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UNIVERSITY CALENDAR FOR 1893–1894.

1893.

Sept. 18, Monday, Entrance Examinations, College, begin, 9 A.M.
"  22, Friday, Announcement of Results of Entrance Examinations, 12 M.
"  29, Friday, First Term begins: College, 10 A.M.

Oct. 2, Monday, Session begins: Departments of Medicine, Dentistry, Veterinary Medicine and Auxiliary Medicine, 12 M.

Nov. 29, Wednesday, Thanksgiving Recess begins: College, 5 P.M.

Dec. 4, Monday, First Term begins: Department of Law, 4 P.M.

1894.

Jan. 4, Thursday, Christmas Recess begins: College and Department of Law, 5 P.M. Department of Medicine, 6.30 P.M.; Departments of Dentistry and Veterinary Medicine, 5.30 P.M.

Feb. 1, Thursday, Thanksgiving Recess begins: College, 5 P.M.

Mar. 21, Wednesday, Thanksgiving Recess ends, 9 A.M.

April 27, Friday, Christmas Recess ends, 9 A.M., Departments of Medicine, Dentistry and Veterinary Medicine.

May 5, Tuesday, Easter Recess begins: College, 5 P.M.

June 6, Wednesday, Easter Recess ends, 9 A.M.

July 26, Friday, Last day for receipt of Theses and Prize Essays, College.

Aug. 5, Tuesday, Commencement: Departments of Medicine and Dentistry.

Aug. 6, Wednesday, Announcement of Results of Examinations, College, 10 A.M.
June 7, Thursday, Commencement: College and Departments of Law, Veterinary Medicine and Philosophy, 11 A.M.

" 11, Monday, Entrance Examinations begin: College, 9 A.M.

" 11, Monday, Entrance Examinations: Departments of Medicine and Veterinary Medicine.

" 14, Thursday, Examinations for Advanced Standing: College, 9 A.M.

" 15, Friday, Announcement of Results of Entrance Examinations: College, 12 M.

SUMMER VACATION.

Sept. 17, Monday, Entrance Examinations begin: College, 9 A.M.

" 21, Friday, Announcement of Results of Entrance Examinations, 12 M.

" 26, Wednesday, Competitive Examination for Medical Scholarships, 12 Noon.

" 26, Wednesday, Registration of all Students, College.

" 27, Thursday, Examinations for Admission to Advanced Standing and Re-examinations of Undergraduates: Departments of Medicine and Dentistry, 12 M.

" 28, Friday, Entrance Examination: Departments of Medicine and Veterinary Medicine, 12 M.

Oct. 1, Monday, First Term begins: College and Department Philosophy, 10 A.M.

" 1, Monday, Session begins: Departments of Medicine, Dentistry, Veterinary Medicine and Auxiliary Medicine, 12 M.

" 1, Monday, First Term begins: Department of Law.

Nov. 28, Wednesday, Thanksgiving Recess begins: All Departments, 5 P.M.

Dec. 3, Monday, Thanksgiving Recess ends, 9 A.M.

Dec. 21, Friday, Christmas Recess begins: College and Department of Law, 5 P.M. Departments of Medicine, Dentistry and Veterinary Medicine, 6.30 P.M.

1895.

Jan. 3, Thursday, Christmas Recess ends: All Departments, 9 A.M.

" 31, Thursday, First Term ends: College and Department of Law.
A pamphlet, called: Proposals Relative to the Education of Youth in Pennsylvania, written in 1749 by Dr. Franklin, led to an association by certain citizens of Philadelphia, for the purpose of raising to the dignity of an Academy the Charitable School which had been established in 1740, and which was then struggling under a debt upon the building erected for its use and the accommodation of the celebrated preacher Whitefield. A Board of Trustees was constituted, to whom the school and buildings were transferred upon their assuming the original trusts, and in 1751 the Academy, consisting of an English, a Mathematical, and a Latin School, each under a Master, with subordinate tutors and ushers, was formally opened. So successful was the undertaking that in two years the Trustees applied to the Proprietors for a Charter, which was thus granted:

THOMAS PENN and RICHARD PENN, true and absolute proprietors and governors in chief of the province of Pennsylvania and counties of Newcastle, Kent and Sussex, on Delaware, To all persons to whom these presents shall come, greeting: Whereas, the well-being of a society depends on the education of their youth, as well as, in great measure, the eternal welfare of every individual, by impressing on their tender minds principles of morality and religion, instructing them in the several duties they owe to the society in which they live, and one towards another, giving them the knowledge of languages, and other parts of useful learning necessary thereto, in order to render them serviceable in the several public stations to which they may be called. And whereas, it hath been represented to us by Thomas Lawrence, William Allen, John Inglis, Tench Francis, William Masters, Lloyd Zachary, Samuel M'Call, junior, Joseph Turner, Benjamin Franklin, Thomas Leech, William Shippen, Robert Strettell, Philip Syng, Charles Willing, Phineas Bond, Richard Peters, Abraham Taylor Thomas Bond, Joshua Maddox, William Plumsted, Thomas White, William Coleman, Isaac Norris, and Thomas Cadwalader, of our city of Philadelphia, gentlemen, that for the erecting, establishing, and maintaining an academy within our said city, as well to instruct youth for reward, as poor children whose indigent and helpless circumstances
demanded the charity of the opulent part of mankind, several benevolent and charitable persons have generously paid, and by subscriptions promised hereafter to pay, into their hands as trustees, for the use of the said academy, divers sums of money, which sums already paid, they, the said trustees, have expended in the purchase of lands well situated, and a building commodious for the uses aforesaid, within our said city in maintaining an academy there as well for the instruction of poor children on charity, as others whose circumstances have enabled them to pay for their learning, for some time past, and in furnishing the said academy with books, maps, mathematical instruments, and other necessaries of general use therein, according to the intentions of the donors. And whereas, the said trustees to facilitate the progress of so good a work, and to perfect and perpetuate the same, have humbly besought us to incorporate them and their successors.

Now know ye, That we favouring such pious, useful, generous, and charitable designs, hoping, through the favour of Almighty God, this academy may prove a nursery of virtue and wisdom, and that it will produce men of dispositions and capacities beneficial to mankind in the various occupations of life; but more particularly suited to the infant state of North America in general, and for other causes and considerations us hereto specially moving, have granted, ordained, declared, constituted, and appointed, and by these presents we do for us, our heirs, and successors grant, ordain, declare, constitute, and appoint, That the said Thomas Lawrence, and others, as before recited, and such others, as shall be from time to time chosen, nominated or elected in their place and stead, shall be one community, corporation and body politic, to have continuance for ever, by the name of The Trustees of the Academy and Charitable School in the Province of Pennsylvania.

In witness whereof, we have caused these our letters to be made patent; in the twenty-seventh year of the reign of our sovereign lord, George the second, who now is king of Great Britain, France, and Ireland, etc., and in the year of our Lord, one thousand, seven hundred and fifty-three.

Under the skillful training of the learned Rev. William Smith the highest class in this Academy attained that proficiency which, in a College course, would entitle it to a Degree. Accordingly, two years later the Proprietaries were again petitioned to convert the Academy into a College with the power of conferring Collegiate Degrees. The petition was granted substantially as follows:

Thomas Penn and Richard Penn, true and absolute proprietaries of
the province of Pennsylvania, etc., to all persons to whom these presents shall come, greeting:

And whereas, the said trustees have, . . . . represented, That since our granting our said recited charter, the academy therein mentioned, by the blessing of Almighty God, is greatly improved, being now well provided with masters, not only in the learned languages, but also in the liberal arts and sciences, and that one class of hopeful students has now attained to that station in learning and science, by which, in all well-constituted seminaries, youth are entitled to their first degree. Now know ye also, That we do hereby, for us, our heirs and successors, give and grant full power and authority to the said trustees and their successors, . . . . to constitute and appoint a Provost and Vice-Provost of the said college and academy, who shall be severally named and styled Provost and Vice-Provost of the same. And also to nominate and appoint professors in all the liberal arts and sciences, the ancient languages and the English tongue, which Provost, Vice-Provost, and Professors, so constituted and appointed, shall be known and distinguished as one body and faculty, by the name of The Provost, Vice-Provost, and Professors of the College and Academy of Philadelphia, in the province of Pennsylvania; and by that name shall be capable of exercising such powers and authorities as the said trustees and their successors shall think necessary to delegate to them, for the discipline and government of the said college, academy, and charitable school: Provided always, That the said trustees the Provost and Vice-Provost, and each Professor, before they shall exercise their several and respective powers or authorities, offices, and duties, do and shall take and subscribe the three first written oaths appointed to be taken and subscribed, in and by one act of Parliament, passed in the first year of the reign of our late sovereign lord, George the first, intituled, An Act for the further security of his Majesty's Person and Government; and the Succession of the Crown in the Heirs of the late Princess Sophia, being protestants, and for extinguishing the hopes of the pretended Prince of Wales, and his open and secret abettors; and shall also make and subscribe the declaration appointed to be made and subscribed by one other act of parliament, passed in the twenty-fifth year of the reign of king Charles the second, intituled, An Act for preventing dangers which may happen, etc. . . . . excepting only the people called Quakers, who, upon taking, making, and subscribing the affirmations and declarations appointed to be taken, made, and subscribed, by the acts of General Assembly of the province of Pennsylvania, to qualify them for the exercise of civil offices, shall be admitted to the
exercise of all and every the powers, authorities, offices, and duties above mentioned, any thing in this provision to the contrary notwithstanding. . . . . And we do hereby, at the desire and request of the said trustees, constitute and appoint the Reverend William Smith, M.A., to be the first and present Provost of the said college and academy, and the Reverend Francis Allison, M.A., to be the first and present Vice-Provost of the same. . . . . And we do further, for us, our heirs and successors, give and grant to the trustees of the said college and academy, That for animating and encouraging the students thereof to a laudable diligence, industry, and progress in useful literature and science, they and their successors, met together on such day or days as they shall appoint for that purpose, shall have full power and authority, by the provost, . . . . to admit any the students within the said college and academy, or any other person or persons meriting the same, to any degree or degrees, in any of the faculties, arts, and sciences, to which persons are usually admitted, in any or either of the universities or colleges in the kingdom of Great Britain. . . . . Provided always, and it is hereby declared to be our true meaning and express will, That no student or students, within the said college and academy, shall ever, or at any time or times hereafter, be admitted to any degree or degrees, until such student or students have been first recommended and presented as worthy of the same, by a written mandate, given under the hands of at least thirteen of the trustees of the said college and academy . . . . .

In testimony whereof, we have caused these our letters to be made patent, and the great seal of our said province to be hereunto affixed . . . . this fourteenth day of May, in the twenty-eighth year of the reign of our sovereign lord, George the second, king of Great Britain, France, and Ireland, etc., and in the year of our Lord, one thousand seven hundred and fifty-five.

The First Commencement was held May 17th, 1757, when Paul Jackson, Jacob Duché, Francis Hopkinson, Samuel Magaw, Hugh Williamson, James Latta, and John Morgan received the Degree of Bachelor of Arts. In the agitated times that followed, during the wars with the French, the Provost, Mr. Smith, opposed so vehemently the non-resistance policy of the legislature of Pennsylvania, that by an arbitrary stretch of power he was thrown into prison. In faithfulness to his duties as Provost, however, he received his classes in gaol, and continued his instructions to them there while still a prisoner. Finally he was set at liberty, for the purpose of going to England to make a personal appeal to the king, and his kindly reception there was not lessened by the strain to which his loyalty at home
had been put. Oxford conferred on him the Degree of Doctor of Divinity. On his return home so highly did his fellow-citizens rate his influence abroad, that when in 1761 the Trustees were hard bestead they sent him back to England to raise funds for an endowment. It happened that King's College (now Columbia) in New York was in similar straits and had resolved on similar efforts. The two commissioners met in England and amicably resolved to "divide the land between them," and share the proceeds. Through the influence of the Archbishop of Canterbury they received a circular letter from the king to all churches, and succeeded in raising a very considerable endowment for each college.

On Dr. Smith's return, as it appears on the minutes of the 14th of June, 1764, a letter was received from the Archbishop of Canterbury, Thomas and Richard Penn, and the Rev. Samuel Chandler, D.D., addressed to the trustees, in which the trustees are congratulated on the success of Dr. Smith's, the provost's, collection in England, and advised of what would be further necessary to the due improvement of the collection and the future prosperity of the institution. "That the institution was originally founded and carried on for the general benefit of a mixed body of people—that on the king's brief it is represented as a seminary that would be of great use for securing capable instructors and teachers, as well for the service of the society for propagating the gospel in foreign parts, as for other protestant denominations in the colonies.—That at the time of making the collection, the provost was a clergyman of the Church of England—the vice-provost, a Presbyterian—a principal professor, a Baptist, with other useful professors and tutors, all carrying on the education of youth with great harmony, and people of various denominations have heretofore contributed liberally and fully.—That jealousies had arisen lest the foundation should be narrowed, and some party exclude the rest, or put them on a worse footing than they have been or were at the time of the collection, which would be unjust and productive of contentions unfriendly to religion. It was therefore recommended to the trustees, by the writers of the letter (who had a principal share in procuring the collection), to make a fundamental rule or declaration, to prevent inconvenience of this kind, and in doing which, they were advised that the more closely they kept in view the plan on which the seminary was at the time of the royal brief, and on which it was carried on from the beginning, so much the less cause would any party have to be dissatisfied."

A committee having been appointed to frame a fundamental Resolve
or declaration, in consequence of the letter, the following was reported and adopted:

"The trustees being ever desirous to promote the peace and prosperity of this seminary, and to give satisfaction to all its worthy benefactors, have taken the above letter into their serious consideration, and perfectly approving the sentiments therein contained, do order the same to be inserted in their books, that it may remain perpetually declaratory of the present wide and excellent plan of this institution, which hath not only met with the approbation of the great and worthy personages above mentioned, but even the royal patronage of his majesty himself. They further declare that they will keep this plan closely in their view, and use their utmost endeavors that the same be not narrowed, nor the members of the church of England, or those dissenting from them (in any future election to the principal offices mentioned in the aforesaid letter), be put on any worse footing in this seminary, than they were at the time of obtaining the royal brief. They subscribe this with their names, and ordain that the same be read and subscribed by every new trustee that shall hereafter be elected, before he takes his seat at the board."

Perhaps no more striking instance can be given of the distortion to which men's minds were subject in those days of political commotion than the fact that in 1779 this resolution was construed by the Legislature into a "narrowing of the foundation," and seized as a pretext for confiscating all the rights and properties of the College, which were bestowed upon a new organization called in its charter the "Trustees of the University of the State of Pennsylvania." Ten years later, these rights and properties were all restored, and in 1791 an act was passed amalgamating the old College in the new University, as follows:

WHEREAS, the trustees of the University of the State of Pennsylvania, and the trustees of the College, Academy, and Charitable School of Philadelphia, in the commonwealth of Pennsylvania, by their several petitions have set forth, that they have agreed to certain terms of union of the said two institutions, which are as follows:

First. That the name of the institution be "The University of Pennsylvania," and that it be stationed in the city of Philadelphia.

Second. That each of the two boards shall elect, from among themselves, twelve persons, who, with the governor for the time being, shall constitute the board of trustees of the University of Pennsylvania; and that the governor shall be president.

Sect. 2. And be it further enacted, That the said twenty-four persons so elected and certified, together with the governor for the time..."
being, who shall always be president, and their successors, be, and they are hereby made and constituted a corporation and body politic, in law and in fact, to have continuance forever by the aforesaid name, style, and title of "The Trustees of the University of Pennsylvania," and that the said University shall at all times be stationed in the city of Philadelphia.

The University of Pennsylvania now comprises the following departments:

The College, in which are given
The Arts and Science Courses.
The Course in Science and Technology.
The Course in Finance and Economy.
The Course in American History.
The Course in Biology.
The Course in Music.
The Course in Architecture.
The Special Two-year Course in Architecture.
The Four-year Course in Chemistry.
The Four-year Course in Chemical Engineering.
The Four-year Course in Mechanical and Electrical Engineering.
The Four-year Course in Civil Engineering.

The Department of Medicine.
The University Hospital.
The Department of Law.
The Auxiliary Department of Medicine.
The Department of Dentistry.
The Department of Philosophy.
The Department of Veterinary Medicine.
The Department of Physical Education.
The Museum of Archeology and Paleontology.
The Laboratory of Hygiene.
The Graduate Department for Women.
The Wistar Institute of Anatomy and Biology.
Provost of the University,
William Pepper, M.D., LL.D.,
President pro tempore of the Board of Trustees.

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TRUSTEES.

The Governor of Pennsylvania, ex-officio President of the Board.
Fredrick Fraley, LL.D.
Rev. Charles W. Schaeffer, D.D., LL.D.
William Sellers.
J. Vaughan Merrick.
Richard Wood.
S. Weir Mitchell, M.D., LL.D.
Charles C. Harrison.
Rev. George Dana Boardman, D.D., LL.D.
William Hunt, M.D.
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  Assistant Instructor in Mechanical Engineering.

HORACE CLARK RICHARDS, PH. D., 4812 Fairmount Ave.
  Instructor in Physics.

WILLIAM DRAPER LEWIS, PH. D., 701 Drexel Building.
  Lecturer on Institutional Law.

EMORY R. JOHNSON, PH. D., 3731 Spruce St.
  Lecturer on Transportation.

C. ANDERSON WILLIS, M. E., 3727 Spruce St.
  Instructor in Mechanical Engineering.

CHARLES E. COTTON, V. M. D., University.
  Assistant Demonstrator of Veterinary Anatomy.

FRANZ ENGE, University.
  Demonstrator of Forging and Horseshoeing.

DANIEL W. PETTEROLF, M. D., University.
  Assistant Demonstrator of Chemistry.

NATHANIEL A. CASHMAN, M. D., University.
  Instructor of Laryngology.

SAMUEL M. HAMIL, M. D., University.
  Instructor in Physical Diagnosis.

HENRY TOULMIN, M. D., University.
  Instructor in Physical Diagnosis.

HENRY PLASSCHAERT, 4520 Westminster Ave.
  Instructor in Modeling.

T. HARVEY DOUGHERTY, School Lane, Gtn.
  Assistant Instructor of Zoology.

AMOS J. BOYDEN, B. S., 413 Walnut St.
  Lecturer on Architecture.

WM. H. SALVADOR,
  Clerk to the Faculty of Medicine.

JOHN A. REIMOLD,
  Clerk to the Faculty of Dentistry.

HENRY KORTENHAUS,
  Clerk to the College Faculty.

FRANK R. TROWBRIDGE,
  Clerk to the Faculty of Veterinary Medicine.

ALBERT WILSON,
  Messenger, College Department.
THE COLLEGE.

FACULTY.

WILLIAM PEPPER, M. D., LL. D., Provost of the University and ex-officio President of the Faculty.

E. OTIS KENDALL, LL. D., Vice-Provost, Honorary Dean, THOMAS A. SCOTT Professor of Mathematics, and FLOWER Professor of Astronomy.

HORACE JAYNE, M. D., PH. D., Professor of Vertebrate Morphology, and Dean of the Faculty.

FRANCIS A. JACKSON, A. M., Professor of the Latin Language and Literature.

HARRISON ALLEN, M. D., Professor of Comparative Anatomy and Zoology.

OSWALD SEIDENSTICKER, PH. D., Litt. D., Professor of the German Language and Literature.

GEORGE F. BARKER, PH. B., M. D., Professor of Physics.


JOSEPH T. ROTHROCK, B. S., M. D., Professor of Botany.

MORTON W. EASTON, PH. D., Professor of English and Comparative Philology.

EDMUND J. JAMES, PH. D., Professor of Finance and Administration.

JOHN BACH McMASTER, A. M., Professor of American History.

REV. GEORGE S. FULLERTON, PH. D., ADAM SEYBERT Professor of Intellectual and Moral Philosophy.

JOHN A. RYDER, PH. D., Professor of Comparative Embryology.

DANIEL G. BRINTON, M. D., SC. D., Professor of American Archaeology and Linguistics.

REV. HERMANN V. HILPRECHT, PH. D., Professor of Assyrian.

MORRIS JASTROW, JR., PH. D., Professor of Semitic Languages.
THE COLLEGE.

WILLIAM POWELL WILSON, Sc. D., Professor of the Anatomy and Physiology of Plants.
HENRY W. SPANGLER, WHITNEY Professor of Dynamical Engineering.
WILLIAM A. LAMBERTON, A. M., Professor of the Greek Language and Literature.
SIMON N. PATTEN, Ph. D., Professor of Political Economy.
FELIX E. SCHELLING, A. M., JOHN WELSH CENTENNIAL Professor of History and English Literature.
EDGAR F. SMITH, Ph. D., Professor of Chemistry.
ARTHUR W. GOODSPeed, Ph. D., Assistant Professor of Physics.
EDWIN S. CRAWLEY, Ph. D., Assistant Professor of Mathematics.
GEORGE E. FISHER, A. B., Assistant Professor of Mathematics.
JOHN S. BILLINGS, M. D., LL. D., PEPPER Professor of Hygiene.
EDWARD D. COPE, Ph. D., Professor of Mineralogy and Geology.
GEORGE H. HORN, M. D., Professor of Entomology.
RANDOLPH FARIES, M. D., Director of Physical Education.
WARREN P. LAIRD, Professor of Architecture.
CHARLES E. DANA, Professor of Art.
EDWARD P. CHEYNEY, A. M., Assistant Professor of History.
ROLAND P. FALKNER, Ph. D., Associate Professor of Statistics.
FRANCIS N. THORPE, Ph. D., Professor of American Constitutional History.
HUGO A. RENNERT, Ph. D., Professor of Romance Languages and Literature.
JAMES HARVEY ROBINSON, Ph. D., Associate Professor of European History.
EDGAR MARBURG, C. E., Professor of Civil Engineering.
JOHN M. MACFARLANE, D. Sc., Professor of General Biology.
ALFRED GUDeman, Ph. D., Associate Professor of Classical Philology.
JOSEPH FRENCH JOHNSON, A. B., Associate Professor of Business Practice.
WALTER L. WEBB, C. E., Assistant Professor of Civil Engineering.
EDGAR V. SEELER, Assistant Professor of Design.
INSTRUCTORS.

CHARLES M. BURK, M. D., Instructor in Zoology.

* DANIEL B. SHUMWAY, B. S., Instructor in English.

AMOS PEASLEE BROWN, E. M., Ph. D., Instructor in Mining and Metallurgy.

J. PERCY MOORE, Instructor in Zoology.

JOHN HARSHBERGER, Ph. D., Assistant Instructor in Analytical Botany.

WILSON EYRE, Jr., Instructor in Pen and Ink Drawing.

J. J. MORRIS, Assistant Instructor in Mechanical Engineering.

ALEXANDER C. ABBOTT, M. D., First Assistant in Hygiene.

JULIAN MILLARD, Instructor in Architecture.

JULIUS OHLY, Ph. D., Instructor in Chemistry.

DANIEL L. WALLACE, Assistant in Chemistry.

HOMER SMITH, A. B., Instructor in English.

ROBERT BEALLE BURKE, A. B., Instructor in Greek.

JOSIAH HARMAR PENNIMAN, A. B., Instructor in English.

HERBERT E. EVERETT, Instructor in Drawing.

JOHN QUINCY ADAMS, Ph. D., Instructor in Political Science.

CHARLES WORTHINGTON, C. E., Instructor in Civil Engineering.

A. WILLIAM SCHRAMM, B. S., M. E., Instructor in Electrical Engineering.

LUCIEN E. PICOLET, Instructor in Mechanical Engineering.

EDWARD WESSELHOEFT, Instructor in German.

J. HARTLEY MERRICK, Assistant to the Dean.

PHILIP P. CALVERT, Assistant Instructor in Zoology.

ALBERT T. CLAY, Instructor in Hebrew.

HENRY PLASSCHAERT, Instructor in Modeling.

DANA C. MUNRO, A. M., Instructor in History.

ISAAC J. SCHWATT, Ph. D., Instructor in Mathematics.

THEODORE LORENZ, Instructor in French.

EDWARD T. CHILD, B. S., M. E., Instructor in Mechanical Engineering.

C. ANDERSON WILLIS, M. E., Instructor in Mechanical Engineering.

* Absent on leave.
C. W. SCRIBNER, A. B., M. E., Instructor in Mechanical Engineering.
H. W. McCONNELL, Assistant Instructor in Mechanical Engineering.
HORACE CLARK RICHARDS, Ph. D., Instructor in Physics.
INGERSOLL OLMSTED, M. B., Assistant in Bacteriology.
HERMANN FLECK, Ph. D., Instructor in Chemistry.
OWEN L. SHINN, Instructor in Chemistry.
J. BIRD MOYER, Instructor in Chemistry.

LECTURERS.
ALBERT S. BOLLES, Ph. D., University Lecturer on Banking Law and Practice.
MAXWELL SOMMERVILLE, University Lecturer on Glyptology.
THEOPHILUS P. CHANDLER, Jr., Lecturer in Architecture.
FRANK MILES DAY, B. S., Lecturer in Architecture.
JOHN STEWARDSON, Lecturer in Architecture.
WALTER COPE, Lecturer in Architecture.
BARR FERREE, Lecturer in Architecture.
WILLIAM ROMAINE NEWBOLD, Ph. D., Lecturer on Philosophy.
LIGHTNER WITMER, Ph. D., Lecturer on Experimental Psychology.
CHARLES S. BOYER, B. S., Lecturer on Technical Chemistry.
HARRY W. JAYNE, Ph. D., Lecturer on Technical Chemistry.
LOUIS J. MATOS, M. E., Lecturer on Technical Chemistry.
WILLIAM DRAPER LEWIS, Ph. D., Lecturer in Institutional Law.
EMORY R. JOHNSON, Ph. D., Lecturer on Transportation.
ABRAM H. WINTERSTEEN, LL. B., Lecturer on Business Law and Practice.
T. HARVEY DOUGHERTY, Assistant Instructor of Zoology.
AMOS J. BOYDEN, Lecturer in Architecture.

STANDING COMMITTEES OF THE COLLEGE FACULTY.
The Executive Committee.—The Dean, Chairman; Professor LAMBERTON, Secretary; Professor JACKSON, Professor FISHER, Professor FULLERTON, Professor SMITH, Professor SPANGLER.
STANDING COMMITTEES.

ENTRANCE EXAMINATIONS.—The Dean, Chairman; Professor Jackson, Professor Seidensticker, Professor Lamberton, Professor Schelling, Professor Crawley, Professor Goodspeed, Professor Cheyney, Professor Rennert.

ROSTER.—Professor Crawley, Chairman; Professor Goodspeed.

RULES.—Professor Cheyney, Chairman; Professor Lambert, Professor Jackson, Professor Patten, Professor Marburg.

LIBRARY.—Professor Lambert, Chairman; Professor Barker, Professor McMaster, Professor Smith, Professor Schelling.

STUDENTS' RESIDENCES.—Professor Fullerton, Chairman; Professor Lambert, Professor Smith.

REGULATION OF ATHLETIC SPORTS.—Professor Smith, Chairman; Professor Schelling, the Dean.

DIVISIONS OF COLLEGE WORK.

The work of the College Faculty is classified under the following Departments:

ANCIENT LANGUAGES.—Professor Lambert, Chairman; Professor Jackson, Professor Easton, Professor Hilprecht, Professor Jastrow, Professor Gudden, Mr. Burke, Mr. Clay.

MODERN LANGUAGES.—Professor Easton, Chairman; Professor Seidensticker, Professor Schelling, Professor Brinton, Professor Rennert, Mr. Penniman, Mr. Smith, Mr. Wesselhoeft, Mr. Lorenz.

PHILOSOPHY.—Professor Fullerton, Chairman; Dr. Witmer, Dr. Newbold.

HISTORY.—Professor McMaster, Chairman; Professor Thorpe, Professor Cheyney, Professor Robinson, Mr. Munro.

ECONOMICS.—Professor James, Chairman; Professor Patten, Professor Falkner, Professor Johnson, Dr. Adams, Mr. Wintersteen, Dr. Johnson, Dr. Lewis.

MATHEMATICS.—Professor Kendall, Chairman; Professor Fisher, Professor Crawley, Dr. Schwatt.

PHYSICS.—Professor Barker, Chairman; Professor Goodspeed, Dr. Richards.
CHEMISTRY AND MINERALOGY.—Professor Smith, Chairman; Dr. Brown, Dr. Ohly, Dr. Fleck, Mr. Moyer, Mr. Shinn, Mr. Wallace.

NATURAL HISTORY.—Professor Wilson, Chairman; Professor Jayne, Professor Allen, Professor Rothrock, Professor Ryder, Professor Macfarlane, Professor Cope, Dr. Burk, Mr. Moore, Mr. Harshberger, Mr. Calvert, Mr. Dougherty.

ARCHITECTURE AND DRAWING.—Professor Laird, Chairman; Professor Dana, Professor Stehler, Mr. Millard, Mr. Everett, Mr. Chandler, Mr. Stewardson, Mr. Cope, Mr. Ferrer, Mr. Eyre, Mr. Day, Mr. Dawson, Mr. Boyden.

MECHANICAL AND ELECTRICAL ENGINEERING.—Professor Spangler, Chairman; Mr. Schramm, Mr. Picolel, Mr. Child, Mr. Scribner, Mr. Willis, Mr. Morris, Mr. McConnell.

CIVIL ENGINEERING.—Professor Marburg, Chairman; Professor Webb, Mr. Worthington.

MINING ENGINEERING.—Mr. Brown, Chairman; Professor Smith, Professor Marburg.

FELLOWS IN THE COLLEGE.

Philip P. Calvert, Fellow in Biology.
Frank Warren Klingensmith, Fellow in Assyrian.
Benjamin F. Shambaugh, Wharton School Fellow.
* Samuel McCune Lindsay, Ph. D., Wharton School Fellow.
David Mandel, Jr., Ph. B., Wharton School Fellow.
J. R. Mosley, B. S., M. S., Wharton School Fellow.
Lyman Pierson Powell, A. B., Wharton School Fellow.
John L. Stewart, Ph. B., Wharton School Fellow.
Clarence Stanley McIntire, B. S., Fellow in American History.
James Henri Donnelly, B. S., Fellow in English.
Jesse Moore Greenman, Ph. B., Fellow in Biology.
George Hervey Hallett, A. B., Tynsdale Fellow in Physics.

* Absent on leave.
UNDERGRADUATES.

The College Courses are indicated as follows:—Arts and Science, A.; Biology, B.; Finance and Economy, Wh.; American History, A. H.; Science and Technology (Lower Years), Sc.; Upper Years; Pure and Applied Chemistry, Sc. 1; Mining and Metallurgy, Sc. 2; Civil Engineering, Sc. 3; Mechanical Engineering, Sc. 4; Four Year Technical Courses, Chemistry, Ch.; Chemical Engineering, C. E.; Mechanical Engineering, M. E.; Electrical Engineering, E. E.; Architecture, Arch.

POST-SENIORS.

<table>
<thead>
<tr>
<th>Name</th>
<th>Course</th>
<th>Residence</th>
<th>City Address</th>
</tr>
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<tbody>
<tr>
<td>Edward Burton Colket</td>
<td>Sc. 4</td>
<td>Philadelphia,</td>
<td>2037 Chestnut St.</td>
</tr>
<tr>
<td>Francis Thibault Cross</td>
<td>Sc. 4</td>
<td>do.</td>
<td>32 S. 21st St.</td>
</tr>
<tr>
<td>Joseph Robbins Curtis</td>
<td>Sc. 4</td>
<td>do.</td>
<td>3723 Spruce St.</td>
</tr>
<tr>
<td>Alfred Christian Pleckenstein</td>
<td>Sc. 4</td>
<td>do.</td>
<td>321 N. 19th St.</td>
</tr>
<tr>
<td>Charles Allyn Gilchrist</td>
<td>Sc. 4</td>
<td>do.</td>
<td>5914 Wayne Ave., Gtn.</td>
</tr>
<tr>
<td>Joseph J. Gillingham Hibbs</td>
<td>Sc. 4</td>
<td>do.</td>
<td>1534 N. 17th St.</td>
</tr>
<tr>
<td>Benjamin Wolf Loeb</td>
<td>Wh. 1</td>
<td>do.</td>
<td>929 N. 8th St.</td>
</tr>
<tr>
<td>Martin Port Rice</td>
<td>Sc. 4</td>
<td>do.</td>
<td>710 N. 40th St.</td>
</tr>
<tr>
<td>Marion Rinehart Rodgers</td>
<td>Sc. 3</td>
<td>do.</td>
<td>1403 N. 13th St.</td>
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<tr>
<td>Frederick Dawson Stone, Jr.</td>
<td>Sc. 3</td>
<td>do.</td>
<td>Fisher's Lane, Gtn.</td>
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<tr>
<td>Harry Eugene Spencer</td>
<td>Sc. 3</td>
<td>do.</td>
<td>206 W. Logan Sq.</td>
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<tr>
<td>William Budd Warne, Jr.</td>
<td>Sc. 4</td>
<td>do.</td>
<td>1520 N. 18th St.</td>
</tr>
<tr>
<td>Edward Burke Wilford</td>
<td>Sc. 4</td>
<td>do.</td>
<td>724 N. 19th St.</td>
</tr>
<tr>
<td>Frank Potts Witmer</td>
<td>Sc. 3</td>
<td>do.</td>
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</table>

SENIORS.

<table>
<thead>
<tr>
<th>Name</th>
<th>Course</th>
<th>Residence</th>
<th>City Address</th>
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<tbody>
<tr>
<td>Raymond Macdonald Alden</td>
<td>A.</td>
<td>Washington, D. C., 145 Manheim St.</td>
<td>3223 Sansom St.</td>
</tr>
<tr>
<td>Harvey Gottschall Allebach</td>
<td>A.</td>
<td>Green Lane,</td>
<td>637 Oxford St.</td>
</tr>
<tr>
<td>Joseph Kahn Arnold</td>
<td>A.</td>
<td>Philadelphia,</td>
<td>3729 Locust St.</td>
</tr>
<tr>
<td>John Brander Austin, Jr.</td>
<td>Sc. 3</td>
<td>Wallingford.</td>
<td>1938 N. 13th St.</td>
</tr>
<tr>
<td>Frederick Cook Beecher</td>
<td>Wh.</td>
<td>North East,</td>
<td>102 S. 33d St.</td>
</tr>
<tr>
<td>Clarence E. Blackburn</td>
<td>Wh.</td>
<td>Philadelphia,</td>
<td>1323 Mt. Vernon St.</td>
</tr>
<tr>
<td>Frederick Buel Bonebrake</td>
<td>Wh.</td>
<td>Topeka, Kan.,</td>
<td>1833 Fitzwater St.</td>
</tr>
<tr>
<td>William Earle Bradley</td>
<td>Sc. 4</td>
<td>do.</td>
<td>143 Price St., Gtn.</td>
</tr>
<tr>
<td>William Purdon Brines</td>
<td>A.</td>
<td>School Lane, Gtn.</td>
<td>326 S. 24th St.</td>
</tr>
<tr>
<td>Frederick Schernerhorn Brinton</td>
<td>Sc. 4</td>
<td>do.</td>
<td>4301 Haverford St.</td>
</tr>
<tr>
<td>Henry Cartright Burr</td>
<td>Ch.</td>
<td>do.</td>
<td>3733 Spruce St.</td>
</tr>
<tr>
<td>William Leberman Cauffman</td>
<td>A.</td>
<td>do.</td>
<td>103 S. 21st St.</td>
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<tr>
<td>Paul Cheyney</td>
<td>Sc. 1</td>
<td>do.</td>
<td>429 S. 40th St.</td>
</tr>
<tr>
<td>George Morrison Coates, Jr.</td>
<td>B.</td>
<td>Berwyn.</td>
<td>2218 St. James Place.</td>
</tr>
<tr>
<td>George Douglas Codman</td>
<td>Wh.</td>
<td>Philadelphia,</td>
<td>3733 Spruce St.</td>
</tr>
<tr>
<td>Henry Hill Collins, Jr.</td>
<td>Wh.</td>
<td>do.</td>
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<tr>
<td>Robert Duncan Coombs, Jr.</td>
<td>Sc. 3</td>
<td>do.</td>
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<tr>
<td>Erskine Hazard Cox</td>
<td>Sc. 4</td>
<td>do.</td>
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<tr>
<td>Benjamin Franklin Cresson</td>
<td>Sc. 3</td>
<td>Conshohocken.</td>
<td>2218 St. James Place.</td>
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<td>A.</td>
<td>Philadelphia, do.</td>
<td>114 N. 18th St.</td>
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<tr>
<td>Arch.</td>
<td>do.</td>
<td>2009 Girard Ave.</td>
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<td>A.</td>
<td>do.</td>
<td>1936 N. 13th St.</td>
<td></td>
</tr>
<tr>
<td>Wh.</td>
<td>do.</td>
<td>Girard College.</td>
<td></td>
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<tr>
<td>Sc. 1</td>
<td>do.</td>
<td>1203 N. 41st St.</td>
<td></td>
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<td>B.</td>
<td>do.</td>
<td>1404 Spruce St.</td>
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<td>Sc. 4</td>
<td>do.</td>
<td>110 S. 19th St.</td>
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<tr>
<td>A.</td>
<td>Jenkintown, Sc. 4, do.</td>
<td>114 N. 16th St.</td>
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<tr>
<td>B.</td>
<td>Milwaukee, Wis., Wh.</td>
<td>3909 Spruce St.</td>
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<td>Sc. 4</td>
<td>Philadelphia, C.E., do.</td>
<td>723 Spruce St.</td>
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<td>A.</td>
<td>Philadelphia, Sc. 4, do.</td>
<td>264 S. 36th St.</td>
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<td>Philadelphia, Sc. 1, do.</td>
<td>4050 Aspen St.</td>
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<td>1032 Vine St.</td>
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<td>A.</td>
<td>Philadelphia, Sc. 4, do.</td>
<td>2259 Franklin St.</td>
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<td>Haddonfield, N.J.</td>
<td>2121 Arch St.</td>
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<td>Newtown, Bucks Co.</td>
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<td>4050 Aspen St.</td>
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<td>2121 Arch St.</td>
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<tr>
<td>A.</td>
<td>Newtown, Bucks Co.</td>
<td>2020 Spruce St.</td>
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</table>
### Undergraduates

**Students of the Fourth Year Not Candidates for a Degree.**

<table>
<thead>
<tr>
<th>Course</th>
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<th>City Address</th>
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<tr>
<td>Sc. 4</td>
<td>Philadelphia</td>
<td>1417 Walnut St.</td>
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<tr>
<td>Arch.</td>
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<td>3227 Woodland Ave.</td>
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<tr>
<td>Arch.</td>
<td>Chester,</td>
<td>28 W. Third St.</td>
</tr>
<tr>
<td>A.</td>
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### Juniors

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## Undergraduates

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## Students of the Third Year not Candidates for a Degree

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<tr>
<td>Edward John Kuhns</td>
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<td>Walter John Leaman</td>
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<td>Leaman Pl.</td>
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<td>W. Irving Lex</td>
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<td>do.</td>
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<td>Walter Crispin Lippincott</td>
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<tr>
<td>Morton Githens Lloyd</td>
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<td>George Thomas Lukens</td>
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<td>Conshohocken</td>
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<td>Clinton Hancock Miller</td>
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<tr>
<td>Henry Polk Miller</td>
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<td>West Chester</td>
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<td>Frazer Smith Monaghan</td>
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<td>Davis Levis Moore, Jr.</td>
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<td>Israel Wister Morris</td>
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<td>Benjamin F. Murphy, Jr.</td>
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<tr>
<td>Harry Warren Nice</td>
<td>Arch.</td>
<td>N. Hope, Bucks Co., 2005 Arch St.</td>
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<tr>
<td>Oliver Randolph Parry</td>
<td>Arch.</td>
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<tr>
<td>Frank Adler Pfaelzer</td>
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<tr>
<td>Howard Lamon Shock</td>
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<td>Arthur Shrigley</td>
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<td>Thomas Somerville Stewart, Jr.</td>
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<tr>
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<td>Otman Franklin Wagonhurst</td>
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<tr>
<td>Robert Burns Wallace</td>
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<td>Tyrone Co., Ireland, 2306 Federal St.</td>
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<tr>
<td>Robley Anderson Warner</td>
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<td>Arthur Edward Weil</td>
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<tr>
<td>J. Howard Weinberger</td>
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<tr>
<td>Henry Hunter Welsh</td>
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<tr>
<td>Edward Morwitz West</td>
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THE COLLEGE.

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<tr>
<th>Course</th>
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<tr>
<td>A.</td>
<td>Phoenixville</td>
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<td>A.</td>
<td>Haverford</td>
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<tr>
<td>Ch.</td>
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</tr>
<tr>
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STUDENTS OF THE SECOND YEAR NOT CANDIDATES FOR A DEGREE.

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<tr>
<th>Course</th>
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<tr>
<td>Sc. 1</td>
<td>Philadelphia</td>
<td>4013 Baring St.</td>
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<tr>
<td>Sc. 4</td>
<td>Camden, N.J.</td>
<td>116 North 4th St.</td>
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<tr>
<td>A.</td>
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<td>1323 N. 6th St.</td>
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<tr>
<td>Sc. 4</td>
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<td>435 N. Broad St.</td>
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<tr>
<td>Wh.</td>
<td>do</td>
<td>3719 Spring Garden.</td>
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<tr>
<td>Wh.</td>
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<td>833 Marshall St.</td>
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<tr>
<td>Arch.</td>
<td>New Albany, Ind.</td>
<td>4124 Chester Ave.</td>
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<tr>
<td>Wh.</td>
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<td>Wh.</td>
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<td>1416 N. 17th St.</td>
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<td>Ch.</td>
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<td>1418 N. 16th St.</td>
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<td>York, Pa.</td>
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<td>Sc. 3</td>
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<td>5083 Main St., Gtn.</td>
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<td>A.</td>
<td>Mount Holly, N.J.</td>
<td>6211 Seminole Ave.</td>
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<td>M. E.</td>
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<td>1610 Page St.</td>
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<td>Sc. 4</td>
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<td>C. E.</td>
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<td>1833 Carpenter St.</td>
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## UNDERGRADUATES.

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<tr>
<td>John Fessenden Truesdell</td>
<td>Wh.,</td>
<td>Philadelphia,</td>
<td>3409 Baring St.</td>
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<tr>
<td>Harrison B. Weil</td>
<td>Wh.,</td>
<td>do.</td>
<td>502 N. 6th St.</td>
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<tr>
<td>George Whitney Wood</td>
<td>Sc.,</td>
<td>do.</td>
<td>5502 Germantown Av.</td>
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<tr>
<td>Henry Gillette Woodman</td>
<td>Arch.,</td>
<td>do.</td>
<td>244 S. 21st St.</td>
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### IN BIOLOGY.

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<tr>
<td>Naomi Bitting</td>
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<td>1625 Diamond St.</td>
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<tr>
<td>Francis Head Brown</td>
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<td>Stenton Ave., Gtn.</td>
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<tr>
<td>Edward Crathorne Dale</td>
<td></td>
<td>do.</td>
<td>1011 St. Bernard's Pl.</td>
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<tr>
<td>Annie Parson</td>
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<tr>
<td>Henry Flannery, Jr.</td>
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<tr>
<td>Lucy C. Gendell</td>
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<td>Thomas Stotesbury Githens</td>
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<tr>
<td>Harriett Herring</td>
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<td>Charles Edwin Hite</td>
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<td>Sarah Edith Ives</td>
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<td>Elmiria Lodor</td>
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<td>James M. Phillips</td>
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<tr>
<td>Edith Adeline Reed</td>
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<tr>
<td>C. Clarence Sichel</td>
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<td>Louise Hortense Snowden</td>
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<tr>
<td>Bertha Elizabeth Corson Yocum</td>
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### IN MUSIC.

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<tr>
<td>Lilly G. Capps</td>
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<td>Philadelphia,</td>
<td>1191 Carpenter St.</td>
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<tr>
<td>Mary Delaney</td>
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<td>1510 South 16th St.</td>
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<td>Gertrude Perkins</td>
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<td>Salem, N. J.</td>
<td>1410 Christian St.</td>
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<td>Emma A. Price</td>
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<td>Palmyra, N. J.</td>
<td>25th &amp; Hermont St.</td>
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<td>Mary E. Robinson</td>
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<td>1502 Dickinson St.</td>
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<tr>
<td>Lulu J. Schiller</td>
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<td>Kate V. Tracey</td>
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### FRESHMEN.

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<tr>
<td>William Ridge Allen</td>
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<td>Conwell Banton</td>
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<td>Albert Russell Bartlett</td>
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<td>3938 Pine St.</td>
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<tr>
<td>Narciss Batte</td>
<td>M. E.,</td>
<td>Spain,</td>
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<td>George Croll Baum</td>
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<td>872 N. 6th St.</td>
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<td>James Wright Blackwood</td>
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<td>630 N. Broad St.</td>
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<td>James Morton Boice</td>
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<td>Edwin Stimble Boyer</td>
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<tr>
<td>Barclay White Bradley</td>
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<tr>
<td>David Hiester Bradley</td>
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THE COLLEGE.

