a brass and iron foundry, and a blacksmith shop.

Closely connected with the lecture-rooms are the rooms for freehand and mechanical drawing, for the designing of machinery and pattern-making, and the machine shop. The shop practice embraces work requiring the use of all hand-tools and the machines employed in the ordinary machine shops.

Each student in the department is required to devote two hours a day to work in the shop; but such students as have, before entering, acquired sufficient practical knowledge, are admitted to advanced standing.

Mechanical Laboratory.

The machine shop is used for the sole purpose of giving instruction in practical work. It is supplied with lathes of various kinds, planers, grinding machines, drilling machines, shaping machines, a universal milling machine fitted for cutting plane, bevel, and spiral gears, spiral cutters, twist drills, with additional tools and attachments for graduating scales and circles, and for working various forms and shapes.

In addition to the hand and lathe tools of the usual kinds there are tools of the greatest accuracy, consisting of standard surface-plates, straight-edges, and squares of various sizes, a standard measuring machine, measuring from zero to twelve inches by the ten-thousandth of an inch, a universal grinding machine for producing true cylindrical and conical forms, and a set of Betts's standard gauges.

In the iron and brass foundry and the blacksmith shop, instruction is given in molding, casting, and forging. The cupola used is one of Colliau's improved, with a capacity for melting one ton of iron per hour.

For the purpose of instruction in experimental work there is a twenty-ton Riehle testing machine, arranged for testing the strength of materials by tension, compression, and transverse strain; Wood's apparatus for testing steam-gauges, pressure per square inch, etc.; Richards's, Thompson's, Crosby's, and Tabor's steam-engine indicators; Amsler's planimeter; Schaeffer & Budenberg's revolution counter, steam-gauges, injectors, inspirators

and pop-valves; Blake's, Blakesley's, Deane's, Miller's, and Woodworth's steam-pumps; Allen's, Chase's, Gardner's, Lynde's, Shive's, Waters's, and Wright's governors; Baldwin's link and valve motion, and experimental valve motion; a complete collection of Reuleaux's kinematic models; together with a large collection of brass, iron, and wooden models, illustrative of mechanical principles.

The course of instruction in mechanical drawing is progressive, from geometrical drawing to the designing of machines and the making of complete working drawings.

The appliances for instruction consist of several hundred drawings selected from those of technical schools abroad, and from representative American steam-engine makers and others; of photographs, models, and machines; and of apparatus used in copying by the "blue-print process."

For the Course in Mechanic Arts see page 62.

MILITARY SCIENCE.

Pursuant to the act of Congress creating the land grant on which the Cornell University is founded, and the act of the legislature of the State of New York assigning that land grant, instruction is provided in Tactics and Military Science. Drill and Military Science are "a part of the studies and exercises in all courses of study and in the requirements of all students in the University" during the fall and spring terms of the freshman and sophomore years and the winter term of the senior year. Foreigners, laboring students, and those physically unfitted therefor are excused from drill. Students are required to provide themselves with the University uniform, unless excused on account of inability to procure it, and they are held accountable for loss or injury to the arms and other public property issued to them.

The course extends through the fall and spring terms of the first two years, and the winter term of the senior year. During the first two years there are three exercises a week, of an hour each; those of the senior year consist of a regular course of lectures on the general operations and science of war, twice a week.

The subjects treated are: *The Art of War.*—To comprise the history and principles of grand and minor tactics; the organiza

tion of armies, with some account of the administrative arrangements of our own army; strategy, with historical illustrations; and accessory operations of war. *Military Engineering.*—To comprise the principles of military topography; the effect of projectiles; the principles of fortification, with their application to field works; military mining; the attack and defense of works; and the construction of military roads and bridges. *Military Law.*—To comprise the origin, principles, and limitations of military law; the nature and force of the articles of war and the general regulations for the army; a summary of the rules of evidence; the constitution, jurisdiction, and procedure of courts-martial, courts of inquiry, military commissions, and military boards.

Any student who has satisfactorily performed all the duties required for the first two years, and who is qualified therefor, may be selected for the place of a commissioned officer if needed. For the performance of his duties as a commissioned officer in the junior or senior year he is entitled to a credit of three recitations a week for each term; and, at graduation, he may receive a certificate of military proficiency with his diploma.

The practical military exercises include: *Infantry Tactics.*—To comprise the schools of the soldier, company, and battalion; with skirmishing, the forms of parade, and the duties of guards. *Artillery Practice.*—To comprise at least the school of the piece and section for the field guns, with such further artillery instruction as may be found practicable. *Special Exercises..*—To comprise recitations at such times as may be prescribed

NATURAL HISTORY.

I. BOTANY.

A course of instruction is given on the following subjects: physiological botany, field work, compositæ and gramineæ, systematic and economic botany, vegetable histology, fungi and algæ, vegetable physiology, the higher cryptogams, principles of plant culture, arboriculture and forestry, and woody plants. The instruction in most of these courses includes both lectures and laboratory work, the latter being supplemented, whenever desirable, by field work or class excursions. The arrangement of the several subjects in regard to the terms and years which they

are given, may be ascertained by reference to the tabulated statement of the courses in Natural History and in Agriculture.

The full course in Botany as laid down is not intended to be wholly inflexible, and students whose standing will warrant it may shape their studies by their taste, or by the ultimate object they have in view. To those who have completed a large share of the regular course, opportunities are afforded for advanced work in some special branch of botanical science.

Herbarium and Apparatus.

The means of illustrating the instruction in Botany include the Herbarium, estimated to contain fifteen thousand species; two series of models, the Auzoux and the Brendel; two sets of maps, one by Achille Comte, the other by Professor Henslow; a lime lantern with five hundred views, illustrating different departments of Botany, but especially phytography; ten compound microscopes and several dissecting microscopes; a collection of fruits, barks, cones, nuts, seeds, fibers, and various dry and alcoholic specimens; a general collection of economic vegetable products, and above a thousand specimens of the woods of different countries. Besides these, the large conservatories and gardens, and an uncommonly rich native flora afford abundant material for illustration and practical work.

II. GEOLOGY AND LITHOLOGY.

Instruction is given in general and economic geology and lithology by means of lectures, laboratory practice, and field work. The lectures consist of a course on general geology in the fall term, and a course on economic geology in the winter term.

The laboratory work consists of a progressive series of exercises in determinative lithology, for which at least one term of previous work in the mineralogical laboratory is required; and of exercises in the preparation of geological sections and maps from the data furnished by government reports, and careful study of the chief characteristic fossils of the various geological periods. During the fall and spring terms there are frequent excursions and lessons in field work.

To advanced students, opportunities are offered for the microscopic investigation of minerals and rocks, and for the extended study of important mineral districts, with the preparation of reports thereon and discussions of the metallurgical methods and

appliances adapted to their products. The rocks of Ithaca and its neighborhood afford ample material for study and original research.

III. PALÆONTOLOGY.

Instruction is given as follows: by laboratory work throughout the year; by excursions during the fall and spring terms to the rich fossiliferous localities in and about Ithaca; and by lectures on systematic palæontology in the winter term.

The elementary work comprises the observation and recording of facts, the collecting of material in the field, the critical study of the literature, and the classification in the laboratory of invertebrate fossils from all parts of the world.

Exceptional facilities are offered for advanced work in the interpretation of fossil forms as marks of geological age and sequence; in the study of faunas, their conditions and distribution; and in the critical study of species and genera, their characters, relations, and modifications, as exhibited in the faunas and floras of the past.

Laboratory.

The laboratory is well furnished with the appliances needful for successful study. Among other things, it has numerous maps, wall tablets, engravings of geological objects, and magic-lantern slides. Large and important additions have also been made during the past year to the lithological and stratigraphical collections.

Museum of Palæontology.

The museum comprises the following collections:

1. The Jewett Collection, accumulated by the late Col. Jewett when curator of the State Cabinet of Natural History. This collection is especially rich in New York fossils, containing many of the original specimens described in the State reports, and not a few unique specimens.

2. A fair representation of the rich faunas of the cretaceous and tertiary formations along the eastern and southern part of the Union, and a large number of characteristic English and European fossils.

3. A fine series of English mesozoic fossils; of tertiary fossils from Santo Domingo; of pre-glacial fossils from Sweden; and

numerous smaller collections from various typical localities in our own country.

4. The Ward series of casts.

5. The unique collections from Brazil, made by Prof. Hartt and party on the Morgan expedition, containing the original specimens; and a great number of duplicates.

Numerous additions have been made during the past year, making the museum more complete in ichthyosauri and other vertebrate remains, in Trenton trilobites, and in the fauna of the Upper Devonian.

IV. VERTEBRATE ZOOLOGY.

The title likewise includes Human Physiology and Hygiene, Microscopy, and Comparative Anatomy. The instruction is by lectures, demonstrations, laboratory practice, and field work, as follows:

1. *Hygiene.*—Early in the fall term are given six lectures upon the personal care of health, and upon emergencies. Among other practical matters, students are shown how to check bleeding, and how to practice the best methods for resuscitating the drowned.

2. *Human Physiology.*—The thirty-six lectures treat chiefly of the subjects not included in the entrance examination, the phenomena of nervous and muscular action, the vaso-motor system, and the structure and functions of the brain. They are illustrated by a life-sized manikin and other models, by numerous anatomical preparations, by diagrams, and by painless experiments upon the frog and cat. Each student also examines, through the microscope, about thirty preparations of the tissues, including the living amœba, cilia in action, and the circulation in the frog's foot and necturus's gill.