Howard Bechtle Bremer, A.,
Clarence Cresson Brinton, A.,
George Lewis Brinton,
Arthur Spayd Brooke, A.,
Howard Bucknell,
Addison Brown Burk, Jr.,
John Walton Calver, Jr.,
Harold Calvert,
J. Thompson Carson,
Fernando Fernandez Cavada,
Irving A. Chandler, M. E.,
Charles Engle Chipley,
Charles West Churchman,
Louis Joseph Clarke,
Charles Frederick Cludius,
Arthur Newbold Coles,
Tristram Coffen Colket,
George Norwood Comly,
Winfield Walker Conard,
Horace Chauncey Cook,
Edward Mitchell Cope,
Walter Stewart Cornell,
Joseph Emanuel Crawford,
Charles Collins Davis,
Melbourne Enseibus Davis,
C. W. Dempsey,
Frederick Matthew Devlin,
George E. Diament,
Alexander King Dickson, Jr.,
Byron Wright Dickson,
Edgar Meek Dilley,
Edward Treston Dillon,
Thomas Francis Dunn,
Frederick Martyn Dunn,
Hyacinth Peraldi de Connene,
Franklin Davenport Edmunds,
George Eiser,
Thomas Robert Elcock, Jr.,
Daniel Eppesheimer, Jr.,
Erskine Birch Essig,
David Lloyd Eynon,
Samuel Edward Fairchild, Jr.,
Sigourney Webster Fay,
George McIntire Ferguson,
Berthold Fischler,
Clarence Stanley Fisher,
John J. Foulkrod, Jr.,
Horace Hugh Francine,
Joseph Markley Freed,
Robert Russell Freeman,
Thomas Robert Galbraith,

Howard, A.,
Clarence, A.,
George, A.,
Arthur, A.,
Howard, A.,
Addison, Jr.,
John, Jr.,
Harold,
J.,
Fernando,
Irving, M. E.,
Charles, C. E.,
Charles, M. E.,
Louis, A.,
Charles, A.,
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Erskine, A.,
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Samuel, A.,
Sigourney, A.,
George, A.,
Berthold, A.,
Clarence, A.,
John, A.,
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Joseph, A.,
Robert, A.,
Thomas, A.,

Philadelphia,
Reading, Pa.,
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Cienfuegos, Cuba,
Wilmington, Del.
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Port Kennedy, Pa.
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<th>Name</th>
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<tr>
<td>Frank Paul Gengenbach</td>
<td>M. E.</td>
<td>Philadelphia,</td>
<td>30 N. 15th St.</td>
</tr>
<tr>
<td>Herbert Winfred Geshwind</td>
<td>M. E.</td>
<td>do</td>
<td>1627 S. 6th St.</td>
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<tr>
<td>Samuel Goodman, Jr.</td>
<td>A.</td>
<td>do</td>
<td>Bethlehem Pike,</td>
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<td>George H. Greenfield</td>
<td>A.</td>
<td>Philadelphia,</td>
<td>2308 E. Norris St.</td>
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<tr>
<td>Walter Landell Haehnlen</td>
<td>M. E.</td>
<td>do</td>
<td>629 North 15th St.</td>
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<tr>
<td>William Hamilton</td>
<td>M. E.</td>
<td>do</td>
<td>2300 Venango St.</td>
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<td>Joseph Grundy Harrison</td>
<td>M. E.</td>
<td>Philadelphia,</td>
<td></td>
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<td>William Raymond Hilary</td>
<td>C. E.</td>
<td>Mt. Holly, N. J.</td>
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<tr>
<td>Isaac Husik</td>
<td>Arch.,</td>
<td>Philadelphia,</td>
<td>do</td>
</tr>
<tr>
<td>Charles Tattersall Ingham</td>
<td>C. E.</td>
<td>do</td>
<td>3256 Walnut St.</td>
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<tr>
<td>Stanley Jordan</td>
<td>C. E.</td>
<td>Cynwyd, Pa.</td>
<td></td>
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<tr>
<td>William Kleecefd, Jr.</td>
<td>C. E.</td>
<td>Philadelphia,</td>
<td>628 N. 34th St.</td>
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<tr>
<td>Ernest Herman Koch, Jr.</td>
<td>M. E.</td>
<td>do</td>
<td>921 Passyunk Ave.</td>
</tr>
<tr>
<td>Iwa Guma Koka</td>
<td>C. E.</td>
<td>Japan</td>
<td></td>
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<tr>
<td>Adolph Max Krakauer</td>
<td>M. E.</td>
<td>El Paso, Texas.</td>
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<tr>
<td>Heilner Maxwell Langdon</td>
<td>A.</td>
<td>do</td>
<td>1536 Mt. Vernon St.</td>
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<tr>
<td>Robert Hartshorne Large</td>
<td>C. E.</td>
<td>do</td>
<td>2312 De Lancey Pl.</td>
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<tr>
<td>Francis Wiltner Lawrence</td>
<td>M. E.</td>
<td>Wilmington, Del.</td>
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<td>Ralph Waldo Emerson Leach</td>
<td>M. E.</td>
<td>Philadelphia,</td>
<td>2219 Green St.</td>
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<tr>
<td>Lister Hoff Lewis</td>
<td>M. E.</td>
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<tr>
<td>Horace Mather Lippincott</td>
<td>A.</td>
<td>do</td>
<td>1527 M'ntg'm'ry Ave.</td>
</tr>
<tr>
<td>Thomas James Little, Jr.</td>
<td>M. E.</td>
<td>do</td>
<td>805 N. 8th St.</td>
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<tr>
<td>Louis Centennial Loewenstein</td>
<td>M. E.</td>
<td>do</td>
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<tr>
<td>Howard Marshall Long</td>
<td>Sc.,</td>
<td>Lewes, Del.</td>
<td></td>
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<tr>
<td>James Forney McCoy</td>
<td>A.</td>
<td>Gap, Pa.</td>
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<tr>
<td>Samuel Delaplain McDaniel</td>
<td>M. E.</td>
<td>Philadelphia,</td>
<td>1714 Walnut St.</td>
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<tr>
<td>Charles Louis McKeehan</td>
<td>A.</td>
<td>do</td>
<td>2116 Chestnut St.</td>
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<tr>
<td>Robin Macdonald</td>
<td>Sc.</td>
<td>do</td>
<td>2035 Green St.</td>
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<tr>
<td>John Dick Macfarlan</td>
<td>Sc.</td>
<td>do</td>
<td>1805 Chestnut St.</td>
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<tr>
<td>Frank Joseph Madden</td>
<td>Sc.</td>
<td>do</td>
<td>1702 Vine St.</td>
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<td>William Austin Magee</td>
<td>Sc.</td>
<td>do</td>
<td>3624 Hamilton St.</td>
</tr>
<tr>
<td>John Dennis Mahoney</td>
<td>A.</td>
<td>do</td>
<td>10th &amp; Westmorland.</td>
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<tr>
<td>Edward Worrell Manderson</td>
<td>A.</td>
<td>do</td>
<td>3820 Spruce St.</td>
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<tr>
<td>Clarence Lemuel Marks</td>
<td>Sc.</td>
<td>do</td>
<td>1717 Spring Garden.</td>
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<tr>
<td>Lawrence Hochstader Marks</td>
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<td>Clifford Cleland Marshall</td>
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<td>226 Walnut St.</td>
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<td>Edward Livingston Martin</td>
<td>A.</td>
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<td>1507 S. Broad St.</td>
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<tr>
<td>Frederic Charles Matchett</td>
<td>Sc.</td>
<td>do</td>
<td>3208 Sansom St.</td>
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<tr>
<td>Jumatsu Matsuo</td>
<td>M. E.</td>
<td>Japan</td>
<td>1614 Green St.</td>
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<tr>
<td>Frederick Basil Miles</td>
<td>A.</td>
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</tr>
<tr>
<td>Joseph Stearne Miles</td>
<td>Arch.,</td>
<td>do</td>
<td>129 Gay St., Man'yunk.</td>
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THE COLLEGE.

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<thead>
<tr>
<th>Name</th>
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<th>City Address</th>
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<tr>
<td>John Irvin Marchance Milligan</td>
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<td>Frank R. Minnig</td>
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<td>William Richard Mohn</td>
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<td>Charles Mortimer Montgomery</td>
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<td>20 Pastorius St., Gtn.</td>
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<td>1015 Farragut Ter'ce.</td>
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<td>George Conrad Muhly</td>
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<td>Walter Slifer Myers</td>
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<td>Albert Dallam O'Brien</td>
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<td>Charles Moore Patterson</td>
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<td>Ralph Payne</td>
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<td>Frank Pearson</td>
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<td>3439 Woodland Ave.</td>
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<td>Harry Laird Phillips</td>
<td>M. E.</td>
<td>do</td>
<td>4659 Green St., Gtn.</td>
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<td>Edward Wallace Pierce</td>
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<td>Harald Brynburg Porter</td>
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<td>1504 Spring Garden.</td>
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<td>Gilbert Kent Preston</td>
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<td>Charles Snyder Reeve</td>
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<td>Louis Reuning</td>
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<td>256 S. 15th St.</td>
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<td>George Clemens Baxter Rowe</td>
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<td>Henry E. Schoenhut, Jr.</td>
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<td>Alexander Wilson Shaw</td>
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<td>William Penn Sherman</td>
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<td>Asbury Park, N. J.</td>
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<td>Francis Wharton Sinkler</td>
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<td>Myer Solis-Cohen</td>
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<td>Edward Adams Stroud</td>
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<td>Claude T. Taggart</td>
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<tr>
<td>Floyd Edmund Thorn</td>
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<tr>
<td>Alfred Columbus Tickner</td>
<td>C. E.</td>
<td>do</td>
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UNDERGRADUATES.

Richard William Tull, C. E.,
George Noblit Tyson, M. E.,
Algernon Sidney Uhler, Ch.,
Jonathan Knight Uhler, M. E.,
Russell Uhler, Arch.,
Adolf Brown Van der Wielen, Sc.,
Walter Mosely Van Kirk, Ch.,
Harlow Voorhees, Arch.,
John Howard Weatherby, M. E.,
Edgar A. Weimer, Arch.,
William Moore Wilson, M. E.,
John K. Wright, Arch.,
Eugene Wilson Yearsley, Ch.,
David Thomas Young, Arch.,
James Bertram Young, Ch. E.,
Myer Zaslavsky, City Address.

Richard William Tull, C. E., Philadelphia, 1524 N. 6th St.
George Noblit Tyson, M. E., 414 N. 33d St.
Algernon Sidney Uhler, Ch., 1607 Chestnut St.
Jonathan Knight Uhler, M. E., Lower Roxborough.
Russell Uhler, Arch., 1909 S. 48th St.
Adolf Brown Van der Wielen, Sc., 1703 Locust St.
Walter Mosely Van Kirk, Ch., 1333 Pine St.
Harlow Voorhees, Arch., 1025 Spruce St.
William Moore Wilson, M. E., Exm'th, Devonshire, Eng., 4336 Sansom.
John K. Wright, Arch., Philadelphia.
David Thomas Young, Ch., Philadelphia.
James Bertram Young, Ch. E., Kiev, Russia.
Myer Zaslavsky, City Address.

STUDENTS OF THE FIRST YEAR NOT CANDIDATES FOR A DEGREE.

Walter Hazel Andrews, Arch., Manchester, N. H.
Arthur Leonard Benkert, Ch., Washington, D.C., 1745 N. 21st St.
Charles John Buhmann, Arch., Chicago, Ill.
Frank Thomas Woodbury, A., 218 S. 16th St.
John K. Wright, M. E., 635 Walnut St.
Eugene Wilson Yearsley, M. E., 635 Snyder Ave.
David Thomas Young, Ch., 2029 Arch St.
James Bertram Young, Arch., 1639 N. 19th St.
Myer Zaslavsky, Ch. E., 1027 Christian St.

Course. Residence. City Address.

Course. Residence. City Address.
Edward Patton Miner,       
Robert Worth Moore,        
Alfred Thornton Moss,      
Emile George Perrot,       
John Fulton Meade Reynolds, 
William H. Roeller,        
Harrison Lee Shafer,       
Herman Hoopes Sharpless,   
James Frederick Sinnott,   
Joseph Russell Smith,      
Frederick William Starke,  
Howard Ackerman Stout,     
Matthew Ambrose Tracy,     
Paul Van Deusen,           
William Sansom Vaux, Jr.,  
Herbert J. Wetherill,      
Walter Ross Baumes Wilcoxon, 
Edward Woolman,            
Clarence Clark Zantzinger,  
Charles Augustus Ziegler,  

Frank Ardary Craig,        
Daniel Risher Crump,       
Julie Espen,               
Sophie Espen,              
William Harrison Finney,   
Harold Goodman Goldberg,  
Archibald Hunter Graham, Jr.,
Anna Margaret Hewes,       
Charles Shoemaker Jack,    
Bayard Knerr,              
Mary Ella Lyndall,         
Catharine Macfarlane,      
Alf. Cookman Marshall,     
Michael P. O'Neill,        
John Norman Risley,        
Robert Murray Ross,        
Luther J. Saeger,          
Lina Schwatt,              
Omar Shalicros,            
Edward Burgen Shellenberger, 
Susan B. Smith,            
Andrew Speese,             
Joseph Vernier,            
Howard Priestly Wells,     
Mary C. Wiggins,           
Hanson Laurence Withers, Jr., 
Evelyn Witmer,             

THE COLLEGE.

Course.                  Residence.             City Address.
M. E.,                   Suffolk, Va.           
Wh.,                     Galveston, Tex.        
C. E.,                   Fredericksburg, Va., 332 S. 16th St.
Arch.,                   Philadelphia, 1542 Willington St.
Ch.,                     do.                     1534 Dauphin St.
Wh.,                     Pottstown, Pa.           
Wh.,                     Salem, Ohio.            
M. E.,                   West Chester, Pa.       
Wh.,                     Rosemont, Pa.           
Wh.,                     Lincoln, Va.            3205 Baring St.
Ch.,                     Philadelphia, 704 Parrish St.
Ch. E.,                  Cincinnati, Ohio, 1514 N. 17th St.
Arch.,                   Philadelphia, Oak Lane.
Sc.,                     Conshohocken, Pa.       
Ch.,                     Philadelphia, 2209 Tioga St.
M. E.,                   Philadelphia, 1715 Arch St.
Arch.,                   do.                     3734 Walnut St.
Arch.,                   do.                     3435 Walnut St.
M. E.,                   Philadelphia, 44 N. 38th St.
Arch.,                   do.                     1736 Pine St.
Arch.,                   do.                     321 South St.

IN BIOLOGY.

Philadelphia,           Allegheny, Pa.          3417 Baring St.
Philadelphia,           do.                     1908 Spring Garden.
Philadelphia,           do.                     1908 Spring Garden.
Clintonville, Wis.,     Philadelphia, 67th & Greenway Av.
Philadelphia,           do.                     1518 Diamond St.
Philadelphia,           do.                     4304 Walnut St.
Salem, N. J.            do.                     1533 Locust St.
Salem, N. J.,           Philadelphia, 12th and Spruce Sts.
Philadelphia,           do.                     155 Pomona Terrace,
Philadelphia,           do.                     610 S. 22d St.  [Gtn.
Media, Pa.              do.                     1427 Tasker St.
Versailles, Mo.         do.                     3350 Walnut St.
Germany,                Parkesburg, Pa., 4027 Ludlow St.
Philadelphia,           4783 Germantown Av.
do.                     131 Maplew'd Ave., Gtn.
do.                     Green St., Gtn.
do.                     208 S. 41st St.
<table>
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<tr>
<td>Laura Chamberlain</td>
<td>Philadelphia</td>
<td>3905 Chestnut St.</td>
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<tr>
<td>Nana dos Santos</td>
<td>do.</td>
<td>258 S. 38th St.</td>
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<td>Marguerite A. Farren</td>
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<td>1245 N. Front St.</td>
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<td>Marussia Formad</td>
<td>do.</td>
<td>3447 Woodland Ave.</td>
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<td>Charles Gilchrist</td>
<td>do.</td>
<td>Germantown</td>
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<tr>
<td>Mary Lawton Hammer</td>
<td>do.</td>
<td>R. E. Seminary, 43d and Ludlow Sts.</td>
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<tr>
<td>Emelie A. Lorenz</td>
<td>do.</td>
<td>3314 Woodland Ave.</td>
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<tr>
<td>Harold B. Nason</td>
<td>do.</td>
<td>5123 Green St., Gtn.</td>
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<tr>
<td>Mary P. Nicholson</td>
<td>do.</td>
<td>2106 Chestnut St.</td>
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<td>Edith A. Ogelsby</td>
<td>do.</td>
<td>3221 Baring St.</td>
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<tr>
<td>Adelaide E. Ramsey</td>
<td>do.</td>
<td>1335 South 20th St.</td>
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<td>Wells D. Reed</td>
<td>do.</td>
<td>53 Harvey St., Gtn.</td>
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<td>Anna Sailer</td>
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<td>2039 Spruce St.</td>
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<td>William C. Schwartz</td>
<td>do.</td>
<td>321 Noble St.</td>
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## SUMMARY.

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SUBJECTS OF INSTRUCTION
OFFERED BY
THE COLLEGE FACULTY.

All the subjects in which instruction is offered by the College Faculty are enumerated and described in detail below. The description of the grouping of the various Courses prescribed for all candidates for the Bachelor's degree will be found on page 99 seq. Special students, not candidates for degrees, may select from these the subjects they wish to take, under the conditions stated on pages 93 and 94.

The numerals prefixed to the Courses are for purposes of reference only. Except where otherwise specified, Courses extend throughout the year.

HEBREW.

The undergraduate courses in Hebrew cover the elements of Hebrew grammar, and include translations of selected chapters from the narrative and legal portions of the Old Testament, thus preparing students who intend to pursue theological studies for advanced work, and serving at the same time as an introduction to the graduate work in Semitic Languages. These Courses are offered as electives.

Professor JASTROW:
1. After a general introduction upon the features of the Semitic Languages, the position of Hebrew in the Semitic group, and the Hebrew Alphabet, the principles of pronunciation are illustrated by exercises in reading. The Hebrew pronoun, verb and noun are then treated in the order as arranged in Strack's Hebrew Grammar, especial attention being given to the development of the verb and noun formations. Parallel with this go exercises in translating from Hebrew into English, and vice versa. In addition, six to eight chapters of Genesis are carefully gone over; other parts more rapidly, and the student thus trained in the handling of the Hebrew Dictionary (Bagster's Hebrew-English Lexicon). Easy exercises in translation at sight are also given. Elective for Juniors in Arts. Two hours a week.

Professor HILPRECHT:
2. The students will review Hebrew grammar systematically, do exercises in translating English into Hebrew, with especial reference to syntax, and read selections from historical and prophetical books. This course is offered as an elective in Senior year. Two hours a week.

4
Mr. Clay:


Sanskrit.

Professor Easton:

1. Whitney's Sanskrit Grammar. Lanman's Reader. Two hours.
2. Lanman's Reader. Selected Hymns from the Veda. Two hours.

Course 2 is open to those only who have taken Course 1.

Greek.

The courses in Greek described below are numbered according to their grade, the lowest grade having the highest number. No student is allowed to take a course unless he has already taken those following it in the enumeration. Thus, a student applying for Course 2 must have already taken Course 1, or its equivalent; and a student applying for Course 3 must already have taken Courses 1 and 2, or their equivalent.

Course 1, which is taken by Freshmen, is intended more particularly to strengthen and extend the foundations already laid in the preparatory school. The fixing of the forms and the simpler principles of syntax well in the mind, and the acquisition of a well-ordered and somewhat extensive Attic vocabulary, are accordingly the chief aims; and this is worked for by reading and Greek composition (in daily and weekly exercises) based upon that reading. Along with this goes naturally careful explanation of all matters relating to life, manners and customs, history and geography, which are needed to make the work interesting and intelligent.

In the Sophomore year the same method is followed. Greek composition as a means for securing accuracy in linguistic knowledge goes on as before, based upon the reading that is done in class. It is attempted, however, to give a wider scope to the instruction by giving more prominence to the subject matter of what is read, and to the historic place of the writer and work in the literature. Private reading is added to class work, that the student may be introduced to a wider range of works, and that a habit of private reading may, if possible, be fostered in him.

In the Junior year the private reading continues; in the class work the literary and historic-literary side of the work is further emphasized; and it is sought to awaken interest in the linguistic side by encouraging the practice of independent observation of linguistic facts, and their effect upon literary expression. A systematic course on Greek life, with constant quotation and comparison of original sources, goes hand in hand with this work.

In the Senior year the aims are the same as in the Junior and the methods the same, except that they are extended and developed. A course in the history of Greek Literature by text book, with accompanying lectures and readings, is given in this year.
COURSES.

Professor LAMBERTON:—

3. Euripides' Iphigenia in Tauris; Plato's Meno, Jevon's Greek Literature; Private reading, Sophocles' Philoctetes, Euripides' Bacchae. Three hours.
2. (Half course.) Xenophon's Hiero, Euripides' Medea. One hour.
1. (Half course.) Xenophon's Economicus, Greek Composition. One hour.


Course A is voluntary work, not counting for degree in Junior year.

Professor GUDEMAN:—

4a. Plato's Protagoras. One hour; (First Term.) Elective for Juniors in Arts.
4b. Aristophanes' Clouds. One hour; (Second Term.) Elective for Juniors in Arts.

Mr. BURKE:—

2. (Half course.) Plato's Laches, Andocides' de Mysteriis, Greek Composition. Two hours.
1. (Half course.) Lysias, Plato's Apology, Greek Composition. Two hours. Section I, Section II.

NOTE.—A course in Beginner's Greek is offered by Professor Lambert to such students as have not studied the language before. This course may be taken as a Free Elective in the Junior Year, or as a voluntary in other years. Two hours.

LATIN.

Professor JACKSON:—

1. Selections from Livy and Horace (Satires).—Prescribed for Freshmen in Arts. Three hours.
3. Tacitus (Agricola, Germania, or Annals). Cicero (De Senectute or De Officiis). Horace (Selected Odes).—Course 3 is open only to those who have taken Course 1, and is prescribed for Sophomores in Arts. Three hours.
5. Selections from Juvenal. Cicero (De Officiis, De Finibus, or De Amicitia). Horace (Epistles).—Reading at sight. Course 5 is open only to those who have taken Course 3. Three hours.
6. Cicero (Tusculanae) or Lucretius (Selections). Horace (Ars Poetica).—Reading at sight. Three hours.

Professor GUDEMAN:—

9. Quintilian Book X. One hour; (First Term.) Elective for Juniors in Arts.
10. Plautus' Trinummus. One hour; (Second Term.) Elective for Juniors in Arts.
Four objects are contemplated in the arrangement of the undergraduate courses in English, (1) proficiency in the writing of English; (2) practice in speaking and debate; (3) a general acquaintance with English literature, and (4) a study of the history and philology of English. The disposition of this work in the college curriculum is dependent upon the course pursued or upon the elective chosen, but in every case constant exercise in composition is deemed a subject of prime importance, and thus forms the bulk of the work of all students in the College during the earlier years.

The endeavor to interest the student in good writers begins in Freshman year, and although then subordinate to composition, becomes a main feature of the Sophomore work in the courses in composition and literature, which are prescribed for all students of this class. The general subject continues a required study for all students except those pursuing the technical courses, one hour per week being devoted, in Junior year, to composition work, and two hours to the history of English literature. Further courses in literature and in English language and philology are provided in the German-English, History-English and French-English groups of Electives, which provide for a course of four hours per week in each of these studies throughout the Junior year, the four hours of English being divided between the general subjects, English language and English literature. It is proposed to continue these elective groups of German-English, History-English and French-English in the Senior year of 1894-1895.

The Senior Class pursue the subject of literature as electives in lectures and seminars devoted to such topics as the Drama, Poetics and Aesthetic Criticism; whilst the subject of English language is represented in the upper classes by electives involving Phonetics, the comparative study of Anglo-Saxon and Middle and Modern English, with readings in Anglo-Saxon authors, and in Chaucer and other Middle English writers.

(A.) COMPOSITION AND DECLAMATION.

English composition is prescribed as the study of all students in the College during Freshman and Sophomore years. It is continued as a requirement for Juniors in courses not technical, while the electives of Senior year render it possible for certain students to continue such courses up to graduation. The object of the work in composition includes training in reading and method of work, and the cultivation of readiness and accuracy of perception in matters of thought and style. Exercises in Declamation form a part of the required work of Sophomore year, and a course involving the preparation of speeches and debates is offered as an elective to Juniors. It is the purpose of these courses to afford practice in speaking rather than to offer set instruction in elocution. Special training is offered to students of both these classes who propose competing for the annual prizes in Declamation and Oration.
Mr. PENNIMAN:—

ENGLISH 1.—Composition work based on a study of American prose authors (Franklin, Irving, Hawthorne, Poe). The compositions, after correction, must, if necessary, be rewritten by the student. Genung's Outlines of Rhetoric is used as a text-book. Course 1 is prescribed for all Freshmen. Two hours, throughout the year.

ENGLISH 6.—Weekly Exercises in Composition, corrected and criticised by the instructor with special view to developing a clear and ready English style. This course is elective for Seniors. One hour, throughout the year.

Mr. SMITH:—

ENGLISH 2, COMPOSITION.—This course demands the preparation of one composition a week on subjects chosen to illustrate the various modes of rhetorical expression. The compositions, after correction by the instructor, are read by the students before small sections of the class, and matter, style and manner of reading are considered in rating the work. Genung's Handbook of Rhetorical Analysis is used for reference. Course 2 is prescribed for all Sophomores, students in Engineering taking the year's work in sessions of two hours per week during the second term. One hour, throughout the year.

ENGLISH 3.—Weekly exercises in popular and literary subjects assigned by the instructor, special attention being given to the arrangement of arguments and the writing of speeches. The compositions of this course are read and corrected as in Course 2. Course 3 is prescribed for Juniors, excepting those pursuing four-year technical courses. One hour, throughout the year.

ENGLISH 8, DECLAMATION.—This course involves the preparation by each student of two or more declamations per term. These are rehearsed to the instructor with attention to utterance, action and mode of delivery, and delivered before the class at hours assigned. Course 8 is prescribed for all Sophomores and forms part of Course 3.

ENGLISH 9, DECLAMATION.—This course affords opportunity for special training in the writing of orations, in debating, and in speaking, extemporaneous and prepared. Course 9 is elective for Juniors and Seniors.

The attention of students pursuing these courses is called to the Prizes for Declamation and Oration mentioned below. In addition to the prescribed courses in Declamation, special training will be given to a voluntary class of students wishing to compete for these prizes.

(B.) ENGLISH LITERATURE.

Although the student has already been brought into contact with the writings of good authors in Freshmen year through his work in composition, the regular courses in English Literature begin in Sophomore year. It is the purpose of these courses to train the student to the perception of the principles of form and literary thought by means of actual contact with those writings which are least distantly removed
THE COLLEGE.

from contemporary modes of thought. Junior year is devoted to the study of the History of English Literature, the Period of French Influence preceding the age of Elizabeth; and in Senior year the subject is treated anew from an organic and aesthetic point of view. The seminaries of these two years and the requirements of collateral reading keep the student in constant touch with the works which form the subjects of the lectures.

English Literature is prescribed as a study for all Sophomores and Juniors, except certain of the latter pursuing technical courses. In addition to the prescribed courses, electives are offered to the students of the upper classes as parts of the German-English, History-English and French-English courses mentioned above, and two seminaries—or classes for study and discussion—for students candidates for honors in English.

Professor SCHELLING:—

1. MODERN ESSAYISTS.—This course consists of Lectures on the nature and growth of the familiar and literary Essay, in recitation on the subjects of the lectures, and in the preparation of brief papers on subjects involving collateral readings in the works of the authors discussed. Prescribed for all Sophomores. Two hours. (First Term.) (Given conjointly with Mr. SMITH.)

2. MODERN NOVELISTS.—Lectures on the development of the novel through Scott, Dickens, Thackeray, George Eliot and Hawthorne. Recitations and the frequent writing of brief papers, as in Course 1. These courses are designed to cultivate in the student the habit of careful reading, and the formulation in writing of his thoughts on what he has read. Prescribed for all Sophomores, except students in Engineering, who substitute Course English 2. Two hours. (Second Term.) (Given conjointly with Mr. PENNIMAN.)

3. PERIOD OF FRENCH INFLUENCE.—Lectures on the History of English Literature from Waller to Cowper, including the writers of the Restoration, of the age of Queen Anne, the rise of the newspaper, the novel and the poetry of nature; recitations and examinations in collateral reading. Gosse's Eighteenth Century Literature is recommended for reference. Two hours. (First Term.)

7. THE AGE OF ELIZABETH.—Lectures on the History of English Literature from the Revival of Learning to Milton, exclusive of the Drama; recitations and examinations in collateral reading. Saintsbury's Elizabethan Literature is recommended for reference. Two hours. (Second Term.) Courses 3 and 7 are prescribed for all Juniors, except those in Architecture and in Engineering courses of four years. These courses are elective with History and Philosophy to Juniors in five year technical courses.

4. SEMINARY.—Discussions and Criticism of papers prepared by the students on subjects selected from the works of authors treated in Courses 3 and 7. Course 4 is open to Juniors, candidates for honors in English, and as a voluntary to any student of the class in good standing. Two hours. Every other week throughout the year.
COURSES.

10. **PRINCIPLES OF ENGLISH VERSIFICATION.**—Lectures on Poetics, the nature of English Verse from an aesthetic as well as a structural point of view, with practical exercises in the scanning of English metres. Gummere's *Handbook of Poetics* and Corson's *Primer of English Verse*. Two hours. (First Term.)

13. **ENGLISH PROSE AUTHORS.**—Readings in the prose of Cowley, Temple, Swift, Addison, Goldsmith and Johnson, with special reference to the development of English prose style. *Courses 10 and 13 are elective successively to Juniors in the German-English, History-English and the French-English groups*. One hour. (Second Term.)

14. **THE ENGLISH DRAMA.**—Lectures on the origin, structure and development of the Drama from the Mystery and Miracle Play to the Restoration Drama, with special reference to Shakespeare and his contemporaries. Recitation and examinations upon collateral reading. Two hours. (First Term.)

8. **MODERN AND CONTEMPORARY POETS.**—Lectures upon the Romantic Revival, the Poetry of Revolt, Wordsworth, Keats, Tennyson, Browning, Mr. Swinburne and Walt Whitman. Recitations and examinations upon collateral reading. Two hours. (Second Term.) *Courses 14 and 8 follow Courses 3 and 7 as electives in Senior year.*

9. **SEMINARY.**—Readings, discussions and criticisms of papers prepared by the students on subjects selected from the works of authors treated in Courses 14 and 8. Two hours. Every other week throughout the year. *Course 9 is open to Seniors, candidates for honors in English, and to other members of the Senior Class under certain restrictions.*

11. **ELIZABETHAN DRAMATISTS.**—Readings and critical study of plays of Marlowe, Shakespeare, Jonson, Beaumont and Fletcher, Webster and Shirley. Preparation of papers involving the principles of dramatic construction. Two hours. (First Term.)

12. **ENGLISH LITERARY CRITICISM.**—Readings and critical study of Sidney, Jonson, Bacon, Milton, Dryden and others, with special reference to the opinions and literary theories of these authors. Two hours. (Second Term.) *Courses 11 and 12 are elective in Senior year to accompany Courses 14 and 8.*

**SPECIAL CLASS IN LITERATURE.**—Owing to a demand which exists for university teaching in literature, a demand which cannot be met by the undergraduate nor yet by the graduate courses, the University has established a special course in this subject, given on Saturday mornings at nine o'clock by members of the Corps of Instructors in the Department of English. The course is intended particularly for teachers and is conducted by means of lectures and written and oral recitations. An examination is held at the end of each term. The first course is "Studies in Representative American Writers," conducted by Mr. PENNIMAN.
(C.) English Language (including English Philology).

The courses in these subjects are so arranged that a student can devote to them either one or two years. In the former case Anglo-Saxon is studied for six months; after which the study of Chaucer is pursued. In the latter, Anglo-Saxon is studied for one year, and, in the following year, selections from Middle English authors, including Chaucer, are read. Under certain circumstances, however, a student will be permitted to take the six months' course in Middle English (Chaucer) in addition to the year's course in Anglo-Saxon.

The purpose of the course is to prepare for the study of the language and style of Modern English authors. Comparison of the three forms of speech, Anglo-Saxon, Middle English and Modern English, in the phonetic forms, including the orthography, the syntax, the structure of the period and the rhetoric, is steadily kept up from the beginning to the end of the courses. The Anglo-French element is studied mainly in connection with Chaucer, and the modifications undergone by Latin words in passing into the Romance are investigated so far as to enable the student to explain the form assumed in Middle and Modern English by the better known Latin elements of our vocabulary. Exceptional cases, such as words passing into the French from the Teutonic or Celtic, or from certain obscure Low Latin sources, are treated less fully.

The instructor gives to the class a course of lectures upon the history of the English language and the sources of its vocabulary; also upon phonetics.

Professor Easton:—

1. English Language and Analysis.—It is the purpose of this course to prepare for the rhetorical and literary courses which accompany and follow it, and to increase the efficiency of the instruction in foreign languages. The principles of general grammar, as applied to the mother-tongue, are reviewed, with exercises in the analysis of difficult constructions, but the greater part of the time is devoted to the structure of the English period. The history of the English language is studied in outline with reference to the sources of its vocabulary. Course 1 is prescribed for all Freshmen. One hour, throughout the year. Lounsbury's English Language and Gilmore's Outlines of the Art of Expression are used as text-books.

2. Anglo-Saxon.—First Term. Sweet's Anglo-Saxon Primer, Sweet's Anglo-Saxon Reader, lectures on phonetics, with some comparative study of Anglo-Saxon, Middle English and Modern English forms and orthography. Two hours.


4. English Philology.—Minor Course. Readings in Chaucer. Course 4 is open to those only who have completed Course 2 in Anglo-Saxon. Two hours. (Second Term.)
5. ENGLISH PHILOLOGY.—Major Course. Morris’ Specimens of Early English. Readings in Chaucer. Course 5 is open to those only who have taken Courses 2 and 3 in Anglo-Saxon. Two hours.

6. ELIZABETHAN GRAMMAR.—A philological and grammatical study of plays of Shakespeare. Abbott’s Shakespearean Grammar. One hour. (Second Term.)

Courses 2, 3, 4 and 6 are elective in due order for Juniors and Seniors and Course 5 for Seniors, in the German-English, History-English and the French-English groups.

7. ANGLO-SAXON.—Second Year. Open as a free elective to Seniors who have taken Courses 2 and 3 in Anglo-Saxon. Two hours.

FRENCH.

Professor RENNERT:—

1. Molière, Le Médecin malgré lui; Le Malade imaginaire. Racine, Esther or Athalie. The French Dramatic writers of the Seventeenth Century, with especial reference to the influence of the Spanish Drama. (Second Term.) Principal laws governing the changes in the forms of the Latin in the transition into French. Two hours. For Seniors in Arts and Science.


For Sophomores in Architecture, Science and Technology, and Chemistry: two hours per week throughout the year. For Mechanical, Civil and Chemical Engineers, only a part of this course will be given. One hour per week. See below.


5. A course for beginners. After the study of some Elementary French Grammar (this year Joynes’ Minimum French Grammar and Reader is used), with exercises in translation from English into French, easy prose is read, beginning with Super’s French Reader. In addition the class will read Halévy’s L’Abbé Constantin. Claretie, Pierille. Four hours. Professor RENNERT and Mr. LORENZ.

Mr. LORENZ:—

1. Advanced Grammar and Prose Composition. Two compositions are to be written each term upon subjects to be assigned by the instructor. One hour.
4. Review of Grammar. Exercises in translating English into French and the reading of such texts as may be designated by the instructor. Four hours.
5. See above.

Mr. Lorenz will conduct a class in French conversation and prose composition, one exercise per week through the term, at an hour to be determined by him.

OLD FRENCH.

Professor Rennert:

1. Toynbee, Specimens of Old French. Two hours.
2. Octavian. (Vollmöller's Edition.)

These courses are elective in Junior and Senior years.

OLD PROVENÇAL.

Professor Rennert:

1. Lectures on the Grammar. Bartsch's Chrestomathie Provençale. The Poème sur Boece, the prose extracts, and selections from the following Troubadours will be read: Cercalmont, Marcabrun, Jaufre Rudel, Guillem de Cabestaing, Peire Rogier, Alphonse II., Roi d'Aragon, Arnaut de Maroill, Peire Vidal, Giraut de Salinbac, Giraut Riquier, Roman de Jaufre, Peire de Corbiac, Peirol, Daude de Pradas. One hour.

ITALIAN.

Professor Rennert:

1. Dante, Selections from the Inferno; Tasso, La Gerusalemme Liberata. Cantos 1 and 2. Lectures on the Literature. (Snell's Primer of Italian Literature as a basis.) (Second Term.) One hour.

SPANISH.

Professor Rennert:


GERMAN.

Professor Seidensticker:

1. Platen's Abassiden; Goethe's Egmont; Schiller's Gedichte; Jagemann's Materials for German Composition; History of German Literature. Three hours. Elective for Seniors in Arts and Science.
COURSES.


3. Cohn's *Bakterien*; Virchow's *Nahrungs und Genussmittel*; Heine's *Prose*; Harris' *German Composition*. Three hours. Elective for Sophomores in Science and Technology.


Mr. WESSELMOREFT:—

6. Collar-Eysenbach's *German Grammar*; Hauff's *Das Kalle Herz*; Auerbach's *Brigitta*; Heyse's *L'Arrabiata*. Five hours. Elective for Freshmen in Science and Technology.

7. The same, without Hauff's *Das Kalle Herz*. Three hours. Elective for Freshmen in the Mechanical, Civil and Chemical Engineering Courses.

8. Whitney's *Brief German Grammar*; Niebuhr's *Heroengeschichten*; Koerner's *Zriny*; Stein's *German Exercises*. Four hours. Elective for Juniors in Arts and Science.

9. Joynes-Meissner's *German Grammar*; Brandt's *German Reader*. Three hours. For students of the first year of the special course preparatory to Medicine.

10. Grammar and exercises continued. Hodges' *Course of Scientific German*; Cohn's *Bakterien*. Two hours. For students of the second year in the special course preparatory to Medicine.

PHILOSOPHY.

Professor FULLERTON:—

1. LOGIC.—Lectures and recitations, covering in outline the Inductive and Deductive Logic. Jevons' *Lessons in Logic* is the textbook used. This course is prescribed for Juniors in Arts and Science and in the Wharton School, and is elective for Juniors in Science and Technology, excepting those in Chemistry. Two hours. (*First Term.*)

2. ETHICS.—Lectures and recitations. The course is critical and constructive; and students intending to take it are advised to take Course 6 in the preceding term. It is prescribed for Juniors in Arts and Science and in the Wharton School, and is elective for Juniors in Science and Technology, excepting those in Chemistry. It is prescribed for Juniors in the four-year course in Chemistry. Two hours. (*Second Term.*)

3. HISTORY OF PHILOSOPHY.—Lectures with use of Schwager's Outline. In 1893-94 this course is prescribed for Seniors in Arts and Science. Two hours. (*First Term.*)
4. **The Development of Idealism.**—Lectures and recitations. This course is open only to those who have taken a course in Psychology. In 1893–94 it is prescribed for Seniors in Arts and Science. Two hours. *(Second Term.)*

5. **The Philosophical Club.**—Open to Seniors of all departments. Meets once in a fortnight, in the evening, to hold discussions on special topics in Philosophy and Psychology.

Dr. Newbold:

6. **History of Ethical Theories.** (Ancient and Mediaeval.)—Elective for Juniors in Arts and Science, and open as voluntary work to Juniors in all departments. The text-book used is Sidgwick's *Outlines*. One hour. *(First Term.)*

7. **History of Ethical Theories.** (Modern.)—Elective for Juniors in Arts and Science, and open as voluntary work to Juniors in all departments. One hour. *(Second Term.)*

**Psychology.**

Dr. Newbold:

1. **General Psychology.**—Elective for Juniors in Arts and Science, and in 1893–94 prescribed for Seniors in Arts and Science. The text-book used is James' *Outlines of Psychology*. One hour. *(First Term.)*

2. **General Psychology.**—Elective for Juniors in Arts and Science, and in 1893–94 prescribed for Seniors in Arts and Science. This course is a continuation of Course 1. One hour. *(Second Term.)*

Dr. Witmer:

3. **Experimental Psychology.**—The Physiology of the Nervous System, and Sensation. Elective for Seniors and Juniors in Arts and Sciences. Given in the Biological Building. Two hours. *(First Term.)*

4. **Experimental Psychology.**—The Psychology of Perception. A continuation of Course 3, and open to the same students. Two hours. *(Second Term.)*

**American History and Government.**

Professor McMaster:

1. **Political History of the United States (1765–1892).** These lectures are delivered twice each week to the Junior Class. An outline prepared for this class is used; a supplementary course of reading, with synopsis of the books read is prescribed; maps and diagrams are required, and a certain number of carefully written essays assigned as the work of the students. Course 1 is prescribed for Juniors in the Wharton School. Two hours.
2. **Economic and Financial History of the United States.**—
A short course of lectures delivered twice each week to the Senior Class. A printed outline is used; a course of reading is required, and from time to time an essay. Prescribed for Seniors in the School of American History and Institutions.

3. **United States in the 19th Century.**—A course of lectures delivered twice each week, as elective to Juniors in Arts and Science. (First Term.)

4. **History of Our Own Time.**—A course of lectures delivered on the economic and political history of the United States from 1876-1892. Delivered twice each week, as elective to Juniors in Arts and Science. (Second Term.)

5. **American Political Orations.**—A course of required reading for Juniors in the School of American History and Institutions.

6. **Political History of the United States since the Civil War.**—Accompanied by required papers. Required reading reviews, the legislative action of Congress since 1861. Prescribed for Seniors in the School of American History and Institutions, and in the Wharton School. (First Term.) Two hours.

7. **Government in the United States, (a) the States, (b) the Nation (1776-1892).**—These lectures are delivered three times a week to the Freshman Class, an outline specially prepared for the purpose being used. Supplementary readings, the preparation of papers, quizzes and examinations. Course 7 is prescribed for Freshmen. Two hours.

8. **The Constitutional History of the United States.**—(a) The Principles of American Government, Local, State and National, 1578-1892. (b) The Colonial Charters, 1606-1776. (c) The State Constitutions and State Governments, 1776-1892. These lectures are delivered twice a week to the Senior Class in the School of American History and Institutions; an outline prepared for the use of the class shows the development of the subject. Carefully prepared papers, quizzes and examinations are required. Course 8 is prescribed for Seniors. Two hours.

THE COLLEGE.

11. **Constitutional History.**—The Constitution of the United States, origin, formation, interpretation and administration. Prescribed for Seniors in the School of American History and Institutions, and in the Wharton School. Two hours. *(Second Term.)*


**European History.**

Professor Cheyney:

1. **English History.**—To the close of Stuart Period. The various threads of influence that brought about the Reformation in England, the social changes that reached their culmination in the reign of Elizabeth, the religious and political elements in the struggle of the 17th Century, with the settlement reached at the Revolution, form the main subjects of this course. Gardiner's *Student's History of England*, Vols. 1 and 11, are used as a textbook, with prepared papers and required readings. Prescribed for Freshmen. Three hours. *(One Term.)*


Professor Robinson:

5. **The History of Europe from 1789 to 1815.**—The leading events of the French Revolution will be carefully considered in their causal relations, and as illustrating the elements of modern political thought. In the study of the Napoleonic period, stress will be laid upon the diplomatic history and the beginnings of self-consciousness among the European nations. Prescribed for Sophomores in Arts and Science. Three hours. *(First Term.)*

6. **Recent European History since 1815.**—The successive changes in France, and the unification of Germany and of Italy will be considered, some attention being devoted to the Eastern Question. Prescribed for Sophomores in Arts and Science. Three hours. *(Second Term.)*
COURSES.

7. THE RENAISSANCE AND REFORMATION.—The beginnings of the modern spirit will be traced in Italy and Germany, illustrated by the progress of Literature and Art during the 14th and 15th Centuries. The history of the Papacy from the opening of the Conciliar period will serve at once to indicate the earlier stages of the Reformation, and the progress of the Renaissance. The history of the period of Charles V., and of the Thirty Years' War will occupy the Second Term. Prescribed for Seniors in the Wharton School. Two hours. (Both Terms.)

Mr. MUNRO:—

9. ROMAN HISTORY.—The Roman Empire from the death of Sulla, 78 B.C., to the deposition of Romulus Augustulus, 476 A.D. In the second term the main stress will be laid on the extension and influence of Christianity. Three hours weekly, elective for Sophomores in Arts and Science.

10. MEDIEVAL HISTORY.—In this course no attempt will be made to cover the whole period of Mediaeval History. In the first half-year the lectures will be on the great founders among the new races, Theodoric, Clovis, Charlemagne. After a few lectures on the relations of Church and State, the age of the Crusades will be studied during the second term. As subjects for papers, studies of the most important original sources, such as Charlemagne's Capitularies, or the Letters of the Crusaders, will be assigned. Two hours weekly. Elective for Juniors and Seniors in Arts and Science.

PUBLIC LAW AND POLITICS.

Professor JAMES:—


4. CONSTITUTIONS OF LEADING FOREIGN COUNTRIES.—A study of the text of the German Federal Constitution in comparison with those of the United States and Switzerland. Prescribed for Juniors in the Wharton School. Two hours. (Second Term.)

5. PUBLIC ADMINISTRATION IN THE UNITED STATES.—A study of Federal, State and Local Administration in the United States. Prescribed for Seniors in the Wharton School. Two hours. (First Term.)

6. PUBLIC ADMINISTRATION IN LEADING FOREIGN COUNTRIES.—A study of the characteristic features of governmental administration in England, France and Germany. Prescribed for Seniors in the Wharton School. Two hours. (Second Term.)

Dr. ADAMS:—

Professor Falkner and Dr. Adams:


10. Public Lectures.—By well-known men, on practical subjects, dealing especially with Municipal Administration, Journalism and Banking.

Dr. Lewis:

12. Legal Institutions.—Lectures. Prescribed for Seniors in the Wharton School. Two hours. (Both Terms.)

Dr. Rowe:

13. Ten lectures on Municipal Government. Seniors in the Wharton School. (Second Term.)

Business Law and Practice.

Professor Falkner:

2. Mercantile Law.—Lectures. Prescribed for Seniors in the Wharton School. Two hours. (Second Term.)

Professor Johnson:


Mr. Wintersteen:


Economics and Social Science.

Professor Patten:

1. Political Economy.—Walker's Political Economy, and Adam Smith's Wealth of Nations. Prescribed for Juniors in the Wharton School. Two hours. (Both Terms.)

5. Political Economy.—Mill's Political Economy. Prescribed for Seniors in the Wharton School. Two hours. (First Term.)

6. Political Economy.—Ingram's History of Political Economy and Patten's Dynamic Economics. Prescribed for Seniors in the Wharton School. Two hours. (Second Term.)
Professor Falkner:—
9. Statistics.—Lectures and investigation. Prescribed for Seniors in the Wharton School. Two hours. (First Term.)
13. Geography and History of Commerce.—Lectures and investigation. Prescribed for Juniors in the Wharton School. One hour. (Both Terms.)

Dr. Adams:—
7. Finance.—Bastable's work on Public Finance, supplemented by lectures. Prescribed for Seniors in the Wharton School. Two hours. (Both Terms.)

Mr. Chandler:—
11. Lectures on Finance.—The Money Market, Bonds, Mortgages, Investments, Panics, Corporations, etc. Ten Lectures.

Dr. Bolles:—

Dr. Adams:—

Dr. E. R. Johnson:—
15. Lectures on Transportation.—Railroads, Waterways. Prescribed for Seniors in the Wharton School. One hour. (Second Term.)

Professor Johnson:—
2. Newspaper-Making.—Law of libel; business management; typographical unions; cost and revenue; advertising; method of criticism, etc. Prescribed for Seniors in the Course in Journalism. One hour.
3. Newspaper Practice.—Exercises in reporting; editing of copy; condensation, etc. Prescribed for all students in the Course in Journalism. Three hours. (First Term.)
4. Current Topics.—Lectures on live issues in the United States and foreign countries. Professor Johnson will be assisted in this course by other instructors. It is prescribed for all students in the Course in Journalism. Three hours. (Second Term.)

Public Lectures by men engaged in the active work of the profession.

Note.—All the Courses in Journalism are open as voluntaries to all Juniors and Seniors in the College.
THE COLLEGE.

MATHEMATICS.

Professor Kendall:

1. **ALGEBRA.**—C. Smith's *Treatise on Algebra*. Third edition. The Theory of Exponents and Logarithms, Permutations, Combinations and Simple Probability, Continued Fractions, Series, Undetermined Co-efficients, Interpolation, the Elements of the Theory of Equations and Determinants. Prescribed for Freshmen in Arts and Science, Architecture and Chemistry. Two hours. (First Term and part of Second Term.) Two sections of the class meet Dr. Schwatt.


5. **TRIGONOMETRY.**—Crawley's *Elements of Trigonometry*. Prescribed for Freshmen in Arts and Science, Architecture and Chemistry. Two hours. Two sections of the Class meet Dr. Schwatt. (Second part of First Term, and Second Term.)


11a. **ANALYTIC GEOMETRY.**—Nichol's *Analytic Geometry*. The fundamental properties of the straight line, Circle, Parabola, Ellipse and Hyperbola, including the chapter on the general equation of the second degree. Prescribed for Sophomores in Science and Technology. Four hours. (First Term.)

15. **DIFFERENTIAL AND INTEGRAL CALCULUS.**—Rice and Johnson's *Differential and Integral Calculus* (abridged). This course covers the methods of differentiation and integration with some few applications. It is intended mainly to put at the student's command the machinery of the Calculus for use in future more advanced courses. Prescribed for Sophomores in Science and Engineering. Four hours. (Second Term.) Classes in Engineering meet Dr. Crawley.


Assistant Professor Crawley:

6. **PLANE AND SPHERICAL TRIGONOMETRY.**—Crawley's *Elements of Trigonometry* and Newcomb's *Tables of Logarithms*. This course covers the derivation and application of the ordinary trigonometric formulae, the solution of Plane and Spherical Triangles, together with some introduction to Trigonometric Analysis. Prescribed for Freshmen in Science and Technology. (Second Term.) Four hours.

8. **PLANE AND SPHERICAL TRIGONOMETRY.**—Crawley's *Elements of Trigonometry* and Newcomb's *Tables of Logarithms*. This course is more advanced than 6, and is open only to students who have passed Mathematics F for admission. Much stress is laid...
upon skillful and rapid reduction of trigonometric expressions, and the solution of trigonometric problems. Prescribed for Freshmen in Civil, Mechanical, Electrical and Chemical Engineering. Four hours. (First Term.) Half of the section in Mechanical and Electrical Engineering meet Assistant Professor Fisher.

7. Special Work in Geometry, Algebra and Trigonometry.—This course is designed to supplement the work of Freshman year, and is open as a voluntary course to members of the Freshman Class. One hour.

15. Differential and Integral Calculus.—Rice and Johnson’s Differential and Integral Calculus (abridged). This course covers the methods of differentiation and integration with some few applications. It is intended mainly to put at the student’s command the machinery of the Calculus for use in future more advanced courses. Prescribed for Sophomores in Science and Technology and in Engineering. Four hours. (Second Term.) The Class in Science and Technology meet Professor Kendall.

16. Differential and Integral Calculus.—Rice and Johnson’s Differential and Integral Calculus (abridged). This course consists mainly of such applications of the Calculus as will be useful to students in Engineering. It is a continuation of the preceding course. Prescribed for Juniors in the Engineering Departments. Three hours.

21. Determinants.—Weld’s Theory of Determinants. Open to students who have completed the Mathematics of the Freshman year. Two hours. (First Term.)

12. Analytical Geometry of Three Dimensions.—Smith’s Solid Geometry. This course takes up the subject at the beginning and goes through surfaces of the second degree, with such additional matter in systems of conicoids as the time will permit. Some knowledge of Calculus and of Determinants is a prerequisite. Two hours. (Second Term.)

25. Methods of Curve Tracing, with some introduction to the Theory of Higher Plane Curves.—Open to students who have had a course in Calculus. One hour, or two hours for one term.

27. A Course for Special Students, in preparation for work in the Department of Philosophy. This course is intended solely for teachers, and for that reason meets on Saturday mornings. The work this year is a somewhat advanced Course in Analytic Geometry.

Assistant Professor Fisher :—

2. Algebra.—C. Smith’s Treatise on Algebra. Third edition. This course differs from Course 1, chiefly in the amount and nature of the work in the same topics. Prescribed for Freshmen in Engineering. Four hours. (Second Term.) One third of the class meet Dr. Schwatt.
8. **PLANE AND SPHERICAL TRIGONOMETRY.**—Crawley's *Elements of Trigonometry* and Newcomb's *Tables of Logarithms*. This course is more advanced than 6, and is open only to students who have passed Mathematics F for admission. Much stress is laid upon skillful and rapid reduction of trigonometric expressions and the solution of trigonometric problems. Prescribed for Freshmen in Civil, Mechanical and Electrical Engineering. Four hours. (*First Term.*) Half the class in Mechanical and Electrical Engineering and the class in Civil Engineering meet Professor CRAWLEY.

11. **ANALYTIC GEOMETRY.**—C. Smith's *Conic Sections*. The fundamental properties of the straight line, Circle, Parabola, Ellipse and Hyperbola, including the chapter on the general equation of the second degree. Prescribed for Sophomores in Engineering. Four hours. (*First Term.*)


20. **QUATERNIONS.**—Lectures. For the Faculty prize in Mathematics, to members of the Junior Class. The lectures are based upon Taite's *Elements of Quaternions*, and, in addition to developing the elementary theory, include some applications to Geometry and Physics. May be taken by any students properly prepared as a first course in the subject. One hour.


13. **ADVANCED ANALYTIC GEOMETRY of two and three Dimensions.** The study of lines and surfaces of the first and second degrees, based upon the works of Salmon. Omitted in 1893–94.


18. **CALCULUS.**—Advanced work in Integral Calculus. Williamson, and lectures with references to Bertrand. Elective for Juniors and Seniors who have taken Course 17 or an equivalent. Two hours.

23. **DIFFERENTIAL EQUATIONS.**—Forsyth, and lectures. Two hours.

Dr. Schwatt:

1. **ALGEBRA.**—C. Smith's *Treatise on Algebra*, third edition. The topics taken up are Theory of Quadratic Equations, Permutations and Combinations, Binomial Theorem for any exponent. Theory of Exponents and of Logarithms, Series, Undetermined Coefficients, Continued Fractions, Elements of the Theory of Equations and of
the Theory of Probabilities, etc. Prescribed for Freshmen in Arts and Science, Architecture and Chemistry. Two hours. 

(First Term and part of Second Term.) One section of the Freshmen in Arts and Science meets Professor Kendall.

2. ALGEBRA.—C. Smith's Treatise on Algebra. Third edition. This course differs from 1 chiefly in the amount and nature of the work in the same topics. Prescribed for Freshmen in Science and Technology; four hours (First Term); and for Freshmen in Engineering; four hours (Second Term). The class in Civil Engineering and half the class in Mechanical and Electrical Engineering meet Professor Fisher.


5. PLANE TRIGONOMETRY.—Crawley's Elements of Trigonometry. This course is prescribed for Freshmen in Arts and Science, Architecture and Chemistry. The equivalent of three hours (Second Term). Half of the Freshmen in Arts and Science meet Professor Kendall.

28. MODERN GEOMETRY.—Lectures on Brocard’s and Grebe’s theories of the plane triangle; followed by applications of the same to conic sections. Elective for Juniors and Seniors. Two hours.

CHEMISTRY.

The Laboratories are open every day from 9 A.M. to 5 P.M., except Saturday afternoons after 1 o'clock.

Professor Smith, assisted by Dr. Ohly, Dr. Fleck, Mr. Shinn, Mr. Moyer and Mr. Wallace:—

1. GENERAL INORGANIC CHEMISTRY.—This subject is taught by recitation and conversational lectures. All students pursuing the course carry out a series of well-selected experiments illustrating the principles of Chemistry. After some knowledge of general methods and dexterity in handling apparatus have been acquired, simple quantitative experiments are conducted under the immediate supervision of instructors. All the more difficult experiments are performed before the class by the instructors. The student is constantly drilled in the solution of numerous problems bearing upon the various reactions carried out practically in the laboratory.

The Freshman Class of the four-year course in Chemistry devote six hours per week to the experimental portion of this course; the Freshmen in Chemical Engineering, eight hours per week. Both classes recite twice per week.

The Freshmen in Mechanical Engineering, Civil Engineering and Architecture, as well as the Sophomores in Arts and Science and in Science and Technology, devote three hours per week to this course. They all recite one hour per week.

2. ANALYTICAL CHEMISTRY.—Qualitative Analysis. Laboratory practice with recitations. Preparation of a series of inorganic
salts. The Juniors in Science and Technology in the Chemical Section are required to take twelve hours in this subject; the Sophomores of the four-year course in Chemistry, from eighteen to twenty hours; the Sophomores in Chemical Engineering, twelve hours; the Juniors in Metallurgy and Mining, six hours; Juniors and Sophomores in Civil Engineering (four-year course), four hours; Sophomores in Mechanical Engineering (four-year course) three hours (First Term); and the second-year Biological Class, six hours.

3. Analytical Chemistry. — Quantitative Analysis. Practice in both gravimetric and volumetric analysis, with careful drill in mineral analysis. Seniors in Chemistry take six hours in this course; Seniors in Metallurgy and Mining, four hours; Juniors in four-year Chemical course, twelve hours; Juniors in Chemical Engineering, twelve hours; and Sophomores in four-year Mechanical Engineering course, three hours (for Second Term).

4. Organic Chemistry. — The instruction is by recitation and lectures. Prescribed for Juniors in Science and Technology in the Chemical Section, Juniors in the four-year course in Chemistry, and Juniors in Chemical Engineering, two hours.

5. Organic Chemistry. — This course consists in the preparation of a series of typical organic compounds. It supplements Course 4, and is required of Seniors in Science and Technology in the Chemical Section, six hours, and Juniors in four-year course in Chemistry, twelve hours. One hour per week is devoted to a lecture or recitation on this subject.

6. Applied Chemistry. — This course consists of lectures upon subjects pertaining both to inorganic and organic Chemistry, supplemented by regular and frequent excursions to works in and out of the city. This course is required of Seniors in Science and Technology in the Chemical Section, Seniors in Chemical Engineering, and Juniors in the four-year course in Chemistry. This regular work in College is supplemented by a course of lectures occupying one hour per week, delivered by graduates.

7. Industrial Chemistry. — The execution of experimental studies in both applied inorganic and organic Chemistry. The course is not begun until the student has completed all previous courses in Chemistry. It is mainly of a practical character. Ten hours.

8. Seminar. — The hour devoted to this feature of the course is given to the reading of journals, papers on special topics in Chemistry, or to lectures delivered by advanced students. One hour.

9. Chemical Theory. — Lectures and recitations. This is a prescribed course for Post-Seniors in Chemistry, and Seniors in the four-year course in Chemistry. One hour.

10. Advanced Analytical Chemistry. — This includes the discussion of electrolytic methods, gas analysis, and special topics in this field of Chemistry. It is a prescribed course for Post-Seniors in Science (Sec. 1), Seniors in the four-year course, and Seniors in Chemical Engineering. The lecture hour is appointed after consultation with those who take the Course.
The undergraduate courses in Physics are classified under the three heads of Elementary Practical Physics (Courses 1 and 2), General Physics (Courses 3, 4, 5 and 6), and Advanced Laboratory Physics (Courses 7, 8 and 9). The courses in Advanced Laboratory Physics must be preceded by the courses in General Physics.

Professor Barker:—


Professor Barker and Assistant Professor Goodspeed:—

5. Radiation (including Light), and Magnetism.—Lectures, two hours, Professor Barker; and Recitation, one hour, Assistant Professor Goodspeed. Prescribed for Juniors in Science and Technology, and for Sophomores in Chemical, Civil, Electrical and Mechanical Engineering. This course must be preceded by 3 and 4. (First Term.)

6. Electricity.—Lectures, two hours, Professor Barker; and Recitation, one hour, Assistant Professor Goodspeed. Prescribed for Juniors in Science and Technology, and for Sophomores in Chemical, Civil, Electrical and Mechanical Engineering. This course must be preceded by 3, 4 and 5. (Second Term.)

Professor Barker, Assistant Professor Goodspeed and Dr. Richards:—

8. Physical Measurements.—Practical work in Laboratory. (First Term.) Dynamical, Thermal and Optical measurements. Prescribed for Seniors in Science and Technology, and for Juniors in Chemical, Civil, Electrical and Mechanical Engineering. Three hours. (In this course, Electrical Engineers take six hours.)

9. Physical Measurements.—Practical work in Laboratory. (Second Term.) Electrical measurements. Prescribed for Seniors in Science and Technology, and for Juniors in Chemical, Civil, Electrical and Mechanical Engineering. Three hours. (In this course, Electrical Engineers take six hours.)

Assistant Professor Goodspeed and Dr. Richards:—

1. Elementary Practical Physics.—Prescribed for Sophomores in Arts and Science, and in Architecture. Three hours.

2. Elementary Practical Physics.—Prescribed for Freshmen in Chemistry. Methods. One hour. Assistant Professor Goodspeed. Laboratory, three hours. Assistant Professor Goodspeed and Dr. Richards.

3. Mass-Physics, Energy.—This course must be preceded by Mathematics 1, 3 and 5 or their equivalents. Prescribed for Sophomores in Science and Technology, and Freshmen in
Chemical, Civil, Electrical and Mechanical Engineering. Two hours. (*First Term.*)

4. **Sound and Heat.**—This Course must be preceded by Course 3. Prescribed for Sophomores in Science and Technology, and Freshmen in Chemical, Civil, Electrical and Mechanical Engineering. Two hours. (*Second Term.*)

**Biology.**

*Zoology.*

Professor Jayne:—

12. **Vertebrate Morphology.**—Advanced Course. Lectures and Laboratory work. Course 12 is open to those only who have taken Courses 5 and 25. Six hours. (*First Term.*)

13. **Osteology of the Mammalia.**—Lectures and Laboratory work. Course 13 is open to those only who have taken Course 5 or 8. Six hours.

Professor Jayne and Dr. Burk:—

8. **Mammalian Anatomy.**—Lectures and Laboratory work. Six hours.

24. **Human Anatomy.**—Laboratory exercises. Six hours.

Professor Cope:—

25. **Systematic Study of the Vertebrates.**—Lectures. Three hours.

Mr. Moore:—

5. **Elementary Vertebrate Morphology.**—Laboratory exercises, with explanatory Lectures. Six hours.

Professor Ryder:—

6. **Animal Histology.**—Lectures and Laboratory work. Course 6 is open only to those who have taken Course 1. Six hours. (*First Term.*)

7. **Animal Embryology.**—Lectures and Laboratory work. Course 7 is open only to those who have taken Course 6. Six hours. (*Second Term.*)

9. **Animal Histology.**—Advanced Course. Lectures and Laboratory work. Course 9 is open to those only who have taken Course 6. Six hours. (*First Term.*)

10. **Animal Embryology.**—Advanced Course. Lectures and Laboratory work. Course 10 is open to those only who have taken Course 7. Six hours. (*Second Term.*)
COURSES.

Professor Ryder and Mr. Calvert:—

3. **SYSTEMATIC STUDY OF THE INVERTEBRATES.**—Laboratory work, with explanatory Lectures. Six hours. *(First Term.)*

Professor Allen:—

22. **THE MECHANISM OF LOCOMOTION.**—Course 22 is open only to advanced students. Two hours.

23. **MAMMALIAN NEUROLOGY AND CRANIOLOGY.**—Course 23 is open only to advanced students. Two hours.

Professor Horn:—

21. **ENTOMOLOGY.**—The General Anatomy of Insects, with practical exercises in Systematic Coleopterology. Course 21 is open only to advanced students. Hours as assigned.

Botany.

Professor Wilson:—

16. **PLANT HISTOLOGY.**—Lectures and Laboratory work. Course 16 is open only to those who have taken Course 14. Six hours. *(First Term.)*

Professor Wilson, Dr. Harshberger and Mr. Greenman:—

14. **GENERAL STRUCTURAL BOTANY.**—Lectures and Laboratory work. Six hours. *(First Term.)*

Professor Wilson and Dr. Harshberger:—

18. **PLANT PHYSIOLOGY.**—Lectures and Laboratory work. Course 18 is open only to those who have taken Courses 14 and 16. Seven hours.

Professor Macfarlane:—

26. **COMPARATIVE MORPHOLOGY (MACRO- AND MICROSCOPIC) OF LEADING NATURAL ORDERS OF PLANTS.**—Lectures, two hours, and daily Laboratory exercises.

27. A **Course of Lectures and Practical Demonstrations on the organization of Museums of Comparative Botany for Schools, Colleges and Universities.** Begins in January.

Professor Macfarlane and Dr. Harshberger:—

17. **SYSTEMATIC STUDY OF CRYPTOGAMS.**—Lectures and Laboratory work. Course 17 is open only to those who have taken Course 1. Six hours. *(Second Term.)*

Courses 15 and 17 may be taken together.

Professor Macfarlane, Dr. Harshberger and Mr. Greenman:—

15. **SYSTEMATIC STUDY OF THE PHÆNOGAMS.**—Lectures and Laboratory work. Course 15 is open only to those who have taken Course 14. Six hours. *(Second Term.)*

Professor Rothrock:—

19. **ECONOMIC BOTANY.**—Lectures.
SANITARY SCIENCE.

Dr. Abbott:—

1. SANITARY SCIENCE.—Lectures on Heating and Ventilation in their relation to architectural practice. Illustrated by models and drawings. Prescribed for Juniors and First-year special students in Architecture. One hour. (Second Term.)

2. SANITARY SCIENCE.—Lectures on Plumbing and Drainage in their relation to architectural practice. Illustrated by models and drawings. Prescribed for Seniors and Second-year special students in Architecture. One hour. (First Term.)

METALLURGY.

Dr. Brown:—

1. THEORY of Metallurgical processes, and of the dressing and mechanical treatment of ores. This course is prescribed for all Seniors in Science and Technology. One hour.

2. ASSAYING.—This course is prescribed for Seniors in Metallurgy and Mining. Four hours.

3. DEMONSTRATIONS of the principal Metallurgical processes by furnace. This course is prescribed for Post-Seniors in Metallurgy and Mining. Two hours.

4. LECTURES on the production of pig, weld, and temper iron, and of silver, copper and lead. Prescribed for Post-Seniors in Metallurgy and Mining. Two hours. The class also makes visits to metallurgical works in the city and state.

MINERALOGY.

Dr. Brown:—

1. MINERALOGY BEGUN.—Crystallography, native elements, sulphides, chlorides, fluorides and oxides. This course is prescribed for Juniors in Chemistry, in Metallurgy and Mining, and in Civil Engineering. Two hours.

2. MINERALOGY.—Sulphates, phosphates, etc. Carbonates and silicates. This course is prescribed for Seniors in Science and Technology, except those in Civil and Mechanical Engineering. Two hours.

3. DETERMINATIVE MINERALOGY.—Prescribed for Seniors in Chemistry, Metallurgy and Mining, and in Civil Engineering. Two hours.

4. PHYSICAL MINERALOGY.—Determination of minerals by physical properties, use of contact and reflecting goniometer, polariscope, stauroscope, refractometer, etc. One hour.

5. MINERALOGY. BRIEFER COURSE.—This course embraces the salient points of Courses 1 and 2, but only such minerals as are of economic importance are considered. Prescribed for Post-Seniors in Civil Engineering and for Seniors in the four-year course in Civil Engineering. Two hours.
MINING.

Dr. Brown:

1. MINING ENGINEERING.—Construction of parts of mines and mining machinery, from notes and sketches. Course 1 is prescribed for Juniors and Seniors in Metallurgy and Mining. Five hours.

2. MINING ENGINEERING.—Lectures on the methods used in prospecting for and developing ore and coal deposits. Course 2 is prescribed for Juniors in Metallurgy and Mining. Two hours.

3. MINING ENGINEERING.—Lectures on the ventilation and drainage of mines. Special mining problems in faulted strata, more especially in coal mining. Excursions for two weeks to the Anthracite Coal Regions, to make underground surveys, and to learn how to examine a mine and report its condition. Course 3 is prescribed for Post-Seniors in Metallurgy and Mining. Two hours.

4. MINING ENGINEERING.—Lectures on the principles involved and the machinery employed in haulage, hoisting, and pumping in mines. Course 4 is prescribed for Seniors in Metallurgy and Mining. Two hours.

GEOLOGY.

Dr. Brown:

1. LITHOLOGY.—Prescribed for Juniors in Metallurgy and Mining. One hour.

3. STRATIGRAPHY of the rock systems in connection with Palaeontology, Laws of Dynamic Geology, Structural Geology of North America, with reference to that of Europe, with the principle minerals and fossils and distribution of metals and fuels. Prescribed for Post-Seniors in Chemistry, in Metallurgy and Mining, and in Civil Engineering. Two hours.

ARCHITECTURE.

Professor Laird:

B. 4. BUILDING CONSTRUCTION.—A consideration of modern practice in the building and finishing of ordinary structures in wood, brick and stone. Lectures. Prescribed for Sophomores in Architecture. One hour. (Second Term.)


Students in Architecture. One hour throughout two years. (This course is given by Professor Laird and members of the Corps of Lecturers.)

C. II. Graphical Statics.—A consideration of the stresses in beams, girders and trusses, and in piers, arches and abutments, with application of the graphical method to their analysis. Lectures and exercises. Seniors and Second-year Specials in Architecture. Two hours.


Assistant Professor Seeler:—


C. 7. Design.—Monthly problems in design developing the principles of planning and composition. Juniors in Architecture. Fifteen hours. (First and Second Terms.) First-year Specials in Architecture. Fifteen hours. (Second Term.)


D. 7. Design.—Advanced Problems in design completing the studies in planning and composition prescribed for Junior year. Seniors in Architecture. Twenty hours. (First Term.)

D. 8. Thesis.—A problem in Architectural Composition requiring plans, sections, elevations and a descriptive essay. Seniors in Architecture. Twenty-five hours. (Major part of Second Term.)

Mr. Everett:—

C. 1. Freehand Drawing.—Drawing in charcoal from casts of architectural ornament; in charcoal from casts of parts of the human figure and in pencil from photographs. Juniors in Architecture. Six hours. First-year Specials in Architecture. Six hours.

C. 2. Sketching.—Drawing in pencil from nature and from the object. Juniors and First-year Specials in Architecture. Three hours. (Part of First and Second Terms.)

C. 9. History and Ornament.—Lectures on the historical development of ornamental forms. Juniors and First-year Specials in Architecture, and First-year class in Interior Architecture. One hour. (Part of First and Second Terms.)
A. B. C. 1. **Summer Sketching.**—Completion of a stated amount of drawing during the summer vacation as per programme issued at end of College year. Drawings criticised and passed upon at close of vacation by the instructor. Prescribed (alternatively with office work) for all undergraduates in Architecture.

D. 1. **Freehand Drawing**—Advanced drawing in charcoal from developed forms of architectural ornament and from casts of the human figure. Seniors in Architecture. Seven hours. Second-year Specials in Architecture. Seven hours.

D. 2. **Sketching.**—Completion of Course C. 2 by advanced studies in sketching from nature and objects of art. Seniors and Second-year Specials in Architecture. Three hours. *(Part of First and Second Terms.)*

G. 1. **Freehand Drawing.**—Pencil drawing from the flat and the object, charcoal drawing from the object and the cast, and the drawing of ornamental forms; with special reference to accompanying studies in Interior Architecture. First-year students in Interior Architecture. Four hours.

G. 2. **Water-Color Drawing.**—Studies in water-color, of tapestries and other fabrics executed in color, with reference to harmony and contrast of color and color composition. First-year Students in Interior Architecture. Three hours. *(Part of First and Second Terms.)*

G. 4. **Theory of Design.**—Lectures on the principles of the design and application of ornament, with application to First-year Problems. First-year Students in Interior Architecture. One hour.

G. 5. **Problems and Criticisms.**—Weekly problems in the composition of ornament, comprising studies in fabrics; tapestries, silks, brocades, embroideries and rugs. Mosaics; in marble and glass. Stained glass; memorial and decorative. Art Metal Work; in brass, copper, gold silver and iron. Furniture; Interior Wood Work; Carving in stone and wood, and the Treatment of Wall Surfaces; in color, with fabrics, and in relief. Problems studied under criticism and direction of the instructor in charge. First-year Students in Interior Architecture. Eight hours. *(Hours as assigned.)*

H. 1. **Freehand Drawing.**—Advanced drawing in charcoal from casts of ornament and the human figure and from the object, with special reference to the Second-year studies in Interior Decoration. Second-year Students in Interior Architecture. Four hours.

H. 2. **Water-Color Drawing.**—Advanced color studies in executed decorations; with reference to harmony and contrast of color and color composition. Second-year Students in Interior Architecture. Three hours. *(Part of First and Second Terms.)*

H. 5. **Problems and Criticisms.**—Weekly problems in the design of interiors, involving the study of the Composition of Interior Decorations. Employing the various studies in Composition of Ornament, enumerated in Course G. 5, and covering broadly the subject of Interior Architecture. Eight hours.

Mr. **Millard**:—

A. 3. **Elements of Architecture.**—Typical Greek, Roman and Gothic Moldings. Architectural features rendered in India ink. Freshmen in Architecture. Three hours. *(First Term.)*


A. 5. **Descriptive Geometry.**—Freshmen in Architecture. Two hours. *(Second Term.)*

B. 2. **Shades and Shadows.**—Lectures on theory and practical exercises. Sophomores and First-year Specials in Architecture. Three hours. *(First Term.)*

B. 3. **Working Drawings.**—The preparation of working drawings to scale and full size, from notes and dictations. Drafting room exercises under personal direction. Sophomores in Architecture. Three hours. *(First Term.)*

B. 6. **Sketch Design.**—Three and six hour programmes in design to be rendered in pencil and color in sketch form. Alternating with the regular monthly problems in design. Sophomores in Architecture. *(Second Term.)*

B. 7. **Sketch Design.**—Problems to be rendered in sketch form in limited time. Alternating with the monthly problems in Design. Sophomores in Architecture. *(Second Term.)*

B. 8. **Design.**—Monthly Problems in Design of simple character, embodying the application of elementary principles of design and the rendering of architectural drawings. Sophomores in Architecture. Twelve hours. *(Second Term.)*


*Professor Dana*:—

C. 5. **Water-Color Drawing.**—Drawing in water-color from still life and from nature. Three-hour studies during two years

*Under direction of Mr. Everett, during Professor Dana's absence in 1893-94.*
under personal direction and criticism. Juniors, Seniors and Special Students in Architecture. Three hours.

Mr. Eyre:—


Mr. Plasschaert:—

C. 4. Modeling.—Modeling in clay from the flat and the cast with special attention to architectural forms. Juniors and First-year Specials in Architecture. Three hours.

Mr. Dawson:—

A. 1. Freehand Drawing.—(a) Drawing details of ornament in outline from the flat, in pencil. (b) Drawing in charcoal from the round. Freshmen in Architecture. Five hours.

A. 2. Mechanical Drawing.—Geometrical problems and ornamental forms to cultivate accuracy in the use of drawing instruments. Projections, isometric drawing and elementary shades and shadows. Text-book, Faunce’s Mechanical Drawing. Freshmen in Architecture. Three hours. (First Term.)

B. 1. Freehand Drawing.—Drawing from casts of architectural ornament in charcoal and pencil. Sophomores in Architecture. Five hours.

B. 5. Perspective.—Principles and practical exercises. (B. 5 follows directly on A. 5.) Sophomores and First-year Specials in Architecture, and First-year Students in Interior Architecture. Three hours. (Second Term.)

I. 1. Freehand Drawing.—Drawing in Pencil from the object. Freshmen in Chemistry. One hour.


I. 3. Freehand Drawing.—(a) Drawing in pencil from the object. (b) Drawing Biological specimens from the object in pencil. Students in Biology. Three hours.

Mr. Boyden:—

C. 14. Advanced Building Construction.—Lectures on modern practice in the erection of large buildings, with attention to special forms of construction. Juniors and Second-year Special Students in Architecture. One hour. (Part of First and Second Terms.)
Professor MARBURG:—


2. MATERIALS OF ENGINEERING.—Properties of building stones and methods of quarrying. Manufacture and use of lime, cement, mortar, concrete and brick. Classification, strength and cost of masonry. Course 2 is prescribed for Seniors in Civil Engineering, and for Juniors in the four-year course. One hour. (Second Term.)

3. MATERIALS OF CONSTRUCTION.—Manufacture and physical characteristics of Iron and Steel. Strength, elasticity, resilience and conditions by which these properties are affected. Crystallization and granulation. Inspection and specifications. Properties of timber, and methods of preservation. Course 3 is prescribed for Post-Seniors in Civil Engineering, and for Seniors in the four-year course. Two hours.

4. GRAPHICAL STATICS.—Application of the principles of the force and equilibrium polygons to the graphical determination of shears, bending moments, centres of gravity and moments of inertia. Graphical analysis of the stresses in roof trusses of standard types. Course 4 is prescribed for Juniors in Civil Engineering and Architecture, and for Seniors in the four-year course. Two hours. (Second Term)

5. STRUCTURES.—Analytical determination of the stresses in Framed Structures. Modern types of bridge trusses and their relative merits. Treatment of uniform and concentrated load systems, according to the most approved methods. Effect of wind and centrifugal forces. Analysis of details of construction. Course 5 is prescribed for Seniors in Civil Engineering, and for Seniors in the four-year course. Four hours. (Second Term.)

6. SUSPENSION, CANTILEVER AND SWING BRIDGES.—Determination of stresses in bridges of these types by analytical methods. Course 6 is prescribed for Post-Seniors in Civil Engineering, and for Seniors in the four-year course. One hour. (First Term.)

7. BRIDGE DESIGNING.—Complete design of a plate girder bridge. Computations and detailed drawings. Course 7 is prescribed for Seniors in Civil Engineering, and for Juniors in the four-year course. Two hours. (Second Term.)

8. BRIDGE DESIGNING.—Complete design of a railway bridge. Pratt truss. Computations and detailed drawings. Course 8 is prescribed for Post-Seniors in Civil Engineering, and for Seniors in the four-year course. Four hours.
### COURSES.

<table>
<thead>
<tr>
<th>Course</th>
<th>Description</th>
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<tr>
<td>11.</td>
<td><strong>FOUNDATIONS, DAMS, PIERS AND ABUTMENTS.</strong>—Ordinary foundations, pile and I beam foundations, subaqueous foundations. Theory of masonry dams and retaining walls, bridge piers and abutments. Course 11 is prescribed for Post-Seniors in Civil Engineering, and for Seniors in the four-year course. Two hours. <em>(First Term.)</em></td>
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<td>12.</td>
<td><strong>STONE ARCHES AND CULVERTS.</strong>—Theory and methods of construction. Course 12 is prescribed for Post-Seniors in Civil Engineering, and for Seniors in the four-year course. One hour. <em>(Second Term.)</em></td>
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<td>13.</td>
<td><strong>ENGINEERING SPECIFICATIONS.</strong>—Study of selected specifications relating to iron and steel, masonry, bridge construction, etc. Course 13 is prescribed for Post-Seniors in Civil Engineering, and for Seniors in the four-year course. One hour. <em>(Second Term.)</em></td>
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<td>14.</td>
<td><strong>SPECIAL LECTURES.</strong>—Lectures on River and Harbor Improvements, Municipal Engineering, Water Supply, Materials of Engineering, etc. Course 14 is prescribed for Post-Seniors in Civil Engineering, and for Seniors in the four-year course. At hours assigned. <em>(Second Term.)</em></td>
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<td>15.</td>
<td><strong>INSPECTION TOURS.</strong>—Visits to engineering works and manufacturing establishments. Course 15 is prescribed for Post-Seniors in Civil Engineering, and for Seniors in the four-year course. At hours assigned.</td>
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<td>16.</td>
<td><strong>THESIS.</strong>—Thesis on a professional subject. Required of the Post-Seniors in Civil Engineering, and of the Seniors in the four-year course.</td>
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<td>Assistant Professor <strong>WEBB:</strong></td>
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<td>17.</td>
<td><strong>SURVEYING.</strong>—Theory relating to the use and adjustments of the compass, transit, level, plane table and the smaller field instruments; relocation of boundaries of land; division and computation of areas; topographical surveying; methods of the U. S. Government land surveys. Course 17 is prescribed for Juniors in Civil Engineering, and for Freshmen in the four-year course. One hour.</td>
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18. **Surveying.**—Theory of hydrographical, mining and city surveying. Course 18 is prescribed for Seniors in Civil Engineering, and for Sophomores in the four-year course. One hour. *(First Term.)*

19. **Surveying.**—Theory relating to railroad surveying. Simple, compound and transition curves; turnouts, etc. Course 19 is prescribed for Juniors in Civil Engineering, and for Sophomores in the four-year course. Three hours. *(Second Term.)*

20. **Geodesy.**—Figure of the earth. Method of least squares; adjustment and weight of observations; theory of probable error; computations relating to triangulations. Course 20 is prescribed for Post-Seniors in Civil Engineering, and for Seniors in the four-year course. Three hours. *(Second Term.)*

21. **Surveying.**—Field practice in land, topographical and plane table surveying. Course 21 is prescribed for Juniors in Civil Engineering, and for Freshmen in the four-year course. Three hours. In addition to the hours mentioned, one entire week during the Second Term is devoted to a special land survey.

22. **Surveying.**—Field practice in city, topographical and hydrographical surveying. Course 22 is prescribed for Seniors in Civil Engineering, and for Sophomores in the four-year course. Three hours. *(First Term.)* In addition to the hours mentioned, one entire week during the First Term is devoted to a special hydrographical survey.

23. **Surveying.**—Field practice in staking out simple, compound and transition curves. Course 23 is prescribed for Juniors in Civil Engineering, and for Sophomores in the four-year course. Two hours. *(Second Term.)*

24. **Railroad Location.**—Field practice in laying out a short line of railroad, including reconnaissance, preliminary survey, location, determination of grades, cross-sectioning, setting of slope stakes, etc. Course 24 is prescribed for Seniors in Civil Engineering, and for Juniors in the four-year course. Equivalent of four hours per week. *(First Term.)*

25. **Map Drawing.**—Map of hydrographical survey; map of city survey. Course 25 is prescribed for Seniors in Civil Engineering, and for Sophomores in the four-year course. One hour.

26. **Railroad Office Work,** based on the data of survey during the preceding term; drawing of final map and profile; amount, haul and cost of earthwork; estimates of masonry; designs of culverts; detail drawings. Course 26 is prescribed for Seniors in Civil Engineering, and for Juniors in the four-year course. Three hours. *(Second Term.)*

27. **Railway Economics.**—General theory of the inception and completion of railway projects; probable volume of traffic and its probable growth; effect of details of alignment on operating expenses and revenue; study of the methods of railway management. Course 27 is prescribed for Post-Seniors in Civil.
COURSES.

Engineering, and for Seniors in the four-year course. Four hours. (First Term.)

Mr. WORTHINGTON:—

28. PROJECTIONS.—Elementary plane problems. Orthographic projections in one quadrant. Isometric and oblique projections. Elementary problems in shades and shadows, and linear perspective. Course 28 is prescribed for Freshmen in the four-year course. Two hours. (First Term.)

29. DESCRIPTIVE GEOMETRY.—Problems of the point, line and plane; single-curved, double-curved and warped surfaces; intersections, tangencies and developments. Course 29 is prescribed for Sophomores in Science, and Sophomores in the four-year course. Two hours. (First Term.)

30. SHADES AND SHADOWS, AND PERSPECTIVE.—Determination of shade lines and brilliant lines and points of curved surfaces and shadows on planes of projection and other surfaces. Course 30 is prescribed for Sophomores in Science, and for Sophomores in the four-year course. Two hours. (Second Term.)

31. STEREOTOMY.—Stone cutting. Determination of the forms and sizes of stones in the construction of groined, trumpet and cloistered arches, compound and conoidal wing-walls, arched gateways, etc. Construction of templets and use of directing instruments. Theory and preparation of models. Course 31 is prescribed for Post-Seniors in Civil Engineering, and for Juniors in the four-year course. One hour. (First Term.)

32. PEN TOPOGRAPHY.—Conventional signs. Elementary exercises. Course 32 is prescribed for Juniors in Civil Engineering (First Term), and for Freshmen in the four-year course (Second Term).

33. COLORED TOPOGRAPHY.—Conventional methods of representation and general exercises. Course 33 is prescribed for Sophomores in the four-year course. Two hours. (First Term.)

34. TOPOGRAPHICAL DRAWING.—Map drawing, based on survey of previous year. Course 34 is prescribed for Seniors in Civil Engineering, and for Sophomores in the four-year course. Two hours. (First Term.)

35. LETTERING.—Freehand and mechanical lettering. Course 35 is prescribed for Freshmen in the four-year course. One hour.

36. MECHANICAL DRAWING.—Drafting instruments and operations, graphic constructions relating to plane problems and elementary projections; dot, line and brush shading, coloring, graining, representation of earthwork and masonry. Course 36 is prescribed for Sophomores in Science, and for Freshmen in the four-year course. Four hours.

37. MECHANICAL DRAWING.—Graphic construction of problems relating to shades and shadows and perspective. Course 37 is prescribed for Sophomores in the four-year course. Two hours. (Second Term.)
38. MECHANICAL DRAWING.—Graphic construction of arches, gateways, wing-walls, etc. Course 38 is prescribed for Post-Seniors in Civil Engineering and for Juniors in the four-year course. Two hours. (First Term.)

39. SURVEYING.—Theory and field practice in the use and adjustment of the transit and level. Course 39 is prescribed for Juniors in Architecture. Three hours. (First Term.)

MECHANICAL ENGINEERING.

The courses in Mechanical Engineering are open to students who have pursued the regular scientific course in Freshman and Sophomore years, to students in the four-year technical course, or others who have had Mathematics 1, 3, 5, 10 and 15, or 2, 6, 11 and 15, Physics 1, and the equivalent of Mechanical Engineering 4.

Professor SPANGLER:—

3. HYDRODYNAMICS.—The design of reaction and impulse turbines, measurement of flowing water, description and discussion of experiments. Hydraulic pressure engines (Bodmer's Hydraulic Motors). Prescribed for Post-Seniors in Mechanical Engineering, and for Seniors in the four-year course. Must be preceded by 1 and 2. Two hours.


16. MARINE ENGINEERING AND NAVAL ARCHITECTURE.—Naval Architecture. (Thearle’s Theoretical Naval Architecture, Senett’s Marine Engines.) Course 16 is required for Post-Seniors in Mechanical Engineering, and for Seniors in the four-year course. Voluntary for others having the necessary preparation. One hour.

18. VISITS TO MANUFACTURING ESTABLISHMENTS.—Students are required to visit various machine-shops, foundries, iron and steel rolling-mills, shipyards, electric-light plants, etc.; to make reports (illustrated) on the general arrangement of plants, arrangement of power, tools, etc., in shops, descriptions of particular machines and processes. Prescribed for Post-Seniors in Mechanical Engineering. Sixteen weeks, one visit per week.

24. ELECTRICITY.—Graphical Analysis of Alternating Currents. (Blakesley’s Alternating Currents.) Voluntary for Post-Seniors. One hour.

19. SPECIFICATIONS.—Methods of drawing specifications and contracts for engines, boilers, foundations, etc. Making estimates as to cost, weight, etc. Prescribed for Post-Seniors in Mechanical Engineering. One hour. (Second Term.)
COURSES.

23. STEAM ENGINES AND BOILERS.—Short course. For students in Civil Engineering only. Two hours.

Mr. SCRIBNER, Mr. CHILD and Mr. WILLIS:

2. HYDROSTATICS AND HYDRAULICS.—Transmission of pressure, determining centres of pressure and amount of same under different conditions. Depth of flotation and stability. Theoretical hydraulics. Flow through orifices, over weirs, through tubes; designing dams, flow in pipes, conduits, and canals, water meters, measurement of water power and theory of hydraulic motors. Principles of propulsion of ships. (Merriman's *Hydraulics.*) Prescribed for Seniors in Mechanical Engineering, and Juniors after Statics is finished, and for Juniors in the four-year course.

Professor SPANGLER, Mr. CHILD and Mr. WILLIS:

6. KINEMATICS.—General mathematical theory of slide-valve and link motions and its practical application in designing mechanism of valve motion, for automatic and marine engines. Zeuner Diagram applied to the principal automatic and radial gears as well as the side-valve. (Spangler's *Valve Gears.*) Prescribed for Juniors in Mechanical Engineering, and Sophomores in four-year course. Two hours.

Professor SPANGLER, Mr. CHILD AND Mr. WILLIS:

GRAPHICAL STATICS.—Principles of graphical statics, and their application to cranes, bridges, roof-trusses, and other framed structures. Prescribed for Juniors in Mechanical Engineering and for Sophomores in the four-year course. (Merriman and Jacoby's *Roofs and Bridges, Part II.* Church's *Notes and Examples in Mechanics.*

Professor SPANGLER and Mr. PICOLET:

17. DESIGNING MACHINERY.—Continuation of work on Steam Engines and Boilers from Senior year. Application of the principles of design to special machinery. Prescribed for Post-Seniors in Mechanical Engineering, and Seniors in the four-year course. Four hours, and one afternoon.

Mr. CHILD:


4.b. DESCRIPTIVE GEOMETRY.—Principle and application to mechanical drawing. Prescribed for Freshmen in the four-year course. (Faunce's *Descriptive Geometry.*) One hour.

Mr. SCHRAMM:

11. ELECTRICITY.—Measurements and discussion of electrical quantities, and their application to the construction and use of galvano-
10. ELECTRICITY.—(Jenkins’ *Electricity and Magnetism*. Ayrton’s *Practical Electricity.*) Prescribed for Seniors in Mechanical Engineering, and for Juniors in the four-year course. Two hours.

11 a. ELECTRICITY.—(Preece and Siveright’s *Telegraphy.*) Prescribed for Juniors in Electrical Engineering. Two hours.

12. ELECTRODYNAMICS.—Measurement of electrical quantities and their application to the theory, construction and use of dynamos, motors, galvanometers, batteries, etc. (Ayrton’s *Practical Electricity*. Thompson’s *Dynamo Electric Machinery*. Slingo and Brooker’s *Electrical Engineering*. Kapp’s *Electric Power Transmission.*) Prescribed for Post-Seniors in Mechanical Engineering, and for Seniors in the four-year course. Must be preceded by Course 11. Two hours.

21. ELECTRODYNAMICS.—Laboratory work. Wiring, testing dynamos, motors and storage batteries, calorimetry, measurement of currents, insulation, etc. Prescribed for Post-Seniors in Mechanical Engineering. Six hours.

21 a. ELECTRODYNAMICS—Laboratory work. Prescribed for Juniors in the four-year course. Three hours.

*Note.—Additional courses in Dynamo Design, Electric Lighting and Telephony will be offered in 1894-95.*

Professor SP ANGLER and Mr. WILLIS:—

5. THE STEAM ENGINE.—Description of engines and boiler covering, detail of cylinders, pistons, valves, connecting rods, bed plates, governors, foundations, the ordinary type of boilers with their settings. (Holmes’ *The Steam Engine*, supplemented by the engines and boilers in the laboratory.) Prescribed for Juniors in Mechanical Engineering, and for Freshmen in the four-year course, and covers elementary work in the details of engines and boilers. Two hours.

Mr. MORRIS and Mr. M CCONNELL:—


12 a. SHOP WORK.—Manual training in wood and iron-work. Course 12 a is prescribed for Freshmen in the four-year course. Three hours.

12 b. SHOP WORK.—Continuation of 12 a. Prescribed for Sophomores in the four-year course. Six hours.


Mr. C HILD and Mr. W IL LIS:—

1. STATICS.—Application of the principles of statics to rigid bodies. Elasticity and strength of materials. Forms of uniform strength.
COURSES.

Theory of framed structures. Stability of structures. Strains in parts of mechanism (Merriman’s Mechanics of Materials.) Designing of beams, columns and shafts, according to the principles laid down. Prescribed for Juniors in Mechanical Engineering, and for Juniors and Sophomores in the four-year course. As this Course underlies the entire work in Mechanical Engineering, it is continued until a thorough practical knowledge of the subject is obtained. Two hours (until finished).

Professor SPANGLER and Mr. SCRIBNER:

15. THERMODYNAMICS.—Testing engines, boilers, gauges and indicators, determining duty of pumps, and injectors, calorimetric work. (All in Laboratory.) Prescribed for Post-Seniors in Mechanical Engineering, and for Seniors in the four-year course. Six hours.

15a. LABORATORY WORK.—Prescribed for Juniors in the four-year course. Three hours.

Professor SPANGLER and Mr. WILLIS:

7a. KINEMATICS.—Elementary Combinations. Pulleys and belts, link work, gearing, etc. (Goodere’s Elements of Mechanism.) Prescribed for Freshmen in the four-year course. Three hours. (Second Term.)

Mr. SCRIBNER:

8. STEAM ENGINE.—Determination of the proper proportions for cylinders, valves, pistons, rods, shafts, fly-wheels, etc. Making rough sketches and working drawings from original designs. (Marks’ The Steam Engine, Unwin’s Machine Design, Part II.) Each student is required to design the principal parts of an engine after one of the well-known types, calculating the parts when the question of strength enters, and following the general design of the chosen type when the proportions are matters of experience. Prescribed for Seniors in Mechanical Engineering, and must be preceded by 1, first part of 2, 4, 5 and 6. Four hours. (Second Term.)

14. THERMODYNAMICS.—Mechanical theory of heat. Application to steam, air and gas engines, and refrigerating machinery. (Wood’s Thermodynamics.) Three hours.

9. STEAM BOILERS.—Value of fuels, determination of proper proportions for grate and heating surfaces, area and height of chimneys, thickness of shell, size of braces, etc., for various forms of boilers. Making rough sketches and working drawings from original designs. (Wilson’s Steam Boilers. Law and Bevis’ Machine-Drawing and Design.) Each student is required to design the principal parts of a boiler after one of the well-known types, in the same manner as prescribed for Course 8. Course 9 must be preceded by 1, 4, 5 and first part of 2. Prescribed for Seniors in Mechanical Engineering. Four hours. (First Term.) For Juniors in the four-year course in Mechanical Engineering. Two hours. (Both Terms.)
Mr. Piculet:—

4. Drawing.—Elementary mechanical drawing. Use of instruments. Copying working drawings, tracing and blue printing. Making working sketches and drawings of pieces of machinery from the model. Prescribed for Juniors in Mechanical Engineering and for Sophomores in the four-year course, and is intended to teach the use of instruments, and the reading of drawings. After the elementary drawings are finished, tracings and blue prints are required. Three hours.

4 a. Sketching and Drawing.—Making working sketches, finished drawings, tracings and blue prints for the tools and machines in the laboratories. Prescribed for Seniors in Mechanical Engineering, and for Juniors in the four-year course. Must be preceded by Course 4. Two hours.

Mr. Piculet and Mr. Willis:—


Music.

Professor Clarke:—

1. Harmony.—First year. Formation of major scale. The chords of the major scale; the laws of their succession and inversion. The minor scale. The relation of scales. Dissonant chords; the laws governing their formation and progression; the employment of dissonants that are not members of chords. Modulation. Course 1 includes all that is embraced in the study of harmony or thorough-bass. Two hours.

2. Counterpoint.—Second year. The laws for the combination of independent parts. The five species of counterpoint in the ancient or strict style, and the modern or free style, are taught side by side. The higher development of counterpoint, viz.: canon and fugue, double counterpoint. Course 2 is prescribed for students who have satisfactorily passed Course 1. Applicants who can pass an examination in harmony may also be admitted to Course 2. Two hours.

3. Form and Orchestration.—Third year. The laws of melody. The development of the Suite from Lyric Melodies. The Rondo in its several forms. The Sonata. The adaptation of these forms to one, two or more instruments. Orchestration. The compass, quality and manner of combining instruments. The forms of orchestral music. Course 3 is open to students who have taken Course 2, or to applicants who can pass an examination in Harmony and Counterpoint, and furnish a satisfactory composition in fugue form. Two hours.
COURSES OF STUDY.

The College Faculty conducts the following Courses of Study:

I. The Courses in Arts and Science.
II. The Course in Finance and Economy.
III. The Course in American History.
IV. The Course in Biology.
V. The Course in Music.
VI. The Course in Mechanical Engineering.
VII. The Course in Electrical Engineering.
VIII. The Course in Civil Engineering.
IX. The Course in Chemistry.
X. The Course in Chemical Engineering.
XI. The Courses in Architecture.
XII. The Course in Science and Technology.

THE COURSES IN ARTS AND SCIENCE.

The Courses in Arts and Science comprise a number of definite courses embracing, in all cases, in the lower years prescribed studies; and in the upper years prescribed studies, elective groups and a fixed proportion of free electives.

There are five courses open to Freshmen and Sophomores which differ mainly in the character and amount of language study. The languages required to be taken in the Freshman and Sophomore years are required for admission. These are: in the first course, Greek and Latin; in the second, Latin and German; in the third, Latin and French; and in the fourth, French and German. Two languages are required for admission to the fifth course, although Latin is the only language, other than English, required in the Freshman and Sophomore years. The student may offer with Latin any one of the three other languages. For the present, the requirements in German and French are the same as have been exacted for a number of years for the course in General Science, but it is proposed to materially increase them in the future. Ample notice of any such change will be given. All five courses include English, History and Mathematics in the Freshman year, and English, Chemistry, Physics and Mathematics or History in the Sophomore year. In the fifth
course Science is added in Freshman year, and both History and Mathematics required of Sophomores.