3. *General Vertebrate Zoölogy.*—At one-third of the thirty-six lectures the student examines representative forms, including amphioxus, lamprey, shark, perch, catfish, necturus, frog, turtle, fowl and cat. The lectures are illustrated by a full set of Auzoux models, by diagrams, and by the free use of the zoölogical collections.

4. *Comparative Anatomy.*—A course of twenty lectures is devoted either to the brain or to some special group of vertebrates. In either case, practical work is done both in dissecting and in the examination of the literature of the subject.

5. *Anatomical, Microscopical, and Physiological Technology.*—The forty lectures upon these subjects are accompanied by practical demonstrations of all the methods presented, and these methods are employed by the student in the laboratory.

LABORATORY PRACTICE.—This varies with the needs of the student and the extent of his preparation. Usually, as a basis for other work, the skeletons of man and the domestic cat are studied, and some of the bones are drawn and described by the student. He then dissects some of the muscles, vessels, and nerves. In the winter term, the methods of microscopical manipulations are learned, and the tissues of the cat, frog, and necturus are examined. In the spring term the student examines the brain, heart, and other viscera of the cat, and performs for himself the simpler physiological experiments. Ordinarily, laboratory work can be commenced only at the beginning of the year, and the student must have had instruction in drawing.

After the first year the student, according to his purposes, dissects other vertebrate animals, or human subjects. There are special facilities for the study of the brain, heart, and early stages of development.

FIELD WORK.—During the fall and spring terms the students are occasionally accompanied by their instructors to the field or lake in order to observe living animals, and to learn the methods of their capture and preservation.

MUSEUM.—The vertebrate collections are as follows: About twenty-three hundred examples of about twenty-two hundred species of entire animals in alcohol. Nearly half of the specimens are fishes collected in Brazil by the late Prof. C. F. Hartt; the remainder include series of named fishes from the Smithsonian Institution and the Museum of Comparative Zoölogy, representatives of the general North American fauna, and of the local fauna, and rare forms from various parts of the world. Among the last are the following: Chimpanzee, orang, dingo, pangolin, sloth, ant-eater, armadillo, ornithorhynchus, echidna, jacana, sphenodon, monitor, heloderma, crocodile, alligator, draco, axolotl, proteus, megalobatrachus, siren, amphiuma, pipa, ceratodus, protopterus, polypterus, calamoichthys, thalassophryne, chimæra, myxine, bdellostoma, and amphioxus.

About twenty-five hundred anatomical preparations, including mounted skeletons of man, gorilla, lion, camel, sloth, ostrich, alliga-

tor, frog, cryptobranchus, necturus, cæcilia, and amia; more than six hundred preparations of the brain; large series of dissections of the lamprey and necturus; embryos or young of man, ape, leopard, opossum, kangaroo, manatee, dugong, peccary, lama, sea-lion, bat, alligator, necturus, amia, lepidosteus, shark, skate, and domesticated animals.

About four hundred microscopical preparations, chiefly from the cat, frog, and necturus.

More than one thousand mounted skins of birds, many of which were presented by the late Green Smith, Esq., including ostrich, emeu, apteryx, penguin, etc.

Many mounted skins of other vertebrates, including orang, tiger, moose, camel, beaver, hyrax, centetes, galeopithecus, porpoise, koala, wombat, kangaroo, echidna, ornithorhynchus, gavial, heloderma, megalobatrachus, etc.

V. ENTOMOLOGY AND GENERAL INVERTEBRATE ZOOLOGY.

Owing to the economic importance of the study of insects, and to the difficulties attending a thorough study at a distance from the sea-shore of any group of marine animals, more attention is given to entomology than to any other division of invertebrate zoölogy.

General Zoölogy of Invertebrates.

There are three exercises per week during the winter term. Two of these are lectures; and the third consists of an examination by the students of specimens illustrating the subjects discussed in the lectures. At these practical exercises the minute forms of animal life are examined microscopically; and each student dissects specimens of the larger typical invertebrates, including squid, clam, ascidian, gephyrea, starfish, sea-urchin, crayfish, and grasshopper.

Those students who wish to pursue the subject farther, after taking the above course, are admitted to the laboratory. Here the greater part of the work indicated in Brooks's Handbook of Invertebrate Zoölogy is performed as a basis for more advanced study. From this point the work varies with the needs of the student. The laboratory is open during the entire year.

Entomology.

In addition to the course on economic entomology described on page 61, there are special facilities for advanced work in systematic entomology, insect anatomy, and the study of the life-histories of insects. The entomological laboratory is open during the entire year.

Collections of Invertebrates.—1. The general collection of invertebrates comprises a small but well selected series of forms representing all of the larger groups. In this collection there is a nearly complete set of the duplicates distributed by the U. S. National Museum, many specimens collected on the coast of Brazil by the late Professor C. F. Hartt, and specimens from Florida and the West Indies, collected by Dr. Wesley Newcomb.

2. The Newcomb collection of shells embraces more than eighty thousand examples of more than twenty thousand varieties, representing at least fifteen thousand species.

3. There is in the collection a set of the Auzoux models, and of the glass models made by Blaschka.

4. The biological and systematic collections of insects are described elsewhere under the general head Agriculture.

For the Course in Natural History see page 59.

VI. PRELIMINARY MEDICAL EDUCATION.

There is no medical department in the University, but special facilities are afforded those who wish their course to be of direct use in the study of medicine.

The Faculty believe that the crowded and difficult curricula of the medical schools should be preceded, when possible, both by a broad general education, and by a special and practical training in certain branches. They therefore strongly advise those who intend to become physicians to pursue some one of the full courses, and then to become resident graduates, reviewing physiology and chemistry, attending the lectures in veterinary science, and taking laboratory work in chemistry and anatomy.

When only four years are available, the courses in Natural History, Science, and Science and Letters afford more or less time for laboratory work, especially in the senior year.

In case the student can remain but two years, he is advised to take the two-year Course Preparatory to the Study of Medicine, which embraces the branches best calculated to serve as the basis of a proper medical education.

Finally, special students are received for a shorter period than two years, if fitted to undertake the lectures and laboratory work.

For the Course Preparatory to the Study of Medicine see page 60.

PHILOSOPHY AND LETTERS.

LITERATURE.

English Literature, and Rhetoric and General Literature, form a part of each of the general courses of study, either as required or as optional work, the matter being distributed as shown in the tabulated statements of those courses.

1. *ANGLO-SAXON AND ENGLISH LITERATURE.*

SPECIAL COURSE.

SOPHOMORE YEAR.

FALL and WINTER TERMS.—Anglo-Saxon grammar, the A.-S. Version of the Gospel according to St. John, and selections from the Homilies of Ælfric.

SPRING TERM.—Selections from King Alfred's A.-S. Version of the History of Paulus Orosius, and of Boethius De Consolatione Philosophiæ, and selections from the A.-S. Chronicle.

JUNIOR YEAR.

FALL TERM.—Selections from Layamon's Brut or Chronicle of Britain, the Ancren Riwle, and the Ormulum; the Proclamation of King Henry III, and selections from Robert of Gloucester's Chronicle.

WINTER TERM.—Selections from Dan Michel's Ayenbite of Inwyt, or Remorse of Conscience, the Voiage and Travaile of Sir John Maundeville, Trevisa's Translation of Ralph Higden's Polychronicon, the Vision of William concerning Piers Plowman, Pierce the Plowmans Crede, and the Wycliffite Versions of the Bible.

SPRING TERM.—Chaucer's Prologue to the Canterbury Tales, the Knightes Tale, the Nonne Prestes Tale, etc., and lectures on the language and versification of Chaucer.

SENIOR YEAR.

FALL and WINTER TERMS.—The critical textual study of selected poems and plays.

SPRING TERM.—Lectures on Shakespeare and contemporary dramatists.

General Course.

JUNIOR YEAR.

Fall Term.—Lectures on the English language and literature, from Chaucer to Shakespeare, inclusive.

Winter Term.—Lectures on the English language and literature, from Milton to Cowper, inclusive.

Spring Term.—Lectures on English literature of the nineteenth century.

A syllabus of the course, prepared by the professor, presents to the student the leading points of each lecture, and the order of their treatment, designates the best editions of an author's works, or parts of them, that are generally accessible, and guides the student to such sources, philological, historical, biographical, critical, etc., as enable him to read to the best advantage.

Three lectures a week are given throughout the year.

It is sometimes found advisable to depart from the chronological order, and to begin with the lectures of the winter term, as given above, or of the spring term.

II. RHETORIC, GENERAL LITERATURE, AND ORATORY.

The course in rhetoric, general literature, and oratory extends through the four years.

The work of the freshman year embraces the principles of elementary rhetoric, including diction, the properties of the sentence, the structure of paragraphs, figures of speech, and the history and elements of the English language. In addition to recitations on these topics, each student every week writes an exercise, which is corrected and returned to be rewritten.

The sophomore year takes up the study of narration and description, and includes the writing of essays, which, after correction, are returned to the student to be rewritten. Elocution and exercises in declamation are optional during the winter and spring terms.

The junior year includes exposition and advanced rhetoric. Original themes and orations are delivered before the class, after private criticism by the professor. During the spring term, lectures are given on oratory and orators, the themes and orations being on related topics.

The senior year continues the delivery of themes and orations and takes up the study of general literature, which is taught entirely by lectures and collateral reading. The lectures are on topics connected with the history of literature, its different periods, and the leading representative essayists and orators. Optional classes are formed for the special study of Shakespeare, Demosthenes, and the masters of English prose style, and for practice in oral discussion and extempore speaking.