Each student selects at the beginning of Junior year a group of studies which he will pursue for the last two years of his course. There are thirteen of these groups, each containing two subjects, to each of which four hours per week are assigned. The student is permitted to select in addition a two-hour course from a list of free electives. The studies prescribed in addition to the group subjects and the free electives are, English, Logic and Ethics.

In Senior year the student continues the studies of his group, giving to each five hours per week, and selects courses to the extent of five hours per week from the free electives. The groups offered are: Greek and Latin, Latin and French, Latin and German, German and French, German and English, French and English, History and English, Philosophy and History, Economics and History, Physics and Mathematics, Mathematics and Astronomy, Chemistry and Physics, Biology and Chemistry. In addition to these groups, the student may enter, at the beginning of Junior year, the course in Finance and Economy of the Wharton School; the course in American History, or the two-year course in Biology preparatory to medicine, and still be in regular standing a candidate for the Bachelor's degree. The degree of Bachelor of Arts is given to all students who have completed the last two years in any of the groups or special courses after having taken the first two years in the course containing Greek and Latin. Graduates of the other courses receive the degree of Bachelor of Science.

The degrees of Master of Arts and Master of Science are given by the Faculty of Philosophy to Baccalaureate graduates upon the satisfactory completion of a course of one year resident study.

THE COURSE IN FINANCE AND ECONOMY.

The course in Finance and Economy in the Wharton School extends through the Junior and Senior years, and is open to students who have taken the Freshman and Sophomore years in the courses in Arts and Science, Science and Technology, or to other candidates for a degree who have had equivalent training elsewhere.

The studies in the course are all prescribed and are grouped under the heads of Public Law and Politics, Business Law and Practice, Economics and Social Science, History and Philosophy. The degree given depends upon the course taken by the student in the Freshman and Sophomore years. Students from other institutions who are
TECHNICAL COURSES OF FOUR YEARS.

admitted to full standing in the Junior Class receive the degree of Bachelor of Philosophy upon the completion of the course. The degrees of Master of Arts, Master of Science, and Doctor of Philosophy are given upon completion of graduate (resident) studies in the Department of Philosophy.

THE COURSE IN AMERICAN HISTORY AND INSTITUTIONS.

The instruction in this course extends through the Junior and Senior years. The conditions of entrance and the degrees given are similar to those for the course in Finance and Economy. While American History is the leading study of the course, proper attention is given to Archaeology, Ethnology, General History, Philosophy, Economics and the Languages.

THE COURSE IN BIOLOGY PREPARATORY TO MEDICINE.

This course covers two years and may be elected by students at the beginning of the Junior year. It includes, in addition to the various branches of Biology, instruction in Drawing, Chemistry, Physics, Mineralogy, Geology and the Languages. A Baccalaureate graduate of this course will be admitted to the second year of the required four-year course in Medicine, on condition that he make up certain minor medical subjects taught in the first year. He will be able thus to shorten his combined undergraduate and graduate course by one year. Special students are admitted to this course.

THE COURSE IN MUSIC.

The course in Music extends through three years and is open to special students only.

TECHNICAL COURSES OF FOUR YEARS.

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(THE TOWNE SCIENTIFIC SCHOOL.)

These courses lead to the degrees of Bachelor of Science in Mechanical Engineering, in Electrical Engineering, in Civil Engineering, in Chemistry, and in Chemical Engineering respectively. They contain a fair amount of literary and general science studies, with thorough instruction in the professional branches.

As the technical work peculiar to each course begins in the first year, students are not permitted to change to these courses from the other college courses, and new students are admitted to advanced standing only on condition that they have pursued similar courses
elsewhere. Bachelors of Science in Mechanical and Electrical Engineering, Civil Engineering, Chemistry or Chemical Engineering of three years' standing, who have shown marked progress in their professions and have submitted a satisfactory thesis, may receive the degree of Master of Science, together with the technical degrees appropriate to the course pursued.

THE COURSES IN ARCHITECTURE.

The School of Architecture offers a four-year course leading to the degree of Bachelor of Science in Architecture, to be followed, on evidence of advanced work in subsequent years, by a professional degree.

The professional studies begin in the Freshman year, and receive each succeeding year an increasing amount of attention, while liberal studies form an important part of the course during the first two years. The course comprises all the studies necessary to a complete professional curriculum, and adds to these English, Modern Languages, Mathematics, Chemistry, Physics, and Hygiene.

A two-year Special course is open to candidates who have had at least one year's experience as architectural draftsmen. No examination is required for admission. This course consists of the purely professional work of the last two years of the regular course with certain subjects from the Sophomore year, and leads to a Special Certificate.

An auxiliary course of two years in Interior Architecture is also provided. Its curriculum is complete and independent of that of the regular course in Architecture. It prepares students for the practice of the profession of Interior Architecture. An examination in drawing is required for admission.

THE COURSE IN SCIENCE AND TECHNOLOGY.

This course covers five years—two years of general literary and scientific study, and three years devoted chiefly to technical training in one of the following courses: Chemistry, Mining and Metallurgy, Civil Engineering, and Mechanical and Electrical Engineering. Students in regular standing receive at the end of the Senior year the general degree of Bachelor of Science, and at the end of the Post-Senior year the degree of Master of Science. The technical degree appropriate to the course pursued may be conferred upon Masters of Science of two years' standing, who have made satisfactory progress in their professions and have presented an acceptable thesis. It is
believed that this course satisfactorily unites the advantages of liberal culture with the definite preparation for professional life. The first two years give the broad foundation that will enable the student to decide what his future work shall be. They form an excellent preparation for the courses in Finance and Economy, in American History, and in Biology preparatory to Medicine; any one of which may be elected at the beginning of Junior year by candidates for the degree of Bachelor of Science. Students in the course in Science and Technology who desire to continue their literary and historical studies are permitted to enter the Arts and Science courses in Junior year.

The work of the Freshman and Sophomore years in Science includes English, History, Mathematics, Drawing, Chemistry, Physics, Hygiene, and one modern language, German or French. These subjects are all prescribed. In the years devoted to technical instruction are included courses in English, the Modern Languages, History, Philosophy and Political Economy, with the necessary instruction in pure and applied Mathematics and the scientific branches allied to the principal subject of the course. Special students, who have had the requisite training in Mathematics, Physics and Drawing, are admitted to these three year technical courses.

Further descriptions of the different courses are given in the following pages and in the special circulars issued from time to time. For a full enumeration of the studies, and a description of all the instruction given by the College Faculty, see pages 49 to 88.

SPECIAL AND PARTIAL COURSES.

SPECIAL STUDENTS, not candidates for a degree, may be received into any of the courses.

In the Courses in Arts and Science, they will be under the supervision of a standing committee of the Faculty, and may take special studies in any subject taught in the course, provided they can satisfy the professor teaching the subject that they are competent to profit by his instruction. With their special subject they must take at least two other subjects. At the close of such a special course, a Certificate of Proficiency in the subject elected will be granted, signed by all the professors whose instructions the student has attended.

In the Towne School, special students may take any one of the Professional courses, provided the professor in charge of that course
is satisfied of their competency to profit by his instruction. They
take all the studies that the professor thinks necessary to complete
the course, together with such others as the Faculty may require.
At the end of the course, upon passing the examinations and present-
ing a satisfactory thesis, they receive a Certificate of Proficiency.
Application should be made to the professor in charge of the course
which the student wishes to take, and definite arrangements may be
made with him—subject, however, to the approval of the Faculty.

**Partial Courses**, also, may be taken, consisting of such groups
of studies (not constituting special courses) as the Faculty may sanc-
tion; but admission to a partial course is to be considered an excep-
tional arrangement, and may be withdrawn when deemed expedient.
A Certificate, stating what studies have been pursued, will be
awarded to those who complete such a course satisfactorily.

In selecting studies to constitute a special or partial course, the
student is limited to those branches which his previous training
qualifies him to pursue, and he must observe any restrictions that
may be attached to the particular courses and avoid conflict of hours.

Special and Partial students are subject to all the regulations of the
College, and the Faculty reserves the right to deprive such students
of their privileges at any time if they abuse or fail to use them.

The studies from which special students may select their courses
are to be found on pages 49 to 88 inclusive.

**Admission to College.**

Candidates for the Freshman Class are admitted to the College either
on certificate or by examination.

Blank certificates are issued every year to such principals of recog-
nized preparatory schools as may be named for the privilege. The
Faculty reserves the right, however, to withdraw this privilege from
any school.

Entrance examinations are held in June and September. Circulars
stating the days and the subjects of examination for each day can
be had, after April first, on application to the Dean of the College
Faculty. In addition to the examination held at the University,
simultaneous examinations for entrance are held in a number of cen-
tres in the United States. Due notice of these examinations will be
given in the local newspapers, and further information may be obtained
on application to the Dean. Certain prizes have been established for
proficiency shown at entrance examination by candidates for the Fresh-
man Class. These will be found in detail under the head of Prizes.
ADMISSION TO COLLEGE.

The subjects of examination are in part the same for all candidates, in part dependent upon the course that the candidate wishes to take in college.

FOR ALL CANDIDATES.

ENGLISH.

A.—Grammar (as in Abbott’s *How to Parse*, or Murray’s *Advanced Lessons in English Composition, Analysis and Grammar*), together with the correction of specimens of English bad in grammar (as in Strang’s *Exercises in English*).

B.—Composition and Reading. 1. The correction of English bad in expression with a brief statement of the principles on which the correction is made (as in Williams’ *Composition and Rhetoric by Practice*); 2. Questions on the subject matter of passages taken from the required reading for the year; 3. A short essay, correct in spelling, punctuation, grammar, division by paragraphs and expression, the subject to be selected from several subjects taken from the required reading, and announced at the time of the examination. The required reading for the year is as follows: Shakespeare’s *Julius Cæsar* and *Merchant of Venice*, Scott’s *Lady of the Lake* and *The Abbot*, Arnold’s *Sohrab and Rustum*, the *Sir Roger de Coverley Papers* in *The Spectator*, Macaulay’s second *Essay on the Earl of Chatham*, Emerson’s *American Scholar*, Irving’s *Sketch Book*, Dickens’ *David Copperfield*.


HISTORY.

A.—History of the United States. (Scudder or Johnston is suggested.)

B.—Ancient History—Greek and Roman.

MATHEMATICS.

A.—Arithmetic (including the decimal system of weights and measures, circulating decimals, square and cube root, proportion, percentage, interest, etc.).

B.—Algebra (including factoring, fractions, simple equations and simultaneous equations of the first degree).
C.—Algebra (to the end of quadratic equations, including ratio, proportion, arithmetical and geometrical progression, surds and imaginaries).  (C. does not include B.)  
D.—Plane Geometry (as in the first five books of Chauvenet's or Wentworth's Geometry).

ADDITIONAL SUBJECTS FOR THE COURSES IN ARTS AND SCIENCE.

GREEK.
A.—Greek Grammar.
B.—Greek Prose Composition (White's First Lessons covers the amount required).
C.—Xenophon (first four books of the Anabasis).
D.—Homer (first three books of the Iliad or the Odyssey, with the scanning).  An elementary knowledge of Greek accentuation is required. Students are expected to pronounce by the written accent.

LATIN.
A.—Latin Grammar.
B.—Latin Prose Composition (as in Arnold's Latin Prose Composition to the end of exercise 23).
C.—Cæsar (four books of the Gallic War).
D.—Virgil (first six books of the Aeneid, with the scanning).
E.—Cicero (Six Orations, including the four against Catiline).

FRENCH.
A.—French Grammar (as much as is indicated by the first forty-five "Practical Exercises" appended to Harrison's French Syntax).
B.—French Reading—Télémaque (the first three books or an equal amount of matter from any good modern prose author).

GERMAN.
A.—German Grammar, Otis' or Meissner's German Grammar.
B.—German Reading, Grimm's Märchen (Otis' edition), 100 pages or an equivalent.  
Only two of these four languages are required of each student.

ADDITIONAL SUBJECTS FOR THE COURSE IN SCIENCE AND TECHNOLOGY.

MATHEMATICS.
E.—Solid Geometry (as contained in Chauvenet's or Wentworth's Geometry).

LATIN.
A.—Latin Grammar.
B.—Latin Prose Composition (as in Arnold's Latin Prose Composition to the end of exercise 23).
ADMISSION TO COLLEGE.

C.—Caesar (four books of the *Gallic War*).
D.—Virgil (first three books of the *Aeneid* with the scanning).

**FRENCH.**
A.—French Grammar (as much as is indicated by the first forty-five "Practical Exercises" appended to Harrison's *French Syntax*, with especial reference to the uses of the Subjunctive Mode).
B.—French Reading—*Télémaque* (the first three books or an equal amount of matter from any good modern prose author).

**GERMAN.**
A.—German Grammar, Otis' or Meissner's *German Grammar*.
B.—German Reading, Grimm's *Märchen* (Otis' edition), 100 pages, or an equivalent.

*Only two of these three languages are required of each student.*

**ADDITIONAL SUBJECTS FOR THE COURSE IN CHEMISTRY.**
French A and B, or German A and B (as above).

**ADDITIONAL SUBJECTS FOR THE COURSES IN CIVIL, MECHANICAL, ELECTRICAL AND CHEMICAL ENGINEERING.**

**MATHEMATICS.**
E.—Solid Geometry (as above).
F.—Plane Trigonometry (as in the more elementary portions of Chaps. I–VI. in Crawley's *Elements of Trigonometry*), and the use of Logarithms.

**PHYSICS.—(As in Carhart and Chute's, or Gage's *Elements of Physics*, or Avery's *Elements of Natural Philosophy*).**
French A and B, or German A and B (as above).

**ADDITIONAL SUBJECTS FOR THE COURSE IN ARCHITECTURE.**
French A and B, or German A and B (as above).

**THE COURSES IN FINANCE AND ECONOMY, AND AMERICAN HISTORY.**
These courses are open to Juniors only. Students entering the Freshman Class with a view to electing either the course in Finance and Economy or the course in American History in Junior year, pass in the subjects required for the Arts and Science and Science and Technology Courses.
ADMISSION TO SPECIAL AND PARTIAL COURSES.

The requirements for admission to special and partial courses are given on pages 93–94.

PRELIMINARY EXAMINATIONS.

Candidates who wish to do so may be examined one year in advance of their entering college in any or all of the following subjects: viz., English A, History A, Mathematics A and B, Greek A, B and C, Latin A and B, French A and German A. In addition, candidates for the course in Arts and Science may be examined in Latin C and D, and those for the course in Science and Technology, in Mathematics D. A record will be kept of these examinations, and credit be given for such of them as are passed satisfactorily. Preliminary examinations are held only in June, in College Hall.

EXAMINATIONS FOR ADVANCED STANDING.

For advanced standing candidates must pass satisfactorily in all the subjects pursued by the lower class or classes; but students coming with letters of honorable dismissal from other colleges, and showing that they have pursued successfully courses of study equivalent to those taken by the classes they wish to enter, are admitted without examination.

Duly authenticated graduates of other colleges are admitted without examination to any of the courses upon giving evidence that their studies have been such as to fit them to pursue the particular course for which they apply.
### THE COURSES IN ARTS AND SCIENCE.

#### FRESHMAN CLASS.

Studies prescribed for all Freshmen in these courses.

<table>
<thead>
<tr>
<th>Course</th>
<th>Description</th>
<th>Instructor(s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>ENGLISH I</td>
<td>Composition work based on a study of American prose authors. Genung's <em>Outlines of Rhetoric</em>. Two hours.</td>
<td>Mr. Penniman</td>
</tr>
<tr>
<td>ENGLISH LANGUAGE I</td>
<td>English Language and Analysis.</td>
<td>Professor Easton</td>
</tr>
<tr>
<td>EUROPEAN HISTORY I</td>
<td>English History. Three hours (<em>First Term</em>).</td>
<td>Assistant Professor Cheyney</td>
</tr>
<tr>
<td>AMERICAN HISTORY 7</td>
<td>The Constitutional History of the United States. Three hours (<em>Second Term</em>).</td>
<td>Professor Thorpe</td>
</tr>
<tr>
<td>MATHEMATICS I</td>
<td>Algebra. Two hours.</td>
<td>Professor Kendall and Dr. Schwatt</td>
</tr>
<tr>
<td>MATHEMATICS 3</td>
<td>Solid Geometry. Two hours (<em>First Part of First Term</em>).</td>
<td>Professor Kendall and Dr. Schwatt</td>
</tr>
<tr>
<td>MATHEMATICS 5</td>
<td>Plane Trigonometry. Two hours (<em>Second Part of First Term, and Second Term</em>).</td>
<td>Professor Kendall and Dr. Schwatt</td>
</tr>
<tr>
<td>PHYSICAL EDUCATION</td>
<td>Hygiene Lectures, Examinations and work in Gymnasium. Three hours. Dr. Faries</td>
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#### IN COURSE 1.

<table>
<thead>
<tr>
<th>Course 1</th>
<th>Description</th>
<th>Instructor(s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>GREEK I</td>
<td>Xenophon's <em>Economicus</em>. Greek. Composition. One hour.</td>
<td>Professor Lambertson</td>
</tr>
<tr>
<td>LATIN I</td>
<td>Selections from Livy and Horace (<em>Satires</em>). Three hours.</td>
<td>Professor Jackson</td>
</tr>
</tbody>
</table>

#### IN COURSE 2.

<table>
<thead>
<tr>
<th>Course 2</th>
<th>Description</th>
<th>Instructor(s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>LATIN I</td>
<td>Selections from Livy and Horace (<em>Satires</em>). Three hours.</td>
<td>Professor Jackson</td>
</tr>
<tr>
<td>GERMAN 7</td>
<td>Collar-Eysenbach's <em>German Grammar</em>; Auerbach's <em>Brigitta</em>; Heyse's <em>L'Arrabbiata</em>. Three hours.</td>
<td>Mr. Wessel-Horft</td>
</tr>
</tbody>
</table>

#### IN COURSE 3.

<table>
<thead>
<tr>
<th>Course 3</th>
<th>Description</th>
<th>Instructor(s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>FRENCH 4a</td>
<td>Super's <em>French Reader</em>, Joynes' <em>Minimum French Grammar and Reader</em>. Three hours.</td>
<td>Mr. Lorenz</td>
</tr>
<tr>
<td>LATIN I</td>
<td>Selections from Livy and Horace. Three hours.</td>
<td>Professor Jackson</td>
</tr>
</tbody>
</table>
IN COURSE 4.

GERMAN 7.—Collar-Eysenbach's *German Grammar*; Auerbach's *Brigitta*; Heyse's *L'Arrabiaia*. Three hours. Mr. Wessel-Hoefl.

FRENCH 4a.—Super's *French Reader*, Joynes' *Minimum French Grammar and Reader*. Three hours. Mr. Lorenz.

IN COURSE 5.

LATIN 1.—Selections from Livy and Horace (*Satires*). Three hours. Professor Jackson.

ZOOLOGY 8.—Mammalian Anatomy. Six hours. Professor Jayne.

SOPHOMORE CLASS.

Studies prescribed for all Sophomores in these courses.

ENGLISH 2.—Composition. One composition a week on subjects chosen to illustrate the various modes of rhetorical expression. One hour. Mr. Smith.

ENGLISH LITERATURE 1.—Modern Essayists. Two hours (*First Term*). Professor Schelling and Mr. Smith.

ENGLISH LITERATURE 2.—Modern Novelists. Two hours (*Second Term*). Professor Schelling and Mr. Penniman.

EUROPEAN HISTORY 5.—The History of Europe from 1789 to 1815. Three hours (*First Term*). Professor Robinson.

EUROPEAN HISTORY 6.—Recent European History since 1815. Three hours (*Second Term*). Professor Robinson.

History is elective with Mathematics, except in Course 5 (see below), in which both subjects are required.

MATHEMATICS 10.—Analytic Geometry. Three hours. Professor Kendall.

Mathematics is elective with History, except in Course 5 (see below), in which both subjects are required.

PHYSICS 1.—Elementary Practical Physics. Three hours. Assistant Professor Goodspeed and Dr. Richards.

CHEMISTRY 1.—General Inorganic Chemistry. Three hours. Professor Smith and Assistants.

IN COURSE 1.


LATIN 3.—Tacitus (*Agricola*, *Germania* or *Annals*); Cicero (*De Senectute* or *De Officiis*); Horace (*Selected odes*). Three hours. Professor Jackson.
THE COURSES IN ARTS AND SCIENCE.

IN COURSE 2.

GERMAN 3.—Cohn's Bakterien; Virchow's Nahrungs und Genussmittel; Heine's Prose; Harris' German Composition. Three hours. Professor Seidensticker.

IN COURSE 3.
FRENCH 3.—Selections from French Authors. French Grammar. Three hours. Professor Rennert and Mr. Lorenz.


IN COURSE 4.
GERMAN 3.—Selections from German Authors. German Composition. Three hours. Professor Seidensticker.

FRENCH 3.—Selections from French Authors. French Composition. Three hours. Professor Rennert and Mr. Lorenz.

IN COURSE 5.

Both History and Mathematics are required in this course (see above under prescribed studies).

JUNIOR CLASS.*

Studies prescribed for all Juniors.

ENGLISH 3.—Weekly exercises in popular and literary subjects assigned by the instructor, special attention being given to the arrangement of arguments and the writing of speeches. One hour. Mr. Smith.

ENGLISH LITERATURE 3.—Period of French Influence. Lectures on the History of English Literature from Waller to Cowper, including the writers of the Restoration, of the Age of Queen Anne, the use of the newspaper, the novel and the poetry of nature; recitations and examinations on collateral reading. Gosse's Eighteenth Century Literature is recommended for reference. Two hours (First Term). Professor Schelling.

ENGLISH LITERATURE 7.—The Age of Elizabeth. Lectures on the History of English Literature from the Revival of Learning to Milton, exclusive of the Drama; recitations and examinations in collateral reading. Saintsbury's (Elizabethan Literature) is recommended for reference. Two hours (Second Term). Professor Schelling.

* The courses announced for the Juniors are for 1893-94 only. As the lower years become fully established, the character of the instruction in the upper years will be correspondingly modified.
PHILOSOPHY 1.—Logic. Lectures and recitations covering in outline the Inductive and Deductive Logic. Jevons' *Lessons in Logic* is the text-book used. Two hours (*First Term*). Professor FULLERTON.

PHILOSOPHY 2.—Ethics. Lectures and recitations. Two hours (*Second Term*). Professor FULLERTON.

FREE ELECTIVES.—Each Junior in these courses is required to select from the subjects given in the list beginning on page 49, a two-hour course, which is known as the Free Elective. In his selection he must be governed by the restrictions attached to the courses, and his choice must meet with the approval of the instructors in charge of one of the following groups into which, or into the course in the Schools of Finance, American History or Biology, he enters at the beginning of Junior year.

Additional Subjects for Juniors taking

THE GREEK-LATIN GROUP.

GREEK 3.—Euripides' *Iphigenia in Tauris*; Plato's *Meno*, Jevons' *Greek Literature*; Private reading, Sophocles' *Philoctetes*, Euripides' *Bacche*. Three hours. Professor LAMBERTON.

GREEK 4a.—Plato's *Protagoras*. One hour (*First Term*). Professor GUDEMAN.

GREEK 4b.—Aristophanes' *Clouds*. One hour (*Second Term*). Professor GUDEMAN.

LATIN 5.—Selections from Juvenal, Cicero (*De Officiis, De Finibus*, or *De Amicitia*), Horace (*Epistles*). Reading at sight. Three hours. Professor JACKSON.

LATIN 9.—Quintilian. *Book X*. One hour (*First Term*). Professor GUDEMAN.

LATIN 10.—Plautus' *Trinummus*. One hour (*Second Term*). Professor GUDEMAN.

THE LATIN-FRENCH GROUP.

LATIN 5.—Juvenal, Cicero, Horace. Three hours. Professor JACKSON.

LATIN 9.—Quintilian. One hour (*First Term*). Professor GUDEMAN.

LATIN 10.—Plautus' *Trinummus*. One hour (*Second Term*). Professor GUDEMAN.

FRENCH 5.—For the year 1893–94 this Course is for beginners. After the study of some Elementary French Grammar. With exercises in translation from English into French. Easy prose to read, beginning with Super's *French Reader*. In addition the Class will read Halévy's *L'Abbé Constantin*, Claretie *Pierille*. Four hours. Professor RENNERT and Mr. LORENZ.
THE COURSES IN ARTS AND SCIENCE.

THE LATIN-GERMAN GROUP.

LATIN 5.—Juvenal, Cicero, Horace. Three hours. Professor Jackson.

LATIN 9.—Quintilian. One hour (First Term). Professor Gudemman.

LATIN 10.—Plautus' Trinummus. One hour (Second Term). Professor Gudemman.

GERMAN 8.—Whitney's Brief German Grammar; Niebuhr's Heroengeschichten; Koerner's Zriny; Stein's German Exercises. Four hours. Mr. Wesselhoeft.

THE GERMAN-FRENCH GROUP.

GERMAN 8.—As above. Four hours. Mr. Wesselhoeft.

FRENCH 5.—French Grammar and Reading. Four hours. Professor Rennert and Mr. Lorenz.

THE ENGLISH-GERMAN GROUP.


ENGLISH LITERATURE 13.—English Prose Authors. Readings in the prose of Cowley, Temple, Swift, Addison, Goldsmith and Johnson, with special reference to the development of English prose style. One hour (Second Term). Professor Schelling.

ENGLISH LANGUAGE 2.—Anglo-Saxon. Sweets' Anglo-Saxon Primer; Sweets' Anglo-Saxon Reader. Lectures on phonetics with some Comparative Study of Anglo-Saxon. Middle English and modern English forms and orthography. Two hours (First Term). Professor Easton.

ENGLISH LANGUAGE 3.—Anglo-Saxon Poetry. Sievers' Anglo-Saxon Grammar. March Comparison of Anglo-Saxon forms with those of the later periods continued. Two hours (Second Term). Professor Easton.

ENGLISH LANGUAGE 4.—English Philology. Minor Course. Readings in Chaucer. Two hours (Second Term). Professor Easton. The student elects either Course 3 or Course 4.


GERMAN 8.—Grammar and Reading. Four hours. Mr. Wesselhoeft.
THE ENGLISH-FRENCH GROUP.

ENGLISH LITERATURE 10 AND 13.—Professor Schelling.

ENGLISH LANGUAGE 2 AND 3, OR 4 AND 6.—Professor Easton.
Four hours.

FRENCH 5.—French Grammar and Reading. Four hours. Professor Rennert and Mr. Lorenz.

THE HISTORY-ENGLISH GROUP.

AMERICAN HISTORY 3.—United States in the Nineteenth Century. Two hours (First Term). Professor McMaster.

AMERICAN HISTORY 4.—History of Our Own Time. Two hours (Second Term). Professor McMaster.

EUROPEAN HISTORY 10.—Medieval History. Two hours. Mr. Munro.

ENGLISH LITERATURE 10 AND 13.—As above. Professor Schelling.

ENGLISH LANGUAGE 2 AND 3, OR 4 AND 6.—As above. Professor Easton. Four hours.

PHILOSOPHY-HISTORY GROUP.

PHILOSOPHY 6.—History of Ethical Theories. Ancient and Medieval. One hour (First Term). Dr. Newbold.

PHILOSOPHY 7.—History of Ethical Theories. Modern. One hour (Second Term). Dr. Newbold.

PSYCHOLOGY 1 AND 2.—General Psychology. One hour. Dr. Newbold.

PSYCHOLOGY 3.—Experimental Psychology. The Physiology of the Nervous System and Sensation. Two hours (First Term). Dr. Witmer.

PSYCHOLOGY 4.—Experimental Psychology. The Psychology of Perception. Two hours (Second Term). Dr. Witmer.

AMERICAN HISTORY 3.—United States in the Nineteenth Century. Two hours (First Term). Professor McMaster.

AMERICAN HISTORY 4.—History of Our Own Time. Two hours (Second Term). Professor McMaster.

EUROPEAN HISTORY 10.—Medieval History. Two hours. Mr. Munro.

THE ECONOMICS-HISTORY GROUP.


ECONOMICS.—Two hours. Professor James.
AMERICAN HISTORY 3.—United States in the Nineteenth Century. Two hours (First Term). Professor McMaster.

AMERICAN HISTORY 4.—History of Our Own Time. Two hours (Second Term). Professor McMaster.

EUROPEAN HISTORY 10.—Mediaeval History. Two hours. Mr. Munro.

THE PHYSICS-MATHEMATICS GROUP.

PHYSICS 5.—Radiation (including Light) and Magnetism. Four hours (First Term). Professor Barker and Assistant Professor Goodspeed.

PHYSICS 6.—Electricity. Four hours (Second Term). Professor Barker and Assistant Professor Goodspeed.

MATHEMATICS 21.—Determinants. One hour. Assistant Professor Crawley.

MATHEMATICS 12.—Solid Analytical Geometry. One hour. Assistant Professor Crawley.

MATHEMATICS 18.—Calculus. Two hours. Assistant Professor Fisher.

THE MATHEMATICS-ASTRONOMY GROUP.

MATHEMATICS 21.—Determinants. Weld's Theory of Determinants. One hour. Assistant Professor Crawley.

MATHEMATICS 12.—Analytical Geometry. Smith's Solid Geometry. This course takes up the subject at the beginning and goes through surfaces of the second degree, with such additional matter in systems of conicoids as the time will permit. One hour.

MATHEMATICS 18.—Calculus. Advanced work in Integral Calculus. Williamson, and lectures with references to Betrand. Two hours. Assistant Professor Fisher.

ASTRONOMY.—Major Course. Four hours. Professor Kendall.

THE CHEMISTRY-PHYSICS GROUP.

CHEMISTRY 1.—General Inorganic Chemistry. Six hours. Professor Smith.

CHEMISTRY 2.—Analytical Chemistry. Qualitative Analysis. Six hours. Professor Smith.

In 1893-94 the students may take either Course 1 or Course 2, depending on their previous preparation.

PHYSICS 5.—Radiation (including Light) and Magnetism. Lectures and Recitations. Four hours (First Term). Professor Barker and Assistant Professor Goodspeed.

PHYSICS 6.—Electricity. Lectures and Recitations. Four hours (Second Term). Professor Barker and Assistant Professor Goodspeed.
THE BIOLOGY-CHEMISTRY GROUP.

BIOLOGY 3.—Zoölogy. Systematic study of the Invertebrates. Six hours. Professor Ryder and Mr. Calvert.

BIOLOGY 14.—General Structural Botany. Six hours (First Term). Professor Wilson, Dr. Harshberger and Mr. Greenman.

BIOLOGY 15.—Systematic study of the Phænogams. Six hours (Second Term). Professor MacFarlane, Dr. Harshberger and Mr. Greenman.

CHEMISTRY 1.—General Inorganic Chemistry. Six hours. Professor Smith.

CHEMISTRY 2.—Analytical Chemistry. Qualitative Analysis. Six hours. Professor Smith.

Either Course 1 or Course 2.

SENIOR CLASS.

The Seniors are required to continue with the subjects in the groups selected in Junior year, giving ten hours per week to these subjects, and choosing courses, covering at least five hours, from the list, beginning on page 49.

The courses that will constitute the Senior groups have not yet been definitely determined. The arrangement for 1894-95, necessarily temporary, will be announced in the spring.
THE COURSE IN FINANCE AND ECONOMY IN THE WHARTON SCHOOL.

OFFICERS:

WILLIAM PEPPER, M. D., LL. D., Provost.
HORACE JAYNE, M. D., Ph. D., Dean of the College.
EDMUND J. JAMES, Ph. D., Director. Finance and Administration.
SIMON N. PATTEN, Ph. D., Political Economy.
ROLAND P. FALKNER, Ph. D., Statistics.
JOSEPH FRENCH JOHNSON, A. B., Business Practice.
JOHN BACH McMMASTER, A. M., American History.
EDWARD P. CHEYNEY, A. M., History.
FRANCIS N. THORPE, Ph. D., American Constitutional History.
JAMES HARVEY ROBINSON, Ph. D., European History.
GEORGE S. FULLERTON, Ph. D., Philosophy.
JOHN QUINCY ADAMS, Ph. D., Political Science.
ALBERT S. BOLLES, Ph. D., Banking Law and Practice.
EMORY R. JOHNSON, Ph. D., Transportation.
WILLIAM DRAPER LEWIS, Ph. D., Institutional Law.

This School was founded by Mr. Joseph Wharton, of Philadelphia, in order to provide for young men special means of training, and of correct instruction in the knowledge and in the arts of modern Finance and Economy. It serves for the University of Pennsylvania the same purposes as are served in other institutions by their Departments or Faculties of History and Politics, or by the so-called Schools of Political Science. In addition, however, to the courses usually provided in such departments, this Institution offers also a course, at once liberal and practical, which is specially designed for those who intend to enter upon business pursuits.

The founder of the School expressed the desire that it should offer facilities for obtaining—

1. *An adequate education in the principles underlying successful civil government.*

2. *A training suitable for those who intend to engage in business, or to undertake the management of property.*

In order to realize these objects, courses have been provided in Political Economy, Social Science, Finance, Statistics, Political Science, Administrative and Constitutional Law of the United States and of leading foreign countries, Comparative Politics, Political and
Constitutional History of the United States, Theory and Practice of Accounting, and Mercantile Law and Practice.

It will be observed that nearly all the courses above enumerated are such as may fairly lay claim to be called liberal branches, and such as every American citizen should pursue in outline at least as a preparation for the duties of citizenship.

They are, however, also studies which form a leading constituent in the special preparation for certain callings, such as the teaching of History and Politics, Journalism, Business, Public Service and Law.

The attention, therefore, of students who are looking forward to entering upon these or similar lines of work, is especially invited to the facilities of this Institution.

A special course for young men looking forward to journalism as a career was established in the fall of 1893. It is designed not only to give the student an extensive and thorough liberal training in History, Politics and Economics, but also to make him ready and accurate in the application of his knowledge to the discussion of current issues and the solution of current problems.

JUNIOR CLASS.

FIRST TERM.

PUBLIC LAW AND POLITICS I.*—Constitution of the United States. Two hours. Professor James.


PUBLIC LAW AND POLITICS 10.—Public Lectures. During the past year lectures in this course were delivered as follows:


Lester F. Ward, Smithsonian Institution, on: Sociocracy.

Louis E. Wagner, Chairman of the Philadelphia Sinking Fund Commission, on: The Sinking Fund and the City Debts.

A. K. McClure, Editor of the Philadelphia Times, on: Newspaper Work.

Abraham M. Beitler, Director of the Department of Public Safety of Philadelphia, on: Department of Public Safety.

G. E. Schlegelmitch, Member of Common Council, on: The Problem of the City Debt.

* For a full description of this and all other studies below, see pages 49 to 88.
**THE COURSE IN FINANCE AND ECONOMY.**

**Rev. Dr. C. Ellis Stevens,** Rector of Christ Church, Philadelphia, on: Sources of the American Constitution.

**James H. Windrim,** Director of the Department of Public Works of Philadelphia, on: The Department of Public Works.

**Talcott Williams,** of the Philadelphia Press, on: Journalism.

**Edward T. Lee,** of Washington, on: Congress and Congressional Work.

**Lorin Blodgett,** on: Resources of Pennsylvania.

**Mr. Vrooman,** on: The College Settlement in Philadelphia.

**PUBLIC LAW AND POLITICS 3.**—History and Theory of the State. Two hours. Dr. Adams.

**ECONOMICS AND SOCIAL SCIENCE 1.**—Political Economy. Walker's Political Economy, and Adam Smith's Wealth of Nations. Two hours. Professor Patten.

**ECONOMICS AND SOCIAL SCIENCE 11.**—Ten lectures on the Money Market. Mr. Chandler.

**ECONOMICS AND SOCIAL SCIENCE 13.**—The Geography of Commerce. One hour. Professor Falkner.

**BUSINESS LAW AND PRACTICE 1.**—Methods of Accounting. Two hours. Professor Falkner.

**BUSINESS LAW AND PRACTICE 3.**—Lectures on Panics, Corporations, etc. Two hours. Professor Johnson.

**EUROPEAN HISTORY 3.**—Modern Economic History. Two hours. Professor Cheyney.

**AMERICAN HISTORY I.**—Political History of the United States. Two hours. Professor McMaster.

**PHILOSOPHY I.**—Logic. Two hours. Professor Fullerton.

**SECOND TERM.**

**PUBLIC LAW AND POLITICS 4.**—Comparative Study of the Constitutions of Germany and Switzerland. Two hours. Professor James.

**PUBLIC LAW AND POLITICS 3.**—Politics. Comparative Constitutional Law. Two hours. Dr. Adams.


**PUBLIC LAW AND POLITICS 10.**—Public lectures continued.

**ECONOMICS AND SOCIAL SCIENCE 1.**—Walker's Political Economy, and Patten's Economic Basis of Protection. Two hours. Professor Patten.

ECONOMICS AND SOCIAL SCIENCE 12.—Ten lectures on Finance. Banks of the United States. Dr. Bolles.


BUSINESS LAW AND PRACTICE 1.—Methods of Accounting. Two hours. Professor Falkner.

BUSINESS LAW AND PRACTICE 3.—Lectures on Stock and Produce Exchanges, Prices, Modern Mercantile Methods, etc. Two hours. Professor Johnson.

EUROPEAN HISTORY 2.—History of England. Two hours. Professor Cheyney.

AMERICAN HISTORY 1.—Political History of the United States. Two hours. Professor McMaster.

PHILOSOPHY 2.—Ethics. Two hours. Professor Fullerton.

SENIOR CLASS.

FIRST TERM.

PUBLIC LAW AND POLITICS 7.—Public Administration. Two hours. Professor James.


PUBLIC LAW AND POLITICS 10.—Public Lectures. Same as to the Junior Class.

ECONOMICS AND SOCIAL SCIENCE 7.—Finance. Bastable's Public Finance. Lectures. Two hours. Dr. Adams.

BUSINESS LAW AND PRACTICE 4.—History and Development of Corporations and Trusts; Railway Finance. Two hours. Professor Johnson.

ECONOMICS AND SOCIAL SCIENCE 9.—Statistics. Lectures. Two hours. Professor Falkner.

ECONOMICS AND SOCIAL SCIENCE 5.—Political Economy. Mill's Political Economy. Two hours. Professor Patten.

PUBLIC LAW AND POLITICS 12.—Legal Institutions. Lectures. Two hours. Dr. Lewis.

EUROPEAN HISTORY 7.—The Renaissance and Reformation. Two hours. Professor Robinson.

AMERICAN HISTORY 6.—Political History of the United States. Two hours. Professor McMaster.

SECOND TERM.

PUBLIC LAW AND POLITICS 7.—Public Administration. Two hours. Professor James.
COURSES IN JOURNALISM.


PUBLIC LAW AND POLITICS 10.—Public Lectures. Continued. Same as to Junior Class.


ECONOMICS AND SOCIAL SCIENCE 6.—Political Economy. Ingram's *History of Political Economy*. Patten's *Dynamic Economics*. Two hours. Professor Patten.

PUBLIC LAW AND POLITICS 12.—Legal Institutions. Lectures. Two hours. Dr. Lewis.

PUBLIC LAW AND POLITICS 13.—Ten Lectures on Municipal Government. Dr. Rowe.

ECONOMICS AND SOCIAL SCIENCE 15.—Transportation. Lectures. One hour. Dr. E. R. Johnson.

BUSINESS LAW AND PRACTICE 2.—The Commercial Law. Two hours. Professor Falkner.

BUSINESS LAW AND PRACTICE 4.—Railway and Corporation Finance, continued. Two hours. Professor Johnson.

EUROPEAN HISTORY 7.—The Renaissance and Reformation. Two hours. Professor Robinson.

AMERICAN HISTORY 8, 9 AND 10.—History of State Constitutional Law. Two hours. Professor Thorpe.

COURSES IN JOURNALISM.

The courses in Journalism are open as voluntaries to students of the Wharton School.

JOURNALISM.—Art and History of Newspaper-making. One hour. Professor Johnson.

JOURNALISM.—Law of Libel, Business Management, Typographical Unions, Cost and Revenue, Advertising, Method of Criticism, etc. One hour. Professor Johnson.

JOURNALISM.—Newspaper Practice. Exercises in Reporting, Editing of Copy, Conversation, etc. Three hours. Professor Johnson.

JOURNALISM.—Current Topics, Lectures on Live Issues in the United States and Foreign Countries. Three hours. Professors Johnson, Cheyne, Falkner, Robinson, Dr. Adams and Mr. Munro.

JOURNALISM.—Public Lectures by men engaged in the active work of the Profession.
METHODS OF WORK.

The plan of instruction embraces recitations, lectures, and seminaries. The endeavor is made to train the students to think independently on the topics that form the subjects of instruction. An earnest effort is made to exclude all dogmatism in political or economic teaching, to present fairly all aspects of disputed questions, and to put the students in a position to form their own opinions on intelligent grounds.

The advanced students receive special attention and assistance in the seminaries, which are organized to promote correct habits of work and to foster a spirit of original investigation.

In order to quicken interest in political and economical subjects, and to encourage acquaintance with parliamentary procedure, a congress has been formed in the school. It is divided into Senate and House, and adopts the rules of procedure of the respective houses, following the course of Congressional debate and action, but confining itself to a few leading topics.

WHARTON SCHOOL COUNCILS.

To facilitate the study of problems of municipal administration, the students have been organized into Select and Common Councils. Committees are appointed, and the different problems are taken up by them in the same manner as in the Philadelphia City Councils. This work is supplemented by frequent lectures during the year by the gentlemen in charge of the different Departments of the Philadelphia City Government.

FELLOWSHIPS.

Five honorary Fellowships, which confer the privilege of attending any of the economic and historical courses of the University free of charge, are assigned at the beginning of each year. Graduates of any American college, or of foreign schools of similar grade, are eligible for appointment.

AUXILIARY FACILITIES.

All the courses in the other departments of the College, embracing those usually found in the graduate and undergraduate courses of our best universities, are open to students of the Wharton School without
extra charge for tuition, so far as this is consistent with their roster of studies in the School.

Of such courses, the following, given in the Law School, are of special interest to students in this department:

1. Roman Law.
3. International Law.

Besides the University Library, which has an unusually valuable collection of works on economics and statistics, the public libraries of the city, and many of the private ones also, aggregating several hundred thousand volumes, are open to the students in the pursuit of their University work.

PUBLICATIONS.


LIBRARY.

The University possesses a large and valuable library of works relating to finance and political economy. The foundation was laid by the great collection of the late Stephen Colwell, comprising between seven and eight thousand volumes, and including nearly every important book on these subjects in English, French, and Italian languages, published before 1860. This collection has been supplemented by the bequest of the library of the late Henry C. Carey, which includes many later works and pamphlets, and is especially rich in statistical literature, European government reports, and the like. It embraces a collection of about three thousand English pamphlets, formerly Mr. McCalmont's, covering the period from the close of the seventeenth century to our own times, and
bound in chronological order. Mr. Joseph Wharton has recently increased his benefactions to the School by a gift of twenty-five thousand dollars to establish a fund for the purchase of books in economics and politics.

Original research by the students, under the direction of the professors, is a part of the work of the School. The results of some of this investigation have been published as follows:

The Recent Development of American Industries, by the Class of '91, pp. 111.
The City Government of Philadelphia, by the Class of '93, pp. 278.
THE SCHOOL OF AMERICAN HISTORY AND INSTITUTIONS.

OFFICERS:

WILLIAM PEPPER, M. D., LL. D., Provost.
HORACE JAYNE, M. D., Ph. D., Dean of the College.
JOHN BACH MCMASTER, A. M., American History.
FRANCIS N. THORPE, Ph. D., American Constitutional History.
EDWARD P. CHEYNEY, A. M., European History.
JAMES HARVEY ROBINSON, Ph. D., European History.
EDMUND J. JAMES, Ph. D., Finance and Administration.
SIMON N. PATTEN, Ph. D., Political Economy.
FELIX E. SCHELLING, A. M., English Literature.
GEORGE S. FULLERTON, Ph. D., Philosophy.

This school, organized in 1891, offers undergraduate instruction in American History as part of a definite course leading to the degrees of Bachelor of Arts, Science or Philosophy; as well as graduate courses in the Department of Philosophy, open to candidates for the degrees of Master of Arts, of Science or Doctor of Philosophy. The special circular of the School will be sent on application to the Dean.

As the undergraduate course in American History begins with the Junior year, students who are candidates for the Bachelor's degree are required to pass through the Freshman and Sophomore years in one of the established courses in Arts and Science, or Science and Technology, or to bring a preparation equivalent to that to be gained in such courses. Special students, not candidates for a degree, are admitted directly to the work of the Junior year on condition that they have had such training as will enable them to profit by the instruction given. The fee for this course is one hundred and sixty dollars per annum.

JUNIOR CLASS.

AMERICAN HISTORY 1.—Political History of the United States. Two hours. Professor MCMASTER.

AMERICAN HISTORY 5.—American Political Orations. (Required Reading.) Professor MCMASTER.
THE COLLEGE.

EUROPEAN HISTORY 3.—Modern Economic History. Three hours (First Term). Assistant Professor CHEYNEY.

EUROPEAN HISTORY 2.—The Political and Constitutional History of England Since 1792. Three hours (Second Term). Assistant Professor CHEYNEY.

ECONOMICS AND SOCIAL SCIENCE 1.—Political Economy. Walker's Political Economy, and Adam Smith's Wealth of Nations. Two hours (First Term). Professor PATTEN.

ECONOMICS AND SOCIAL SCIENCE 2.—Political Economy. Walker's Political Economy, and Patten's Economic Basis of Protection. Two hours (Second Term). Professor PATTEN.

ENGLISH LITERATURE 3.—Period of French Influence. (Waller to Cowper.) Two hours (First Term). Professor SCHELLING.

PHILOSOPHY 1.—Logic. Two hours (First Term). Professor FULLERTON.

PHILOSOPHY 2.—Ethics. Two hours (Second Term). Professor FULLERTON.

SENIOR CLASS.

AMERICAN HISTORY 2.—Economic and Financial History, 1830–1892. Two hours. Professor McMasters.

AMERICAN HISTORY 3 AND 4.—American State Papers, and Veto Messages of the Presidents. (These two together make one course.) Two hours. Professor McMasters.

AMERICAN HISTORY 6.—Political History Since the Civil War. Two hours. Professor McMasters.

AMERICAN HISTORY 8.—Constitutional History of the United States. Two hours. Professor THORPE.

AMERICAN HISTORY 9.—Constitutional History. Two hours. Professor THORPE.

Not required in 1893-94.

EUROPEAN HISTORY 7.—The Renaissance and Reformation. Two hours. Associate Professor ROBINSON.

ECONOMICS AND SOCIAL SCIENCE 5.—Political Economy. Mill's Political Economy. Two hours (First Term). Professor PATTEN.

ECONOMICS AND SOCIAL SCIENCE 6.—Political Economy. Ingram's History of Political Economy, Patten's Dynamic Economics. Two hours (Second Term). Professor PATTEN.

ENGLISH LITERATURE 10.—English Versification. Two hours (First Term). Professor SCHELLING.

ENGLISH LITERATURE 8.—Lectures on Modern Poets. Two hours (Second Term). Professor SCHELLING.

PHILOSOPHY 3.—History of Philosophy. Two hours (First Term). Professor FULLERTON.
PHILOSOPHY 4.—The Development of Idealism. Two hours (Second Term). Professor FULLERTON.

THE SATURDAY CLASS.

A special feature of the School is the Saturday Class for the convenience of teachers and others who cannot take lectures on any other day. It is directed by Professors McM aster and Thorpe, alternately, on Saturday mornings, in the lecture room of the School. For this Class the courses offered in 1893-94 are:

AMERICAN HISTORY II.—The Political and Economic History of the United States. The course follows an Outline prepared specially for the purpose. Maps are drawn, papers prepared by members of the Class are discussed at its meetings, and the methods of historical study are made an important element in the course. Two hours. Professor McMaster.

AMERICAN HISTORY 12.—The Development of Government in America. Local Government; State Government; National Government. Discussions of important questions involved in the growth of American civil institutions. Preparation and discussion of papers by the Class. An Outline is printed for convenience in study. Two hours. Professor Thorpe.

LIBRARY.

The special library of the School comprises at present about 13,000 volumes, consisting of the documentary records of the National Government, approximately complete; the Laws of the States and Territories; Municipal Ordinances of American cities; State records and miscellaneous collections. In addition to these collections, the working library of the School contains the authorities referred to in the lectures of the professors.*

LIBRARY FACILITIES IN PHILADELPHIA.—The aggregate library facilities of the city include over 750,000 volumes, distributed in the Philadelphia Library, founded by Benjamin Franklin, and rich in public documents; in the Mercantile Library, having large collections of Americana; and the Library of the Pennsylvania Historical Society, all of which are accessible to students. In the University Library, in addition to the special Library of the School of American History, are the Colwell, Carey and Wharton collections in political economy, in social and political science. The University Law Libraries and the Hirst Free Law Library affords every opportunity to consult the Law Reports of the several States and treatises on the law.

* For a fuller description of the Library see circular of information No. 1, of the School.
Another feature of the School is The College Congress, composed of the Freshman and Junior Classes: the Freshman Class is organized as a House of Representatives; the Junior Class as a Senate. The Congress assembles weekly for the consideration of such public questions as are pending in the National Congress. By means of the Congressional Record, and bibliographies prepared with the assistance of the professors, the debates in the Congress are made interesting and valuable to the students. A knowledge of parliamentary procedure is also obtained. The College Congress is organized as nearly as may be after the model of the Federal Congress.

SCHOLARSHIPS.

Through the generosity of Mr. Charles Elmer Bushnell, of Philadelphia, the School is enabled to offer a free scholarship for a period of five years. This scholarship is open only to graduates of the Central High School of Pittsburgh, Pa. The scholarship is granted each year, but holders of it are eligible to re-appointment.

Five honorary fellowships, which confer the privilege of attending any of the Economical and Historical Courses given in the University, free of charge, are assigned at the beginning of each year. Graduates of any American college or of foreign schools of similar grade are eligible for appointment.
THE COURSE PREPARATORY TO MEDICINE
IN THE
SCHOOL OF BIOLOGY.

OFFICERS.

WILLIAM PEPPER, M. D., LL. D., Provost.
HORACE JAYNE, M. D., PH. D., Dean of the College. Vertebrate Morphology.
WILLIAM POWELL WILSON, SC. D., Director of the Laboratory. Botany.
JOHN A. RYDER, PH. D., Comparative Histology and Embryology.
JOHN M. MACFARLANE, SC. D., Botany.
EDWARD D. COPE, PH. D., Zoology and Comparative Anatomy.
EDGAR F. SMITH, PH. D., Chemistry.
GEORGE F. BARKER, M. D., PH. B., Physics.
ARTHUR W. GOODSPEED, PH. D., Physics.

CHARLES M. BURK, M. D., Zoology.
J. PERCY MOORE, B. S., Zoology.
JOHN HARSHBERGER, PH. D., Analytical Botany.
PHILIP L. CALVERT, Zoology.
T. HARVEY DOUGHERTY, Zoology.
JESSE M. GREENMAN, B. S., Plant Physiology.
JULIUS OHLY, PH. D., Chemistry.
OWEN L. SHINN, B. S., Chemistry.
J. BIRD MOYER, B. S., Chemistry.
HORACE C. RICHARDS, PH. D., Physics.
EDWARD WESSELHOEF, German.
ROBERT B. BURKE, A. B., Latin.
GEORGE WALTER DAWSON, Drawing.

This course extends through two years, and may be elected at the beginning of Junior year, by candidates for the Bachelor's degree, who have taken the Freshman and Sophomore years in one of the courses in Arts and Science, or in the course in Science and Technology, or have been admitted from another college to the Junior Class in regular standing. Such students, after completing the course, passing all the examinations and receiving the degree of Bachelor of Arts or of Science, will be admitted to the second year of the now required four-year Medical course.
THE COLLEGE.

The course is not only an excellent preparation for the study of Medicine, but also a conveniently arranged plan of work for students desiring to devote special attention to these subjects, with a view to teaching or as an introduction to more advanced special work in the graduate Department of Philosophy. It is open to earnest students who cannot present the requirements for admission to the regular College courses, or who are unable to devote four years to preparatory work, and yet desire some systematic training in scientific and liberal studies. For such students no regular entrance examinations are prescribed, but candidates must satisfy the Faculty that they are able to pursue the course with profit.

The special student, who has completed the entire two-year course, is granted the certificate of the School. This certificate is received by the Medical Faculty in lieu of the regular examinations for entrance to the Medical course and permits the holder to pass his examination in certain second-year studies at the end of the first year and omit entirely other branches prescribed for the first year.

The fee for this course is one hundred and sixty dollars per annum.

FIRST YEAR.

BIOLOGY 3.—Systematic Study of the Invertebrates. Laboratory work with explanatory lectures. Six hours. Professor Ryder and Mr. Calvert.

BIOLOGY 8.—Mammalian Anatomy. Six hours. Professor Jayne and Dr. Burk.

BIOLOGY 14.—General Structural Botany. Lectures and Laboratory work. Six hours (First Term). Professor Wilson and assistants.

BIOLOGY 15.—Systematic Study of the Phsenogams. Lectures and Laboratory work. Six hours (Second Term). Professor MacFarlane and assistants.

DRAWING 2.—Freehand Drawing from Models. Three hours. Mr. Dawson.

CHEMISTRY 1.—General Inorganic Chemistry. Laboratory work with recitations. Three hours. Professor Smith and assistants.

PHYSICS 1.—Elementary Practical Physics. Three hours. Assistant Professor Goodspeed and Dr. Richards.

LATIN, GERMAN OR FRENCH. Three hours.

SECOND YEAR.

METHODS OF WORK.

BIOLOGY 5.—Elementary Vertebrate Morphology. Laboratory. Exercises with Explanatory Exercises. Six hours. Mr. Moore.

BIOLOGY 6.—Animal Histology. Six hours (First Term). Professor Ryder.

BIOLOGY 7.—Animal Embryology. Six hours (Second Term). Professor Ryder.

BIOLOGY 20.—Animal Physiology. Lectures and demonstrations. Three hours.

BIOLOGY 24.—Human Anatomy. Six hours. Professor Jayne and Dr. Burk.

BIOLOGY 16.—Plant Histology. Six hours (First Term). Professor Wilson.

BIOLOGY 17.—Systematic Study of Cryptogams. Six hours (Second Term). Professor MacFarlane and Assistants.

CHEMISTRY 2.—Analytical Chemistry. Qualitative Analysis. Making of Inorganic Preparations. The Laboratory is open every day from 9 until 5, except on Saturday afternoons. Six hours. Professor Smith and assistants.

LATIN, GERMAN OR FRENCH. Three hours.

METHODS OF WORK.

The instructions in the different subjects, included in the course, is given partly by laboratory exercises and partly by lectures and recitations. Thoroughness and exactness is insisted upon and regularity in attendance rigorously required. The work in Zoology begins in the first year with the course on the Invertebrates and is continued in the second year by two courses, one consisting of didactic lectures and demonstrations on the Comparative Anatomy and classification of the higher animals, both living and fossil, and the other of a laboratory course in the dissection of a number of typical forms.

The course in Mammalian Anatomy of the first year leads to the courses in Histology and Embryology, and in Human Anatomy of the second year.

The instruction in Botany begins with the course in Structural Botany, which occupies the first term of the first year. The student is made familiar with the gross anatomy of the different organs of plants and their general functions, and is enabled to take up in the second course, in the next term, the systematic affinities of flowering plants, the methods of plant classification and the structure of the
In the second year, the work of the first term is designed to give the student a much more complete knowledge of plant Anatomy, with more Physiology and leads again to the second course in systematic Botany, in which special attention is given to the lower forms.

The courses in Physics and Chemistry are given by practical laboratory exercises and recitations. The instruction in the language will depend upon the previous preparation of the student. Special students who propose to enter subsequently upon a course of Medical study, and who have never studied Latin, are required to give at least one year to the study of that language.

**ADDITIONAL COURSES OF INSTRUCTION.**

In addition to the courses on Zoology and Botany, included in the two-year course, there are the following which are open under restrictions to undergraduates and special students:

**BIOLOGY 12.**—Vertebrate Morphology. Advanced course. Six hours *(First Term).* Professor JAYNE.

**BIOLOGY 13.**—Osteology of the Mammalia. Six hours *(Second Term).* Professor JAYNE.

**BIOLOGY 9.**—Animal Histology. Advanced course. Six hours *(First Term).* Professor RYDER.

**BIOLOGY 10.**—Animal Embryology. Advanced course. Six hours *(Second Term).* Professor RYDER.

**BIOLOGY 22.**—The Mechanism of Locomotion. Two hours. Professor ALLEN.

**BIOLOGY 23.**—Mammalian Neurology and Craniology. Two hours. Professor ALLEN.

**BIOLOGY 21.**—Entomology. The General Anatomy of Insects, with Practical Exercises in Systematic Coleopterology. Professor HORN.

**BIOLOGY 18.**—Plant Physiology. Seven hours. Professor WILSON, Dr. HARSHBERGER and Mr. GREENMAN.

**BIOLOGY 26.**—Comparative Morphology (Macro- and Microscopic) of Leading Natural Orders of Plants. Lectures, two hours, and daily laboratory exercises. Professor MACFARLANE.

**BIOLOGY 27.**—A Course of Lectures and Practical Demonstrations on the Organizations of Museums of Comparative Botany for Schools, Colleges and Universities. Will begin in January. Professor MACFARLANE.
FACILITIES FOR INSTRUCTION.

The courses in Botany and Zoölogy are given in the Biological Laboratory, a commodious building which was erected in 1884 for the exclusive use of this school. It contains four large laboratories for undergraduate work, four laboratories for graduate courses, private rooms and laboratories for the instructors, and space for the botanical and zoölogical collections.

There is a large equipment of specimens, diagrams, instruments and all the necessary reagents for elementary and advanced work. Each student is furnished with a compound microscope by Leitz, Zeiss or Reichert, and a Zentmayer dissecting stand.

The herbarium is very large and embraces, among other special collections, the Burk herbarium, a singularly complete representation of the flora of the vicinity of Philadelphia. An important series of plants, beautifully mounted and preserved in alcohol, has been secured and is being constantly increased.

The ground around the laboratory is used as a botanical garden. In winter a green-house, in direct communication with one of the botanical laboratories, is filled with the plants that are used in the demonstrations and laboratory work, or that are the subject of experiment in the physiological laboratory.

The zoölogical collections have been brought together especially to illustrate the courses of instruction. In some lines they are peculiarly rich.

The biological library contains several thousand volumes and includes works of reference and the more important periodicals. It is deposited at present in the University Library.

PRIZES.

Regular students, candidates for a degree, may compete for any of the prizes offered in the College. The following are open also to special students in the School of Biology:

1. A prize of twenty-five dollars, and a second prize of fifteen dollars, for the best dissected preparation illustrating the anatomy of any animal or vegetable form.


3. The Kappa Kappa Gamma Fraternity offers its Zoölogical Table at the Woods' Holl Laboratory for the summer of 1894 as a prize to the students in the School of Biology. Any student desiring to com-
pete should notify the Dean, from whom further information may be obtained.

THE FIELD CLUB.

THE NATURALISTS' FIELD CLUB, formed for the purpose of carrying on actual field work, holds bi-weekly meetings at the Biological Hall throughout the College year. All undergraduate students of the University are eligible to membership. Numerous excursions for the purpose of field-work are taken during the fall and winter months. The order of exercises at the regular meetings consists of communications, reviews, and also in the comparison of observations made by different members of the society, affording excellent advantages to the student in science.

PUBLICATIONS.

The School of Biology issues two serial publications under the titles of Contributions from the Zoological and Botanical Laboratories. One number of the former and two numbers of the latter have already appeared and other numbers are in preparation. They contain original articles, the results of researches made in the laboratories by the instructors and students.

A Handbook of Information concerning the School of Biology (pp. 125), was published in 1889. Although the courses of study have since been somewhat changed, yet it contains a useful description of the school and the different courses of instruction.

Copies may be obtained upon application to the Dean.
THE COURSE IN MUSIC.

The qualifications required to enter the course are, first, a knowledge of the rudiments of music, and, second, the ability to play on some instrument—preferably the piano or organ.

The course extends through three years. The year begins on the first Monday in October, and is divided into three terms of ten weeks each. The first year is devoted to Harmony; the second to Counterpoint and Composition; the third to Form and Instrumentation.

Persons of both sexes are admitted. The fees are ten dollars ($10) for each term, payable in advance.

A CERTIFICATE OF STUDY is awarded to the student who has completed the full course, passed the required examination, and presented as a thesis a satisfactory original composition. The fee for the certificate is ten dollars.

BACHELOR OF MUSIC.—Persons holding the above Certificates may at any subsequent time proceed to the degree of Bachelor of Music (Mus. Bac.) on the following conditions:

1. They must be examined in Harmony, Counterpoint and Composition, by three examiners appointed by the Professor, subject to the approval of the Provost. The examination will be oral or written, or both, at the discretion of the examiners.

2. They must submit to the examiners an original composition in the form of a cantata for solos and chorus, with an accompaniment of at least a quintette of string-instruments.

3. This composition must be of such length as to require at least twenty minutes for its performance; it must contain a four-part fugue; and the accompaniment must be independent, except in the fugue.

4. The composition must be accompanied by a written statement that it is the student's own unaided effort.

DOCTOR OF MUSIC.—The Degree of Doctor of Music is an honorary degree, and is given only to composers who have written one important work in some one of the larger musical forms, as Cantata, Oratorio, Symphony, etc., which work has been accepted, after public performance, by the musical public as a valuable contribution to musical literature.

For detailed information, apply to Professor H. A. Clarke, Mus. D., 223 South 38th Street.
FOUR YEAR COURSES IN MECHANICAL AND ELECTRICAL ENGINEERING.

OFFICERS:

WILLIAM PEPPER, M. D., LL. D., Provost.
HORACE JAYNE, M. D., Ph. D., Dean of the College.
HENRY W. SPANGLER, Director. Whitney Professor of Dynamical Engineering.
A. WILLIAM SCHRAMM, B. S., M. E., Electrical Engineering.
LUCIEN E. PICOLET, Mechanical Drawing and Designing.
C. W. SCRIBNER, A. B., M. E., Mechanical Engineering.
EDWARD T. CHILD, B. S., M. E., Mechanical Engineering.
C. ANDERSON WILLIS, M. E., Mechanical Engineering.
J. J. MORRIS, Wood Working.

These courses lead to the degrees of Bachelor of Science in Mechanical Engineering and in Electrical Engineering. They contain a fair amount of literary and general science studies, with thorough instruction in the professional branches.

As the technical work peculiar to each course begins in the first year, students are not permitted to change to these courses from the other College courses, and new students are admitted to advanced standing only on condition that they have pursued similar courses elsewhere. Bachelors of Science in Mechanical and Electrical Engineering of three years' standing, who have shown marked progress in their professions, and have submitted a satisfactory thesis, may receive the degree of Master of Science in these subjects, together with the technical degrees appropriate to the course pursued.

The requirements for admission to these courses are: English, History, Mathematics (including Arithmetic, Algebra, Plane and Solid Geometry, and Plane Trigonometry), Physics and either French or German. The details of these requirements are given under "Admission to College."

The fee for the course is two hundred dollars a year.

FRESHMAN CLASS.

ENGLISH I.*—Rhetoric. Two hours. Mr. PENNIMAN.
ENGLISH LANGUAGE I.—English Language and Analysis. One hour. Professor EASTON.

* For full description of this and other studies named below, see pp. 49-88.
COURSES IN MECHANICAL AND ELECTRICAL ENGINEERING.

MATHEMATICS 8.—Trigonometry. Four hours (First Term). Assistant Professor CRAWLEY and Assistant Professor FISHER.

MATHEMATICS 2.—Algebra. Four hours (Second Term). Assistant Professor FISHER and Dr. SCHWATT.

PHYSICS 3.—Mass-Physics, Energy. (Barker's Physics.) Two hours (First Term). Assistant Professor GOODSPEED.

PHYSICS 4.—Sound and Heat. (Barker's Physics.) Two hours (Second Term). Assistant Professor GOODSPEED.

CHEMISTRY 1.—General Inorganic Chemistry. Laboratory work with recitations. Three hours. Professor SMITH, Dr. OHLY and Dr. FLECK.

MECHANICAL ENGINEERING 7a.—Kinematics. Elementary combinations, pulleys and belts, link work, gearing. Three hours (Second Term). Assistant Professor SPANGLER and Mr. WILLIS.

MECHANICAL ENGINEERING 5.—Steam Engine. Two hours (First Term). Professor SPANGLER and Mr. WILLIS.

MECHANICAL ENGINEERING 12a.—Shop work. Manual training in wood and iron. Three hours (First Term). Six hours (Second Term). Mr. MORRIS and Mr. McCONNELL.

MECHANICAL ENGINEERING 4c.—Drawing: Geometrical construction and projection. Three hours. Mr. PICOLET and Mr. WILLIS.

MECHANICAL ENGINEERING 4b.—Descriptive Geometry. Principles and applications to mechanical drawing. One hour. Mr. CHILD.

FRENCH 4.—Three hours. Professor RENNERT and Mr. LORENZ.

GERMAN 7.—Three hours. Mr. WESSELHOEFT.

Each student is required to take one of these two languages.

SOPHOMORE CLASS.

ENGLISH LITERATURE 1.—Lectures on Modern Essayists. Themes. Two hours (First Term). Professor SCHELLING and Mr. SMITH.

ENGLISH 2.—Composition. Two hours (Second Term). Mr. SMITH.

MATHEMATICS 11.—Analytic Geometry. Four hours (First Term). Assistant Professor FISHER.

MATHEMATICS 15.—Differential and Integral Calculus. Four hours (Second Term). Assistant Professor CRAWLEY.

PHYSICS 5.—Radiation, Magnetism. Three hours (First Term). Professor BARKER and Assistant Professor GOODSPEED.

PHYSICS 6.—Electricity. Three hours (Second Term). Professor BARKER and Assistant Professor GOODSPEED.

CHEMISTRY 2.—Analytic Chemistry. (Laboratory work.) Three hours. Professor SMITH and Dr. FLECK.

MECHANICAL ENGINEERING 22.—Graphics. Two hours (First Term). Professor SPANGLER and Mr. WILLIS.
MECHANICAL ENGINEERING 1.—Statics. Two hours (Second Term). Mr. Child.
MECHANICAL ENGINEERING 6.—Kinematics. Two hours. Mr. Child and Mr. Willis.
MECHANICAL ENGINEERING 12b.—Shop work. Six hours. Mr. Morris and Mr. McConnell.
MECHANICAL ENGINEERING 4c.—Drawing. The preparation of working drawings from sketches. Three hours. Mr. Piculet.
FRENCH 3.—Three hours. Professor Rennert and Mr. Lorenz.
GERMAN 3.—Three hours. Professor Seidensticker.
Each student is required to take one of these two languages.

JUNIOR CLASS.

Mechanical Engineering Students only.

MATHEMATICS 16.—Calculus. Three hours. Assistant Professor Crawley.
PHYSICS 7.—Physical measurements. Theory and Methods. Three hours throughout the year. Professor Barker.
PHYSICS 8.—Practical Laboratory work. (First Term) Dynamical, Thermal and Optical measurements. Three hours. Professor Barker, Assistant Professor Goodspeed and Dr. Richards.
PHYSICS 9.—Practical Laboratory work. (Second Term) Electrical measurements. Three hours. Professor Barker, Assistant Professor Goodspeed and Dr. Richards.
METALLURGY 1.—Metallurgical processes. One hour. Dr. Brown.
MECHANICAL ENGINEERING 1.—Statics. Two hours (First Term). Mr. Child.
MECHANICAL ENGINEERING 2.—Hydrostatics and Hydraulics. Two hours (Second Term). Mr. Child.
MECHANICAL ENGINEERING 9.—Steam boilers. Two hours. Mr. Scribner.
MECHANICAL ENGINEERING 11.—Electricity. Two hours. Mr. Schramm.
MECHANICAL ENGINEERING 15a, 21a.—Mechanical and Electrical Laboratory. Six hours. Professor Spangler, Mr. Scribner and Mr. Schramm.

Electrical Engineering Students only.

MATHEMATICS 16.—Calculus. Three hours. Assistant Professor Crawley.
PHYSICS 8.—Practical Laboratory work. Six hours. Professor Barker.
MECHANICAL ENGINEERING 1.—Statics. Two hours (First Term). Mr. Child.
MECHANICAL ENGINEERING 2.—Hydrostatics and Hydraulics. Two hours (Second Term). Mr. Child.
COURSES IN MECHANICAL AND ELECTRICAL ENGINEERING.

MECHANICAL ENGINEERING 9a.—Steam boilers. Two hours (Second Term). Mr. Child.

MECHANICAL ENGINEERING II.—Electrical measurements. Two hours. Mr. Schramm.

MECHANICAL ENGINEERING 11a.—Telegraphy. Two hours (Second Term). Mr. Schramm.

MECHANICAL ENGINEERING 15a, 21a.—(Laboratory work.) Six hours. Professor Spangler and Mr. Schramm.

SENIOR CLASS.*

Mechanical Engineering Students only.

MECHANICAL ENGINEERING 8.—Steam engine. Two hours.

MECHANICAL ENGINEERING 14.—Thermodynamics. Three hours.

MECHANICAL ENGINEERING 15.—Thermodynamics. Six hours.

MECHANICAL ENGINEERING 3.—Hydrodynamics. Two hours.

MECHANICAL ENGINEERING 20.—Electrodynamics. Two hours.

MECHANICAL ENGINEERING 21b.—Electrodynamics. (Laboratory work.) Three hours.

MECHANICAL ENGINEERING 17.—Designing Machinery. Three hours.

MECHANICAL ENGINEERING 16.—Marine engines. Two hours.

BUSINESS LAW AND PRACTICE 4.—One hour.

Electrical Engineering Students only.

MECHANICAL ENGINEERING 8.—Steam engine. Two hours.

MECHANICAL ENGINEERING 14.—Thermodynamics. Three hours.

MECHANICAL ENGINEERING 15a.—Thermodynamics. (Laboratory work.) Three hours.

MECHANICAL ENGINEERING 3.—Hydrodynamics. Two hours.

MECHANICAL ENGINEERING 17a.—Designing machinery. Three hours.

MECHANICAL ENGINEERING 11a.—Continued from previous year. Three hours (first half of First Term).

MECHANICAL ENGINEERING 21d.—Telephony. Two hours (first half of First Term).

MECHANICAL ENGINEERING 21c.—Electric lights. Photometry. Accumulators. Five hours (second half of First Term).

MECHANICAL ENGINEERING 21b.—Dynamo Electric Machinery. Four hours (Second Term).

MECHANICAL ENGINEERING 21.—Electrodynamics. (Laboratory work.) Six hours.

BUSINESS LAW AND PRACTICE 4.—One hour.

* The Senior Class will be first formed in 1894-95.
METHODS OF STUDY.

The instruction is eminently practical, and is given by recitations, lectures and exercises in the laboratory. The recitations are principally from text-books, which thus form the basis for the work to be done in each subject. Practical problems, whenever possible, are given to the class for solution.

The instruction in MATHEMATICS extends through three years, and Higher Algebra and Plane and Spherical Trigonometry are taught in the Freshman year. In the Sophomore year, in addition to the instruction in Analytical and Descriptive Geometry, a thorough course in Elementary Differential and Integral Calculus is given. A more extended course in the Calculus is continued through the Junior year. Voluntary courses are offered in Quaternions and Determinants.

CHEMISTRY is taught by practical laboratory exercises in the elements of General and Inorganic Chemistry. Each student is shown how to construct the necessary chemical apparatus, to make the simpler qualitative tests, and to determine quantitatively those substances coming under the work of the engineer.

The courses in PHYSICS begin with the recitations in Mechanics, which are followed by illustrated lectures and recitations on sound, heat, light, electricity and magnetism. One year is devoted to practical physics and to exercises in the Physical Laboratory, in which the student carries out practical work with physical apparatus and is taught the best methods of physical experimentation. This course is of particular importance to students of Mechanical Engineering, as giving the necessary training for advanced work in the Engineering Laboratories.

The courses in DRAWING begin with geometrical construction and are followed by projection and a course in descriptive geometry especially adapted to this work. Freehand drawing as applied to sketching is taught, and the principles of perspective and isometric drawing. In Mechanical Drawing the student begins by making copies of simple drawings. He then takes up more complex drawings, working from sketches, and by making other views of the objects represented, he is taught to read drawings with facility. After the elementary part of the work is finished, tracing and blue prints are required. In the last two years the students are required to make sketches and drawings of machinery in the laboratories and to prepare original designs.

In the four year courses elementary geometrical drawing precedes this work.
METHODS OF STUDY.

The instruction in English and English Literature is designed to furnish the student with a thorough knowledge of the language. Each student is required to study, during parts of three years, one language in addition to English. Since much of the current engineering literature is to be found in German and French publications, provision is made for thorough drill in these languages. Spanish may be also taken as a voluntary study.

The subject of Applied Mechanics is divided into a number of parts for facility of instruction, and is taught under the following heads:

Graphical Statics, under which is taught the general theory of the graphical method of determining the strains in framed structures, with its practical application to numerous examples.

Statics as applied to rigid bodies, the strength and elasticity of materials, and forms of uniform strength. As an accurate knowledge of this branch of the subject is indispensable to a well-equipped engineer, the class-room instruction is made as exhaustive as possible, and each student is required to carry out, on the testing machine in the laboratory, a series of experiments in tension, compression and cross breaking. The work in this branch is continued until the instructor is satisfied that the subject is thoroughly understood.

Hydrostatics and Hydraulics, embracing the equilibrium and pressure of fluids, determination of specific gravity, velocity and flow in pipes, channels and jets, continuity of flow, etc.

Kinematics, under which head are taught the principles underlying elementary combination of mechanism, theory of the teeth of wheels and the practical methods of laying them down, cams, belts, pulleys, speed cones and link work, epicyclic trains and other aggregate combinations of mechanism.

Hydrodynamics, covering dynamic head, contracted veins, surface of equal pressure and head, laws of fluid friction, hydraulic mean depth, resistance of mouth-piece, pressure of jets and water meters. The theory and practice of building water-wheels and turbines are also given. The Department is in possession of turbines, pumps, water-meters, etc., which will be set up in the Engineering building now completed.

As a sound knowledge of Steam Engineering is one of the most important parts of a mechanical engineering training, a large proportion of the time is devoted to this subject. The work is divided into several branches, and extends over the last years of the course.

Nomenclature.—An elementary course in the general nomenclature of the steam engine and boiler and their attachments is given.
The ordinary forms of engines and boilers are described, and the general details of cylinders, valves, pistons, connecting rods, bearings, indicators, gauges, etc., rendered familiar by blackboard sketches and by the practical use of the apparatus in the workshops and laboratories. To make the students more conversant with the ordinary forms of engineering appliances, their fundamental differences or similarities, and many of the advantages and disadvantages of their use, the members of the two upper classes are required to prepare and read before the Department essays on the appliances in common use.

Trade circulars, a complete set of which is kept in the Department, are used to a very great extent for examples.

The steam engine.—A course is given on the Zeuner diagram, as applied to slide valves, and to the principal automatic cut-off engines. The radial gears, such as the Hackworth, Marshall and Joy, are treated in the same way, and in nearly all cases the accuracy of the Zeuner diagram is shown from actual examples.

The designing of the parts of the steam engine is then taken up. All those parts which must be designed from a consideration of the stresses acting on them are first considered, and the method of applying the formulæ of statics shown. Each student is then assigned one of the more familiar types of engines, such as the Armington and Sims, Porter-Allen, Corliss, Ball, or Westinghouse, and is required to design the principal parts of the engine, using his calculations where the question of strength enters, and studying the particular type for details, which can only be determined by experience. Working sketches and many of the working drawings of the engines are made.

Steam boilers.—The study of steam boilers is taken up in much the same manner as that of the steam engine. The methods of determining the sizes of the parts from a consideration of their strength, such as the thickness of shell, size of rivets, braces, furnaces, etc., the character and physical properties of the materials used in the construction and the operation of the boilers, are discussed. The methods of constructing boilers of different types, with their advantages and disadvantages; boiler mountings, and the proper and improper methods of connection; considerations affecting the life of a boiler; boiler explosions; the methods of determining the efficiency of fuels, of heating surfaces and of boilers, and the usual methods of calculating and erecting chimneys are treated in their turn. Each student is required to make the principal calculations for one of the well-known boilers, and to make working sketches and drawings from his own designs.
METHODS OF STUDY.

THERMODYNAMICS.—In the last year the subject of thermodynamics, as applied to perfect and imperfect gases, is taught, and the principles are applied to the solution of practical questions pertaining to air, gas and steam engines, refrigerating machinery, injectors, condensers, etc.

The work in Marine Engineering covers the details of marine engines where they differ from stationary engines, and is given mostly by lectures. The methods of determining the power required, of calculating displacement and stability, of proportioning cylinders, condensers, boilers, pumps, etc., are given. In naval architecture the methods of constructing iron and steel ships, of laying down and erecting, are taken up, and, by the use of a large ship model in frame, the details of construction are treated.

The work in Electrical Engineering begins in the next to the last year with a discussion of quantity, potential, current, resistance, electrostatic measurement, magnetism and magnetic measurement, electro-magnetic measurement and the units adopted in practice. The course then treats of the measurement of currents, the construction, calibration and use of galvanometers, the measurement of difference of potential, quantity, resistance, a study of batteries, insulation tests and the apparatus used, the effects and measurement of electrostatic capacity, the measurement and comparison of magnetic fields, the construction, testing and advantages of different ammeters and voltmeters, measurement of power and efficiency of dynamos and motors, the efficiency and life of incandescent lamps, and of the various carbons used in arc lighting.

The theory of dynamo electric machines is taken up, and the characteristics of each of the different types are studied. Motors are studied in their theoretical and practical aspects. Lectures are given on electric lighting, including the most prominent arc and incandescent systems, wiring on the different systems, and the theory and practical management of accumulators.

Electrical Engineering students receive more extended instruction in the above subjects, and in addition are instructed in the general principles of Telegraphy, including the principles of single transmission, forms of sounders, relays and keys, opened and closed circuit working, duplex, quadruplex and harmonic telegraphy, and the use of dynamos in telegraphy. In the following year the principles underlying the telephone are discussed to the same extent.

The course in the Electrical Laboratory covers the use of all the test apparatus for measuring currents, resistances, insulation and capacity, the testing of dynamos and motors, storage batteries and commercial ammeters and voltmeters. The apparatus in this
THE COLLEGE.

Department is being rapidly increased, and now contains Edelmann, Hartman, Thomson, d’Arsonval and standard tangent galvanometers, Wheatstone bridge sets, resistance boxes and frames, condensers, voltmeters, ammeters, standard cells, special electrolytic cells, Bunsen photometer for arc and incandescent work and all the keys, shut boxes, telescopes, galvanoscopes and scales necessary for carrying on the work of the course, in addition to primary batteries, secondary batteries, dynamos, motors, friction brakes, Emerson power scale, and floating dynamometer, etc., for power and efficiency tests. The classes will be limited in size, thereby having the work of each student carefully overlooked by the instructor in charge of the work.

THE ENGINEERING BUILDINGS.

The University has now completed extensive buildings, which add materially to the facilities of this Department. A boiler house, 100 by 50 feet, has been completed and equipped with examples of the best modern types of steam boilers. The plant contains externally and internally fired shell boilers and several water-tube and other boilers of the sectional type. These boilers are erected in such a way that the student is enabled to examine and test them and compare their workings for heating and power purposes under the same conditions.

Adjoining this building is the new ENGINEERING LABORATORY. This building is 100 by 45 feet and three and one-half stories high. On the first floor are the engines and dynamos used for lighting all the University buildings. The engines are of the best types, both simple and compound, and will be arranged so that all the information possible may be obtained by the students. A 100 horse-power Westinghouse Compound and a 100 horse-power Porter-Allen engine are already installed, and provision has been made for a 100 horse-power Armington and Sims, a 100 horse-power Straight Line and a 50 horse-power Buckeye engine.

The dynamos used for lighting purposes include examples of the best modern types of both direct and alternating current machines, and the students in this department will be given instruction in the commercial handling and testing of the plant. These engines, in connection with the historical Oliver Evans’ “grasshopper” engine, the 45 horse-power Porter-Allen and the 30 horse-power Corliss engine, and several plain slide valve engines of 15 horse-power each, used for running blast and ventilating fans, place the facilities of this Department far in advance of any plant used for instruction purposes in this country. Each student is given charge of all the machinery and
apparatus in the Department for a portion of his time, under proper supervision.

There are now installed a 30 kilo-watt Edison machine, a 400 light Brush incandescent machine, a 500 light United States machine and a 300 ampere Thompson-Houston machine, and to these will be added, as rapidly as the plant can be put in, three additional incandescent machines and two alternating machines. These machines are connected up with their own apparatus, and the students are required to study and test each of the machines in use.

The remainder of the first floor is used for the Department of Mechanical Engineering.

The work of boiler testing is carried on in the new boiler house. Arrangements are made by which any one of the boilers can be used for test purposes, and it is the intention to have these tests carried out exactly as is done in practical engineering work. Calorimetric work is also to be carried on in the boiler house, and all the standard types of calorimeters are set up and used by the students.

The instruction in the principles of engine testing are given on the laboratory engines, which are an 8 by 16 Porter-Allen engine, and a 10 by 24 Corliss. The latter is used exclusively for testing purposes, while the former is also used to run a line of shafting.

Either of these engines may be run condensing or non-condensing, or the exhaust steam from one may be used to run the other, showing the principles underlying proper compounding. These engines are also used to show the difference between governing by throttling and by cut-off gears, so that before tests are made on the larger engines, the methods of procedure may be thoroughly understood.

A portion of the mechanical laboratory on the first floor is used for pumps and injector testing, and a large cistern under the floor and two large tanks on the fourth floor furnish an ample supply of water. The remainder of this floor is used for workshops.

Shop Work.—A floor space of about 1500 square feet is set apart for work in wood and metals.

On the second floor of this building is located the office of the Department, class rooms, one of which is used for a study, closets, and a large mechanical testing laboratory having a floor space of 2500 square feet. In this laboratory are placed machines for testing materials, iron and steel, oils, cement, steam gauges, indicators, chimney gases, etc. The machinery in this room is run from the engine on the floor below. Small dynamos and motors for test purposes are located in this room, so arranged that the methods of conducting these tests can be conveniently taught. It is the intention to
locate here a small air motor and gas motor for test purposes, and here are located absorbing and transmitting dynamometers now in the possession of the Department.

On the third floor of this building is located the drawing room, with 2,500 square feet of floor space, well lighted and amply supplied with the necessary furniture to carry out the work of the Department. An additional classroom, the Instructors' room and the Electrical Laboratory are also on this floor, the latter having 1,600 square feet of floor space. This room is so arranged that the most delicate experiments can be carried out, and at the same time is well supplied with the best commercial test apparatus. A special switch-board allows the current from any of the dynamos to be carried to any portion of the room without interfering with other work being carried on at the same time.

The building throughout is of mill construction, finished in natural wood and well adapted to the work to be carried on in it.

In this building there is floor space of about 15,000 square feet, all of which is utilized for instruction in mechanical and electrical work only. The extensive chemical and physical laboratories in the College building will be used for the instruction of the students in those branches. These courses have been made fuller and better adapted to the needs of the engineering students, a very large proportion of the work being now done in the laboratories.

THE ENGINEERING LIBRARY.

The Evans-Rogers Library is composed of standard works on drawing, mathematics, astronomy, physics, surveying and explorations, as well as of technical works on roads, strength and properties of materials, railroads, tunnels, canals, water supply, drainage, architecture, mechanics, navigation, harbor improvements and park and landscape engineering. It contains, also, a valuable collection of reports of American, English and French Engineering Societies, periodicals, Coast Survey and hydrographic charts, maps, diagrams and drawings.

Engineering periodicals, such as Engineering, The Engineer, American Engineer, Franklin Institute Journal, Iron Age, Electrical World, Electrical Engineer, Electrician (English), American Machinist, Metal Worker, Mechanics, and many others, are regularly received and kept in the office of the Department for the use of students, where they are at all times accessible. The working Electrical Library has been greatly increased by the recent purchase of books
and periodicals. New books and technical journals are continually added as their need is felt. A complete card catalogue of current technical literature is kept in the department for the use of the students.

The library is open from 8.30 A.M. to 5.30 P.M. every College day, and students are allowed to take books from the library under certain restrictions.
THE FOUR YEAR COURSE IN CIVIL ENGINEERING.

OFFICERS:

WILLIAM PEPPER, M. D., LL. D., Provost.
HORACE JAYNE, M. D., Ph. D., Dean of the College Faculty.
EDGAR MARBURG, C. E., Professor.
WALTER J. WEBB, C. E., Assistant Professor.
CHARLES WORTHINGTON, C. E., Instructor.

This course leads to the degree of Bachelor of Science in Civil Engineering. It contains a fair amount of literary and general science studies, with thorough instruction in the professional branches.

As the technical work begins in the first year, students are not permitted to change to this course from the other College courses, and new students are admitted to advanced standing only on condition that they have pursued similar courses elsewhere. Bachelors of Science in Civil Engineering of three years' standing, who have shown marked progress in their profession, and have submitted a satisfactory thesis, may receive the degree of Master of Science in this subject, together with the technical degree of Civil Engineer (C. E.).

The requirements for admission to this course are: English, History, Mathematics (including Arithmetic, Algebra, Plane and Solid Geometry, Plane Trigonometry), Physics, and either French or German. The details are given under "Admission to College."

The fee for the course is two hundred dollars per annum.

FRESHMAN CLASS.

CIVIL ENGINEERING 36.—Mechanical Drawing. Four hours. Mr. WORTHINGTON.

CIVIL ENGINEERING 28.—Projections. Two hours (First Term). Mr. WORTHINGTON.

CIVIL ENGINEERING 32.—Pen Topography. Two hours (Second Term). Mr. WORTHINGTON.

CIVIL ENGINEERING 35.—Lettering. One hour. Mr. WORTHINGTON.

CIVIL ENGINEERING 17.—Surveying. Theory. One hour. Assistant Professor Webb.

* For a brief description of this study and the other studies named below, see pages 49 to 58.
COURSE IN CIVIL ENGINEERING.

CIVIL ENGINEERING 21.—Surveying. Field Practice. Three hours. Assistant Professor Webb.

In addition to the hours above mentioned, one entire week during the second term is devoted to a special land survey.

ENGLISH I.—Rhetoric. Two hours. Mr. Penniman.

ENGLISH LANGUAGE I.—English Language and Analysis. One hour. Professor Easton.

GERMAN 7.—Three hours. Mr. Wesselhöft.

FRENCH 4.—Three hours. Professor Rennert and Mr. Lorenz. Each student is required to take one of these two languages.

MATHEMATICS 8.—Trigonometry. Four hours (First Term). Assistant Professor Crawley.

MATHEMATICS 2.—Algebra. Four hours (Second Term). Assistant Professor Fisher.

PHYSICS 3.—Mass-Physics, Energy. Barker's Physics. Two hours (First Term). Assistant Professor Goodspeed.

PHYSICS 4.—Sound and Heat. Barker's Physics. Two hours (Second Term). Assistant Professor Goodspeed.

CHEMISTRY 1.—General Inorganic Chemistry. Three hours. Professor Smith, Dr. Ohly, Mr. Shinn and Mr. Moyer.

SOPHOMORE CLASS.

CIVIL ENGINEERING 29.—Descriptive Geometry. Two hours (First Term). Mr. Worthington.

CIVIL ENGINEERING 30.—Shades and Shadows, and Perspective. Two hours (Second Term). Mr. Worthington.

CIVIL ENGINEERING 37.—Mechanical Drawing. Two hours (Second Term). Mr. Worthington.

CIVIL ENGINEERING 34.—Topographical Map Drawing. Two hours (First Term). Mr. Worthington.

CIVIL ENGINEERING 33.—Colored Topography. Two hours (Second Term). Mr. Worthington.

CIVIL ENGINEERING 18.—Surveying. Theory. One hour (First Term). Assistant Professor Webb.

CIVIL ENGINEERING 22.—Surveying. Field Practice. Three hours (First Term). Assistant Professor Webb.

CIVIL ENGINEERING 25.—Map Drawing. One hour. Assistant Professor Webb.

CIVIL ENGINEERING 19.—Railroad Surveying. Field Practice. Three hours (Second Term). Assistant Professor Webb.

CIVIL ENGINEERING 23.—Railroad Surveying. Theory. Two hours (Second Term). Assistant Professor Webb.

In addition to the hours above mentioned, one entire week during the first term is devoted to a special hydrographical survey.
Summer Work.—During the summer vacation each student is required to prepare a Memoir, containing not less than one thousand words, on some subject of technical interest, descriptive of an engineering work or manufacturing plant.

English 2.—Compositions. Two hours (Second Term). Mr. Smith.

English Literature 1.—Modern Essayists. Themes. Two hours (First Term). Professor Schelling and Mr. Smith.

German 3.—Three hours. Professor Seidensticker.

French 3.—Three hours. Professor Rennert and Mr. Lorenz.

Each student is required to take one of these two languages—that elected in Freshman year.

Mathematics 11.—Analytic Geometry. Four hours (First Term). Assistant Professor Fisher.

Mathematics 15.—Differential and Integral Calculus. Four hours (Second Term). Assistant Professor Crawley.

Physics 5.—Radiation, Magnetism. Three hours (First Term). Professor Barker and Assistant Professor Goodspeed.

Physics 6.—Electricity. Three hours (Second Term). Professor Barker and Assistant Professor Goodspeed.

Chemistry 2.—Qualitative Analysis. Four hours. Professor Smith and Mr. Wallace.

Junior Class.

Civil Engineering 31.—Stereotomy. Theory. One hour (First Term). Mr. Worthington.

Civil Engineering 38.—Mechanical Drawing. Two hours (First Term). Mr. Worthington.

Civil Engineering 1.—Mechanics of Materials. Four hours (First Term). Professor Marburg.

Civil Engineering 4.—Graphical Statics. Two hours (Second Term). Professor Marburg.

Civil Engineering 5.—Structures. Four hours (Second Term). Professor Marburg.

Civil Engineering 7.—Bridge Designing. Two hours (Second Term). Professor Marburg.

Civil Engineering 9.—Hydromechanics. Three hours (First Term). Professor Marburg.

Civil Engineering 10.—Sanitary Engineering Systems. One hour (Second Term). Professor Marburg.

Civil Engineering 2.—Materials of Engineering. One hour (Second Term). Professor Marburg.

Civil Engineering 24.—Railroad Location. Field Practice. Four hours (First Term). Assistant Professor Webb.
COURSE IN CIVIL ENGINEERING.

CIVIL ENGINEERING 26.—Railroad Office Work. Three hours (Second Term). Assistant Professor Webb.

SUMMER WORK.—During the summer vacation each student is required to prepare a Memoir, containing not less than fifteen hundred words, on some subject of technical interest, descriptive of an engineering work or manufacturing plant.

MATHEMATICS 16.—Differential and Integral Calculus. Three hours. Assistant Professor Crawley.

PHYSICS 7.—Physical Measurements. Theory and Methods. Three hours throughout the year. Professor Barker.

PHYSICS 8.—Practical Laboratory Work. (First Term.) Dynamical, Thermal and Optical measurements. Three hours. Professor Barker, Assistant Professor Goodspeed and Dr. Richards.

PHYSICS 9.—Practical Laboratory Work. (Second Term.) Electrical measurements. Three hours. Professor Barker, Assistant Professor Goodspeed and Dr. Richards.

MINERALOGY 5.—Two hours. Dr. Brown.

MINERALOGY 3.—Determinative Mineralogy. Two hours. Dr. Brown.

SENIOR CLASS.

CIVIL ENGINEERING 3.—Materials of Construction. Two hours. Professor Marburg.

CIVIL ENGINEERING 6.—Suspension, Cantilever and Swing Bridges. Theory. One hour (First Term). Professor Marburg.

CIVIL ENGINEERING 8.—Bridge Designing. Four hours. Professor Marburg.

CIVIL ENGINEERING 13.—Engineering Specifications. One hour (Second Term). Professor Marburg.

CIVIL ENGINEERING 11.—Foundations, Dams, Piers and Abutments. Two hours (First Term). Professor Marburg.

CIVIL ENGINEERING 12.—Stone Arches and Culverts. One hour (Second Term). Professor Marburg.

CIVIL ENGINEERING 27.—Railway Economics. Four hours (First Term). Assistant Professor Webb.

CIVIL ENGINEERING 20.—Geodesy. Theory. Three hours (Second Term). Assistant Professor Webb.

CIVIL ENGINEERING 14.—Special lectures on Engineering Subjects. At hours assigned (Second Term). Professor Marburg.

CIVIL ENGINEERING 15.—Inspection Tours to Engineering Works. At hours assigned. Professor Marburg.

CIVIL ENGINEERING 16.—Thesis on a Professional Subject.
MECHANICAL ENGINEERING 22.—Steam Engines and Boilers. Two hours. Professor Spangler.

ARCHITECTURE I 6.—History of Architecture. One hour. Professor Laird.

PUBLIC LAW AND POLITICS II.—Two hours. Professor James.

MATHEMATICS 19.—Astronomy. Two hours. Professor Kendall.


GEOLOGY I.—One hour. Dr. Brown.


COURSES IN CIVIL ENGINEERING.

Two distinct courses are offered to students in CIVIL ENGINEERING, the one given above, the four-year course, and the one included in the Course in Science and Technology. In the latter, the technical work begins with the Junior year, and is pursued throughout the Senior and Post-Senior years, the entire course thus covering a period of five years.

The four-year course begins in the Freshman year, and embraces the same amount of instruction in Mathematics, Physics, Chemistry and its allied subjects, as well as in the strictly technical branches; but in this course the time devoted to the general culture studies, such as Modern Languages, English Literature and kindred matter, is considerably reduced.

METHODS OF INSTRUCTION.

The courses in CIVIL ENGINEERING are designed to meet, as thoroughly as practicable, the demands of modern engineering practice. The studies presented are sufficiently advanced and comprehensive to ensure to the graduate that broad technical training essential to the successful prosecution of his subsequent professional work.

Approved modern text-books are used as a basis of instruction in all the principal branches. Supplemental matter is given, where needed, in the form of notes and lectures. The aim is to keep the class-work intimately in touch with the methods of advanced practice. The leading technical journals are kept on file in the Department, and are accessible to the students at all times. On occasion their attention is directed to matters of special interest or importance.