MORAL AND INTELLECTUAL PHILOSOPHY.

Instruction in Philosophy begins in the fall term of the junior year. During that term it comprises a study of the physiology of the nervous system in relation to mental phenomena, and the nature and origin of knowledge; and during the winter term, the study of moral philosophy, theories of morals, and the development of moral sentiments. In the spring term the subject is logic, including the laws of thought, the formulæ of reasoning, and the various methods of proof and refutation, together with the methods of investigation and the grounds of certainty.

The subject during the fall term of the senior year is the history of philosophy, and the progress of knowledge from its beginning in Greece to the present day, with criticisms on the methods of philosophy and transcendental logic.

THE UNIVERSITY LIBRARY.

The Library contains about forty-nine thousand five hundred volumes, besides fifteen thousand pamphlets. It is made up chiefly of the following collections, increased by annual additions of from three thousand to five thousand volumes: a selection of about five thousand volumes purchased in Europe in 1868, embracing works illustrative of agriculture, the mechanic arts, chemistry, engineering, the natural sciences, physiology, and veterinary surgery; THE ANTHON LIBRARY, of nearly seven thousand volumes, consisting of the collection made by the late Professor Charles Anthon, of Columbia College, in the ancient classical languages and literatures, besides works in history and general literature; THE BOPP LIBRARY, of about twenty-five hundred volumes, being the collection of the late Professor Franz Bopp, of the University of Berlin, relating to the oriental languages and literatures, and comparative philology; THE GOLDWIN SMITH LIBRARY, of thirty-five hundred volumes, presented to the University in 1869 by Professor Goldwin Smith, comprising chiefly historical works, and editions of the English and ancient classics—increased during later years by the continued liberality of the donor; the publications of the Patent Office of Great Britain, about three thousand volumes, of great importance to the student in technology and to scientific investigators; THE WHITE ARCHITECTURAL LIBRARY, a collection of over a thousand volumes relating to architecture and kindred branches of science, given by President White; THE KELLY MATHEMATICAL LIBRARY, comprising eighteen hundred volumes and seven hundred tracts, presented by the late Hon. William Kelly, of Rhinebeck; THE CORNELL AGRICULTURAL LIBRARY, bought by the Hon. Ezra Cornell, chiefly in 1868; THE SPARKS LIBRARY, being the library of the late Jared Sparks, president of Harvard University, consisting

of upwards of five thousand volumes and four thousand pamphlets, relating chiefly to the history of America; THE MAY COLLECTION, relating to the history of slavery and anti-slavery, the nucleus of which was formed by the gift of the library of the late Rev. Samuel J. May, of Syracuse.

The Library is a circulating one so far as the members of the Faculty are concerned, and a library of reference for students. Undergraduates have free access to a collection of cyclopædias, dictionaries, and works of reference in the various departments of study, but they apply to the librarian for other works desired. Graduate students are admitted to the alcoves. And, upon the recommendation of the professor in any department, students of the senior and junior classes, engaged in special work in that department, will be granted access to the shelves for purposes of consultation.

The Library is managed by a body known as the LIBRARY COUNCIL, which consists of seven members, as follows: The President of the University and the acting Librarian, *ex officio*, one trustee chosen by the Board, and four professors nominated by the Faculty and confirmed by the Board. The President of the University is *ex officio* chairman of the council. The elected members hold office one year.

By the will of Mrs. Jenny McGraw Fiske, who died in October 1881, the Library received a specific bequest and was also made residuary legatee. From this source there has been paid to the University up to the present time about $700,000; and the income from this fund, known as the McGraw Library Fund, when it becomes available will be applied to the support and increase of the Library.

THE LIBRARY, a bulletin, is issued at intervals and contains classified lists of recent accessions, and of books in various departments, as well as other bibliographical matter intended to assist students in their use of the Library.

THE MUSEUM OF NATURAL HISTORY

The Museum of Natural History includes the collections in American archæology, botany, conchology, entomology, geology, ornithology, palæontology, veterinary science, and zoölogy. Except in botany, entomology, and veterinary science, the collections are deposited in the McGraw building. Some account of the several collections is to be found under the titles of the respective departments. Large additions have been made during the past year, and still larger ones are anticipated.

The Museum is managed by a body known as the COUNCIL OF THE MUSEUM OF NATURAL HISTORY, which consists of the President of the University, the members of the special faculty of Natural History, and the curator of the collection in American archæology, *ex officio*, and one trustee chosen by the Board, to hold office one year.

THE McGRAW-FISKE HOSPITAL.

In the year 1881, the sum of forty-five thousand dollars was bequeathed by Mrs. Jenny McGraw Fiske as a provision for the care of students who may fall ill during their attendance at the University. It is proposed that a portion of this sum shall be devoted to the erection of a cottage hospital, made comfortable and attractive, and thoroughly equipped in all respects; and that a trained nurse be attached to it, who shall be ready to give attention the moment it may be needed. The carrying out of the intention of the founder is at present delayed by legal proceedings.

PRIZES AND HONORS.

PRIZES.

No student is allowed to be a competitor for any of the following prizes who has not satisfactorily passed all his examinations for the terms preceding that in which he offers himself as a competitor. Nor will the prizes be awarded to any one who so far neglects his other studies as to fail to pass any of his required examinations at the close of the term in which the competition takes place.

The Woodford Prize.

A gold medal of the value of *One Hundred Dollars*, founded by the Honorable Stewart Lyndon Woodford, late Lieutenant-Governor of the State of New York, will be given annually for the best English Oration, taking into account both matter and manner.

The subjects for the Woodford prize the present year are as follows:

1. Abstract Theories in Politics.
2. The Demagogue as portrayed by Aristophanes.
3. The Growth of National Consciousness in the American People.
4. Efforts of the People in Different Ages to realize the Kingdom of God.
5. The Ethical Sentiment in Greek Tragedy.
6. The Ethics of our Political Idea.
7. Magic as a Presentiment of the Powers of Science.
8. "Every Day is Doomsday."
9. The Ideals of Roger Williams.
10. Fashion in Modes of Thinking.

11. The Propagandism of Philosophy as a Religion in the Age of the Antonines.
12. Magnanimity in Politics.
13. The Alleged Lawlessness of Genius.
14. The Explanation of History in Individual Experience.
15. The Social and Political Condition of Rome as Reconstructed from Cicero's Epistles.

The Horace K. White Prizes.

Established by Horace K. White, Esq., of Syracuse. To the most meritorious student in Veterinary Science, *Twenty Dollars*; to the second in merit, *Ten Dollars*.

HONORS.

I. Honors at Graduation for General Excellence.

Beginning with the year 1884, honors will be granted at graduation (subject to conditions stated below) to students whose general average in the studies required in their course is honorable.* These honors will be known as *honors for general excellence*, and will be recorded upon the commencement programme, and in the Register of the year following.

II. Honors for Distinguished Excellence in Special Subjects.

Beginning with the year 1883, honors will be granted (subject to stated conditions) for distinguished excellence in any of the following subjects: history, political science, French. German, Greek, Latin, mathematics, chemistry, physics, entomology.

These honors will be conferred by the Faculty, upon the recommendation of the department concerned. They will be known as *special honors in* ——. They will be recorded in the Register of the year following, and *final honors* will also be announced upon the commencement programme of the year in which they are conferred.

Students who desire to be admitted as candidates for these honors must give notice in writing to the Registrar within four-

* In the usage of the University, the word "honorable" denotes the highest grade of standing; the word "creditable" denotes the next lower grade.

teen days after the day of registration of the spring term. The special examinations for honors will be held in May.

These special examinations will be of two kinds: in certain departments, there will be but a single examination, which will be open to seniors and graduates. In certain other departments there will be, in addition to this, another examination preliminary to the final one, to be known as the mid-course examination, and to be open to sophomores and juniors, and to seniors who intend to be candidates for final honors after graduation.

Graduates of other colleges studying in Cornell University may, by vote of the Faculty, be admitted to become candidates for these honors.

General Requirements.

In order to become a candidate for these honors, the student must satisfy the following requirements:

1. He must have completed all the required studies of his course up to the beginning of the term in which the special examinations are held.

2. At the beginning of the term in which the special examinations are held, his average for his entire work in the studies of his course, exclusive of those in the department in which he seeks for honors, must be creditable.

3. His average for his entire work in the department in which he seeks for honors, up to the beginning of the term in which the special examinations are held, must be honorable.

4. If the department be one in which a mid-course examination is given, the applicant for final honors must have won the mid-course honors.

The candidate must pass with distinguished excellence a special examination upon subjects to be announced in advance, and present any thesis or undergo any other test that may be required of him.

Honors in special subjects will not be granted to a student whose work is unsatisfactory in any of the studies of his course during the term in which the special examinations are held.

The special requirements will be as follows:

Mid-course Honors.

History; Political Science.—The candidate must have passed, with an honorable average, the required work in Grecian, Roman,

and English history, and must pass, with distinguished excellence, a special examination upon a subject to be announced in advance.

The subject for 1884 is either of the following, at the option of the candidate:

(*a*) In Modern European History: Reformers before the Reformation.

(*b*) In English History: The reign of Elizabeth.

French; German.—The candidate must have passed, with an honorable average, the required work of the freshman and sophomore years, and must also pass, with distinguished excellence, a special examination upon the following subjects:

(*a*) Translation at sight from French or German.

(*b*) Translation from English into French or German.

(*c*) Translation from specified French or German authors.