Every effort is made to encourage the students to habits of independent thought and self-reliant analysis. To this end, methods are
everywhere made subordinate to principles. The latter having been thoroughly presented, care is taken not to give undue prominence to special forms of application. Original problems of a distinctly practical nature are frequently assigned, tending to throw the students largely on their own resources, thus serving both to stimulate their interest in the subject and to afford them valuable training in the application of their theoretical acquirements to a great variety of practical conditions.

GENERAL OUTLINE OF COURSES.

MATHEMATICS.—The study of Mathematics is pursued for a period of three years. This begins in the Freshman year with instruction in Higher Algebra and Trigonometry. Analytical Geometry and Elementary Differential and Integral Calculus are taught during the Sophomore year, followed by an advanced course in the Calculus extending throughout the Junior year. Voluntary courses are offered in Quaternions and Determinants.

CHEMISTRY.—The courses in Chemistry are given by recitations and practical laboratory exercises, teaching the student the use and manipulation of ordinary chemical apparatus as applied to the qualitative analysis of inorganic compounds.

MINERALOGY.—The courses in Mineralogy familiarize the student with the characteristic forms of crystallization and with the physical and chemical properties of the principal minerals. In Determinative Mineralogy he is taught the various methods of distinguishing minerals and the application of the blow-pipe to the examination of ores.

METALLURGY.—The instruction in Metallurgy is designed to furnish the student with a general knowledge of the theory of metallurgical processes, and of the commercial methods of extracting the metals from their ores. Special prominence is given in this course to the metallurgy of iron and steel.

GEOLOGY.—In this subject, attention is directed particularly to the structural geology of North America and the relations of the principal ore and fuel deposits in this country.

PHYSICS.—The course in Physics extends through three years. During the first two years instruction is given in the subjects of sound, heat, light, electricity and magnetism by illustrated lectures and recitations. The third year is devoted to lectures on the
methods of experimentation, and to practical exercises in the physical laboratory.

ASTRONOMY.—An elementary course is offered in this subject, serving to impart to the student a general knowledge of the relation of the earth to the heavens, the laws of planetary motion, the instrumental methods of celestial measurements and the determination of time, longitude and latitude.

TECHNICAL BRANCHES.

The scope of the technical branches in Civil Engineering is indicated in some detail under the head of "Subjects of Instruction," (see pp. 49 to 88). These courses may be grouped as follows:

DESCRiptive GEOMETRY AND STEREOTOMY, embracing thorough instruction in the principles of Orthographic, Oblique and Isometric Projections; Descriptive Geometry; Shades and Shadows; Perspective; and the methods of Stone Cutting applied to the construction of arches, wing-walls, etc. In the latter branch, the students receive some practice in the preparation of plaster of Paris models.

MECHANICAL DRAWING.—The instruction in Mechanical Drawing begins with a variety of elementary exercises calculated to render the student proficient in the use of the instruments. This course includes graphic constructions relating to plane problems, projections, shades and shadows and perspective; the use of pen and brush in tinting, shading and graining; the representation of earthwork, masonry structural details, etc., besides a thorough drill in mechanical and free-hand lettering. The instruction in drawing is continued incidentally during the courses in stone cutting and in designing of plate girders and bridge trusses.

SURVEYING.—The Department is equipped with a complete outfit of the surveying instruments needed for general field operations. The students are first made familiar with the structure, adjustments and use of the various instruments, and are then thoroughly drilled in the most improved methods of field-work. They are required to keep notes in a neat and systematic manner, from which the surveys are afterwards plotted and all the necessary computations made. Field-practice is given in the special branches of topographical, hydrographical and city surveying, together with instruction in the theory of methods employed in mining surveying. During two terms, one entire week is devoted to special surveys, in addition to the regular weekly hours allotted to this work. The field-practice includes the
use of compass, level, transit, plane table, sextant, solar attachment and a variety of the smaller instruments.

**RAILROAD SURVEYING, CONSTRUCTION, MAINTENANCE AND OPERATION.**—As introductory to the course in Railroad Surveying, the theory of simple, compound and transition curves, turnouts, etc., is thoroughly taught by recitations and practice with the instruments. The students are then required to lay out a short line of railroad through a rough stretch of country. All details of the work, from reconnaissance to final location, are taken up in their regular sequence, as in actual practice. The office work is based on the data collected in the field, and includes the drawing of the map and profile, computations of earthwork, trestling and culverts, and a detailed estimate of cost.

The subject of **RAILWAY ECONOMICS** is taken up as a special study in which the questions of probable traffic, revenue, operating expenses, value of proposed improvements to existing lines, etc., are carefully considered.

**GEODESY.**—The course in Geodesy includes a study of the figure of the earth: the method of least squares; the adjustment of observations; the theory of probable error; practice in geodetic computations, supplemented by a limited amount of practice in the field.

**MAP DRAWING.**—The various courses in Map Drawing afford the student a thorough drill in the principal branches of this subject. The instruction begins with elementary exercises in pen and colored topography. Each student is afterwards required to construct a complete map of a topographical, hydrographical and city survey, based on notes recorded in the field, besides a map in connection with the railroad surveys.

**GRAPHICAL STATICS.**—This subject is presented chiefly with a view to make the student thoroughly conversant with the broad, fundamental principles on which it is based. The application of these principles to the determination of stresses is considered in detail only in connection with that class of structures for which graphical methods afford distinct advantages over analytical processes.

**STRUCTURES.**—The course in Structures embraces a comprehensive treatment of all standard types of bridge trusses. Special attention is given in this course to the determination of stresses by the most direct analytical methods. The relative merits of different forms of construction under varying conditions of service and span-length are thoroughly presented. The consideration of concentrated rolling loads in connection with railroad bridges is entered upon in consid-
erable detail. The computation of stresses in viaducts, turn-tables and crane-trusses is included in this course. An advanced course is given, treating of the theory of continuous girders, applied to swing-bridges and the stress analysis of cantilever and suspension bridges.

**BRIDGE DESIGNING.**—This course is intended to acquaint the student with the practical designing of framed structures, in strict accordance with approved modern specifications. Each student is required to prepare complete detailed drawings of a plate girder and a pin-connected truss bridge, and to perform all computations needed in this connection. He is taught to execute these plans in a neat, workmanlike manner, according to methods of current practice. No time is allowed to be spent on useless shading and ornamentation.

**MECHANICS OF MATERIALS.**—In this course special attention is devoted to the study of the common theory of flexure and its practical application to the designing of beams and columns. Incidentally the student receives considerable practice in the determination of shears and bending moments, moments of inertia and radii of gyration. The stresses in hollow cylinders, shafts, riveted connections, etc., are considered, as well as the application of the theorem of three moments to continuous girders.

**MATERIALS OF CONSTRUCTION.**—The instruction in this course is directed mainly to an exhaustive investigation of the physical characteristics of wrought iron and rolled steel and the behavior of these materials under varying conditions of stress and chemical composition. The different processes of manufacture and the commercial methods of testing and inspecting the product are also treated in some detail. Practical instruction in making the simpler kinds of tests will be given on the Olsen testing machine in the new Mechanical Laboratory.

**MASONRY AND FOUNDATIONS.**—The courses in Masonry embrace a study of the properties of the principal building stones; the manufacture of lime and cement; the mixing of mortar and concrete; the classification, strength and cost of masonry; and the designing of dams, piers, abutments, stone arches, culverts and retaining walls.

The course in Foundations includes a treatment of the various methods employed for laying foundations on land and under water, viewed under the following general heads: Ordinary land, I-beam and pile foundations; the freezing method applied to quicksand; sub-aqueous foundations by screw-piles, coffer-dams, dredging, and by the pneumatic process.

**HYDRAULICS AND HYDRAULIC MOTORS.**—The laws governing the flow, pressure, and energy of fluids, and the practical application of these laws are clearly presented in this course. The methods of
gauging streams with a view to their utilization for purposes of supply
or power are carefully considered. The course in Hydraulic Motors
is confined to the study of the principal forms of water-wheels and
turbines, and their relative cost and efficiency under different condi-
tions of head. Special facilities are provided in the new Mechani-
cal Laboratory for measurements of flow and tests of standard motors.

Sanitary Engineering Systems.—This course is devoted to the
study of approved methods for the construction and ventilation of
sewers, the treatment and disposal of sewage and modern provisions
for house drainage.

Steam Engines, Pumping Engines and Boilers.—Instruction in
this course is given by a series of lectures covering the principal points
of the subjects treated. These lectures are arranged under the follow-
ing general heads: Theory of combustion, amount of heat utilized,
the designing and setting up of boilers, the theory of the injector, the
proportioning of chimneys, an elementary study of the steam engine
and pumping engine, the interpretation of indicator diagrams, the
efficiencies of boilers and engines, and the best methods of conduct-
ing duty tests of pumping engines.

Architecture.—A brief course is given in the History of Archi-
tecture, in order that the student may obtain an intelligent conception
of the various styles of Architecture and some knowledge of the
history of their development.

Special Lectures are delivered from time to time on subjects
not covered by the regular courses, such as Water Supply, River and
Harbor Improvements, Road-Making, Pavements, Strength and Pre-
servation of Timber, etc.

Visits of Inspection.—A limited number of inspection tours are
made yearly to manufacturing plants and to engineering works com-
pleted or in course of construction. These visits are undertaken only
in so far as they have a direct bearing on the work of the class-room.

Summer Memoirs.—During the summer vacations, following the
Sophomore and Junior years, each student is required to prepare a
Memoir, descriptive of some engineering work or manufacturing
plant, based on his direct personal inquiries and observations.

Thesis.—A thoroughly elaborated thesis on a professional subject
is required of every member of the Post-Senior class in the course in
Science and Technology and of the Senior class in the four-year
course, as a necessary condition for graduation. These theses must
embodi either a design or a review of an engineering plant, process
or structure. They must be illustrated by drawings and models, where
needed, and after graduation must be deposited with the University.
The Evans-Rogers Library contains numerous standard mathematical, scientific and technical works, besides a very complete collection of bound volumes of Engineering journals and of the transactions of Engineering Societies.

This Library is open from 9 A. M. to 5.30 P. M. every College day, and the students are permitted to remove books, under certain restrictions.

The Department Library contains a well assorted collection of the most recent technical works and these also are available for reference. The leading engineering journals are kept on file in the Department, and are constantly accessible to the students.
FOUR YEAR COURSE IN CHEMISTRY.

OFFICERS:

WILLIAM PEPPER, M. D., LL. D., Provost.
HORACE JAYNE, M. D., Ph. D., Dean of the College.
EDGAR F. SMITH, Ph. D., Professor, Director of the Chemical Laboratory.
JULIUS OHLY, Ph. D., General Chemistry.
HERMANN FLECK, Ph. D., Organic and Technical Chemistry.
OWEN L. SHINN, General Chemistry.
J. BIRD MOYER, General Chemistry.
DANIEL L. WALLACE, Analytical Chemistry.

The requirements for admission to this course are English, History, Mathematics (including Arithmetic, Algebra and Plane Geometry), and either French or German. The fee is two hundred dollars per annum.

The degree conferred upon all who have successfully completed the course will be Bachelor of Science in Chemistry. Those who continue study for an additional year at the University will receive the degree of Master of Science in Chemistry. The same degree and the degree of Practical Chemist can be obtained by Bachelors of three years' standing upon application to the Faculty, when they must give evidence of having successfully followed out some line of chemical work since their graduation, and present an acceptable thesis.

FRESHMAN CLASS.

MATHEMATICS 3.*—Solid Geometry. Two hours (major part of First Term). Dr. SCHWATT.
MATHEMATICS 5.—Trigonometry. Two hours (second part of First Term). Dr. SCHWATT.
MATHEMATICS ia.—Algebra. Two hours. Dr. SCHWATT.
GERMAN 1.—Five hours. Mr. WESSELHOEFT.
FRENCH 4.—French Grammar. Two hours. Professor RENNERT.
FRENCH 4.—Five hours. Professor RENNERT and Mr. LORENZ.
Freshmen are required to take either German or French.
ENGLISH 1.—Rhetoric. Two hours. Mr. PENNIMAN.
ENGLISH LANGUAGE 1.—English Language and Analysis. One hour. Professor EASTON.

* For a full description of this study and the other studies named below see pages 49 to 88.
MECHANICAL DRAWING I 2.—Two hours. Mr. MILLARD.
FREEHAND DRAWING I 1.—One hour. Mr. EVERETT.

PHYSICS 2.—Elementary Practical Physics. Lecture or recitation. One hour. Assistant Professor GOODSPEED. Laboratory. Three hours. Assistant Professor GOODSPEED and Dr. RICHARDS.

CHEMISTRY I.—Eight hours. (Six hours devoted to laboratory work, and two to lectures or recitations.) Professor SMITH, with Dr. OHLY, Mr. SHINN and Mr. MOYER.

SOPHOMORE CLASS.

ENGLISH 2.—Weekly Composition. Two hours. Mr. SMITH.
ENGLISH 8.—Declamation. Mr. SMITH.

ENGLISH LITERATURE 1.—Lectures on Modern Essayists. Two hours (First Term). Professor SCHELLING and Mr. SMITH.

ENGLISH LITERATURE 2.—Lectures on Modern Novelists. Two hours (Second Term). Professor SCHELLING and Mr. PENNIMAN.

GERMAN 3 or FRENCH 3.—Three hours. Professor SEIDENSTICKER, or Professor RENNERT and Mr. LORENZ.

MINERALOGY I.—Mineralogy begun. Two hours. Dr. BROWN.

CHEMISTRY 2.—Qualitative Analysis. Preparation of Inorganic Compounds. Quantitative. Analysis begun. Eighteen to twenty hours. Professor SMITH and Mr. WALLACE.

OPTIONAL STUDIES.—MATHEMATICS, BOTANY AND PHYSICS.

JUNIOR CLASS.

PHILOSOPHY 2.—Ethics. Two hours (Second Term). Professor FULLERTON.

GERMAN 2.—Three hours. Professor SEIDENSTICKER.

ENGLISH LITERATURE 3 AND 7.—Two hours. Professor SCHELLING.

MINERALOGY 2.—Two hours. Dr. BROWN.

MINERALOGY 3.—Two hours. Dr. BROWN.

METALLURGY 2.—Assaying. Three hours. Dr. BROWN.

METALLURGY 1.—One hour. Dr. BROWN.

GEOLOGY 1.—Two hours. Dr. BROWN.

CHEMISTRY 3, 4, 6 AND 9.—Gravimetric and Volumetric Analysis. Applied Chemistry. Theoretical Chemistry. Visits to Works. Organic Chemistry. Lectures and practical work in the preparation of organic compounds. Twenty to twenty-five hours. Professor SMITH, Dr. FLECK and Mr. WALLACE.

OPTIONAL STUDIES.—Physics, Microscopic Botany, Biology.
COURSE IN CHEMISTRY.

SENIOR CLASS.

GERMAN 5.—Three hours. Professor SEIDENSTICKER.

PUBLIC LAW AND POLITICS II.—Two hours (First Term). Professor JAMES.

BUSINESS LAW AND PRACTICE 4.—One hour (Second Term). Mr. WINTERSTERN.

CHEMISTRY 5 AND 6.—Organic and Applied Chemistry. Twenty-five or more hours. Professor SMITH, Dr. FLECK and Mr. WALLACE.

THESIS.

METHODS OF STUDY.

The chemistry of the first year consists in the execution of a rather extended series of experiments upon the non-metals and metals. The student omits only those of greater difficulty and such as require a skillful manipulator for their performance. In addition, he attends lectures and recitations and solves numerous examples based upon the various reactions that he conducts practically. The skill and familiarity with chemical methods acquired in this way will fully prepare him for the work of the second year, which is mainly analytical, though considerable time is allotted to the preparation of a well-selected series of inorganic salts.

In quantitative analysis he is given every opportunity to familiarize himself with pure scientific methods in gravimetric, electrolytic and volumetric analysis, also with gas analysis and the methods of technical analysis applied in the various branches of chemistry. The instruction in theoretical chemistry is imparted by lectures; that in applied chemistry by lectures not only by the regularly appointed corps of instructors, but also by invited specialists, and further supplemented by frequent visits to chemical plants in this and adjacent cities. The lectures and recitations in organic chemistry are conducted parallel with practical work upon this subject. The aim is to have the student prepare typical substances from the whole field of organic chemistry. The most recent methods of analysis peculiar to this field receive due attention. In the fourth year the candidate has the greater portion of his time to devote entirely to the principal subject and will be offered the privilege of prosecuting chemical work in the direction of pure inorganic, organic or technical chemistry. The solution of some problem in one of these departments will constitute the thesis which he will be expected to prepare before presenting himself for the final examination.
FOUR YEAR COURSE IN CHEMICAL ENGINEERING.

OFFICERS:

WILLIAM PEPPER, M. D., LL. D., Provost.
HORACE JAYNE, M. D., Ph. D., Dean of the College.
EDGAR F. SMITH, Ph. D., Professor, Director of the Chemical Laboratory.
HENRY W. SPANGLER, WHITNEY Professor of Dynamical Engineering.
JULIUS OHLY, Ph. D., General Chemistry.
HERMANN FLECK, Ph. D., Organic and Technical Chemistry.
OWEN L. SHINN, General Chemistry.
J. BIRD MOVER, General Chemistry.
DANIEL L. WALLACE, Analytical Chemistry.
A. WILLIAM SCHRAMM, B. S., M. E., Electrical Engineering.
LUCIEN E. PICOLET, Drawing.
C. W. SCRIBNER, A. B., M. E., Mechanical Engineering.
EDWARD T. CHILD, B. S., M. E., Mechanical Engineering.
C. ANDERSON WILLIS, M. E., Mechanical Engineering.

This course has been arranged with the view of enabling chemical students to familiarize themselves with mechanical subjects to such a degree that they will be able to overcome the many difficulties which are constantly presenting themselves to those who are engaged in extending the applications of chemistry. The chemical studies introduced into this course will not only give the student a thorough acquaintance with the fundamental principles of chemical science, but will also afford him a complete drill in analysis, and in the preparation of inorganic and organic products. Instruction in technical analysis and applied chemistry is reserved until the last year. This has been purposely so arranged. It permits of the previous preparation in chemistry and mechanics, so necessary for the intelligent comprehension of the mechanisms involved in the applications of chemistry. The course aims to be practical. Laboratory methods will be preferred in instruction. Frequent excursions will be made to adjacent plants for the purpose of studying practical processes in operation and examining in detail the mechanical appliances that are used. The degree conferred upon graduates of this course will be Bachelor of
Science in Chemical Engineering. Three years after graduation those bachelors of science who have shown marked progress in their professions and who submit a satisfactory thesis, may be granted the degree of Chemical Engineer (Ch. E.).

The requirements for admission to this course are English, History, Mathematics (including Arithmetic, Algebra, Plane and Solid Geometry, Plane Trigonometry), Physics, and German or French.

The tuition fee is two hundred dollars per annum.

FRESHMAN CLASS.

ENGLISH I.*—Rhetoric. Two hours. Mr. Penniman.

ENGLISH LANGUAGE I.—English Language and Analysis. One hour. Professor Easton.

MATHEMATICS 8.—Trigonometry. Four hours (First Term). Assistant Professor Crawley.

MATHEMATICS 2.—Algebra. Four hours (Second Term). Assistant Professor Fisher.

PHYSICS 3.—Mass-Physics, Energy. (Barker's Physics). Two hours (First Term). Assistant Professor Goodspeed.

PHYSICS 4.—Sound and Heat. (Barker's Physics). Two hours (Second Term). Assistant Professor Goodspeed.

CHEMISTRY I.—General Inorganic Chemistry. Laboratory work with recitations. Six hours. Professor Smith, Dr. Ohly, Mr. Shinn and Mr. Moyer.

MECHANICAL ENGINEERING 7a.—Kinematics. Elementary combinations, pulleys and belts, link work, gearing. Three hours (Second Term). Professor Spangler and Mr. Willis.

MECHANICAL ENGINEERING 12a.—Shop work. Manual training in wood and iron. Two hours throughout the year. Mr. Morris and Mr. McConnell.

MECHANICAL ENGINEERING 4.—Drawing. Geometrical construction and projection. Three hours. Mr. Piculet.

MECHANICAL ENGINEERING 5.—The Steam Engine. Two hours (First Term). Mr. Willis and Professor Spangler.

FRENCH 2.—Three hours. Professor Rennert.

GERMAN 7.—Three hours. Mr. Wesselhoeft.

Each student is required to take one of these two languages.

* For a description of this and other studies named below see pp. 49-88.
THE COLLEGE.

SOPHOMORE CLASS.

ENGLISH LITERATURE I.—Lecture on Modern Essayists. Themes. Two hours (First Term). Professor SCHELLING and Mr. SMITH.

ENGLISH I.—Composition. Two hours (Second Term). Mr. SMITH.

MATHEMATICS II.—Analytic Geometry. Four hours (First Term). Assistant Professor FISHER.

MATHEMATICS 15.—Differential and Integral Calculus. Four hours (Second Term). Assistant Professor CRAWLEY.

PHYSICS 5.—Radiation, Magnetism. Three hours (First Term). Professor BARKER and Assistant Professor GOODSPEED.

PHYSICS 6.—Electricity. Three hours (Second Term). Professor BARKER and Assistant Professor GOODSPEED.

CHEMISTRY 2.—Analytical Chemistry. Laboratory practice and Recitations in Qualitative Analysis. Quantitative Analysis begun. Making of Inorganic Preparations. Ten hours. Professor SMITH and Mr. WALLACE.

MECHANICAL ENGINEERING 23.—Graphics. Two hours (First Term). Professor SPANGLER and Mr. WILLIS.

MECHANICAL ENGINEERING 1.—Statics. Two hours (Second Term). Mr. CHILD and Mr. WILLIS.

MECHANICAL ENGINEERING 12b.—Shop work. Two hours. Mr. GRIFFITH and Mr. MORRIS.

FRENCH 3.—Three hours. Professor RENNERT.

GERMAN 3.—Three hours. Professor SEIDENSTICKER.

Each student is required to take one of these two languages.

JUNIOR CLASS.

CHEMISTRY 4.—Analytical Chemistry. Laboratory practice. Lectures and recitations in Gravimetric and Volumetric Analysis. Gas Analysis. Assaying. Ten hours (One Term). Professor SMITH and Mr. WALLACE.

CHEMISTRY 6.—Organic Chemistry. Lectures. Laboratory work in making Organic Preparations. Ten hours (One Term). Professor SMITH and Dr. FLECK.

PHYSICS 7.—Physical measurements. Theory and Methods. Three hours throughout the year. Professor BARKER.

PHYSICS 8.—Practical Laboratory work (First Term). Dynamical, Thermal and Optical measurements. Three hours. Professor BARKER, Assistant Professor GOODSPEED and Dr. RICHARDS.

PHYSICS 9.—Practical Laboratory work (Second Term). Electrical measurements. Three hours. Professor BARKER, Assistant Professor GOODSPEED and Dr. RICHARDS.
CHEMICAL LABORATORY.

THE CHEMICAL LABORATORY.

The new chemical laboratory occupies a plot of ground at the northeast corner of Thirty-fourth and Spruce streets. It is E-shaped and fronts upon Thirty-fourth street, with the wings extending toward Thirty-third street. Its frontage is 168 feet, while the wings are 105 feet 3 inches in depth. The central portion of the building has three stories, while the wings are two stories high. The arrangement of rooms on the first floor is briefly as follows:

Entering on Thirty-fourth street, passing the vestibule, there is at the immediate right the entrance to a room, which will serve in conjunction with another room as an office and private laboratory for an instructor. To the left of the entrance are a cloak-room and closet. Across the hallway are two rooms, of which the first will be especially fitted out for the analysis of iron and steel, and will be known as the iron laboratory, while the other will contain chemical preparations
and apparatus intended for use in lectures, and opens consequently
directly into the large lecture theatre. This will hold two hundred and
twenty persons. It is lighted from the sides and by means of a skylight.
The seats gradually rise from the front toward the back. This theatre
may be placed at the disposition of other departments of the University
for entertainment purposes, etc. Stock rooms will be found upon
each floor. The right wing upon the first floor is the laboratory for
beginners. It contains one hundred and twelve double desks, i.e.,
each desk is so constructed that two persons, by working at different
hours, enjoy ample space for their work. The "hoods" are arranged
between the windows, and the sinks are placed at the windows. The
working tables in this laboratory extend from north to south. Rooms
for instructors, a room for hydrogen sulphide, and a balance room are
in immediate connection with this laboratory.

Turning to the left wing, there is first the laboratory for assaying.
This will be provided with twelve or fourteen large furnaces. Until
the present only four of the latter have been available, thus necessitat-
ing a division of classes into sections for proper work. The floor of
this room will be cement. The adjoining room is designed for the
purpose of heating under pressure. A balance room, a gas analysis
room, and technical laboratory, where preparations can be made upon
a more extended scale than is possible in any of the other laboratories,
are near by. Any special experiments it may be desired to execute on
a commercial scale will be conducted here.

Passing to the second floor, there are in the right wing a museum, a
lecture or recitation room, capable of comfortably seating forty
persons, and a qualitative laboratory that will accommodate seventy-
one students. The "hoods" and sinks in this laboratory are arranged
precisely as in the beginners' laboratory. At the east end of the room
are rooms for assistants, and a small hydrogen sulphide room. In the
left wing there is a second small lecture room, and adjoining it are the
library and reading room. The quantitative laboratory will accommo-
date forty students; at its end are an assistant's room, H₂ S-room and
a balance room. The "hoods" find place between the windows; the
sinks are arranged on the working tables, which are further provided
with gas, water and suction.

In the central portion of the second floor are three rooms intended
for special work for advanced students. There are also a balance
room, a dark room for photographic purposes, a spectroscopic room,
and a laboratory for electrolysis and special work in physical chemistry.

The central portion of the building alone has a third floor, and at
its extreme north is situated the organic laboratory; this accommo-
dates thirty persons, giving ample space to each individual. The tables, "hoods," sinks, etc., are arranged just as in the quantitative laboratory. On the same floor are an assistant's room, two additional special laboratories for advanced students; a balance room for the use of all engaged in work on the third floor; a combustion room for organic analysis, and a storeroom. All the storerooms are connected by a lift.

The machinery for ventilation is placed under the large lecture theatre, and properly housed. The general arrangement of the working rooms insures great convenience. The light and ventilation are first-class.
COURSES IN ARCHITECTURE.

OFFICERS:

William Pepper, M. D., LL. D., Provost.
Horace Jayne, M. D., Ph. D., Dean of the College.
Edgar V. Sheeler, Design.
Charles E. Dana, Art and Water Color Drawing.

Herbert E. Everett, Drawing and Interior Architecture.
Julian Millard, Architecture.
Wilson Eyre, Jr., Pen and Ink Rendering.
Henry Plasschaert, Modeling.
George Walter Dawson, Architecture.
Amos J. Boyden, Advanced Building Construction.

LECTURERS ON SPECIAL SUBJECTS.

Theophilus P. Chandler, Jr., Architect, A. I. A.
Walter Cope, Architect.
Frank Miles Day, B. S., Architect.
Wilson Eyre, Jr., Architect, A. I. A.
Barr Ferree, Architectural Writer and Critic.
John Stewardson, Architect.

Two full courses of architectural study are given in the School of Architecture; the four-year course leading to the Degree of B. S., and the two-year Special course, leading to a Certificate of Proficiency. To these is added an auxiliary course of two years in Interior Architecture, upon the completion of which the student is entitled to a special diploma. The School also gives all instruction in Freehand and Mechanical Drawing to Freshmen in the General Science courses of the Towne Scientific School; Freehand Drawing to Freshmen in Biology and Architectural History to Post-Seniors in Civil Engineering.

The fee for the two full courses is one hundred and sixty dollars per annum, each; for the course in Interior Architecture, forty dollars per annum.
COURSES IN ARCHITECTURE.

Four Year Course.

FRESHMAN YEAR (A).

(Architectural Studies.)

ARCHITECTURE, A. 1.*—Freehand Drawing. Five hours. Mr. Dawson.

ARCHITECTURE, A. 2.—Mechanical Drawing. Three hours (First Term). Mr. Dawson.

ARCHITECTURE, A. 3.—Elements of Architecture. Three hours (First Term). Mr. Millard.

ARCHITECTURE, A. 4.—Elementary Design. Three hours (Second Term). Mr. Millard.

ARCHITECTURE, A. 5.—Descriptive Geometry. Two hours (Second Term). Mr. Millard.

(Other Studies Required.)

ENGLISH 1.—Rhetoric. Two hours. Mr. Penniman.

ENGLISH LANGUAGE 1.—English Language and Analysis. One hour. Professor Easton.

GERMAN 6.—Five hours. Mr. Wesselhoeft.

FRENCH 4.—Five hours. Professor Rennert and Mr. Lorenz.

Each student elects one of these two languages.

MATHEMATICS 1.—Algebra. Two hours. Dr. Schwatt.

MATHEMATICS 3.—Solid Geometry. Two hours (Part of First Term). Dr. Schwatt.

MATHEMATICS 5.—Plane Trigonometry. Two hours (Part of First Term and Second Term). Dr. Schwatt.

CHEMISTRY 1.—Three hours. Professor Smith, Dr. Ohly, Mr. Shinn and Mr. Moyer.

SANITARY SCIENCE.—Hygiene. One hour. Dr. Faries.

PHYSICAL EDUCATION.—Lectures, examinations, and exercise in gymnasium. Three hours. Dr. Faries.

SOPHOMORE YEAR (B).

(Architectural Studies.)

ARCHITECTURE, B. 1.—Freehand Drawing. Five hours. Mr. Dawson.

ARCHITECTURE, B. 2.—Shades and Shadows. Three hours (First Term). Mr. Millard.

* For a full description of this and other studies named below, see pages 49 to 88.
ARCHITECTURE, B. 3. — Working Drawings. Three hours (First Term), Two hours (Second Term). Mr. MILLARD.

ARCHITECTURE, B. 4. — Elementary Building Construction. One hour (Second Term). Professor LAIRD.

ARCHITECTURE, B. 5. — Perspective. Three hours (Second Term). Mr. DAWSON.

ARCHITECTURE, B. 6. — The Orders of Architecture. Eight hours (First Term). Professor LAIRD.

ARCHITECTURE, B. 7. — Sketch Design. Mr. MILLARD.

ARCHITECTURE, B. 8. — Design. Twelve hours (Second Term). Mr. MILLARD.

ARCHITECTURE, C. 8. — * History of Architecture. One hour (throughout two years).

(Other Studies Required.)

ENGLISH LITERATURE 1. — Modern Essayists. Three hours (First Term). Professor SCHELLING and Mr. SMITH.

ENGLISH LITERATURE 2. — Modern Novelists. Three hours (Second Term). Professor SCHELLING and Mr. PENNIMAN.

FRENCH 3. — Three hours. Professor RENNERT.

GERMAN 3. — Three hours. Professor SEIDENSTICKER.

Of these two languages only the one selected in Freshman year is required.

MATHEMATICS 10. — Analytic Geometry. Three hours. Professor KENDALL.

PHYSICS 1. — Elementary Practical Physics. Three hours. Assistant Professor GOODSPEED.

PHYSICAL EDUCATION. — Examinations and exercises in gymnasium. Two hours. Dr. FARIES.

JUNIOR YEAR (C).

(Architectural Studies.)

ARCHITECTURE, C. 1. — Freehand Drawing. Six hours. Mr. EVERETT.

ARCHITECTURE, C. 2. — Sketching. Three hours (Part of First and Second Terms). Mr. EVERETT.

ARCHITECTURE, C. 3. — Pen and Ink Rendering. Two hours. Mr. EYRE.

ARCHITECTURE, C. 4. — Modeling. Three hours (Part of First and Second Terms). Mr. PLESSCHAERT.

* See Junior year.
COURSES IN ARCHITECTURE.

ARCHITECTURE, C. 5.—Water Color Drawing.  *Three hours.  Professor Dana.*

ARCHITECTURE, C. 6.—Sketch Design.  Assistant Professor Seeler.

ARCHITECTURE, C. 7.—Design.  *Fifteen hours.  Assistant Professor Seeler.*

ARCHITECTURE, C. 8.—History of Architecture.  Professor Laird and Corps of Lecturers.  *One hour (throughout Two Years).*

ARCHITECTURE, C. 9.—History of Ornament.  *One hour (Part of One Term).*  Mr. Everett.

ARCHITECTURE, C. 10.—Mechanics of Materials.  *Two hours (First Term).*  Mr. Millard.

ARCHITECTURE, C.—Graphical Statistics.  *Two hours (Second Term).*  Professor Laird.

CIVIL ENGINEERING, 39.—Theory of Surveying.  *Three hours (First Term).*  Mr. Worthington.

ARCHITECTURE, C. 12.—Advanced Building Construction.  *One hour (Part of First and Second Terms).*  Mr. Boyden.

SANITARY SCIENCE 1.—Heating and Ventilation.  *One hour (First Term).*  Dr. Abbott.

SANITARY SCIENCE 2.—Plumbing and Drainage.  *One hour (Second Term).*  Dr. Abbott.

ARCHITECTURE, A. B. C. 1.—Summer Sketching.  Mr. Everett.

ARCHITECTURE, A. B. C. 2.—Office Work.

SENIOR YEAR (D).

(Architectural Studies.)

ARCHITECTURE, D. 1.—Freehand Drawing.  *Six hours.*  Mr. Everett.

ARCHITECTURE, D. 2.—Sketching.  *Three hours (Part of First and Second Terms).*  Mr. Everett.

ARCHITECTURE, D. 3.—Pen and Ink Rendering.  *Two hours.*  Mr. Eyre.

ARCHITECTURE, D. 5.—Water Color Drawing.  *Three hours.  Professor Dana.*

ARCHITECTURE, D. 6.—Sketch Design.  Assistant Professor Seeler.

ARCHITECTURE, D. 7.—Design.  *Twenty hours (major part of Year).*  Assistant Professor Seeler.

ARCHITECTURE, D. 8.—Thesis.  *Twenty-five hours (major part of Second Term).*  Assistant Professor Seeler.

* Under instruction of Mr. Everett during Professor Dana’s absence in 1893–94.
Special Course of Two Years.

**FIRST YEAR.**

**ARCHITECTURE, B. 5.**—Perspective. *Three hours (Second Term).*
Mr. Dawson.

**ARCHITECTURE, B. 2.**—Shades and Shadows. *Three hours (First Term).*
Mr. Millard.

**ARCHITECTURE, B. 6.**—The Orders of Architecture. *Twelve hours (Part of First Term).*
Professor Laird.

**ARCHITECTURE, C. 1.**—Freehand Drawing. *Six hours.*
Mr. Everett.

**ARCHITECTURE, C. 2.**—Sketching. *Three hours (Part of First and Second Terms).*
Mr. Everett.

**ARCHITECTURE, C. 3.**—Pen and Ink Rendering. *Two hours.*
Mr. Eyre.

**ARCHITECTURE, C. 4.**—Modeling. *Three hours (Part of First and Second Terms).*
Mr. Plasschaert.

**ARCHITECTURE, C. 5.**—Water Color Drawing. *Three hours.*
Professor Dana.*

**ARCHITECTURE, C. 6.**—Sketch Design. Assistant Professor Seeler.

**ARCHITECTURE, C. 7.**—Design. *Fifteen hours.* Assistant Professor Seeler.

**ARCHITECTURE, C. 8.**—History of Architecture. *One hour (throughout Two Years).*
Professor Laird and Corps of Lecturers.

**ARCHITECTURE, C. 9.**—History of Ornament. *One hour (Part of One Term).*
Mr. Everett.

Mr. Millard.

**ARCHITECTURE, C. 11.**—Graphical Statics. *Two hours (Second Term).*
Professor Laird.

**ARCHITECTURE, C. 12.**—Advanced Building Construction. *One hour (Part of First and Second Terms).*
Mr. Boyden.

**SANITARY SCIENCE 1.**—*One hour (First Term).*
Dr. Abbott.

**SANITARY SCIENCE 2.**—*One hour (Second Term).*
Dr. Abbott.

* Appointment to be made from the Corps of Lecturers on Architecture.
SECOND YEAR.
ARCHITECTURE, D. 1.—Freehand Drawing. *Six hours.* Mr. Everett.
ARCHITECTURE, D. 2.—Sketching. *Three hours.* (Part of First and Second Terms). Mr. Everett.
ARCHITECTURE, D. 3.—Pen and Ink Rendering. *Two hours.* Mr. Eyre.
ARCHITECTURE, D. 5.*—Water Color Drawing. *Three hours.* Professor Dana.
ARCHITECTURE, D. 6.—Sketch Design. Assistant Professor Seeler.
ARCHITECTURE, D. 7.—Design. *Twenty hours.* Assistant Professor Seeler.
ARCHITECTURE, C. 8.—History of Architecture. *One hour.* Professor Laird and Corps of Lecturers.
ARCHITECTURE, D. 9.—Acoustics. (Part of One Term). Professor Laird.

CIVIL ENGINEERING 39.—Theory of Surveying. *Three hours (First Term).* Mr. Worthington.

Course in Interior Architecture.
(INterior Decoration.)

FIRST YEAR (G).
ARCHITECTURE, G. 1.—Freehand Drawing. *Four hours.* Mr. Everett.
ARCHITECTURE, G. 2.—Water Color Drawing. *Three hours (Part of First and Second Terms).* Mr. Everett.
ARCHITECTURE, G. 3.—Water Color Drawing. *Three hours.* Mr. Everett.
ARCHITECTURE, C. 9.—History of Ornament. *One Hour (Part of First Term).* Mr. Everett.
ARCHITECTURE, G. 4.—Theory of Design. *One hour.* Mr. Everett.
ARCHITECTURE, G. 5.—Problems and Criticisms. *Eight hours.* Mr. Everett.

SECOND YEAR (H).
ARCHITECTURE, H. 1.—Freehand Drawing. *Four hours.* Mr. Everett.
ARCHITECTURE, B. 5.—Perspective. *Three hours (Second Term).* Mr. Dawson.

*Under instruction of Mr. Everett during Professor Dana's absence in 1893-94.*
ARCHITECTURE, H. 2.—Water Color Drawing. Three hours (Part of First and Second Terms). Mr. Everett.

ARCHITECTURE, H. 3.—Water Color. Three hours. Mr. Everett.

ARCHITECTURE, H. 4.—Theory of Design. One hour. Mr. Everett.

ARCHITECTURE, H. 5.—Problems and Criticisms. Eight hours. Mr. Everett.

METHODS OF STUDY.

The School of Architecture provides a thorough and comprehensive course of study, offering instruction in the various phases of architectural education: Æsthetic, Historic, Constructive and Practical. It further provides a course of liberal study that tends to broaden and cultivate the student. The aim is to cultivate in its men a thoughtful and earnest method of dealing with architectural problems. While inculcating this habit of study, it seeks to familiarize the student with that which is good in architectural form and true in principle, to the end that he may be able to take up the problems of actual practice and solve them in a direct, simple and scholarly manner. In thus training its students it best serves their future, for the strongest architect is he who, appreciating the good in his art, knows how also to produce it.

The School educates architects, not draftsmen. Its aim is not to produce architects' assistants, but so to educate its men that they may become architects of high grade. But the training is such that the graduates are better draftsmen, better architects' assistants, for having had it. The best school for training draftsmen is the architect's office; but the School of Architecture, while giving an education impossible to acquire in an office and indispensable to the fully developed architect, also gives its students such practical instruction and drill that, on entering an office, they can take up its routine work with intelligent readiness.

As before intimated, the course of study is not confined to mere architectural drawing, but embraces the whole range of subjects in which the architect must be grounded. It may be considered on three lines—Liberal, Scientific and Æsthetic; the first to broaden and cultivate the student, the second to ground him in the principles of good architectural construction, and the third to teach him the Art of Architecture.

Two main lines of study are offered in the School of Architecture; the full four-year course, leading to the degree of Bachelor of Science in Architecture, and the two-year Special course, giving to
METHODS OF STUDY.

165

men fitted for it by experience as draftsmen the purely professional work of the last two years of the regular course. Candidates unable to take either course are admitted as Partial students to such lines of study as their preparation makes advisable.

In addition to these courses an Auxiliary course of two years in Interior Architecture is offered. This course is a complete one, as may be seen from its schedule of studies, and its graduates are prepared to enter on the practice of their profession at once on completing it. It has been placed under the direction of Mr. Herbert E. Everett, formerly of the School of Decoration and Painting in the Boston Museum of Fine Arts. The profession of Interior Architecture has advanced in importance and dignity with the advance in architecture and is now recognized as one of its most important auxiliaries. A steadily increasing number of people are annually entering upon its study and fitting themselves for its practice.

Reference to the accompanying schedule of studies will give an idea of the manner in which these various courses are presented. Forming part of the general College Faculty of the University, the School has a large Corps of Instruction exclusively for its own service. This comprises a Professor of Architecture; an Assistant Professor of Design; a Professor of Art; Instructors in Architecture, Drawing, Water-Color, Pen and Ink, and Modeling; an Assistant Instructor in Architecture; and a Corps of Lecturers.

ARRANGEMENT OF SUBJECTS IN THE FOUR YEAR COURSE.—Two main considerations underlie the arrangement of courses and selection of studies in the School of Architecture, (a) a thorough and competent knowledge of Architecture and allied studies from a scientific, aesthetic and practical point of view, and (b) a reasonable pursuance of general culture studies during Freshman and Sophomore years, so correlated with the technical studies of the department as to serve the student as a valuable aid in his later work and in his subsequent professional career. For this latter purpose Rhetoric, English Composition and English Literature, French and German, Mathematics, Physics and Chemistry are pursued. The practical advantage of such studies, whether for purposes of general education or for the future of the young architect, can not be doubted. In English Composition and Literature he will obtain that drill in writing and that acquaintance with the best models, through which alone he can learn the correct use of his mother tongue; a reading knowledge of French and German will open to him the wide field of the untranslated literature of architecture; whilst the admirable mental drill of the Mathematics and the study of Chemistry and Physics as pure sciences with their innumerable
applications to the nature and strength of building materials form the best possible adjuncts to the more purely technical sciences of the department. These technical courses, together with those on drawing and the history and aesthetics of Architecture will receive separate attention in the detailed description of courses below.

Freshman Year.—The student begins technical studies on entering the school. Drawing, to which a considerable portion of his time is devoted, is taught from the first with a view to the understanding of form and the use of the hand and eye in unison, and an acquisition of the architectural manner in representing it. To this end, while thoroughly drilled in correct methods of Freehand, Brush Work and Instrumental Drawing, the application of each to Architecture is kept constantly in view, in the redrawing from copy and rendering of various architectural features, or "Elements of Architecture," and in the work in Elementary Design. Instrumental drawing is pursued through Linear and Geometric drawing, Projection and Developments, and Descriptive Geometry; thus leading to Isometric drawing, and studies in Shades, Shadows and Perspective pursued in Sophomore year.

The general culture studies of the Freshman year include a careful drill in Rhetoric and English Composition, the study of French or German, Mathematics, including Algebra, Geometry and Trigonometry and Chemistry taught as a pure science. Lectures on Hygiene too form a part of the required course, accompanied by gymnasium exercise under the Instructor in charge.

In order to insure a continuance of purely architectural work the student is required to spend a certain portion of all his vacations in an architect's office, or, if he prefer, may substitute for this a certain amount of sketching.

Sophomore Year.—Throughout the Sophomore year constant practice in Freehand Drawing is continued. Shades and Shadows, and Perspective, and the preparation of Working Drawings are taken. The general character of the work in drawing now involves a closer attention to detail; Freehand Drawing passes from elementary and natural forms into Historic Ornament and drawing from the solid, and from casts, whilst drawing from photographs receives a proper share of attention. Shades, Shadows and Perspective are taught by lectures, by illustration in diagram and by numerous exercises. The subject of Architectural Design for which the studies of Freshman year have already prepared the student is fairly introduced by the study of the Orders of Architecture, which is supplemented on its completion by Design proper. The History of Architecture is taken up. The practical phases of architectural practice receive especial attention
METHODS OF STUDY.

in lectures on construction which involve instruction in the best methods of ordinary building construction; masonry, brickwork, carpenter work, etc., each considered in detail with reference to materials and methods of construction and the various processes followed in completing a building. The general culture studies of the Sophomore year include a continued drill in English Composition, Lectures on English Literature with theme work, French or German of a more advanced character, Analytic Geometry and Physics. Gymnasium work continues to be required of the student as in Freshman year.

JUNIOR AND SENIOR YEARS.—In these years the studies of the course assume almost a wholly technical character.

Freehand drawing continues to demand increasing attention and assumes the form of more difficult drawings from the cast, from photographs, from still life and from nature. Architectural subjects are generally chosen for this exercise, and of such a character that good form, historically and artistically, may become familiar to the eye and thought of the student, while his hand is becoming skilled. The student is taught the use of other mediums besides the pencil; Pen and Ink Rendering with Gregg's work on Pen and Ink as basis of exercises, and Water Color Drawing from still life and later from nature both receive the attention due to subjects of such prime importance to the architect in the rendering of his problems in design. Modeling in clay in Junior year is regarded as a valuable means of teaching appreciation of form, the student learning to interpret a drawing by making the actual form from its representation on the flat, reversing the process of drawing from the cast. It may be added that this work is confined chiefly to actual models of architectural ornament.

The subject of Design assumes with the last two years a greater degree of importance and is pursued with a corresponding increase of time. The student now enters upon a careful study of the principles of planning and composition based upon a recognition of the fact that Architecture is distinctly an Art. He is grounded in the principles which underlie true architectural design, from an acquaintance with what is best in the Architecture of the past and a knowledge of the reasons of such excellence, and above all it is sought to train in him an ability to bring his knowledge to bear practically on modern architectural problems. Study of the problems in Design is accompanied by the daily criticism and oversight of the professor in charge.

The history of Architecture is now pursued through the evolution of national types, such as the Egyptian, Assyrian, Greek and Roman,
the Early Christian, Romanesque, Byzantine, Gothic and Renaissance.
The History of Ornament is pursued in like manner.

The lectures on Construction involve an exposition of the methods employed in construction of large buildings. Sanitary Science in its relation to building is fully treated along the lines of Heating, Ventilation, Plumbing and House Drainage.

The scientific studies of these two years, Mechanics of Materials, Graphical Statics, Construction, etc., cover the principles of scientific construction, thus rounding out and completing the course. Surveying is carried to the point of using transit and level, as required in ordinary architectural practice.
THE COURSE IN SCIENCE AND TECHNOLOGY.

FRESHMAN CLASS.

ENGLISH I.*—Study of American Prose Authors, with Rhetorical Criticism and Composition. Two hours. Mr. Penniman.

ENGLISH LANGUAGE I.—English Language and Analysis. One hour. Professor Easton.

MATHEMATICS 2.—Algebra. Four hours. (First Term.) Dr. Schwatt.

MATHEMATICS 6.—Trigonometry. Four hours. (Second Term.) Assistant Professor Crawley.

ARCHITECTURE I 2.—Geometrical and Isometrical Drawing. Two hours. Mr. Dawson.

AMERICAN HISTORY 7.—Government in the United States. Two hours. (First Term.) Professor Thorpe.

EUROPEAN HISTORY I.—English History. Two hours. (Second Term.) Assistant Professor Cheyney.

GERMAN 6.—Five hours. Mr. Wesselhoeft.

FRENCH 4.—Five hours. Professor Rennert and Mr. Lorenz.
Each student elects one of these two languages.

PHYSICAL EDUCATION.—Lectures, examinations and exercise in gymnasium. Three hours. Dr. Faries.

SOPHOMORE CLASS.

ENGLISH 2.—Weekly Compositions during the year. Two hours. Mr. Smith.

ENGLISH 8.—Declamation. Two or more Declamations during the year by each student. Mr. Smith.

ENGLISH LITERATURE 1.—Lectures on Modern Essayists. Themes. Two hours. (First Term.) Professor Schelling and Mr. Smith.