The subjects for 1884 are, in French: Molière, Le Misanthrope; Bossuet, Discours sur l'Histoire Universelle, Troisième Partie; Orations funèbres de Henriette Marie de France et de Henriette Anne d'Angleterre; Xavier de Maistre, Voyage autour de ma Chambre. In German: Lessing's Laokoon, xxv chapters (omitting notes), Clarendon Press edition; Schiller's Wallenstein's Tod; Goethe's Leiden des Jungen Werthers.

Greek; Latin.—The candidate must have passed, with an honorable average, the required work of the freshman and sophomore years, together with the courses in Grecian and Roman history; and must also pass, with distinguished excellence, a special examination upon the following subjects:

(*a*) Translation at sight from the easier Greek or Latin authors.

(*b*) Translation from English into Greek or Latin.

(*c*) Translation of passages from specified Greek or Latin authors.

The subjects for 1884 are, in Latin: Virgil's Aeneid, Books IX and X; Livy, Book XXII. In Greek; Homer's Odyssey, Books V and VI; Herodotus, Book I.

Mathematics.—The candidate must have passed, with an honorable average, the required work of the freshman and sophomore years of the course in mathematics, with the exception of the subjects of descriptive geometry and mathematical essays, and must also pass, with distinguished excellence, a special examination upon the following subjects:

(*a*) The solving of geometric problems.

(*b*) Modern geometry and conic sections.

(*c*) Algebra, including the theory of equations and the elements of determinants.

(*d*) Plane trigonometry.

University instruction, covering many of the topics required for this examination, is given to extra classes for two hours a week through the freshman and sophomore years, and candidates for mid-course honors are advised to join these classes.

Final Honors.

History; Political Science.—The candidate must be in full and regular standing in the Course in History and Political Science, with an honorable average in the special studies of that course, and must have won mid-course honors. He must also write a satisfactory thesis upon a subject specified in advance, and pass, with distinguished excellence, a special examination upon that subject.

The subject for 1884 is either of the following, at the option of the candidate:

(*a*) In American History: Von Holst's Constitutional History of the United States.

(*b*) In Modern European History: The political development of Germany in the nineteenth century.

For 1885:

(*a*) In American History: England's commercial restrictions upon the colonies prior to the Stamp Act.

(*b*) In Modern European History: The building up of the absolute monarchy in France.

(*c*) In English History: The Constitutional issues involved in the English Revolution of 1688.

(*d*) In Political Economy: The financial and economical reforms of Alexander Hamilton.

(*e*) In International Law: The Alabama Question in its historical and its legal aspects.

French; German.—The candidate must have won mid-course honors, and have passed, with an honorable average, an amount of optional work of the junior and senior years equivalent to three hours a week through two years; he must also present a satisfactory thesis, and must pass, with distinguished excellence, an examination upon the following subjects:

(*a*) Translation at sight from French or German.
(*b*) Translation from English into French or German.
(*c*) The political and literary history of some specified period.
(*d*) Certain specified works of that period.

The subjects for 1884 are, in French: the political and literary history of France from the Restoration in 1814 to the Revolution of 1848; and the following authors: Victor Hugo (selections from Hernani, Nôtre Dame de Paris, and poems), Gautier (Histoire du Romantisme), De Musset (selections), Lamartine (selections). The subject of the thesis required is a comparison of the French classic and romantic dramas, including a study of the origin and development of both.

The subjects for 1885 are, in French: the political and literary history of France under the Second Empire, 1852–1870; and the following authors: Emile Augier (selections from drama); Victor Cherbuliez (selections from novels); Octave Feuillet; and Edmond About (selections). The subject of the thesis required is a study of the literature of the above period with special reference to the influence of the Romantic School.

In German the subjects for 1884 and 1885 are: the political and literary history of Germany from Lessing to the death of Schiller; and the following authors: Lessing (selections from the Hamburgische Dramaturgie), Goethe (Wahrheit und Dichtung, Books 6–20), the correspondence between Schiller and Goethe. The subject of the thesis required is the *Sturm und Drang* period.

Greek; Latin.—The candidate must have won mid-course honors, must have passed, with an honorable average, in three hours a week of optional work for each of the junior and senior years, if the subject be Greek, in four hours, if it be Latin; and must also pass, with distinguished excellence, a special examination upon the following subjects:

(*a*) Translation at sight from the more difficult Greek or Latin authors.

(*b*) Translation from English into Greek or Latin.

(*c*) Translation from specified Greek or Latin authors (with commentary upon the questions of history, archæology, grammar, and etymology involved).

The subjects in Greek for 1884 are: Sophocles' Oedipus Tyrannus and Plato's Gorgias; in Latin, Plautus' Rudens, Terence's Andria, and Cicero's De Natura Deorum, Book 1.

For final honors, 1885, in Greek: Æschylus' Agamemnon; Demosthenes' De Corona. In Latin: Plautus' Trinummus; Terence's Andria; the first two Philippics of Cicero.

Mathematics.—The candidate must have won mid-course honors, and must have passed, with an honorable average, in the junior work in the integral calculus, differential equations, and finite differences, and in the senior work in analytical mechanics; must pass, with distinguished excellence, an examination in special junior work in analytical geometry and calculus equivalent to two hours a term, and in special senior work, equivalent to four hours a term; and must also present a satisfactory thesis.

Chemistry; Physics.—The candidate must, by the beginning of his senior year, have completed, with an honorable average, the required chemical and physical work of the first three years of the course in chemistry and physics, together with not less than half the whole number of hours of laboratory work in chemistry and physics laid down in the fourth year of the course; and in the senior year, besides the remaining hours of chemical and physical laboratory work, he must devote at least seven additional hours a week to advanced work in either the chemical or the physical laboratory, for the preparation of a thesis based upon original investigation; and must pass, with distinguished excellence, an examination upon the subject of his special work.

Entomology.—The candidate must have passed, with an honorable average, the regular examinations in the subjects of zoölogy (vertebrate and invertebrate), microscopic technology, botany (the elementary course, including field-work), and entomology (the general course, as laid down in the sophomore and junior years in the course in Agriculture); and must also pass, with distinguished excellence, a special examination upon the results of an investigation of one or more special subjects to which he has devoted an amount of work equivalent to two hours a term for two years.

The subject for 1884 is to be selected from the following list:

(*a*) The internal anatomy of the larva of the corydalus cornutus Linn.

(*b*) The insects injurious to woolen goods in the United States.

(*c*) The insects infesting apple trees at Ithaca.

(*d*) The insects injurious to wheat in the north-eastern part of the United States.

STATE SCHOLARSHIPS.

1. By the Laws of the State of New York, Chapter 585, § 9, and Chapter 684, §1, the School Commissioners and city Boards of Education of the State of New York are obliged to hold a competitive examination in each year, in each county or city in the State, for the purpose of selecting scholars for the Free Scholarships in Cornell University.

2. The law thus imposing a duty on the School Commissioners and city Boards of Education is understood to *confer a right* upon every student who is qualified to enter the examination and desires to obtain the scholarship, to have such an examination held, and it is believed that any such candidate for the scholarship can enforce his right, if need be, by an appeal to the proper State authorities.

3. Only one examination can be held during the year in any one county or city.

4. This examination *ought to be* held in the summer after the close of the public schools for the season, and before the beginning of the Fall Term of the University.

5. Of the time and place at which the competitive examination is to be held, due public notice should be given at a reasonable time before the examination is to be held.

6. At the examination it is not *necessary* that more than one of the Commissioners or of the School Board should be present, though it is highly desirable that a majority of them, when there is more than one, should be present and take part in conducting the examination.

7. The laws of the State do not designate the studies in which the applicant shall be examined, nor have the Trustees of the University expressed any opinion on the subject; but it is manifestly unfair to impose an examination in any study required for admission to a course which only a part of the competitors expect to enter.

8. Persons to be admitted to the examination must have been educated in the academies and public schools of the State, and *in the county* in which they offer themselves for the competition.

9. It is not understood that the applicants must necessarily be residents of the county in which they seek the scholarship, but only that they should have attended an academy or public school long enough to be entitled to be regarded as having obtained their education, or at least a part of it, in the county. The length of time is not fixed by law.

10. Nor is it regarded as necessary that the applicants shall come from the different Assembly Districts in those counties in which there are more than one such District. And in deciding upon the merits of the competitors and awarding the certificates, no regard need be paid to the Assembly District in which the applicant may have his residence, or may have attended the academy or public school, although the certificate must name the District for which the appointment is made.

11. No student who has once been admitted to the University and received any instruction therein, may be admitted to examinations as a competitor.

12. But it is not understood by the Trustees that the fact that a student who is otherwise qualified to be a competitor and to receive the appointment, ought to be debarred from his right to enter the examination, in consequence of having finished his studies and been out of school for one or two years; especially if during this time he has been occupied in providing the means of defraying his expenses while attending upon the University. Nor do they think that the fact of his having been engaged out of the county during this time and for the purpose above mentioned ought to work to his disadvantage.

13. If, however, the student has been attending school, whether a public or a private school, out of the county, for the period which intervenes between his attendance upon the schools in the county and his application to be received as a competitor, this, it is thought, ought to exclude him from the examination.

14. The certificate of scholarship must in all cases be awarded on the basis of the competitive examination as above described, and not on any examination held otherwise or elsewhere, or on any testimonials obtained from any other source.