ENGLISH LITERATURE 2.—Lectures on Modern Novelists. Themes. Two hours. (Second Term.) Professor Schelling and Mr. Penniman.

EUROPEAN HISTORY 5.—French Revolution. Three hours. (First Term.) Associate Professor Robinson.

* For a description of this and other studies below, see pp. 49-88.
THE COLLEGE.

EUROPEAN HISTORY 6.—Europe since 1815. Three hours. (Second Term.) Associate Professor Robinson.

These courses are elective with Drawing and Descriptive Geometry.

CIVIL ENGINEERING 36.—Mechanical Drawing. Three hours. Mr. Worthington.

Students who do not intend to take the technical courses in Metallurgy and Mining, Civil Engineering or Mechanical Engineering in Junior year may substitute for the courses in Descriptive Geometry and Drawing, History, pure Mathematics or Biology.

MATHEMATICS 11 a.—Analytic Geometry. Four hours. (First Term.) Professor Kendall.

MATHEMATICS 15.—Differential and Integral Calculus. Four hours. (Second Term.) Professor Kendall.

CIVIL ENGINEERING 29.—Descriptive Geometry. Two hours. (First Term.) Mr. Worthington.

CIVIL ENGINEERING 30.—Shades and shadows and perspective. Two hours. (Second Term.) Mr. Worthington.

PHYSICS 3.—Mass Physics, Energy. (Barker's Physics.) Two hours. (First Term.) Assistant Professor Goodspeed.

PHYSICS 4.—Sound and Heat. (Barker's Physics.) Two hours. (Second Term.) Assistant Professor Goodspeed.

CHEMISTRY 1.—General Inorganic Chemistry. Three hours. Professor Smith, Dr. Ohly, Mr. Shinn and Mr. Moyer.

GERMAN 3.—Three hours. Professor Seidensticker.

FRENCH 3.—Three hours. Professor Renner and Mr. Lorenz.

Of these two languages only the one selected in Freshman year is required.

PHYSICAL EDUCATION.—Examinations and exercises in gymnasium. Two hours. Dr. Faries.

THE TECHNICAL COURSES.

The technical divisions of the course in Science and Technology cover three years, termed (respectively) Junior, Senior and Post-Senior. Of these, the last is in the main practical. The courses are:

I. Pure and Applied Chemistry.
II. Metallurgy and Mining.
III. Civil Engineering.
IV. Mechanical Engineering.
I.—PURE AND APPLIED CHEMISTRY.

JUNIOR CLASS.

ENGLISH 3.—Weekly exercises in Composition, read and discussed in small sections of the class. One hour. Mr. SMITH.

ENGLISH 9.—Declamation. Debating and Original Speaking, extemporaneous and prepared. (Optional.) Mr. SMITH.

ENGLISH LITERATURE 3.—The Period of French Influence. Two hours. (First Term.) Professor SCHELLING.

ENGLISH LITERATURE 7.—The Age of Elizabeth. Two hours. (Second Term.) Professor SCHELLING.

GERMAN 2.—Two hours. Professor SEIDENSTICKER.

FRENCH 2.—Two hours. Professor RENNERT.

Of these two languages each Junior elects one—that already taken in Freshman and Sophomore years.

EUROPEAN HISTORY 10.—Medieval History of Europe. Two hours. Mr. MUNRO.

PHYSICS 5.—Radiation (including Light), Magnetism. Three hours (First Term). Professor BARKER and Assistant Professor GOODSPEED.

PHYSICS 6.—Electricity. Three hours (Second Term). Professor BARKER and Assistant Professor GOODSPEED.

CHEMISTRY 2.—Qualitative Analysis. Making of Inorganic Preparations. Twelve hours. Professor SMITH and Mr. WALLACE.

CHEMISTRY 4.—Organic Chemistry. Two hours. Dr. FLECK.

MINERALOGY 1.—Mineralogy begun. Crystallography. Native Elements, Sulphides, Chlorides, Fluorides and Oxides. Two hours. Dr. BROWN.

SENIOR CLASS.

ENGLISH 9.—Declamation. (Optional.) Mr. SMITH.

ENGLISH 6.—Advanced Composition. (Optional.) One hour. Mr. PENNIMAN.

PUBLIC LAW AND POLITICS 11.—Constitutional Law. Two hours. Professor JAMES.

MATHEMATICS 19.—Astronomy. Two hours. Professor KENDALL.

PHYSICS 7.—Physical measurements. Theory and Methods. Three hours throughout the year. Professor BARKER.
PHYSICS 8.—Practical Laboratory Work. (First Term.) Dynamical, Thermal and Optical measurements. Three hours. Professor Barker, Assistant Professor Goodspeed and Dr. Richards.

PHYSICS 9.—Practical Laboratory Work. (Second Term.) Electrical measurements. Three hours. Professor Barker, Assistant Professor Goodspeed and Dr. Richards.


CHEMISTRY 4.—Gravimetric and Volumetric Analysis. Six hours. Professor Smith and Mr. Wallace.

CHEMISTRY 5.—Applied Inorganic and Organic Chemistry. Two hours. Excursions to chemical works. Dr. Fleck.

CHEMISTRY 7.—Organic Chemistry. Laboratory work in making Organic Preparations. Proximate and Ultimate Organic Analysis. Six hours. Professor Smith and Dr. Fleck.

CHEMISTRY 8.—Seminary. One hour. Professor Smith, Dr. Fleck, Dr. Ohly, Mr. Shinn and Mr. Moyer.

MINERALOGY 2.—Mineralogy. Two hours. Dr. Brown.

MINERALOGY 3.—Determinative Mineralogy. Two hours. Dr. Brown.

POST-SENIOR CLASS.

CHEMISTRY 12.—Industrial Chemistry. Experimental Studies in Applied Inorganic and Organic Chemistry. Ten hours. Professor Smith and Dr. Fleck.

CHEMISTRY 15.—Advanced Chemical Theory. Lectures. One hour. Professor Smith.

CHEMISTRY 16.—Analytical Chemistry (Advanced Course.) Electrolysis and Electrolytic Methods. Lectures. One hour. Professor Smith.

CHEMISTRY 17.—Special topics in Pure Inorganic and Analytical Chemistry. Lectures. Professor Smith.

GEOL OGY 3.—Two hours. Dr. Brown.

METALLURGY 3.—Demonstrations of the principal metallurgical processes by furnace. Two hours. Dr. Brown.

METALLURGY 4.—Lectures on the production of pig, weld and temper iron, and of silver, copper and lead. Two hours. Visits to the metallurgical works in the city and State. Dr. Brown.
II.—METALLURGY AND MINING.

JUNIOR CLASS.

ENGLISH 3.—Weekly exercises in Composition, read and discussed by small sections of the class. One hour. Mr. SMITH.

ENGLISH 9.—Declamation. Debating and Original Speaking, extemporaneous and prepared. (Optional.) Mr. SMITH.

ENGLISH LITERATURE 3.—The Period of French Influence. Two hours (First Term). Professor SCHELLING.

ENGLISH LITERATURE 7.—The Age of Elizabeth. Two hours (Second Term). Professor SCHELLING.

GERMAN 2.—Two hours. Professor SEIDENSTICKER.

FRENCH 1.—Two hours. Professor RENNERT.

Of these two languages each Junior elects one—that already taken in Freshman and Sophomore years.

MATHEMATICS 16.—Differential and Integral Calculus. Three hours. Assistant Professor CRAWLEY.

PHYSICS 5.—Radiation (including Light), Magnetism. Three hours (First Term). Professor BARKER and Assistant Professor GOODSPEED.

PHYSICS 6.—Electricity. Three hours (Second Term). Professor BARKER and Assistant Professor GOODSPEED.

MINING 1.—Mining Engineering. Construction of parts of Mines and of Mining Machinery, from notes and sketches. Five hours. Dr. BROWN.

MINING 2.—Mining Engineering. Lectures on the methods used in prospecting for and developing ore and coal deposits. Two hours. Dr. BROWN.

MINERALOGY 1.—Mineralogy begun. Crystallography. Native Elements, Sulphides, Chlorides, Fluorides and Oxides. Two hours. Dr. BROWN.

GEOL OGY 1.—Lithology. One hour. Dr. BROWN.

CHEMISTRY 2.—Qualitative Analysis. Making of Inorganic Preparations. Six hours. Professor SMITH and Mr. WALLACE.

CIVIL ENGINEERING 17.—Surveying. Theory. One hour. Assistant Professor WEBB.

CIVIL ENGINEERING 19.—Railroad Surveying. Theory. Three hours (Second Term). Assistant Professor WEBB.

CIVIL ENGINEERING 21.—Surveying. Field Practice. Three hours. Assistant Professor WEBB.

CIVIL ENGINEERING 23.—Railroad Surveying. Field Practice at hours assigned. (Second Term.) Assistant Professor WEBB.
THE COLLEGE.

CIVIL ENGINEERING 32.—Pen Topography. Two hours (First Term). Mr. Worthington.

CIVIL ENGINEERING 33.—Colored Topography. Two hours (Second Term). Mr. Worthington.

SENIOR CLASS.

ENGLISH 9.—Declamation. (Optional.) Mr. Smith.

ENGLISH 6.—Advanced Composition. (Optional.) One hour. Mr. Penniman.

PUBLIC LAW AND POLITICS 11.—Constitutional Law. Two hours. Professor James.

MATHEMATICS 19.—Astronomy. Two hours. Professor Kendall.

PHYSICS 7.—Physical measurements. Theory and Methods. Three hours throughout the year. Professor Barker.

PHYSICS 8.—Practical Laboratory Work. (First Term) Dynamical, Thermal and Optical Measurements. Three hours. Professor Barker, Assistant Professor Goodspeed and Dr. Richards.

PHYSICS 9.—Practical Laboratory Work. (Second Term) Electrical Measurements. Three hours. Professor Barker, Assistant Professor Goodspeed and Dr. Richards.


METALLURGY 2.—Assaying. Four hours. Dr. Brown.

MINING 1.—Mining Engineering. Construction of parts of Mines and of Mining Machinery from notes and sketches. Five hours. Dr. Brown.

MINING 4.—Mining Engineering. Lectures on the principles involved and the machinery employed in haulage, hoisting and pumping in mines. Two hours. Dr. Brown.

MINERALOGY 2.—Mineralogy. Two hours. Dr. Brown.

MINERALOGY 3.—Determinative Mineralogy. Two hours. Dr. Brown.

CHEMISTRY 4.—Gravimetric and Volumetric Analysis. Four hours. Professor Smith and Mr. Wallace.

CIVIL ENGINEERING.—18-22-24-25-26-34.

POST-SENIOR CLASS.

METALLURGY 3.—Demonstrations of the principal metallurgical processes by furnace. Two hours. Dr. Brown.

METALLURGY 4.—Lectures on the production of pig, weld and temper iron, and of silver, copper and lead. Two hours. Visits to metallurgical works in the city and State. Dr. Brown.
MINING 3.—Mining Engineering. Two hours. Dr. Brown. Excursions for two weeks to the Anthracite Coal Regions, to make underground surveys, and to learn how to examine a mine and report its condition.

GEOLOGY 3.—Two hours. Dr. Brown.

GEOLOGY 4.—The topographical, structural and genetic relations of the principal ore deposits in America and Mexico. One hour. Dr. Brown.

CHEMISTRY 10.—Lectures. Analytical Chemistry (Advanced Course). Electrolysis and Electrolytic methods. One hour, and others as assigned. Professor Smith.

III.—CIVIL ENGINEERING.

JUNIOR CLASS.

ENGLISH 3.—Weekly exercises in Composition, read and discussed in small sections of the class. One hour. Mr. Smith.

ENGLISH 9.—Declamation. Debating and Original Speaking, extemporaneous and prepared. (Optional.) Mr. Smith.

ENGLISH LITERATURE 3.—The Period of French Influence. Two hours (First Term). Professor Schelling.

ENGLISH LITERATURE 7.—The Age of Elizabeth. Two hours (Second Term). Professor Schelling.

Students in Engineering elect English Literature, Philosophy or History.

PHILOSOPHY 1.—Logic. Two hours (First Term). Professor Fullerton.

PHILOSOPHY 2.—Ethics. Two hours (Second Term). Professor Fullerton.

EUROPEAN HISTORY 4.—Medieval History of Europe. Two hours. Assistant Professor Cheyney.

GermAn 2.—Two hours. Professor Seidensticker.

FRENCH 1.—Two hours. Professor Rennert.

Of these two languages each Junior elects one—that already taken in Freshman and Sophomore years.

MATHEMATICS 16.—Differential and Integral Calculus. Three hours. Assistant Professor Crawley.

PHYSICS 5.—Radiation (including Light), Magnetism. Three hours (First Term). Professor Barker and Assistant Professor Goodspeed.

PHYSICS 6.—Electricity. Three hours (Second Term). Professor Barker and Assistant Professor Goodspeed.

CIVIL ENGINEERING 32.—Pen Topography. Two hours (First Term). Mr. Worthington.
THE COLLEGE.

CIVIL ENGINEERING 33.—Colored Topography. Two hours (Second Term). Mr. Worthington.

CIVIL ENGINEERING 1.—Mechanics of Materials. Four hours (First Term). Professor Marburg.

CIVIL ENGINEERING 4.—Graphical Statics. Two hours (Second Term). Professor Marburg.

CIVIL ENGINEERING 17.—Surveying. Theory. One hour. Assistant Professor Webb.

CIVIL ENGINEERING 21.—Surveying. Field Practice. Three hours. Assistant Professor Webb.

In addition to the hours above mentioned, one entire week during the second term is devoted to a special land survey.

CIVIL ENGINEERING 19.—Railroad Surveying. Theory. Three hours (Second Term). Assistant Professor Webb.

CIVIL ENGINEERING 23.—Railroad Surveying. Field Practice. At hours assigned. (Second Term). Assistant Professor Webb.

CHEMISTRY 2.—Qualitative Analysis. Four hours. Professor Smith and Mr. Wallace.

SUMMER WORK.—During the summer vacation each student is required to prepare a Memoir, containing not less than one thousand words, on some subject of technical interest, descriptive of an engineering work or manufacturing plant.

SENIOR CLASS.

ENGLISH 9.—Declamation. (Optional.) Mr. Smith.

ENGLISH 6.—Advanced Composition. (Optional.) One hour. Mr. Penniman.

PUBLIC LAW AND POLITICS 11.—Constitutional Law. Two hours. Professor James.

MATHEMATICS 19.—Astronomy. Two hours. Professor Kendall.

PHYSICS 7.—Physical measurements. Theory and Methods. Three hours throughout the year. Professor Barker.

PHYSICS 8.—Practical Laboratory Work. (First Term.) Dynamical, Thermal and Optical measurements. Three hours. Professor Barker, Assistant Professor Goodspeed and Dr. Richards.

PHYSICS 9.—Practical Laboratory Work. (Second Term.) Electrical Measurements. Three hours. Professor Barker, Assistant Professor Goodspeed and Dr. Richards.


CIVIL ENGINEERING 34.—Topographical Map Drawing. Two hours (First Term). Mr. Worthington.
CIVIL ENGINEERING.

CIVIL ENGINEERING 9.—Hydromechanics. Three hours (First Term). Professor MARBURG.

CIVIL ENGINEERING 10.—Sanitary Engineering Systems. One hour (Second Term). Professor MARBURG.

CIVIL ENGINEERING 5.—Structures. Four hours (Second Term). Professor MARBURG.

CIVIL ENGINEERING 7.—Bridge Designing. Two hours (Second Term). Professor MARBURG.

CIVIL ENGINEERING 2.—Materials of Engineering. One hour (Second Term). Professor MARBURG.

CIVIL ENGINEERING 18.—Surveying. Theory. One hour (First Term). Assistant Professor WEBB.

CIVIL ENGINEERING 22.—Surveying. Field Practice. Three hours (First Term). Assistant Professor WEBB.

In addition to the hours above mentioned, one entire week during the first term is devoted to a special hydrographical survey.

CIVIL ENGINEERING 24.—Railroad Location. Field Practice. Four hours (First Term). Assistant Professor WEBB.

CIVIL ENGINEERING 26.—Railroad Office Work. Three hours (Second Term). Assistant Professor WEBB.

CIVIL ENGINEERING 25.—Map Drawing. One hour. Assistant Professor WEBB.

MECHANICAL ENGINEERING 22.—Steam Engines and Boilers. Two hours. Professor SPANGLER.

SUMMER WORK.—During the summer vacation each student is required to prepare a Memoir, containing not less than fifteen hundred words, on some subject of technical interest, descriptive of an engineering work or manufacturing plant.

POST-SENIOR CLASS.

CIVIL ENGINEERING 31.—Stereotomy. Theory. One hour (First Term). Mr. WORTHINGTON.

CIVIL ENGINEERING 38.—Mechanical Drawing. Two hours (First Term). Mr. WORTHINGTON.

CIVIL ENGINEERING 3.—Materials of Construction. Two hours. Professor MARBURG.

CIVIL ENGINEERING 6.—Suspension, Cantilever and Swing Bridges. One hour (First Term). Professor MARBURG.

CIVIL ENGINEERING 8.—Bridge Designing. Four hours. Professor MARBURG.

CIVIL ENGINEERING 13.—Engineering Specifications. One hour (Second Term). Professor MARBURG.
CIVIL ENGINEERING 11.—Foundations, Dams, Piers and Abutments. Two hours (First Term). Professor MARBURG.

CIVIL ENGINEERING 12.—Stone Arches and Culverts. One hour (Second Term). Professor MARBURG.

CIVIL ENGINEERING 27.—Railway Economics. Four hours (First Term). Assistant Professor WEBB.

CIVIL ENGINEERING 20.—Geodesy. Three hours (Second Term). Assistant Professor WEBB.

CIVIL ENGINEERING 14.—Special lectures on Engineering subjects. At hours assigned. (Second Term.) Professor MARBURG.

CIVIL ENGINEERING 15.—Inspection Tours to Engineering Works. At hours assigned. Professor MARBURG.

CIVIL ENGINEERING 16.—Thesis on a Professional Subject.

MECHANICAL ENGINEERING 14.—Thermodynamics. Three hours. Professor SPANGLER.

ARCHITECTURE J 6.—History of Architecture. One hour. Professor LAIRD.

MINERALOGY 5.—Two hours. Dr. BROWN.

MINERALOGY 3.—Determinative Mineralogy. Two hours. Dr. BROWN.

GEOLOGY 3.—Two hours. Dr. BROWN.

BUSINESS LAW 3.—Law of Contracts. One hour. Mr. WINTERSTEEN.

IV.—MECHANICAL ENGINEERING.

JUNIOR CLASS.

ENGLISH 3.—Weekly exercises in Composition, read and discussed in small sections of the class. One hour. Mr. SMITH.

ENGLISH 9.—Declamation. Debating and Original Speaking, extemporaneous and prepared. (Optional.) Mr. SMITH.

ENGLISH LITERATURE 3.—The Period of French Influence. Two hours (First Term). Professor SCHELLING.

ENGLISH LITERATURE 7.—The Age of Elizabeth. Two hours (Second Term). Professor SCHELLING.

Students in Engineering elect English Literature, Philosophy or History.

PHILOSOPHY 1.—Logic. Two hours (First Term). Professor FULLERTON.

PHILOSOPHY 2.—Ethics. Two hours (Second Term). Professor FULLERTON.

EUROPEAN HISTORY 4.—Medieval History of Europe. Two hours. Assistant Professor CHEYNEY.
GERMAN 2. - Two hours. Professor SEIDENSTICKER.

FRENCH 1. - Two hours. Professor RENNERT.

Of these two languages each Junior elects one—that already taken in Freshman and Sophomore years.

MATHEMATICS 16. — Differential and Integral Calculus. Three hours. Assistant Professor CRAWLEY.

PHYSICS 5. — Radiation (including Light), Magnetism. Three hours (First Term). Professor BARKER and Assistant Professor GOODSPEED.

PHYSICS 6. — Electricity. Three hours (Second Term). Professor BARKER and Assistant Professor GOODSPEED.

MECHANICAL ENGINEERING 1. — Statics. Two hours. Mr. CHILD and Mr. WILLIS.

MECHANICAL ENGINEERING 2. — Hydrostatics and Hydraulics. Two hours. Mr. CHILD and Mr. WILLIS.

MECHANICAL ENGINEERING 4. — Drawing. Three hours. Mr. Picolet.

MECHANICAL ENGINEERING 5. — The Steam Engine. Two hours (First Term). Professor SPANGLER.

MECHANICAL ENGINEERING 6. — Kinematics. Two hours (Second Term). Professor SPANGLER.

MECHANICAL ENGINEERING 12. — Shop work. Manual training in wood and iron work. Nine hours. Mr. MORRIS and Mr. MC-CONNELL.

MECHANICAL ENGINEERING 22. — Graphical Statics. Two hours. Mr. CHILD.

SENIOR CLASS.

ENGLISH 9. — Declamation. (Optional.) Mr. SMITH.

ENGLISH 6. — Advanced Composition. (Optional.) One hour. Mr. PENNIMAN.

PUBLIC LAW AND POLITICS 11. — Constitutional Law. Two hours. Professor JAMES.

PHYSICS 7. — Physical measurements. Theory and Methods. Three hours throughout the year. Professor BARKER.

PHYSICS 8. — Practical Laboratory Work. (First Term.) Dynamical, Thermal and Optical measurements. Three hours. Professor BARKER, Assistant Professor GOODSPEED and Dr. RICHARDS.

PHYSICS 9. — Practical Laboratory Work. (Second Term.) Electrical measurements. Three hours. Professor BARKER, Assistant Professor GOODSPEED, and Dr. RICHARDS.

METALLURGY 1. — Theory of Metallurgical Processes. One hour. Dr. BROWN.
MECHANICAL ENGINEERING 2.—Hydrostatics and Hydraulics. Two hours. Mr. Scribner.

MECHANICAL ENGINEERING 4 A.—Sketching and Drawing. Two hours. Mr. Piculet.

MECHANICAL ENGINEERING 8.—Steam Engine. Four hours (Second Term). Mr. Scribner.

MECHANICAL ENGINEERING 9.—Steam Boilers. Four hours. Mr. Scribner.

MECHANICAL ENGINEERING 11.—Electricity. Two hours. Mr. Schramm.

MECHANICAL ENGINEERING 13.—Shop Work. Nine hours. Mr. Morris and Mr. McConnell.

POST-SENIOR CLASS.

MECHANICAL ENGINEERING 3.—Hydrodynamics. Two hours. Professor Spanger.

MECHANICAL ENGINEERING 7.—Kinematics. Two hours. Professor Spanger.

MECHANICAL ENGINEERING 14.—Thermodynamics. Three hours. Mr. Scribner.

MECHANICAL ENGINEERING 15.—Thermodynamics (In Laboratory.) Six hours. Professor Spanger and Mr. Scribner.

MECHANICAL ENGINEERING 16.—Marine Engineering and Naval Architecture. One hour. Professor Spanger.

MECHANICAL ENGINEERING 17.—Designing Machinery. Four hours. Professor Spanger and Mr. Piculet.

MECHANICAL ENGINEERING 18.—Visits to manufacturing establishments. Sixteen weeks, one visit per week. Professor Spanger.

MECHANICAL ENGINEERING 19.—Contracts and Specifications. One hour (Second Term). Professor Spanger.

BUSINESS LAW AND PRACTICE 4.—Contracts and Specifications. One hour. Mr. Wintersteen.

MECHANICAL ENGINEERING 20.—Electrodynamics. Five hours. Mr. Schramm.

MECHANICAL ENGINEERING 21.—Electrodynamics. Laboratory work. Six hours. Mr. Schramm.

MECHANICAL ENGINEERING 24.—Electricity. Alternating Currents. (Optional.) One hour. Professor Spanger.
ARRANGEMENT OF SESSIONS—SCHOLARSHIPS.

ARRANGEMENT OF SESSIONS.

The College year is divided into two terms of about eighteen weeks each. The first term began in 1893 on September 29, at 10 o'clock, A.M., and ends on January 31, 1894, at 5 o'clock, P.M. The second begins on February 1, at 10 o'clock, and ends with commencement on June 7. The examination for entrance will begin on June 11 and September 11. The next College year will begin on October 1, 1894, at 10 A.M.

EXAMINATIONS.

Examinations are held at the end of each term. Students who attain a certain standing are classed as "Distinguished;" those whose term-standings show them to be deficient in any of their studies are conditionally attached to their class, until the deficiency has been fully made up. For persistent neglect of study, irregularity of attendance, or inability to keep up with the class, students are dropped from the rolls.

SCHOLARSHIPS.

I. THE PENN SCHOLARSHIPS, two in number, are filled by the Governor of the State from time to time as vacancies occur. They exist by virtue of a privilege reserved by Thomas Penn, Proprietary of Pennsylvania.

II. THE PUBLIC SCHOOL PRIZE SCHOLARSHIPS.—Under a contract with the City of Philadelphia, Fifty Free Scholarships have been permanently established in the University for the benefit of pupils from the Public Schools of the city, of which number thirty-one have been assigned to the College. Of these, THE BENJAMIN FRANKLIN SCHOLARSHIPS, three in number, have been endowed by Dr. William Pepper, and the SAMUEL V. MERRICK SCHOLARSHIP, by J. Vaughan Merrick, Esq. The candidates for these scholarships are examined by the Board of Public Education, and the scholarships, according to the number of vacancies, are bestowed upon those who reach the highest grade in their examination, provided that grade be at least sixty-five per cent. All inquiries concerning the City Scholarships should be addressed to the Chairman of the Committee on University of the City Board of Public Education, 713 Filbert street.

III. THE BAI RD SCHOLARSHIP, founded in 1889 by Mrs. Matthew Baird, provides free tuition for one deserving student.
IV. In addition to these scholarships, a certain number of deserving students may be assisted from a fund given annually by friends of the University for this purpose.

Applications accompanied with testimonials of character and scholarship must be sent to the Dean before June 15, and October 1, the days on which awards from this fund are made. As the fund is limited, and the donors desire to assist as many as possible, not more than two hundred dollars can be granted any one student, and preference will be given to those who are able to meet a part of their expenses. Students receiving this aid are not released from the payment of the regular fees and charges. The awards are made for one year only.

PRIZES.

The following prizes are offered to Freshmen for excellence in the entrance examinations:

1. **THE GEORGE W. CHILDs PRIZE** of fifty dollars for the best examination on the subjects required for entrance to the course in Arts.

2. A prize of twenty-five dollars for the second best examination in the subjects required for entrance to the course in Arts.

3. **THE ANTHONY J. DREXEL PRIZE** of fifty dollars for the best examination on the subjects required for entrance to the course in Science.


5. A first prize of fifteen dollars, and a second prize of ten dollars, for the best special examinations in the Elements of Latin Prose Composition by Freshmen on entering College. In 1894, the examination will be upon the first fifty-five exercises in Arnold's *Latin Prose Composition*. Certificates will be presented to all competitors whose examinations reach a satisfactory standard.

6. Two prizes of the same value as those offered for Latin Prose Composition, for the best special examinations in Greek Prose Composition by Freshmen on entering College. In 1894, the examination will be on Jones' *Greek Exercises*, or its equivalent. (A knowledge of Greek accentuation will be required.)

The following prizes are offered annually to other students in the College:

All essays in competition for prizes must be handed to the Dean on or before the last Friday in April, must be signed with a fictitious name, and be accompanied by a sealed envelope on which is written the fictitious name, and in which is enclosed the writer's real name and address. No prize will be awarded unless the work done for it reaches a high standard of excellence. Unless otherwise stated, the prizes are open to regular students only.
I. **THE FACULTY PRIZES:**

1. A prize of thirty dollars for the best Essay in Intellectual and Moral Philosophy by a member of the Senior Class. **Subject: External Reality in the Lockeian Philosophy.**
2. A prize of twenty dollars for the best examination on the *Oration of Demosthenes on the Crown*, by a member of the Junior Class.
3. A prize of ten dollars for the best examination by a member of the Freshman Class on Greek Prose Composition with the Accents.
4. A prize of thirty dollars to a member of the Senior Class, for the most meritorious work in the German Language and Literature over and above the regular course.
5. A prize of thirty dollars to a member of the Senior Class for the most meritorious work in the French Language and Literature over and above the regular course.
6. A first prize of fifteen dollars, and a second prize of ten dollars, for the best examination on the *Lectures on Quaternions* given to the Voluntary Junior Class.
7. A prize of thirty dollars for the best Essay in History and English Literature by a member of the Senior Class. **Subject: National Themes in the Literature of Elizabeth.**
8. A prize of twenty dollars for the best Essay by a member of the Junior Class. **Subject: Life and Works of Matthew Prior.**
9. A prize of fifteen dollars for the best Declamation by a member of the Sophomore Class, the contest being open to the public.
10. A prize of twenty dollars to a member of the Scientific Classes for improvement in Drawing, and for general good conduct and application.
11. A first prize of twenty-five dollars, and a second prize of fifteen dollars, for the best dissected preparations illustrating the anatomy of any animal or vegetable. Open to all students.

II. **THE HENRY REED PRIZE,** founded by the Alumni of the University, for the best English Essay by a member of the Senior Class, entitles the successful competitor to one year's interest on six hundred dollars, and to a Diploma of Merit. *(Essays in competition for this prize are handed to the Dean for transmission to a Committee of the Board of Trustees, by whom the prize is awarded.)* **Subject: Walt Whitman and the Poetry of Democracy.**
III. THE SOCIETY OF THE ALUMNI PRIZES:

1. A prize for the best Latin Essay by a member of the Graduating Class. It entitles the successful competitor to one year's interest on nine hundred dollars. (The essays are handed to the Dean for transmission to a committee of examiners appointed by the Society.)

2. A prize for the best, and a prize for the second best Original Declamation by a member of the Junior Class. The First Prize, of twenty-five dollars, and the Second Prize, of fifteen dollars, are awarded by a Committee of Judges at the Junior Exhibition held in Commencement Week.

IV. A prize founded by Henry LaBarre Jayne, of the class of 1879, for the best English Composition by a member of the Freshman Class. It entitles the successful competitor to one year's interest on two hundred dollars. Subject: Autobiography of Leigh Hunt.

V. The Joseph Warner Yardley Prize, founded by the class of 1877 in memory of their classmate, for the best Thesis in Political Economy by a member of the Senior Class. It entitles the successful competitor to one year's interest on five hundred dollars, and to an accompanying Diploma of Merit. Subject: Changes in the Food Supply of the English People, from the Thirteenth Century to the Present Time.

VI. A prize, founded by D. Van Nostrand, Esq., for the member of the Junior Class in Civil Engineering who attains the highest general average of scholarship. It consists of certain technical works.

VII. A prize, founded by the Phi Kappa Sigma Fraternity in honor of their founder, Samuel Brown Wylie Mitchell, M.D., of the class of 1852, for the best work in English Composition, done during the year, by a member of the Sophomore Class. It entitles the winner to one year's interest on four hundred dollars.

VIII. The Assayers and Miners Gangue offers two prizes of the value of twenty-five dollars each, in books or apparatus to members of the Post-Senior Class. One prize is in the course of Metallurgy and Mining and the other in the course of pure and applied Chemistry. The prizes will be awarded by the Gangue with the advice of the Professors in charge of these branches of study.

TYNDALE FELLOWSHIP.

The Hector Tyndale Fellowship in Physics was endowed in 1885 by Professor John Tyndall, and is awarded from year to year upon recommendation of the College Faculty to a Baccalaureate graduate who proposes to pursue advanced studies in Physics. The incumbent
may be reappointed until he has held the Fellowship three years, and
may, with the sanction of the Faculty, pursue his studies at any
University here or abroad. The income of the Fellowship is $600.

SOCIETIES.

The Philomathean (Literary) Society, founded in 1813, holds
meetings weekly during the College year, at its rooms in the College
Hall. All undergraduates of the College are eligible to membership.
The order of exercises includes orations, essays, and a debate, besides
the usual general business, which affords excellent practice in the
principles of parliamentary law. A large and valuable library is
owned by the Society.

The Zelosophic Society, founded in 1829, and refounded in 1892,
holds bi-weekly meetings at its rooms in College Hall during the
College year. All students in the University are eligible to member-
ship. The work of the Society is carried on through the usual
medium of essays, orations, and debates, and is planned on a scale at
once broad and well-defined. The Society owns a large and carefully-
selected library.

The Naturalists' Field Club, formed for the purpose of carry-
ing on actual field work, holds bi-weekly meetings at the Biological
Hall throughout the College year. All undergraduates of the Uni-
versity are eligible to membership. Numerous excursions for the
purpose of field work are taken during the fall and winter months.
The order of exercises at the regular meetings consists of communi-
cations, reviews, and also in the comparison of observations made by
different members of the society, affording excellent advantages to
the student in science.

The Camera Club, to active membership in which all under-
graduates of the University are eligible, holds stated meetings and
lantern exhibitions monthly, in College Hall, open to the friends
of members. Each spring a public exhibition of lantern slides is
given, and the Club makes excursions in the vicinity of the city.
Informal discussions on methods, etc., and comparisons of work are
features of the meetings.

ACADEMY OF NATURAL SCIENCES.

Through the courtesy of the Curators of the Academy of Natural
Sciences (S. W. corner of Nineteenth and Race Sts.), students of the
University are admitted free of charge to its very extensive Museum
on presentation of their Matriculation Cards. Permission to use the Museum for special study, or to consult the library of 30,000 volumes on Natural Science, can be obtained by application to the Curators.

DEGREES.

The Degree of Bachelor of Arts is given on graduation to those students only who have taken Latin and Greek in at least the first two years of their course. All other successful candidates receive either the general degree of Bachelor of Science or the technical degree appropriate to the course they have pursued.

The Degree of Master of Arts (A. M.) is conferred by the Faculty of Philosophy on Bachelors of Arts of the University on examination after at least one year of resident graduate study.

The Degree of Bachelor of Science (B. S.) is given (1) to students in the Towne Scientific School at the end of Senior year; (2) to students in the Wharton School, School of American History and School of Biology who have passed their first two years in the course in Science and Technology; (3) to students who take Junior and Senior year in the course in Arts and Science after having completed the first two years in the course in Science and Technology.

The Degree of Master of Science will be conferred upon Bachelors of Science who complete the Post-Senior year and present an acceptable thesis.

The Degree of Master of Science will also be conferred by the Faculty of Philosophy on Bachelors of Science upon satisfactory examination after at least one year of resident graduate study.

The Degree of Bachelor of Science in Chemistry, Architecture, Civil Engineering, Chemical Engineering, Mechanical Engineering or Electrical Engineering is conferred on students who complete the four-year course in one of these subjects.

Bachelors of Science in Chemistry, etc., of three years' standing who have shown marked progress in their professions, and who submit a satisfactory thesis, may be granted the Degree of Master of Science in these subjects.

The Technical Degree of Mining Engineer (E. M.), Civil Engineer (C. E.), Mechanical Engineer (M. E.), or Practical Chemist (P. C.), is given (1) to Masters of Science of two years' standing who have taken the Post-Senior year in College, and (2) to Baccalaureate graduates of the four-year courses in these subjects of three years' standing who have successfully pursued their professions and presented an original thesis.
The Degree of Bachelor of Philosophy (Ph. B.) is given on graduation to students in Wharton School or School of American History, who have taken their Freshman and Sophomore years elsewhere.

THESSES.

The theses required of candidates for the Baccalaureate, Master's and Technical Degrees must be sent to the Dean on or before the last Friday in April.

FEES.

The Tuition Fee in the College is one hundred and sixty dollars a year, excepting for the last three years in the Towne Scientific School, and the four-year Technical courses in Chemistry, Civil, Mechanical, Electrical and Chemical Engineering; when the fee is two hundred dollars a year. For the course in Music the fee is thirty dollars a year. The fee for the Special course in Interior Architecture is forty dollars a year.

Each student is required to deposit on entering College, ten dollars to cover loss of books, keys, etc., breakage in the laboratories, or damage to University property. Regular students, electing the course in Science and Technology, deposit fifteen dollars additional at the beginning of Junior year. Students in the four-year Technical courses in Architecture, Chemistry, and Civil, Mechanical, Electrical or Chemical Engineering are required to deposit twenty-five dollars on entering College. Special students in these courses deposit twenty dollars on entrance. Any balance is returned on graduation or withdrawal from College.

The Annual Tuition Fees are payable to the Treasurer of the University in two instalments, on October 1 and February 1.

A Graduation fee of twenty dollars is charged to each candidate for the Baccalaureate Degree, and of ten dollars to each candidate for the Master's Degree. The fee for Certificates for Special or Partial courses is ten dollars.

For further information concerning the College, address Dr. Horace Jayne, Dean of the Faculty.

ACCOMMODATIONS.

Good board can be had near the College at from five to seven dollars a week. Upon application at the office of the Dean, College Hall, a list of boarding houses may be seen. All of these houses are visited.
and recommended by a Standing Committee of the College Faculty, which exercises a general supervision over the boarding places of the students.

**EXPENSES.**

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<tr>
<th>Description</th>
<th>Min.</th>
<th>Max.</th>
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<tbody>
<tr>
<td>Board, thirty-seven weeks</td>
<td>$175 00</td>
<td>$250 00</td>
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<tr>
<td>Tuition (according to Department and Year of the Course)</td>
<td>150 00</td>
<td>200 00</td>
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<tr>
<td>Text-books</td>
<td>10 00</td>
<td>50 00</td>
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<tr>
<td><strong>Total</strong></td>
<td><strong>$335 00</strong></td>
<td><strong>$500 00</strong></td>
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DEPARTMENT OF PHILOSOPHY.

FACULTY.

WILLIAM PEPPER, M.D., LL.D., Provost, and ex-officio President.
HORACE JAYNE, M.D., Ph. D., Professor of Biology, and Dean.
E. OTIS KENDALL, LL. D., Professor of Mathematics.
HARRISON ALLEN, M.D., Professor of Comparative Anatomy and Zoology.
GEORGE F. BARKER, M.D., Ph. B., Professor of Physics.
JAMES PARSONS, A. M., Professor of Law.
THEODORE G. WORMLEY, M.D., LL. D., Professor of Medical Chemistry.
JOSEPH T. ROTHROCK, B. S., M. D., Professor of Botany.
MORTON W. EASTON, Ph. D., Professor of English and Comparative Philology.
EDMUND J. JAMES, Ph. D., Professor of Political and Social Science.
REV. GEORGE S. FULLERTON, B. D., Ph. D., Professor of Intellectual and Moral Philosophy.
REV. HERMANN V. HILPRECHT, Ph. D., Professor of Assyrian.
DANIEL G. BRINTON, M. D., Sc. D., Professor of American Archaeology and Linguistics.
MORRIS JASTROW, Jr., Ph. D., Professor of Semitic Languages.
OSWALD SEIDENSTICKER, Ph. D., Litt. D., Professor of Germanic Philology.
JOHN BACH McMaster, A. M., Professor of American History.
WILLIAM POWELL WILSON, Sc. D., Professor of Botany.
JOHN A. RYDER, Ph. D., Professor of Comparative Embryology.
JOHN M. MACFARLANE, Sc. D., Professor of Biology.
WILLIAM A. LAMBERTON, A. M., Professor of Greek.
SIMON N. PATTEN, Ph. D., Professor of Political Economy.
EDGAR P. SMITH, Ph. D., Professor of Chemistry.
EDWARD T. REICHERT, M. D., Professor of Physiology.
FRANCIS N. THORPE, Ph. D., Professor of American Constitutional History.
JOHN S. BILLINGS, M. D., LL. D., Professor of Hygiene.

(189)
DEPARTMENT OF PHILOSOPHY.

GEORGE H. HORN, M. D., Professor of Entomology.
FELIX E. SCHELLING, A. M., Professor of English Literature.
EDWARD D. COPE, PH. D., Professor of Geology and Palæontology.
JAMES HARVEY ROBINSON, PH. D., Associate Professor of European History.
HUGO A. RENNERT, PH. D., Professor of Romance Philology and Literature.
ALFRED GUDEMAN, PH. D., Associate Professor of Classical Philology.

OTHER INSTRUCTORS.

EDWARD P. CHEYNEY, A. M., Assistant Professor of European History.
GEORGE E. FISHER, A. B., Assistant Professor of Mathematics.
EDWIN S. CRAWLEY, PH. D., Assistant Professor of Mathematics.
AMOS P. BROWN, E. M., PH. D., Instructor in Mining and Metallurgy.
LIGHTNER WITMER, PH. D., Lecturer in Experimental Psychology.
WILLIAM ROMAINE NEWBOLD, PH. D., Lecturer in Philosophy.
ARTHUR W. GOODSPEED, PH. D., Assistant Professor of Physics.
ROLAND P. FALKNER, PH. D., Associate Professor of Statistics.
JULIUS OHLY, PH. D., Instructor in Chemistry.
HERMANN FLECK, PH. D., Instructor in Chemistry.
DANA C. MUNRO, A. M., Instructor in History.
ISAAC J. SCHWATT, PH. D., Instructor in Mathematics.
JOHN QUINCY ADAMS, PH. D., Instructor in Political Economy.
JOSEPH F. JOHNSON, PH. D., Associate Professor of Business Practice.

MATRICULATES.

Josephine Feger Ancona, Reading, 211 S. 38th St.
Alice Minerva Atkinson, A. B., (Swarthmore), Holicong, Pa., 3350 Walnut St.
James Lynn Barnard, B. S., (Syracuse), do.
Charles S. Boyer, A. M., (Brown), do.
Robert Hart Bradbury, do.
Charles Henry Brelesford, do.
Martin Grove Brumbaugh, M. S., (Brethren's College), Huntingdon, 3615 Locust St.
Jacob Franklin Byler, Philadelphia, 45 Sydenham St.
Rev. Albert Tobias Clay, A. B., Lancaster, 3938 Pine St.
(J. Franklin and Marshall),
J. Alexander Clarke, A. M.,
(Washington),
Watson Cornell, Laura Belle Cross, A. B.,
(Philadelphia, 1605 N. 10th St.
J. Lafayette),
Philip Powell Calvert, Louisvile, Ky.,
John Linton Carver, B. S., 3350 Walnut St.
(Swarthmore),
Walter Augustin Coar, A. M., Media.
(J. Villanova),
James Heuri Donnelly, Ph. B.,
(Pennsylvania),
Frank Spencer Edmonds, Ph. B.,
(Pennsylvania),
Charles Hatch Ehrenfeld, A. M.,
(Wittenberg),
Oliver P. Ely, do.
Villanova.
Benjamin Evans, Ph. B.,
(Pennsylvania),
George Egbert Fisher, A. B.,
(Cornell),
George M. Fisk, A. B.,
(Michigan),
Warner Fite, A. B.,
(Haverford),
George Washington Flounders,
Philadelphia, 249 S. 15th St.
Herbert Friedenwald, A. B.,
(Johns Hopkins),
John Palmer Garber,
(Ridley Park),
(Shippenburg State Normal School),
James Oliver Gayley, A. M.,
(Princeton),
Oscar Gerson, do.
2006 Ridge Ave.
Henry Lee Gilbert, A. M.,
(Haverford),
James Henry Graham, Ph. B.,
(Pennsylvania),
Jesse Moore Greenman, B. S.,
(Pennsylvania),
Geo. Hervey Hallett, A. B.,
(Pennsylvania),
John K. Harley, do.
3729 Locust St.
Lewis Reisneider Harley, Ph. B.,
(Illinois Wesleyan),
George Henderson, Ph. B.,
(Pennsylvania),
Fanny Rysan Mulford Hitchcock, New York,
(Swarthmore),
Walter Augustin Coar, A. M.,
(J. Villanova),
James Heuri Donnelly, Ph. B.,
(Pennsylvania),
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3729 Locust St.
Lewis Reisneider Harley, Ph. B.,
(Illinois Wesleyan),
George Henderson, Ph. B.,
(Pennsylvania),
Fanny Rysan Mulford Hitchcock, New York,
<table>
<thead>
<tr>
<th>Name</th>
<th>Institution</th>
<th>Address</th>
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<tbody>
<tr>
<td>Louise L. Hoyt, A. M.</td>
<td>(Upper Iowa)</td>
<td>214 S. 37th St.</td>
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<tr>
<td>William Clayton Jacobs</td>
<td>(Millersville State Normal School)</td>
<td>do.</td>
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<tr>
<td>Geo. Washington Kendrick</td>
<td>(Pennsylvania)</td>
<td>706 N. 44th St.</td>
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<tr>
<td>Rev. John Jacob Kline, A. M.</td>
<td>(Muhlenberg)</td>
<td>3507 Baring St.</td>
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<td>Frank Warren Klingensmith</td>
<td>A. B. (Thiel)</td>
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<td>William Chauncey Langdon</td>
<td>A. M. (Brown)</td>
<td>do.</td>
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<td>Mayne Reid Longstreth</td>
<td>A. B. (Ursinus)</td>
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<tr>
<td>Charles Stanley McIntire</td>
<td>Ph. B. (Pennsylvania)</td>
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<td>Charles Hallam MacCarthy</td>
<td>(Pennsylvania)</td>
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<td>Lauraos G. McConachie</td>
<td>A. M. (Knox)</td>
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<tr>
<td>David Mandel, Jr.</td>
<td>Ph. B. (Pennsylvania)</td>
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<td>Louis Joseph Matos</td>
<td>M. E. (Missouri)</td>
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<td>Jesse Hamor Michener</td>
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<td>Henry F. Moore</td>
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<td>John Percy Moore</td>
<td>B. S. (Pennsylvania)</td>
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<td>Lewis Baxter Moore</td>
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<td>William Joseph Moran</td>
<td>A. B. (Villanova)</td>
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<td>Andrew Jackson Morrison</td>
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<tr>
<td>Joseph Sakinoshin Motoda</td>
<td>A. B. (Kyten)</td>
<td>1430 N. 7th St.</td>
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<td>Edward Neville</td>
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<tr>
<td>Hugh Walker Ogden</td>
<td>A. B. (Pennsylvania)</td>
<td>1509 Poplar St.</td>
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<tr>
<td>Lois Macy Otis</td>
<td>B. S. (Cornell)</td>
<td>do.</td>
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<tr>
<td>Edward Anson Partridge</td>
<td>B. S. (Pennsylvania)</td>
<td>do.</td>
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<tr>
<td>Josiah Harmar Penniman</td>
<td>A. B. (Pennsylvania)</td>
<td>do.</td>
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<tr>
<td>Mary Engle Pennington</td>
<td></td>
<td>do.</td>
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<tr>
<td>Harriet Caroline Powe</td>
<td>A. B. (Wellesley)</td>
<td>do.</td>
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</tbody>
</table>
MATRICULATES.