15. In all cases of contested or duplicate certificates, the

Trustees have decided and instructed their Treasurer to accept the first certificate that is in due form and granted by the proper authorities in the several counties in said State whereby free scholarships are granted to the said University. The University proposes to leave all questions as to the regularity of the proceedings and the rights of the respective parties that may be claimants for the certificate to be adjusted in the county from which the student comes and by the authorities that reside there.

16. In case any student to whom a certificate has been awarded has died, resigned his certificate, or been expelled from the University, a new certificate, which may state the facts in the case, may be given by the Commissioners or Board of Education of the county, to one of those who were present and competitors at the examination on which the certificate was originally awarded, always giving preference to competitors in the order of superiority of scholarship.

17. The certificates thus given are good for four years from the time when the examination was held. And in case of a new certificate, as above provided, the certificate will be accepted for only that portion of the four years which remains unexpired.

18. No allowance will be made in any case for absence or non-attendance upon the University by any student holding a certificate of State Scholarship. His certificate secures him free tuition for only that part of the four years during which he is in attendance upon his University duties.

19. It will be seen from the above statements that only one examination and only one appointment can be made for any one year for the same District. Hence, if no appointment is made for any one year at the appropriate time during the year, no appointment can be made for that year at any subsequent time.

20. No vacancy that can be filled ever arises from the neglect to appoint or the non-appointment of a scholar for any District. Vacancies that can be filled can arise only by the appointees having been removed from the University for some cause or other.

21. No appointment can be made from any one county in the State to fill a vacancy in any Assembly District of the State in another county.

ENTRANCE EXAMINATION PAPERS.

ENGLISH GRAMMAR.

1. Embody in a connected account the following particulars: (*a*) name in full, (*b*) birth-place, (*c*) age, (*d*) school or schools where fitted, (*e*) intended course of study, (*f*) purpose in seeking a college education.

2. Give an example of a simple, of a derivative, and of a compound noun.

3. Why are nouns inflected?

4. State the parts of speech that are invariable or indeclinable.

5. What form of expression can be substituted for the possessive case?

6. Define *demonstrative*, *antecedent*, *interrogative*, *cardinal*, *transitive*, *passive*, *co-ordinating*, as used in grammar.

7. Write out a complex sentence with a subordinate clause in the present tense, subjunctive mood, underlining the clause.

8. Give an example of an impersonal verb.

9. Give a synopsis of the preterit of *build*; write the simple, emphatic, and progressive forms, in all the moods.

10. Analyze the following:

"To fear the worst oft cures the worst."

11. Parse the preceding sentence.

12. Justify or correct the following sentences:

With rational beings nature and reason is the same thing.

You are to slowly raise the trap, while I hold the sack.

Charles let his dollar drop in the creek.

She is fairer but not so amiable as her sister.

To these precepts are subjoined a copious selection of rules.

I could not buy it nor borrow it.

Replevin is when suit is brought to recover property.

13. Write a composition on one of the following subjects:
A Day at a Fair. Prohibition. The Telephone.

14. Define and illustrate the different kinds of conjunctions.

15. Decline the relative pronouns.

16. What is comparison of adjectives? State and illustrate the various methods of indicating the different degrees.

17. Define an abstract noun; a collective noun; give illustrations.

II. GEOGRAPHY.

1. Draw an outline map of Asia, and show thereon (1) the principal rivers and mountain chains; (2) the political divisions and chief cities.

2.. Name the gulfs, seas, and bays, that border the coast of Asia.

3. Give some account of the Empire of China and state (1) its area; (2) its population; (3) its form of government; (4) its religion; (5) the chief industries of the people.

4. Name the five principal countries of Europe in the order of (1) their size; (2) their population; (3) their wealth; (4) the intelligence of their people, and their advancement in civilization.

5. Name the capitals of these five countries; give their populations, and their latitudes.

6. Give a general description of Africa; state its size, location, and physical characteristics.

7. State what parts of Africa are civilized, what parts are half civilized, and what parts are barbarous.

8. Draw an outline map of South America, and show its chief rivers, mountains, political divisions, and cities.

9. State what parts of South America have abundant rains, and what parts are dry; and give the reasons therefor.

10. Name the three principal political divisions of North America, and give their locations with reference to each other.

11. What states of the United States (including territories) may be called cotton states? what, grain states? what, mining states?

12. What part of the world's population is christian? what part is mohammedan? what part is buddhist?

III. PHYSIOLOGY.

1. Draw diagrams of the permanent teeth on one side of the upper jaw, and give their names. State the differences in number and character between milk teeth and permanent teeth.

2. Draw an outline diagram of the alimentary canal, and name its parts.

3. Of what is the diaphragm composed? Draw diagrams showing its condition before and after inspiration.

4. What digestive actions are performed by the gastric juice? What ones can it not perform?

5. Draw a diagram of the right side of the heart showing the vessels and valves, and give their names.

IV. ARITHMETIC.

1. Define: arithmetic, multiplication, a decimal fraction, percentage, square root.

2. Write the value, both in Arabic numerals and in words of

$$[\text{MDCCCLXXXIII} \div 16.\dot{6}] \times [(2.5 - 1.25) \div .0\dot{3}].$$

3. Add 387.5, 91.267, 5.608, .18, .009, 56.42,

$$1.2\tfrac{3}{4},\ \frac{6\,8}{7.5},\ \frac{.0\,1\,8}{5\,6.2\,5},\ \frac{3.5}{8.7\,5},\ \frac{8.8}{2.7\,5}.$$

4. Define simple and compound interest, and explain the difference between them.

If a boy be 17 years old to-day, what sum of money must be put at simple interest (to-day) so that it shall amount to $5000 when he is 21 years old, and what sum at compound interest, the rate being 6 per cent. in both cases?

5. If a field be a kilometre long and three hundred metres wide, find its area in acres.

6. Get the cube root of 1729 correct to three decimal places.

State the general rule for getting cube root, and give reasons therefor.

V. PLANE GEOMETRY.

1. Define: an acute angle, a triangle, a pentagon, two similar polygons, a circle, a line tangent to a circle at a given point, a fourth proportional to three given lines, a limit.

2. If two opposite sides of a quadrilateral be equal and parallel the figure is a parallelogram.

3. If a circle of given radius be tangent to a given straight line, find the locus of its centre.

4. If through a fixed point O, either within or without a given circle, two straight lines be drawn to cut the circle respectively in the points A, A' and B, B', then the rectangle of the segments OA, OA' equals the rectangle of the segments OB, OB'.

If the point O be without the circle and the line OAA' touch the circle, what relation have A and A'? What does the rectangle OA, OA' then become?

5. Find two straight lines in the ratio of the areas of two given polygons.

6. An equiangular polygon circumscribed about a circle is regular.

VI. ALGEBRA, THROUGH QUADRATICS.

1. Define: algebra, a coefficient, multiplication, the lowest common multiple of two numbers, involution, an index of a root, a rational number.

2. If $a=2$, $b=3$, $x=6$, $y=5$, find the value of

$$\sqrt[3]{(a+b)^2y}+\sqrt[3]{(a+x)(y-2a)}+\sqrt[3]{(y-b)^2a}.$$

3. Find the highest common measure of

$$2x^6-11x^2-9 \text{ and } 4x^5+11x^4+81.$$

4. The length of a field is twice its breadth; another field, which is 50 yards longer and 10 yards broader, contains 6800 square yards more than the former; find the length, breadth, and area of each field.

5. Given $x+y+z=a+b+c$

and $bx+cy+az=cx+ay+bz=a^2+b^2+c^2$;

find the values of x, y, z.

6. Show that $\dfrac{(27a^4-18a^2b^2-b^4)^2}{64a^2b^4}+\dfrac{(9a^2-b^2)^3(b^2-a^2)}{64a^2b^4}=b^2$.

7. Solve the quadratic equation $3x^2-10x=25$, and by aid of its roots resolve the expression $3x^2-10x-25$ into two integral factors.

VII. SOLID GEOMETRY AND CONIC SECTIONS.

1. A plane is determined: 1st, by a straight line and a point without that line; 2d, by two intersecting straight lines; 3d, by three points not in the same straight line; 4th, by two parallel straight lines.

2. Two rectangular parallelopipeds having equal altitudes are to each other as their bases.

3. Two triangles on the same sphere are either equal or symmetrical when two sides and the included angle of the one are respectively equal to two sides and the included angle of the other.

4. A frustum of any cone is equivalent to the sum of three cones whose common altitude is the altitude of the frustum, and whose bases are the lower base, the upper base, and a mean proportional between the bases of the frustum.

5. To find two straight lines in the ratio of the volumes of two given cubes.

6. A perpendicular from either focus of an ellipse to any tangent, intersects the tangent on the circumference of a circle whose diameter is the transverse axis of the ellipse.

VIII. HIGHER ALGEBRA.

1. Sum to 10 terms the series $1\frac{3}{5}$, $1\frac{1}{5}$, $\frac{1}{5}$, etc.

2. Find the first term with a negative coefficient in the expansion of

$$(1+\tfrac{1}{2}x)^{-\frac{1}{3}\frac{1}{1}}.$$

3. Develop $\dfrac{1-2x+3x^2}{1+2x+3x_2}$ to 4 terms by the method of undetermined coefficients.

4. Convert $\frac{1}{7}\frac{9}{1}\frac{7}{1}\frac{6}{10}\frac{3}{5}$ into a continued fraction and find three convergents.

5. Transform the equation $\frac{2}{3}x^3-\frac{3}{5}x^2+\frac{2}{7}x-3=0$, into another equation in which the coefficients are whole numbers and that of the first term is unity.

6. By Horner's method find one root of the equation

$x^2-7x+7=0$ to two places of decimals.

IX. TRIGONOMETRY.

1. If the tangent of an angle be $\frac{3}{5}$, find all the other trigonometric functions of the angle.

2. Prove that $\sin 3A \operatorname{cosec} A-\cos 3A \sec A=2$.

3. Prove any two of the formulae which may be written by Napier's two rules and explain how a spherical right triangle may be solved.

4. Prove any one of Napier's analogies.

5. Prove that if θ be the circular measure of a positive angle less than a right angle the limit of the ratio $\sin\theta : \theta$, when θ is indefinitely diminished, is unity; but if degree measure be used, then

$$\lim \frac{\sin n^\circ}{n}=\frac{\pi}{180}.$$

6. In any plane triangle ABC given the side $a=9459.31$ feet,

the side $b=8032.28$ feet, and the included angle C equal to 55° 30′ 26″, find the side c and the angles A and B.

X. FRENCH.

Translate into French the following sentences:

1. If you see my sister, do not forget to tell her what I have told you, but do not show her the letter; I shall send it to her to-morrow.

2. My friend, I ask you to accompany me to-morrow to the country; promise it to me.

3. It was this river on whose banks the Romans gained their first victories.

4. Alexander said one day to Diogenes: "I see that you want many things; I should be glad to assist you; ask of me anything you like."

5. Spring and autumn are two fine seasons; the former gives us flowers and the latter fruits.

6. I shall depart in a fortnight for America; the journey will be effected in twelve days. I shall stay a week in New York, and I expect to be back to England in half a year.

7. Did it often rain when you were in Switzerland? No, but it used to snow very often.

8. What will you have, wine or water? I will take a glass of water; I never drink wine.

9. My brother's books are on the table. Where are yours and your sister's?

10. The room in which I live is eight feet high, and fourteen wide. How large is yours?

11. Should my friend bring me my hat, tell him to put it in my room, and call on my mother, who wants to see him.

12. The letters which I wrote were sent to the post-office an hour ago.

Translate into English:

Charles VII *fit* deux choses qui affermirent et régulerisèrent les conquêtes de ses prédécesseurs. Il *rendit* la taille et l'armée permanentes.

Par l'armée permanente, le roi eut désormais entre les mains une force tout à lui, et toujours disponible pour *réduire* les nobles. Auparavant, l'armée était la réunion des seigneurs, *venus* à l'appel du roi, pour servir durant un temps assez court, déterminé par la loi féodale.

Ce temps expiré, les seigneurs se séparaient, rentraient chez eux, l'armée était dissoute. Et puis, naturellement, cette armée de l'esprit féodal n'était pas très-maniable. Supposez que le roi *voulut* soumettre un de ses grands vassaux révolté; il arrivait d'abord que tous les petits seigneurs dépendant de ce grand vassal, au lieu de se rendre à l'armée du roi, *allaient* au contraire composer l'armée du grand vassal, et soutenir la révolte. Ceux mêmes qui venaient au roi ne se souciaient pas, pour la plupart, de lui donner un triomphe complet; ils *craignaient* de trop vaincre, sentant bien qu'il y avait entre eux et le vassal communauté d'intérêts. Ainsi l'armée féodale n'était ni commode ni sûre pour les rois; tandisque l'armée permanente, composée d'hommes qui se destinaient à vivre de la solde du roi, qui étaient sortis de leur foyer et de leur famille pour toujours, n'avait d'autre intérêt que du maître qui payait.

—LACOMBE, *Petite Histoire.*

* * * * * * *

L'homme n'est qu'un roseau, le plus faible de la nature; mais c'est un roseau pensant. Il ne *faut* pas que l'univers entier s'arme pour l'écraser. Une vapeur, une goutte d'eau suffit pour le tuer. Mais quand l'univers l'écraserait, l'homme serait encore plus noble que ce qui le tue, parce qu'il *sait* qu'il meurt; et l'avantage que l'univers a sur lui, l'univers n'en sait rien.

—PASCAL.

Give the first pers. sing. of indic. pres., imperfect preterite conditional, and imperfect subjunctive of verbs in italic.

XI. GERMAN.

Translate one of the passages, and answer the questions upon both of them.

I.

Es war ein Mädchen faul und wollte nicht spinnen, und die Mutter mochte sagen, was sie wollte, sie konnte es nicht dazu bringen. Endlich übernahm die Mutter einmal Zorn und Ungeduld, dass sie ihm Schläge gab, worüber es laut zu weinen anfing. Nun fuhr gerade die Königin vorbei, und als sie das Weinen hörte, liess sie anhalten, trat in das Haus und fragte die Mutter, warum sie ihre Tochter schlüge, dass man draussen auf der Strasse das Weinen hörte. Da schämte sich die Frau, dass sie die Faulheit ihrer Tochter offenbaren sollte, und sprach: "Ich kann sie nicht vom Spinnen abbringen, sie will

immer und ewig spinnen, und ich bin arm und kann den Flachs nicht herbeischaffen." Da antwortete die Königin: "Ich höre nichts lieber als Spinnen, und bin nicht vergnügter, als wenn die Räder schnurren; gebt mir eure Tochter mit ins Schloss, ich habe Flachs genug; da soll sie spinnen, so viel sie Lust hat." Die Mutter war's von Herzen gern zufrieden, und die Königin nahm das Mädchen mit. Als sie ins Schloss gekommen waren, führte sie es hinauf zu drei Kammern, die lagen von unten bis oben voll vom schönsten Flachs.

1. Give, with definite article, the nominative singular, genitive singular, and nominative plural of the nouns: *Mädchen* (1), *Schläge* (4), *Königin* (5), *Haus* (6), *Tochter* (7), *Strasse* (8), *Schloss* (15), *Herzen* (16).

2. Inflect throughout, singular and plural, *our older brother*.

3. Write the ordinal numbers from one to twenty-one.

4. Mention all the possessive adjectives, with their meanings.

5. State distinctly the different ways of forming the principal parts of verbs, with examples.

6. Define a separable, an inseparable, and a variable compound verb, with principal parts and definitions of each.

7. Give the principal parts of the verbs: *war* (1), *wollte* (1) *mochte* (2), *konnte* (2), *übernahm* (3), *anfing* (5), *fuhr vorbei* (5), *liess* (6), *trat* (6), *schlüge* (7), *führte* (18), *lagen* (19).

8. Synopsis in active and passive, indicative, subjunctive, and conditional, third, singular, of *abbringen* (10).

9. Explain the position of *waren* (18), *führte* (18).

10. What kind of subordinate sentences are respectively introduced by: *warum* (7), *dass* (7)?

II.

Wenn wir nun auf das ungeheure Gedränge in dem Corso zurückblicken, und die für einen Augenblick nur gereinigte Rennbahn gleich wieder mit Volk überschwemmt sehen, so scheinet uns Vernunft und Billigkeit das Gesetz einzugeben, dass eine jede Equipage nur suchen solle, in ihrer Ordnung das nächste ihr bequeme Gässchen zu erreichen und so nach Hause zu eilen. Allein es lenken gleich nach abgeschossenen Signalen einige Wagen in die Mitte hinein, hemmen und verwirren das Fussvolk, und weil in dem engen Mittelraume es einem einfällt, hinunter, dem andern hinauf zu fahren, so können beide nicht von der Stelle, und hindern oft die Ver-

nünftigern, die in der Reihe geblieben sind, auch vom Platz zu kommen. Wenn nun gar ein zurückkehrendes Pferd auf einen solchen Knoten trifft, so vermehrt sich Gefahr, Unheil und Verdruss von allen Seiten. Und doch entwickelt sich diese Verwirrung, zwar später, aber meistens glücklich. Die Nacht ist eingetreten, und ein jedes wünscht sich zu einigen Ruhe Glück.

1. Explain the derivation of the following words, and state clearly the force of each derivative element: *Gedränge* (1), *gereinigte* (2), *Stelle* (11), *Vernünftigern* (11), *glücklich* (16).

2. Give the English cognates of ten words in this passage.

XII. LATIN.

[For the courses in Arts, Literature, Philosophy, and History and Political Science.]

Caesar.

Translate (at sight):

Caesar in eam spem venerat, se sine pugna et sine vulnere suorum rem conficere posse, quod re frumentaria adversarios interclusisset. Cur etiam secundo proelio aliquos ex suis amitteret? cur vulnerari pateretur optime de se meritos milites? cur denique fortunam periclitaretur? praesertim cum non minus esset imperatoris consilio superare quam gladio. Movebatur etiam misericordia civium, quos interficiendos videbat: quibus salvis atque incolumibus rem obtinere malebat. B. C. I, 72.

Compare *optime*. Decline *vulnere*, *quibus salvis*.

Give the principal parts of *amitteret*, *pateretur*, *interficiendos*, *obtinere*. Inflect the last two verbs in the future indicative active and the imperfect subjunctive passive.

Give the reason for the mood and tense of *posse*, *interclusisset*; for the case of *re*, *imperatoris*, *quibus*. What would *cur amitteret* be in the direct discourse, and why?

Virgil.

Translate:

Quo te, Moeri, pedes? an, quo via ducit, in urbem?
O Lycida, vivi pervenimus, advena nostri,
quod nunquam veriti sumus, ut possessor agelli
diceret 'haec mea sunt: veteres migrate coloni.'
nunc victi, tristes, quoniam Fors omnia versat,
hos illi—quod nec vertat bene—mittimus haedos.

Ecl. IX, 1-6.

Translate:

Bina boum vobis Troia generatus Acestes
dat numero capita in navis; adhibete penates
et patrios epulis et quos colit hospes Acestes.
praeterea, si nona diem mortalibus almum
Aurora extulerit radiisque retexerit orbem,
prima citae Teucris ponam certamina classis;
quique pedum cursu valet et qui viribus audax
aut iaculo incedit melior levibusque sagittis,
seu crudo fidit pugnam committere caestu,
cuncti adsint meritaeque expectent praemia palmae.
ore favete omnes et cingite tempora ramis.'

Aen. V, 61–71.

Where were the Trojans at this time? State briefly the principal incidents of the book.

Account for the use of *bina*; for the case of *epulis*, *cursu*, *caestu*.

Give the derivation of *certamina*, *audax*, *iaculo*, *expectent*, giving prefix (if any), root, and suffix or suffixes employed to form the stem from the root, with the meaning of each of these parts.

Write out the last two verses above, dividing into feet and marking the cæsuras, and give the rules for the length of all penultimate and final syllables.

CICERO.

[Take I, if you have read the oration, otherwise 2.]

1. Translate:

Hic miramur hunc hominem tantum excellere ceteris, cuius legiones sic in Asiam pervenerint, ut non modo manus tanti exercitus, sed ne vestigium quidem cuiquam pacato nocuisse dicatur? Iam vero, quemadmodum milites hibernent, quotidie sermones ac litterae perferuntur; non modo, ut sumptum faciat in militem, nemini vis affertur, sed ne cupienti quidem cuiquam permittitur. Hiemis enim, non avaritiae perfugium maiores nostri in sociorum atque amicorum tectis esse voluerunt.

Manil, XIII.

What is the subject of the oration?

Distinguish between the uses of the genitive in *hiemis* and *avaritiae*: between the uses of the subjunctive in *dicatur* and *faciat*.

2. Translate:

Introduxi Volturcium sine Gallis: fidem ei publicam iussu

senatus dedi; hortatus sum, ut ea, quae sciret, sine metu indicaret. Tum ille dixit, cum vix se ex magno timore recreasset, a P. Lentulo se habere ad Catilinam mandata et litteras, ut servorum praesidio uteretur et ad urbem quam primum cum exercitu accederet: id autem eo consilio, ut, cum urbem ex omnibus partibus, quemadmodum descriptum distributumque erat, incendissent caedemque infinitam civium fecissent, praesto esset ille, qui et fugientes exciperet et se cum his urbanis ducibus coniungeret.

Cat. III, 4.

Account for the mood and tense of *sciret*, *coniungeret*.

Translate (at sight):

Quonam meo fato, patres conscripti, fieri dicam, ut nemo his annis viginti rei publicae fuerit hostis, qui non bellum eodem tempore mihi quoque indixerit? Nec vero necesse est quemquam a me nominari: vobiscum ipsi recordamini. Mihi poenarum illi plus quam optarem dederunt: te miror, Antoni, quorum facta imitere, eorum exitus non perhorrescere.

Phil. II, 1.

Account for the mood and tense of *indixerit*: for the case of *poenarum*.

Under what circumstances were the Philippics of Cicero composed, and in what year?

COMPOSITION.

Translate into Latin:

When Brutus entered the forum to address the people, he could scarcely be heard in the tumult. Every one was frightened, for no one could forget the murdered Caesar, nor did any one know who would next be put to death. The liberators, who were forced to take refuge in the Capitol, were urged [1] by Cicero not to treat with Antony. But they trusted in his professions of faith and hoped to win [2] him over to themselves.

[1] Suadeo. [2] Conciliare.

[For the course in Natural History.]

CAESAR.

1. Translate:

Prima luce productis omnibus copiis, duplici acie instituta, auxiliis in mediam aciem coniectis, quid hostes consilii caperent exspectabat. Illi, etsi propter multitudinem et veterem belli gloriam paucitatemque nostrorum se tuto dimicaturos existimabant, tamen tutius esse arbitrabantur, obsessis viis, commeatu intercluso, sine ullo vulnere victoria potiri: et, si propter inopiam rei fru-

mentariae Romani sese recipere coepissent, impeditos in agmine et sub sarcinis infirmiore animo adoriri cogitabant.

B. G. III. 24.

Compare *prima, tutius.* Decline *acie, veterem, vulnere.*

Give the principal parts of *productis, instituta, adoriri.* Inflect *productis* in the future indicative passive, and *instituta* in the present subjunctive passive. Give the reason for the case of *luce, copiis, consilii.*

2. Translate:

Hac oratione habita, mirum in modum conversae sunt omnium mentes, summaque alacritas et cupiditas belli gerendi innata est, princepsque decima legio per tribunos militum ei gratias egit, quod de se optimum iudicium fecisset; seque esse ad bellum gerendum paratissimam confirmavit. Deinde reliquae legiones per tribunos militum et primorum ordinum centuriones egerunt, uti Caesari satisfacerent; se neque unquam dubitasse neque timuisse, neque de summa belli suum iudicium, sed imperatoris esse, existimavisse. Eorum satisfactione accepta, et itinere exquisito per Divitiacum, quod ex aliis ei maximam fidem habebat, ut milium amplius quinquaginta circuitu locis apertis exercitum duceret, de quarta vigilia, ut dixerat, profectus est.

B. G. I. 41.

Give the reason for the mood and tense of *fecisset, satisfacerent, existimavisse, habebat.*

3. Translate (at sight):

Caesar in eam spem venerat, se sine pugna et sine vulnere suorum rem conficere posse, quod re frumentaria adversarios interclusisset. Cur etiam secundo proelio aliquos ex suis amitteret? cur vulnerari pateretur optime de se meritos milites? cur denique fortunam periclitaretur? praesertim cum non minus esset imperatoris consilio superare quam gladio. Movebatur etiam misericordia civium, quos interficiendos videbat: quibus salvis atque incolumibus rem obtinere malebat.

B. C. I. 72

XIII. GREEK.

I.

Attic Prose.

Translate:

Ἐντεῦθεν ὑπολαβὼν Ἀγασίας Στυμφάλιος εἶπεν· Ἀλλὰ τούτῳ γε οὔτε τῆς Βοιωτίας προσήκει οὐδὲν οὔτε

τῆς Ἑλλάδος παντάπασιν· ἐπεὶ ἐγὼ αὐτὸν εἶδον ὥσπερ Λυδὸν ἀμφότερα τὰ ὦτα τετρυπημένον. Καὶ εἶχεν οὕτως. Τοῦτον μὲν οὖν ἀπήλασαν· οἱ δ' ἄλλοι παρὰ τὰς τάξεις ἰόντες ὅπου μὲν στρατηγὸς σῶος εἴη τὸν στρατηγὸν παρεκάλουν· ὁπόθεν δὲ οἴχοιτο τὸν ὑποστρατηγόν· ὅπου δ' αὖ λοχαγὸς σῶος εἴη τὸν λοχαγόν. Ἐπεὶ δὲ πάντες συνῆλθον, εἰς τὸ πρόσθεν τῶν ὅπλων ἐκαθέζοντο· καὶ ἐγένοντο οἱ συνελθόντες στρατηγοὶ καὶ λοχαγοὶ ἀμφὶ τοὺς ἑκατόν. Ὅτε δὲ ταῦτα ἦν σχεδὸν μέσαι ἦσαν νύκτες. Ἐνταῦθα Ἱερώνυμος Ἠλεῖος πρεσβύτατος ὢν τῶν Πρωξένου λοχαγῶν ἤρχετο λέγειν ὧδε· Ἡμῖν, ὦ ἄνδρες στρατηγοὶ καὶ λοχαγοί, ὁρῶσι τὰ παρόντα ἔδοξε καὶ αὐτοῖς συνελθεῖν καὶ ὑμᾶς παρακαλέσαι, ὅπως βουλευσαίμεθα εἴ τι δυναίμεθα ἀγαθόν. Λέξον δ', ἔφη, καὶ σύ, ὦ Ξενοφῶν, ἅπερ καὶ πρὸς ἡμᾶς. —XENOPHON, *Anabasis*, III, 1, 31.

Define *enclitic* and *proclitic*, giving examples from the above passage. Give the nom. and gen. sing. of ὦτα and τάξεις, with the rule for the accentuation of those forms. Decline ἐγώ through all numbers. Compare μέσαι.

Give the principal parts of εἶδον, ἀπήλασαν, συνῆλθον, ἔδοξε, δυναίμεθα. How is the present of ἐγένοντο formed from the verb stem? Give the general rule for the accentuation of verbs, and point out some exceptions to it that occur in the above passage.

Give the reason for the opt. in οἴχοιτο, βουλευσαίμεθα, δυναίμεθα. Recount briefly the events immediately preceding those described in this passage of the Anabasis.

Translate (at sight):

Ἀγησίλαος τοίνυν ἔτι μὲν νέος ὢν ἔτυχε τῆς βασιλείας· ἄρτι δὲ ὄντος αὐτοῦ ἐν τῇ ἀρχῇ, ἐξηγγέλη ὁ βασιλεὺς ὁ Περσῶν ἀθροίζων καὶ ναυτικὸν καὶ πεζὸν πολὺ στράτευμα ὡς ἐπὶ τοὺς Ἕλληνας· βουλευομένων δὲ περὶ τούτων Λακεδαιμονίων καὶ τῶν συμμάχων, Ἀγησίλαος ὑπέστη, ἐὰν δῶσιν αὐτῷ τριάκοντα μὲν Σπαρτιατῶν, δισχιλίους δὲ νεοδαμώδεις (freedmen), εἰς ἑξακισχιλίους δὲ τὸ σύνταγμα τῶν συμμάχων, διαβήσεσθαι εἰς τὴν Ἀσίαν καὶ πειράσεσθαι εἰρήνην ποιῆσαι,

ἢ ἂν πολεμεῖν βούληται ὁ βάρβαρος, ἀσχολίαν (too much to do) αὐτῷ παρέξειν στρατεύειν ἐπὶ τοὺς Ἕλληνας. —XENOPHON, *Agesilaus*, I, 6.

II.

COMPOSITION.

If King Agesilaus had not crossed over into Asia at that time, the Persians would have made an expedition against the Greeks with a great force of ships and men.

III.

HOMER.

Translate:

ἄλλος δ' ἄλλῳ ἔρεζε θεῶν αἰειγενετάων,
εὐχόμενος θάνατόν τε φυγεῖν καὶ μῶλον Ἄρηος.
αὐτὰρ ὁ βοῦν ἱέρευσεν ἄναξ ἀνδρῶν Ἀγαμέμνων
πίονα, πενταέτηρον, ὑπερμενεῖ Κρονίωνι·
κίκλησκεν δὲ γέροντας ἀριστῆας Παναχαιῶν,
Νέστορα μὲν πρώτιστα καὶ Ἰδομενῆα ἄνακτα,
αὐτὰρ ἔπειτ' Αἴαντε δύω καὶ Τυδέος υἱόν,
ἕκτον δ' αὖτ' Ὀδυσῆα, Διὶ μῆτιν ἀτάλαντον.
αὐτόματος δέ οἱ ἦλθε βοὴν ἀγαθὸς Μενέλαος·
ἤδεε γὰρ κατὰ θυμὸν ἀδελφεὸν ὡς ἐπονεῖτο.
βοῦν δὲ περιστήσαντο, καὶ οὐλοχύτας ἀνέλοντο·
τοῖσιν δ' εὐχόμενος μετέφη κρείων Ἀγαμέμνων.
Ζεῦ κύδιστε, μέγιστε, κελαινεφές, αἰθέρι ναίων,
μὴ πρίν ἐπ' ἠέλιον δῦναι, καὶ ἐπὶ κνέφας ἐλθεῖν,
πρίν με κατὰ πρηνὲς βαλέειν Πριάμοιο μέλαθρον
αἰθαλόεν, πρῆσαι δὲ πυρὸς δηΐοιο θύρετρα,
Ἕκτόρεον δὲ χιτῶνα περὶ στήθεσσι δαΐξαι
χαλκῷ ῥωγαλέον· πολέες δ' ἀμφ' αὐτὸν ἑταῖροι
πρηνέες ἐν κονίῃσιν ὀδὰξ λαζοίατο γαῖαν.

—*Iliad*, book II.

Where formed (tense, mood, voice), and from what verbs, are ἤδεε, περιστήσαντο, ἀνέλοντο, λαζοίατο? Give the Attic form of these.—Explain the use of the inf. in l. 413, and the opt. in l. 418.—Scan ll. 400, 404, 410, and explain the quantity of the final syllable of ἄλλῳ (in l. 400), γέροντας, οὐλοχύτας.

FIFTEENTH ANNUAL COMMENCEMENT.

JUNE 21, 1883.

I. THESES OF CANDIDATES FOR A BACCALAUREATE DEGREE.

Theses Presented to the Public.

1. JOHN LOVEJOY PRATT—*Oration*—Some Reforms of the Czar Alexander II.

2. DE WITT HIRAM MCGRAW—*Thesis in Botany*—Transpiration in Plants.

3. CLARA MARIA SMITH—*Dissertation*—Masterpieces as Models in Literature and Art.

4. CHARLES HENRY ANDERSON—*Oration*—Metternich and His Policy.

5. HARRY NATT HOFFMAN—*Thesis in Horticulture*—The Pear-Blight.

6. HERBERT CHARLES ELMER—*Oration*—The Limitation of Facts.

7. GEORGE HENRY THAYER—*Oration*—Alexander Hamilton. the Statesman.

8. ALBERT FRANKLIN MATTHEWS—*Essay*—Chimes and the Art of Ringing them.

9. ASA ALLING ALLING—*The Woodford Oration*—Cromwell's and Gladstone's Policy towards Ireland.

Theses Receiving Honorable Mention.

10. CHARLES IRVING AVERY—The Mormon Question.

11. EDWARD FITCH CUSHING—General Grant's Overland Campaign.

12. EDWIN DERYEA—Determination of Latitude.

13. James Hillhouse Fuertes—Review of a Wrought Iron Railroad Bridge.

14. Frederic Arthur Holton—The Application of Electrolysis and of Pemberton's Method for the Determination of Phosphoric Acid in the Technical Analysis of Iron.

15. Harry Edgar Longwell—The Development of the Steam Engine as Influenced by the Mechanical Theory of Heat.

16. Edwin Place—The Weston Dynamo.

17. Adaline Eldred Prentiss—The Germ History of Man.

18. Charles Smith Prosser—The Geology and Comparative Palæontology of Brookfield, N. Y.

19. George Cartwright Raynor—Christianity as a Factor in the Evolution of Society.

20. Fred Lewis Rœhrig—Sanitary Precautions in House Building.

21. Frank Sherman Washburn — Improved Railway Alignment.

II. THESES OF CANDIDATES FOR A SECOND DEGREE.

1. Daniel Wheeler Bowman, B.C.E.—*In Civil Engineering*—Viaducts.

2. Robert Packer Green, B.C.E.—*In Civil Engineering*—Wrought Iron Bridge Details.

3. Anna Marilla Johnson, A.B.—*In Literature*—"Pierce the Ploughman's Crede" as an Exponent of the Church of the Times.

4. George Henry Johnson, B.S.—*In Mathematics*—Imaginary Quantities.

5. Leland Ossian Howard, B.S.—*In Natural History*—The Characters of the the Chalcididæ.

6. Essie Josephine Watson, A.B.—*In Literature*—Chaucer as a Satirist and Humorist.

III. PRIZES AWARDED.

The Woodford Prize in Oratory.

To Asa Alling Alling.

The Horace K. White Prizes in Veterinary Science.

The first to . . . . . Charles John Walch
The second to . . . . . William Christopher Krauss

Dr. Law's Prize in Veterinary Science.

To Herman Woodworth Smith.

IV. DEGREES CONFERRED.

Bachelors of Arts.

Curtis, Charles Locke,
Diefendorf, Mary Riggs,
Dowling, Eunice,
Dwelle, William Delafield,
Elmer, Herbert Charles,
Marshall, Holmes,
Matthews, Albert Franklin,
McGraw, De Witt Hiram,
Wilcox, Fred Clarence,
Woodruff, Cora Eliza.

Bachelors of Literature.

Anderson, Charles Henry,
Boulton, Jessie Mary,
Crooker, Edward Henry,
Humphries, John Henry,
Pratt, John Lovejoy,
Prentiss, Evarts Lincoln,
Runyon, Frank Willits,
Smith, Clara Maria.

Bachelors of Philosophy.

Alling, Asa Alling,
Cushing, Edward Fitch,
Doubleday, Julia Louisa,
Eaton, William Moser,
Mapes, Arlington.

In History and Political Science.

Browning, Charles Ross,
Southwick, John Leonard.

Bachelors of Science.

In Science and Letters.

Avery, Charles Irving,
Avery, James Carrington,
Boyer, Lyman Fremont,
Brainard, George Austin,
Chase, Charles Curry,
Downing, Elizabeth,
Ehrman, Harry Friedman,
Lyon, John,
Maxwell, Emma Eliza,
Patterson, Roswell Henry,
Payne, Lewis Taber,
Preswick, Eugene Henry,
Raynor, George Cartwright
Smith, Delano Eugene,
Smith, Herman Woodworth,
Sullivan, Frank Robert,
Thayer, George Henry,
Tinsley, Henry Greenwood.

In Science.

Prosser, Charles Smith.

In Chemistry and Physics.

Holton, Frederic Arthur.

In Natural History.

Prentiss, Adaline Eldred.

Bachelors of Agriculture.

Hoffman, Harry Natt,
Wilcox, Fred Elmer.

Bachelors of Architecture.

Rhodes, Frances, Rœhrig, Fred Lewis.

Bachelors of Mechanical Engineering.

Booth, Irving Edward, Place, Edwin,
Longwell, Harry Edgar, Roberts, Willis Markel,
Ruggles, William Benjamin.

Bachelors of Civil Engineering.

Beye, John Charles, Pearson, Edward Jones,
Duryea, Edwin, Reed, James William,
Ewing, William Bion, Sheldon, Daniel Corydon,
Fuertes, James Hillhouse, Turner, Ebenezer Tousey,
Page, William Henry, Washburn, Frank Sherman.

Masters of Science.

Johnson, George Henry, B.S., Howard, Leland Ossian, B.S.

Masters of Arts.

Johnson, Anna Marilla, A.B., Watson, Essie Josephine, A.B

Civil Engineers.

Green, Robert Packer, B.C.E., Bowman, Daniel Wheeler, B.C.E

V. MID-COURSE HONORS AT COMMENCEMENT, 1883.

Emma Neal Bassett, ...	Latin
Ludlow Eliakim Lapham, ...	French
Henry Jay Patten, ...	History
Harry Laurence Shively, . . .	German and French
Andrew Curtis White, A.B., . .	Greek and Latin

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