Adam Laubenstein Ramer, A. B., (Muhlenberg), Philadelphia, Mt. Airy.
Rev. John Richelsen, A. B., (Bloomfield Seminary), do. 867 Corinthian Ave.
William Hershey Righter, Ph. B., (Pennsylvania), do. 3801 Spruce St.
Frank Earle Schermerhorn, Ph. B., (Pennsylvania), do. 824 N. Broad St.
Richard Conrad Schiedt, A. M., (Calvin), Lancaster.
Adeline Frances Schively, (Lehigh), Philadelphia, 1503 Centennial Ave.
Ellis Anstett Schnabel, A. B., (Michigan), do. 615 N. 11th St.
Harry Rogers Seager, Ph. B., (Pennsylvania), do. 3731 Spruce St.
Alfred Newlin Seal, B. S., (Pennsylvania), do. 1418 Bouvier St.
Benjamin F. Shambaugh, A. M., (Iowa State), do. 3330 Walnut St.
Owen Lewis Shinn, B. S., (Pennsylvania), do. 1714 Wellington St.
Edgar Arthur Singer, (Pennsylvania), do. 4562 Penn St.
Edgar Arthur Singer, Jr., B. S., (Pennsylvania), do. 4562 Penn St.
Mary Elizabeth Smith, A. M., (Cornell, Iowa), do. 214 S. 37th St.
Homer Smith, A. B., (Amherst), do. 3912 Pine St.
Walter Emanuel Smith, A. B., (Harvard), do. 303 Chestnut St.
David Heist Stout, (Harvard), do. 214 Uber Place.
George Heist Stout, (Pennsylvania), do. 3746 Powelton Ave.
Eleanor Tibbetts, A. B., (Antioch), do. 3350 Walnut St.
Adah Josephine Todd, A. M., Ph. D., Syracuse, 3350 Walnut St.
Henry Jacob Weber, (Bloomfield Theological Semi.), do. 937 McKeans St.
Herbert Coleman Whitaker, B. S., (Pennsylvania), do. 776 N. 26th St.
Merrick Whitcomb, A. B., (Harvard), do. 646 N. 44th St.
James Monroe Willard, Bethayres, Pa.
Lucy Langdon Williams, Philadelphia, 220 St. Marks Sq.
Thomas Worcester Worrell, Tacony St., Fkd.

Total, 96.
SPECIAL STUDENTS.

Mary Ann Albertson,  Philadelphia,  3040 Brown St.
Peter Altpeter, A. B., Rochester, N.Y.,  Mt. Airy, Pa.
(Thiel),  
Emilie Quimby Atkinson, Three Tuns, Pa.
Harrict Stark Chase Atwater, Philadelphia,  3816 Spruce St.
Winifred Ball,  do.,  3350 Walnut St.
Michael J. Ball, M. D., Eastern Penitentiary.

Jessie Sarah Bagg,  do.,  1637 S. Broad St.
David H. Bergey, do.,  1245 S. 28th St.
Samuel Erwin Berger, A. M., do.,  615 N. 11th St.
(Lehigh),  
(Haverford),  do.,  Somerton.
Robert L. Burns,  do.,  8 S. Twelfth St.
(Anherst),  
Walter L. Cooper,  do.,  1335 Marshall St.

Lindee Walton Crawford, do.,  44th and Osage Ave.
(Pennsylvania),  
Bessie Hickman DuBois, Dingman's Ferry, 3305 Walnut St.
Philip Fine Fulmer, Fishersville, Va., Lutheran Theol.
(Anherst),  
Charles Abram Field, A. B.,  Seminary.
(Roanoke),  
Lewis L. Ford,  do.,  1192 Unity St.
Horace Howard Furness, Jr., A. B.,  do.,  2034 Delancey Place.
(Harvard),  
Carolyn M. Grambo,  do.,  3350 Walnut St.
(Kenyon),  
Mary Harshberger,  do.,  737 Corinthian Ave.

(P. D. C.), (Pennsylvania),  
John Randolph Hunsicker, Downingtown.
Wilhelmina Rachel Jastrow, Philadelphia,  925 N. 8th St.
Rufus Matthew Jones, A. B.,  do.,  1334 Sp. Garden St.
(Haverford),  
Susanna S. Kite,  do.,  2306 Federal St.
George D. Knights,  
James H. Lloyd, M. D., Philadelphia,  7 W. Coulter St.
William S. Long,  do.,  4119 Pine St.
Edward Marshall McPadden,  do.,  200 S. 40th St.
F. M. Magaw,  do.,  1725 Vine St.
Charles Fremont Michener,  do.,  815 N. 28th St.
Marie Louise Nichols,  
Samuel Riddagh,
SPECIAL STUDENTS.

Howard DeHaven Ross, Ph. B., (Pennsylvania),
Francis Michael Rourke, (State Normal School),
William Frederick Rick, A. B., (Thiel),
James Irwin Robb, A. B.,
William W. Rupert,
William Henry Samuel, Ph. D., (Pennsylvania),
Edith Smedley,
Carroll Smith, A. M.,
Elizabeth Drinker Storer, A. B., (Vassar),
Luther Jonas Smith, A. B., (Thiel),
Abraham Lincoln Spencer,
Mary Grey Umsted,
Rev. Philip Vollmer, Ph. D., (Pennsylvania),
Joseph Salomon Walton,
Edward Wesselheft,
Charles Peter Weiskotten, A. B., (Thiel),
Rev. Charles Westermann,
Susan A. Williams,
Scott Wilson, A. B., (Bates),
Elizabeth N. Woolman,
Anna Woolman,
Lee Huntington Young, A. B., (Kenyon),

Wilm'gton, Del., 307 West St.
Geneseo, N. Y., 1725 Vine St.
Utica, N. Y., Luth. Div. Sch.
Bryn Mawr,
Pottstown, Pa.
Philadelphia, 2505 N. 12th St.
Lima, Pa.
Philadelphia, 2110 Walnut St.
Cincinnati, O., 3350 Walnut St.
Philadelphia, 3208 Sansom St.
do. 1601 Park Ave.
do. 1315 Ward St.
Ercildown, Pa.
Philadelphia, 4240 Regent St.
Mt. Airy, Pa.
Woodbury, N. J.
Moorestown, N. J.
Philadelphia, 1618 Arch St.
Lansdowne, Pa.

Total, 58.

COURSES OF INSTRUCTION.

The object of this Department is to afford advanced instruction in the various branches of Literature and Science. In those subjects which are ordinarily taught in the undergraduate courses of our American colleges, the only instruction given is of an advanced character. In those which are usually not represented at all, or only very inadequately, both advanced and elementary courses are offered.

The students are either Matriculates (candidates for the degree of Doctor of Philosophy, Ph. D., Master of Arts, A. M., or Master of Science, M. S.), or Special Students. All instruction in each branch of study is open to special students (whether college graduates or not) who, in the judgment of the professor in charge of that branch, are qualified to profit by the instruction given. All the courses of study in the Department of Philosophy are open to men and women alike.
For the year 1893–94 instruction in the various subjects is announced as follows:

**AMERICAN ARCHAEOLOGY AND LINGUISTICS.**

**Professor Daniel G. Brinton.**

1. *Archaeology:*

   (a) Methods of Archaeological Explorations...
   (b) Characteristic Remains in the leading Archaeological Provinces of North and South America.
   (c) Relations of Archaeology to Ethnography.

2. *Linguistics:*

   (a) General Structure of American Languages...
   (b) Traits of the Principal Linguistic Stocks of North and South America.
   (c) Studies in the Grammatic Structure of Algonkian, Uto-Aztecan, Maya and Kechua Stocks.
   (d) Elementary Reading in the Nahuatl Tongue.

**AMERICAN HISTORY—POLITICAL AND CONSTITUTIONAL.**

**Professor John Bach McMaster.**

1. American Political History...
2. American Economic History...
3. Saturday Class on Political Economic History...

**Professor Francis N. Thorpe.**

1. The Evolution of Democracy in America...
2. American Legislation, 1840–1892...
3. Saturday Class in Constitutional History...

**BOTANY.**

**Professor John M. Macfarlane.**

1. Comparative Morphology of the leading Natural Orders of Plants...
   Laboratory Work on the above...

**Professor Joseph T. Rothrock.**

1. Systematic Botany...
2. Economic Botany...
3. Medical Botany...

*These courses are omitted in 1893–94.*
COURSES OF INSTRUCTION.

Professor William P. Wilson.

I. Plant Histology:
Laboratory Work, with Instruction, first term ... 6

II. Plant Physiology:
Laboratory Work, with Instruction, first term ... 6

CHEMISTRY.
Professor Edgar F. Smith.

(1) Inorganic Chemistry ........................................ 1
(2) Synthetic Organic Chemistry .............................. 1
(3) Analytical Chemistry ......................................... 1

Seminar .......................................................... 1
Laboratory Work .................................................. 1

Dr. Hermann Fleck.

(a) Organic Chemistry ........................................... 

Dr. Julius Ohly.

(b) History of Chemistry ...........................................

Professor Theodore G. Wormley.

(1) Medical Chemistry ............................................
(2) Toxicology .....................................................

CLASSICAL PHILOLOGY.
Associate Professor Alfred Gudeman.

(1) History of Classical Philology ......................... 2
(2) On the Sources of Greek History ...................... 2
(3) History of Alexandrian Literature ................. 2

COMPARATIVE PHILOLOGY AND SANSKRIT.
Professor Morton W. Easton.

(1) Sanskrit Grammar and Readings ....................... 2
(2) Čakuntāla and the Veda .................................. 2
(3) Linguistics and Comparative Philology of the Indo-
    European Languages, with special reference to
    Phonetics .................................................. 2
ENGLISH LANGUAGE.
Professor Morton W. Easton.

(1) English Philology. Readings in Middle English ... 2
(2) Anglo-Saxon—Sweet's Reader, Sievers' and March's Grammars, Beowulf

ENGLISH LITERATURE.
Professor Felix E. Schelling.

(1) Origin and History of the English Drama ... 3
(2) Principles of Dramatic Structure in their Application to the English Drama ... 3
(3) The Theory and History of English Versification ... 3
(4) Modes of Nineteenth Century Poetic Thought and Expression ... 3

Lectures in all four divisions are supplemented by Seminary work.

ETHICS.
Dr. Wm. Romaine Newbold.

(1) History of Ethical Theories ... 2

EUROPEAN HISTORY.
Associate Professor James H. Robinson.

(1) France in the latter half of the Eighteenth Century, with special reference to the Development of Political Thought ... 2½

Assistant Professor Edward P. Cheyney.

(2) English Social and Economic History from the Twelfth to the Sixteenth Century ... 2½

Mr. Dana C. Munro.

(3) Age of the Hohenstaufen, 1138–1254 ... 2½

EXPERIMENTAL PSYCHOLOGY.
Dr. Lightner Witmer.

(1) Experimental Psychology. Lectures and Laboratory Work ... 3
(2) Psychological Aesthetics. Lectures, with Demonstrations and Experiments ... 2
COURSES OF INSTRUCTION.

GEOLOGY.

Dr. Amos P. Brown.

(1) Geology : Stratigraphy of the Rock Systems in connection with Palæontology; Laws of Dynamic Geology; Structural Geology of North America, with reference to that of Europe, with the principal Minerals and Fossils, and Distribution of Metals and Fuels .................. 2
(2) Geology Practicum .................. 3

GERMANIC LANGUAGES AND LITERATURE.

Professor Oswald Seidensticker.

(1) Gothic Grammar and Readings from Ulfilas' Translation of the Bible .................. 2
(2) Middle High German Grammar and Readings in the Nibelungenlied and Lyric Poets .................. 2
(3) History of German Literature

GREEK LANGUAGE AND LITERATURE.

Professor William A. Lambert.

(1) Critical Study of Thucydides .................. 1
(2) Lectures on Greek Syntax .................. 2
(3) Rapid Reading .................. 2
(See the announcement under head of Classical Philology.)

HISTORY OF RELIGIONS.

Professor Hermann V. Hilprecht.

(1) The History of the Religion of Babylonia and Assyria from the Earliest Times to the year 475 B. C. .................. 1

Professor Morris Jastrow, Jr.

(2) History of the Religion of Israel .................. 1
(3) The Religion of Islam .................. 1

Professor Morton W. Easton.

(4) The Religions of India and Persia .................. 1

Professor Daniel G. Brinton.

(5) The Elements and Evolution of Primitive Religions .................. 1
LATIN LANGUAGE AND LITERATURE.

Associate Professor Alfred Gudeman.

(1) Horace Epist. Book II. Seminary, throughout the year .................................................. 2
(2) Lectures on the *Dialogus* of Tacitus ................................................................. 2
(3) Lectures on Cicero's *De Legibus* ................................................................. 2
(See announcement under head of Classical Philology.)

LEGAL INSTITUTIONS—HISTORY AND DEVELOPMENT.

Professor James Parsons.

(1) The Origin and History of the Common Law, and its part in International Law

MATHEMATICS.

Assistant Professor Edwin S. Crawley.

(1) Higher Plane Curves .................................................. 1
(2) Theory of Numbers .................................................. 2

Assistant Professor George E. Fisher.

(1) Advanced Work in Analytic Geometry of Two and Three Dimensions ......................... 2
(2) Advanced Work in Differential and Integral Calculus ........................................ 2
(3) Modern Higher Algebra .................................................. 2
(4) Differential Equations .................................................. 2
(5) Theory of Functions .................................................. 2

Dr. Isaac J. Schwatt.

(1) Modern Geometry .................................................. 2

MINERALOGY.

Dr. Amos P. Brown.

(1) Mineralogy and Crystallography. (Lecture) ..................................... 1
(2) Mineralogy Practicum .................................................. 4

POLITICAL ECONOMY.

Professor Simon N. Patten.

(1) The Scope and Method of Political Economy .................................................. 2
(2) Seminary of Political Economy (every other week) ........................................ 2
(3) Advanced Course for the Investigation of Special Topics ..................................... 3

Dr. John Quincy Adams.

(1) Banking .................................................. 1
COURSES OF INSTRUCTION.

POLITICAL SCIENCE.
Professor EDMUND J. JAMES.
(1) General Political Science ........................................... 2
(2) Administration .......................................................... 2
(3) Political Science (Seminary every other week) ................. 2
(4) Railroad Transportation (Seminary work only, every other week) .................. 2
Associate Professor JOSEPH F. JOHNSON.
(1) Social and Economic Aspects of Corporations .................. 1

PHILOSOPHY.
Professor GEORGE S. FULLERTON.
(1) History of Ancient and Mediæval Philosophy .................. 2
(2) Metaphysics ............................................................ 2
(3) Discussion of Special Topics ........................................ 2
Dr. WM. ROMAINE NEWBOLD.
(1) General Psychology .................................................... 2
(2) Special meetings, to discuss particular topics in Psychology and papers written by students

PHYSICS.
Professor GEORGE F. BARKER.
(1) Theory and Practice of Spectroscopy (First Term) ............ 2
(2) Sound and Light (First Term) ...................................... 2
(3) Electricity and Magnetics (Second Term) ......................... 2
(4) Theory of Potentials .................................................. 1
(5) Physical Investigations ..............................................

Assistant Professor ARTHUR W. GOODSPEED.
(1) Theoretical Dynamics .................................................. 2
(2) Thermo-Dynamics (First Term) ..................................... 1
Professor BARKER and Assistant Professor GOODSPEED.
(1) Absolute Physical Measurements ................................. 6

ROMANCE PHILOLOGY AND LITERATURE.
Professor HUGO A. RENNERT.
(1) Old French ............................................................... 2
(2) History of the Spanish Drama in the Sixteenth and Seventeenth Centuries (Second Term) .................. 1
(3) Old Provençal ........................................................... 1
(4) Spanish. Calderon, *El Principe Constante* (Second Term) .... 2
SEMITIC LANGUAGES AND LITERATURE.

Professor MORRIS JASTROW, JR.

I. Comparative Semitic Philology.

1. Introduction to the Study of the Semitic Languages
   (Second Term) .................................................. 1

   [This course, consisting of Lectures on the general characteristics of the Semitic
   languages and the Semitic Languages, their origin, divisions and history, together with a
   comparative view of the principles underlying the noun and verb formation, is
   obligatory upon all students choosing a Semitic Language as a major or minor
   study, and open to other students choosing any other language as major or
   minor.]

2. Seminar (privatissime). Fortnightly .......................... 1

   (See under V. below.)

II. Arabic:

1. Elements of Arabic Grammar, with Selected Readings,
   Selected Suras from the Koran ................................. 2

2. Prose and Poetical Selections from the Beirut Chrestomathy (Second Term) ...... 1

3. Abd el Malik Ibn Hischam's Life of Mohammed ................ 1½

   Professor HERMANN V. HILPRECHT.

III. Ethiopic:

1. Ethiopic Grammar (Dillman's Aethiopische Grammatik) ................. 1

IV. Assyriology:

1. Assyrian Grammar (including exercises in reading
   cuneiform texts and historical development of cuneiform writing) .......... 2

2. Interpretation of Selected Historical Assyrian Texts
   (Ashurnasirpal, Esarhaddon, Sanherib, Ashurbanipal) ........................ 2

3. Contract Tablets of the Persian Period (Strapmaier's
   "Babylonische Texte" and the Collections of the
   University Museum) (First Term) .................................. 1

4. Assyrian and Neo-Babylonian Letters (Harper's Assyrian Letters) (Second Term) .... 1

5. Old Babylonian Inscriptions (First Term); Semitic
   (Hilprecht, "Old Babylonian Inscriptions chiefly
   from Nippur," I. and IV. Rawlinson) (Second Term);
   Sumerian (De Sarzec, the Inscriptions of the Kings
   of Lagash) .......................................................... 1

6. Sumerian Grammar and Interpretation of Bilingual
   Texts (IV. R.) Seminar ........................................... 1

7. Interpretation of Hittite Inscriptions .......................... 1
COURSES OF INSTRUCTION.

203 Hours per Week.

Professor MORRIS JASTROW, JR.

V. Biblical Hebrew:

(1) Principles of Hebrew Grammar on the basis of Strack's Hebrew Grammar. Selected readings from the narrative portions of the Old Testament 2
(2) Philological Study of the Book of Lamentations 1½

The main purpose of this course will be lexicographical—a study of Hebrew stems and their development.

(3) Study of the Book of the Prophet Micah. Chief attention will be paid to the study of the text in comparison with the ancient versions (Second Term) 1½
(4) Selected chapters from the Books of Kings with comparison of Assyrian and Babylonian History 1½
(5) Advanced course in Hebrew Grammar. Critical Study of Stade's Hebrew Grammar 1
(6) Seminar (privatissime). Fortnightly. Study of Lagarde and Barth's Theories of the Noun Formation in the Semitic Languages, with special reference to Hebrew.
(7) Readings (in English) from the Hebrew Prophets, with brief Historical and Archaeological Comment (Second Term) 1

VI. Biblical Aramaic:

(1) Elements of the Grammar with selected readings from the Book of Daniel. (Kautsch, Grammatik des Biblisch Aramäischen) 1

VII. Post-Biblical Hebrew:

(1) The Treatise Pirké Aboth (Sayings of the Fathers), ed. Strack (for advanced students only) 1

VIII. Phœnician:

(1) Semitic Epigraphy: Selected Phœnician Inscriptions from the Corpus Inscriptionum Semiticarum (for advanced students only) 1

IX. Syriac:

(1) Elements of Syriac Grammar, with Selected Readings 1

STATISTICS.

Associate Professor ROLAND P. FALKNER.

(1) Theory and Practice of Statistics 2
DEPARTMENT OF PHILOSOPHY.

ZOÖLOGY.

I. Comparative Anatomy and Zoölogy:

Professor Harrison Allen.

(1) The Mechanism of Locomotion ................................ 2
(2) Mammalian Neurology and Craniology ............................ 2

Professor Edward D. Cope.

(1) Course primarily for students selecting the subject as a major. One of the following lines of work must be chosen:
   a. Research into the Entire Organography of any Species of Living Vertebrata.
   b. Research into the Osteology and Odontography of any Division of Extinct Vertebrata above species.
   c. Time History of any Single Organ of a Vertebrate derived from Palæontology.

(2) Course for students selecting this division of Zoölogy as a minor subject:
   a. General Toxonomy of Vertebrata.
   b. General Palæontology of American Vertebrata.
   c. General Organography of Vertebrata.

II. Comparative Embryology:

Professor John A. Ryder.

(1) Comparative Histology; supervision and laboratory work ........................................ 12
(2) Comparative Embryology; supervision and laboratory work ........................................ 12
(3) Advanced Laboratory Work, with special attention to the Development and Structure of the Nervous System ................................. 6–12
(4) Physiological Anatomy or Dynamical Biology (First Term and Part of Second Term) .................. 1

III. Vertebrate Morphology:

Professor Horace Jayne.

(1) The Osteology of the Mammalia ................................. 4
DEGREES.—MAJORS AND MINORS.

DEGREES.

The Degree of Doctor of Philosophy is conferred upon the following conditions:

1. The candidate must be a baccalaureate graduate either in Arts or in Science of an American college, whose degrees are accepted by this University as equivalent to its own, or he must satisfy the Executive Committee of the Faculty, by examination or otherwise, that he possesses an equivalent preparation for graduate studies.

2. He must pursue graduate studies for at least two years after taking his Bachelor's degree.

3. He must spend at least one year of this time in residence at this University. The remainder may be spent in residence at other universities.

4. He must present himself for examination in three of the following subjects, one of which he must designate as his principal or major subject, and the other two as his subordinate or minor subjects. Any subject may be taken either as major or as minor.

4. Chemistry.
5. Comparative Philology and Sanskrit.
6. English Language.
7. English Literature.
8. Ethics.
10. Experimental Psychology.
11. Geology.
13. Greek Language and Literature.
15. Legal Institutions—History and Development.
17. Mineralogy.
18. Political Economy.
19. Political Science.
20. Philosophy.
22. Romance Philology and Literature.
23. Semitic Languages and Literature.
Under favorable circumstances it will be possible to obtain the Ph.D. degree after two years' graduate study; but if the subjects selected by the candidate are new to him, or if he does not give up his undivided time to the work of the course, this period will be sufficient only in exceptional cases. Each candidate must present a satisfactory thesis, showing original research in the subject he has chosen as his major.

The Degree of Master of Arts or of Science is conferred upon Bachelors of Arts or of Science, respectively, on examination after one year of resident study. The subjects selected by the candidate must be approved by the Faculty.

Each candidate must register at the office of the Dean, at the beginning of each academic year, on or before the second Friday in October. A student who omits to register at the prescribed time without a satisfactory excuse is liable to be dropped from the list.

RULES GOVERNING SELECTION OF LANGUAGES.

The following rules have been adopted to govern the selection of language courses:

**General Philological Courses.**

The following are obligatory upon all students choosing a language as major or minor, and are open to all other students, whether candidates for a degree or not:

1. General Principles of Phonetics.—Ten Lectures *(First Term).* Professor EASTON.

2. History and Development of Writing.—Ten Lectures *(Second Term)* as follows:

   a. One Lecture on the Picture-Writing of Pre-Historic Times. Professor BRINTON.

   b. One Lecture on the Writing of the Mexicans and Mayas, and the Ikonomatic System. Professor BRINTON.

   c. One Lecture on the Systems of Writing of Eastern Asia. Professor EASTON.

   d. Two Lectures on the Cuneiform Systems of Writing. Professor HILPRECHT.

   e. Two Lectures on the Phoenician Alphabet and its Derivatives, (including an Exposition of the Egyptian System). Professor JASTROW.
RULES GOVERNING SELECTION OF LANGUAGE.—FEES. 207

f. One Lecture on the Iranian and Indian Alphabets. Professor EASTON.

g. Two Lectures on the Greek and Latin Alphabets, and their Derivatives. Professor LAMBERTON.

These lectures will be illustrated by casts and charts in the University Library and Museum. Dates to be announced.

3. Elements of Primitive Culture. Six Lectures (First Term, 1894-95). Professor BRINTON.

Students who take English Literature as a major subject, are required to take a course in English Philology and a course in English History.

Students who take Comparative Philology as a major subject, are required to take a course in Greek, of the same extent as a minor course in that subject, and a course in Semitic Philology.

Students who take English Philology as a major subject, are required to take a course in English Literature, of the same extent as a minor course in that subject, and a course in old French.

Any one of the following languages in the Semitic group may be selected as a major or minor subject: Arabic, Assyrian, Ethiopic, Hebrew or Syriac. A student is permitted to select two Semitic languages as two of the three subjects required for the Ph. D. degree.

FEES.

For those who are in regular course for the Ph. D., A. M. and M. S. degrees, the fee is $150 a year. The charge for those who enter as special students, and take one or more courses, varies with the subject chosen and the amount of instruction given. The fee for a course of one hour a week through the college year is $15. For each extra course of one hour with the same professor, $10. The matriculation fee (paid by all students) is $5, and the graduation fee, $25.

For further information, address Dr. Horace Jayne, Dean of the Faculty of Philosophy.
The Graduate Department for Women was created in 1891 for the purpose of affording to women the opportunities for advanced study which are provided by the Faculty of Philosophy. It is under the direct control of a Board of Managers appointed by the Trustees, and has accommodations for residence and study in a Hall presented by Joseph M. Bennett, Esq., of Philadelphia, nearly opposite to the Library and convenient to the class-rooms and laboratories of the several departments in which its students receive their instruction. As an integral part of the Department of Philosophy, the courses of instruction, identical with those offered to men, are given by the same instructors, and lead to the same degrees. A statement of these, together with the names of the matriculates and special students, will be found in the announcement of that Department.

FEES.

For those who are in regular course for a degree the fee for tuition is $150.00 a year. The fee for those who enter as special students, and take one or more courses, varies with the subject chosen and the amount of instruction given. The matriculation fee (paid by all...
FELLOWSHIPS.

For the year 1893–94, four Fellowships are offered which entitle the holder to all the privileges of tuition and residence.

The first award of Fellowships will be made on Saturday, June 2, at 10 o'clock A. M. Should all the Fellowships not be filled, a second award will be made on Saturday, September 29.

For admission to the Department, or for further particulars, address Horace Jayne, M. D., Ph. D., Dean.
DEPARTMENT OF LAW.

FACULTY.

WILLIAM PEPPER, M.D., LL. D., Provost, and ex-officio President.

Hon. J. I. CLARK HARE, LL. D., Emeritus Professor of Constitutional Law.

C. STUART PATTERSON, A. M., Dean of the Faculty, Professor of Constitutional Law and of the Law of Real Property and Conveyancing.

JAMES PARSONS, A. M., Professor of Commercial Law, Contracts and Decedents' Estates.

GEO. TUCKER BISPHAM, A. M., Professor of Equity Jurisprudence, including the Principles of and Pleading and Practice in Equity, and Orphans' Court Practice.


GEORGE S. GRAHAM, LL. D., Professor of Criminal Law.

Hon. George M. Dallas, LL. D., Professor of the Law of Torts, Evidence, and Practice in Law.

GEORGE WHARTON PEPPER, A. M., LL. B., Algernon Sydney Biddle Professor of Law.

Fellows of the Department of Law.

CHARLES COOPER TOWNSEND, A. B., LL. B.

GEORGE STUART PATTERSON, A. B., LL. B.

FRANCIS HERMAN BOHLEN, LL. B.

CHARLES HENRY BURR, JR., A. M., LL. B.

LIBRARIAN.

S. STANGER ISZARD, A. M., LL. B.
### MATRICULATES.

**THIRD YEAR.**

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<thead>
<tr>
<th>Name</th>
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<tr>
<td>Anderson, James Robert</td>
<td>Philadelphia</td>
<td>G. E. Schlegelmilch</td>
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<td>Bauer, Frederick Wallace</td>
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<td>Butler, George Thomas</td>
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<td>Coulston, Charles Wood, A. B.</td>
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<td>Enich, Joseph Edmund, Ph. B.</td>
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<td>M.D. (Jefferson)</td>
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<td>Matlack, Samuel D.</td>
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<td>Miller, Emlen Hare</td>
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<td>Price, Luther Edmunds</td>
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<td>Russell, George Smyth</td>
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<td>Sailer, Randolph, A. B.</td>
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<td>Joseph C. Fraley</td>
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</table>
DEPARTMENT OF LAW.

Name.  
Schermerhorn, Frank Earle,  
Sell, Wm. Martin, L.I. B.  
Sidler, Charles Arthur, A.B.  
Sion, Isaac,  
Smith, George Hughes, Ph. B. (University),  
Taylor, Benjamin Frank,  
Vail, Louis de Pui, A. B. (University),  
Walters, Louis Rhoades,  
Warren, Reid, A.B. (C. H. S),  
Williams, Irvin Cook, A. B. (Ursinus), L.L. B. (Columbia University),  
Wright, Robert Kemp, Jr., Grad. U. S. Naval Acad'y.,

Residence.  
Philadelphia,  
Slattington, Pa.,  
Danville, Pa.,  
Philadelphia,  
Phoenixville, Pa.,  
Philadelphia,  
Philadelphia,  
Collegeville, Pa., A. W. Horton.

Preceptor.  
Henry R. Edmunds.  
D. D. Roper and Marcus C. L. Kline.  
Hon. F. C. Brewster.  
Samuel B. Huey.  
Charles F. Warwick.  
Lewis D. Vail.  
C. Stuart Patterson.  
Johnston & Tustin.  
Morton P. Henry.
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**FIRST YEAR.**

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<tr>
<td>Althouse, Elmer E.</td>
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<td>Anderson Wm. Young Campbell, B. S. (University),</td>
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<tr>
<td>Colville, Arthur</td>
<td>Philadelphia,</td>
<td></td>
</tr>
<tr>
<td>Crowther, William Mortimer</td>
<td>do</td>
<td></td>
</tr>
<tr>
<td>Daly, J. Burwood, A. B.</td>
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<td></td>
</tr>
<tr>
<td>Dawson, Harry Horace</td>
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</tr>
<tr>
<td>Dudley, Clarence M.</td>
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<td></td>
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<tr>
<td>Ernst, William, Jr.</td>
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<td></td>
</tr>
<tr>
<td>Foss, Cyrus David, Jr.,</td>
<td>Philadelphia,</td>
<td></td>
</tr>
<tr>
<td>Gilfillan, Joseph</td>
<td>do</td>
<td>J. Sergeant Price.</td>
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<tr>
<td>Goodell, Edward Prime</td>
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<td>Gorman, John Francis</td>
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<tr>
<td>Green, John J.</td>
<td>do</td>
<td>Wm. S. Stenger.</td>
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<tr>
<td>Harshaw, Edward, A. B.</td>
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<td>Kendrick, Samuel Murdoch, A. B. (University)</td>
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<td>Kline, Henry Solomon,</td>
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<tr>
<td>Liebfried, Frederick</td>
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<tr>
<td>Middleton, Gustavus Plantou</td>
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<tr>
<td>Name</td>
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<td>-------------------------------</td>
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<tr>
<td>Miller, Melchior Walter,</td>
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<td>McCabe, James,</td>
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<td>McKean, Thomas, Jr., B. S.</td>
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</tr>
<tr>
<td>(Trinity),</td>
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<tr>
<td>Newbourg, Frederick C., Jr.,</td>
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<tr>
<td>A. B. (C. H. S.)</td>
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<tr>
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<tr>
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<td>Patterson, John Morrison,</td>
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<td>C. Stuart Patterson</td>
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<td>Perkins, Benjamin Francis,</td>
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<td>John J. Ridgway</td>
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<tr>
<td>A. B. (Washington Coll.),</td>
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<td>Geo. Tucker Bispham</td>
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<tr>
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<td>Sample, Ralph William,</td>
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Total, 85.
THE PAST AND PRESENT OF THE SCHOOL.

SPECIAL.

FULL COURSE.

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<tr>
<th>Name</th>
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<tr>
<td>Allen, R. F.</td>
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<td>Eilenberger, Wm. Bust</td>
<td>Stroudsburg, Pa., J. B. Storm.</td>
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<td>Fithian, J. Hampton</td>
<td>Bridgeton, N. J.</td>
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<td>Hoffman, Harvey</td>
<td>Marshall’s Creek, J. B. Storm.</td>
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<td>Rankin, George Herbert</td>
<td>Pittsburgh, Pa., John Wilson.</td>
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Total, 7.

SUMMARY.

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<tr>
<td>Third Year</td>
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<tr>
<td>Second Year</td>
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<tr>
<td>First Year</td>
<td>85</td>
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<td>Special</td>
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228

THE PAST AND PRESENT OF THE SCHOOL.

The Law School of the University of Pennsylvania was founded in 1790 and reorganized in 1850. In the past it has had as its professors the Honorable James Wilson, one of the Associate Justices of the Supreme Court of the United States; the Honorable George Shayswood, Chief Justice of Pennsylvania; the Honorable J. I. Clark Hare, the President Judge of one of the Courts of Common Pleas of Philadelphia; Charles Willing Hare, Esq., Peter McCall, Esq., E. Spencer Miller, Esq., P. Pemberton Morris, Esq., E. Coppée Mitchell, Esq., and A. Sydney Biddle, Esq.

The widely recognized reputation of the Bench and Bar of Philadelphia, and the presence of the Supreme Court of Pennsylvania, the United States Court of Appeal, the United States Circuit and District Courts, and the County Courts of Civil and Criminal Jurisdiction, in session in Philadelphia during a great part of the year, render that city a desirable location for a School of Law, the students in which can best be trained, not only by attendance upon the lectures of their professors and by examinations in the School, but also by observation of the proceedings of the courts and of the conduct of causes by skillful advocates.
The present Professors are actively engaged in the practice or administration of the law, and they endeavor to so instruct and train the students as to best fit them for the practice of the profession at any Bar.

LOCATION.

The University buildings are located in West Philadelphia, but the lecture-rooms and library of the Law Department, and the offices of the Dean, are located on the sixth floor of the building of the Girard Life Insurance, Annuity and Trust Company, at Broad and Chestnut streets, Philadelphia, in convenient proximity to the Court Rooms and offices of the Bar.

THE LIBRARY.

The Library of the Law School was presented to the University by the family of George Biddle, Esq., as a memorial of that distinguished lawyer. Effingham B. Morris, Esq., has also deposited with the school 955 volumes, bequeathed by the late Professor Morris to the school, subject to the life interest of Mr. Morris. The library now contains more than 9100 volumes, including complete sets of the reported decisions of all the Federal Courts, the courts of last resort of every State, the English Courts, and many rare and valuable textbooks.

The students have also the free use of the general library of the University, which is unusually full and complete in political economy, social science and American history, including a unique collection of Laws of the States from the English times down to the present, and a set of Government Documents—Federal, State and Local, including City Ordinances, etc.—which is without a rival in the country.

Counting all the works on those subjects, there are over 25,000 volumes in the University Library.

The students of the Law School have access also to the Library of the Pennsylvania Historical Society, to the Philadelphia Library, to the Mercantile Library, and to other smaller libraries in the city, aggregating probably over 750,000 volumes.

The students may also freely attend the lectures given in other departments of the University. Many of these lectures, especially those upon English History and Literature, Political Economy, Rhetoric, Intellectual and Moral Philosophy, and Social Science, are of value to the lawyer, and a great opportunity is thereby afforded to those whose scholastic training has been limited.
Applications for admission should be made to Professor C. Stuart Patterson, Dean of the Faculty, No. 600 Girard Building, Philadelphia. Students may be admitted upon producing—

1. A certificate of preliminary examination before the Board of Examiners of Philadelphia County, as required by the Court of Common Pleas of the County of Philadelphia, for which examination applicants will prepare in grammar, arithmetic, algebra, universal history, particularly history of England and America; spelling, etymology and geography. The student desiring to appear for this examination will procure from the Prothonotary of the Courts of Common Pleas of Philadelphia County, whose office is at the corner of Sixth and Chestnut streets, Philadelphia, duplicate forms of application for preliminary examination, and after signing those forms in duplicate, and having them countersigned by the student's preceptor, if any, and also by the Dean of the Law School, deliver them to the Secretary of the Board of Examiners, giving to him at least one week's notice of appearance for examination. The preliminary examinations are usually held in the Library Rooms of the Law Association of Philadelphia, in the Athenaeum Building, Sixth street, below Walnut street, and on the last Friday of every month, July and August excepted. The present Secretary of the Board is Joseph M. Dohan, Esq., and his address is 850 Drexel Building, Philadelphia. The examination having been passed to the satisfaction of the examiners, or waived by them, upon the production by the student of a satisfactory diploma as Bachelor of Arts or Bachelor of Science, the student should forthwith file in the office of the Prothonotary of the Court of Common Pleas, and also in the office of the Clerk of the Orphans' Court, the duplicate certificates signed by the examiners, and he will then be duly registered as a student-at-law in the University. All students who desire to be admitted to the Bar of Philadelphia County, upon production of their diploma from the University, must obtain the certificates in duplicate of the Board of Examiners as above, and be registered in the offices of the Prothonotary of the Court of Common Pleas and of the Clerk of the Orphans' Court as law students in the University.

2. If the student does not desire to be admitted to the Bar of Philadelphia upon his University diploma conferring the
Degree of Bachelor of Laws, he may be admitted to the Law School upon producing a certificate from two or more of the Fellows of the Law School, setting forth that the student has passed a satisfactory examination in English and American History, the Latin Language, and the first two books of Blackstone's "Commentaries," or upon producing a satisfactory diploma conferring the degree of Bachelor of Arts or Bachelor of Science.

The student may elect to be examined in Latin upon either the first six books of Virgil's \textit{Aeneid}, the Orations of Cicero against Cataline, Sallust's \textit{Jugurtha} or Cataline, or Caesar's Commentaries, being expected to construe at sight and parse passages selected by the examiners from the book upon which he elects to be examined.

(3) The examination will be waived if the student produces a satisfactory diploma conferring the degree of Bachelor of Arts, or the degree of Bachelor of Science.

SPECIAL STUDENTS.

Students who are not candidates for a degree may enter the Department as special students at any time and without preliminary examination. Special students who attend all the lectures of any class pay the regular term fees. Special students, attending one or more courses less than the whole number of courses, pay twenty-five dollars per term, or fifty dollars per year, for each course.

THE COURSE OF INSTRUCTION.

The full course requires attendance for three years.

The course is graded; students of the first year's class are not permitted to attend the lectures of the second and third year, and students of the second year's class are not permitted to attend the lectures of the third year.

The instruction is given by lectures and by frequent examinations, and the students are required to read leading cases illustrating the subjects of instruction.

\textbf{FIRST YEAR.}

The \textit{DEAN}—Principles of Real Property.
Professor \textit{BISPHAM}—Elementary Equity.
Professor \textit{HOLLINGSWORTH}—Contracts.
Professor \textit{DALLAS}—Torts.
\textit{Mr. PATTERSON}—Pleading at Law.
TEXT-BOOKS.—MOOT COURTS.

SECOND YEAR.

The Dean—Real Property and Conveyancing.
Professor Parsons—Partnership.
Professor Bispham—Principles of Equity.
Professor Hollingsworth—Contracts.
Professor Dallas—Evidence.

THIRD YEAR.

The Dean—Constitutional Law.
Professor Parsons—Wills and Administration.
Professor Bispham—Practice and Pleading in Equity.
Professor Hollingsworth—Contracts.
Professor Graham—Criminal Law.
Professor Dallas—Evidence.
Mr. Pepper—Corporations, Insurance.

TEXT-BOOKS.

The following text-books are recommended to the students:

Equity: Bispham's Equity.
Real Property: Williams on Real Property; Mitchell's Lectures upon Real Estate and Conveyancing in Pennsylvania.
Contracts: Pollock on Contracts; Anson on Contracts; Hare on Contracts.
Torts: Pollock on Torts; Bigelow on Torts; Ames' Cases.
Pleading: Pepper on Pleading; Ames' Cases.
Evidence: Stephen on Evidence.
Partnership: Parsons on Partnership.
Criminal Law: Russell on Crimes; Stephen's History of the Criminal Law.
Constitutional Law: Story on the Constitution; Hare on the Constitution; Patterson's Federal Restraints on State Action.

MOOT COURTS.

Moot Courts are held, at which questions prepared by the professors and Fellows are argued. These Courts meet once a week during the term, and an evening is assigned to each case, so that a continuous discussion can be had of the points raised for argument. The Law Academy of Philadelphia, an institution of long standing, of which not only students but many practising lawyers are members, also gives opportunity for debate and argument that has been found of the greatest practical advantage.
DEPARTMENT OF LAW.

EXAMINATIONS.

The examinations required by the statute are both written and oral, and are held annually during the months of April and May. Copies of the questions of the written examination of 1891 will be furnished by the Dean on application.

DEGREES.

Under the statutes of the University, the degree of Bachelor of Law is granted to candidates who have attended upon the full course of instruction in the Law Department, and have prepared and submitted to the Faculty an essay composed by the candidate on some legal subject, sufficient in merit to satisfy the Faculty of fitness to receive the degree, and who have passed satisfactory examinations upon the subjects of instruction.

Certificates of attendance are granted to special students. Certificates of graduation with honor are granted to such graduates as are certified by the Dean to have passed the examinations with distinction.

The degree of Master of Laws is granted in the post-graduate course in Law. (See elsewhere.)

ESSAYS.

The essay required of each candidate must be handed to the Dean on or before the first Monday of October, in the third year of the course. Essays must be printed or typewritten on sheets of octavo size, with a clear margin of at least one inch.

An essay must not disclose the name of the author, and must be accompanied by a sealed envelope indorsed with a distinguishing motto and containing the name of the author.

PRIZES.

THE FELLOWSHIPS.—From each graduating class a Fellow is elected by the Trustees upon the nomination of the Faculty, to hold office for three years unless his office be vacated by death, resignation, or removal by the Faculty. Each Fellow receives an annual salary of three hundred dollars, and performs, under the direction of the Dean, such duties of instruction as may be assigned to him.

ESSAY PRIZES.—The Alumni of this Department have established two prizes, one of seventy-five dollars, called the SHARSWOOD PRIZE, and one of fifty dollars, called the MEREDITH PRIZE, to be competed for by the graduating class, for the best and second-best graduation essay. They are awarded annually by the Faculty.
EXAMINATION PRIZES.—A Prize of fifty dollars is given annually by the Faculty to the student of the Department who passes the best written examination with all the professors, the answers to the questions to be completed within a limited time.

The P. PEMBERTON MORRIS PRIZE of forty dollars for the best examination in Evidence, Pleading and Practice at Law and in Equity is annually awarded to a member of the graduating class.

Honors are granted those students who, attaining an average of 80, or over, with every professor, shall also attain general average of 85, or over, and the averages shall be graded as follows: First Grade, 95, or over; Second Grade, 90, or over; and Third Grade, 85, or over.

ADMISSION TO THE BAR.

Graduates of this Department are admitted to practice in the Courts of Common Pleas, the Court of Quarter Session and the Orphans' Court, of Philadelphia County, upon compliance with the following rules:

"Any citizen of the United States, of full age, who shall have been graduated Bachelor of Laws by the University of Pennsylvania, after the course of study required in the University, may be admitted to practice as an attorney if he shall have complied with the rule now in force as to the preliminary examination, and been registered for one year in the Prothonotary's office as a student of law in said University by the Dean of the Law Faculty thereof."

The rules of the Courts of Common Pleas, with regard to preliminary examination and registration, are:

"It shall be the duty of every attorney of these courts to register with the Prothonotary the name, age, and place of residence of every person studying the law under his direction; and the time of clerkship shall be computed from the date of such registry."

"No person shall hereafter be registered as a student-at-law until he shall have undergone an examination on all the branches of a good English education by the Board of Examiners, or a committee thereof, and shall have produced and filed with the Clerk of the Court a certificate signed by all the examiners who were present at his examination, that he is sufficiently prepared and qualified to commence the study of the law."
DEPARTMENT OF LAW.

"The applicant must give one week's notice in writing to the Secretary of the Board, of his desire to be registered, before he shall come before them for examination."

The rules of the Orphans' Court are in similar terms, except that they require registration in the office of the Clerk of that Court. All students who expect to be admitted to practice at the Bar upon presentation of their diplomas as graduates of this school must pass the preliminary examination before the Board of Examiners, and be registered by the Dean under the foregoing rules. Graduates of this school are also admitted to practice in the Supreme Court of Pennsylvania upon compliance with the following rule of Court:

"Graduates of the Law Department of the University of Pennsylvania who have passed the preliminary examination before the Board of Examiners of Philadelphia County, and an examination upon Latin, and who have taken the full course of three years, and received the diploma and degree of Bachelor of Laws, may be admitted to practice in this Court upon the expiration of three full years from the date of their preliminary examination, upon filing with the Prothonotary a certificate of the Dean of the Law Department stating these facts, and upon exhibiting their diploma, together with a certificate of good character, as in other cases."

The requirements for examination in Latin are stated above.

TUITION FEES.

Each student matriculated after February 1, 1893, will pay a matriculation fee of five dollars, and in addition thereto a term fee of seventy-five dollars, payable in advance. No other charge is made. The total cost for tuition to a student taking a three years' course of instruction and receiving a degree of Bachelor of Law is, therefore, $455. The term fee of seventy-five dollars must be paid within the first week of each term.

Students in attendance before February 1, 1893, will continue to pay fifty dollars per term.

SCHOLARSHIPS.

1. The Faculty Scholarship.—Three scholarships in each class are granted by the Faculty to deserving students who will agree to perform (as assistant librarians) such duties as may be assigned to them by the librarian. These will be open to competitive examination. Each candidate must present to the Dean, at or before the
SCHOLARSHIPS.

examination, written testimonials as to his deserts and needs. The scholarships will be awarded to the three candidates whose testimonials are satisfactory, and who receive the highest three averages on the subjects required by the Faculty in No. 2 of the requirements for admission at an examination, oral and written, to be held for that purpose, provided that, in the discretion of the examiners, the standard attained is of sufficient excellence. The Faculty reserve the right to withdraw any of these scholarships at any time when, in their judgment, the progress of the holder does not justify its continuance.

The examination for 1894 will be held at the Law Department on Monday, October 2, at 10 A. M.

2. THE PUBLIC SCHOOL PRIZE SCHOLARSHIPS.—Under a contract with the city of Philadelphia, six free scholarships (two for each year) have been established in the Law Department for the benefit of pupils from the public schools of the city. The candidates for these scholarships are examined by the Board of Public Education; and the scholarships, according to the number of vacancies, are bestowed by the Board upon those who reach the highest grade in that examination.

TEXT-BOOKS.

The student’s necessary disbursements for text-books will not amount to more than fifty dollars in the three years’ course.

BOARD AND LODGING.

Board and lodging can be found in private families for $5 to $7 per week and upward. A list of recommended boarding houses can be seen on application to E. W. Mumford, Assistant Secretary of the Board of Trustees, at College Hall.

LENGTH OF TERMS.

The college year opens October 2, and extends to the middle of May, with vacations of ten days at Christmas time, one day on Washington's Birthday, and five days at Easter. The year is divided into two terms; the first closing January 31, and the second beginning February 1.

MINIMUM EXPENSES.

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15
DEPARTMENT OF LAW.

RELIGIOUS INFLUENCES.

All the large religious denominations have commodious churches near the University buildings, including Baptist, Roman Catholic, Friends, Lutheran, Episcopal, Methodist, Presbyterian, and others. The students have a Church Club and an active Young Men's Christian Association.

PRIVILEGES OF STUDENTS.

Many special privileges are extended to students in the way of admission tickets to collections, libraries and lecture courses in the city.

GYMNASIUM AND ATHLETIC GROUNDS.

A gymnasium, equipped with the latest and most improved apparatus, is open to students upon payment of a fee of $5 annually. A large space—about four acres—has been set apart as an athletic ground for the use of students. It contains base-ball and foot-ball grounds and a track for exercise in running. The Schuylkill River offers good opportunities for boating. Any further information that may be desired can be obtained upon application to

C. STUART PATTERSON,
Dean of the Department of Law, University of Pennsylvania,
600 Girard Building,
Philadelphia.
## POST-GRADUATE COURSE IN LAW.

### MATRICULATES.

#### SENIOR CLASS.

<table>
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<th>Name</th>
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<tbody>
<tr>
<td>Mayne R. Longstreth, LL.B.</td>
<td>Philadelphia</td>
<td>1823 Arch St.</td>
</tr>
<tr>
<td>Joseph Mellors, LL.B.</td>
<td></td>
<td>528 Arch St.</td>
</tr>
</tbody>
</table>

#### JUNIOR CLASS.

<table>
<thead>
<tr>
<th>Name</th>
<th>Residence</th>
<th>City Address</th>
</tr>
</thead>
<tbody>
<tr>
<td>Isidor D. Blair</td>
<td>Philadelphia</td>
<td>1731 Addison St.</td>
</tr>
<tr>
<td>H. Gilbert Cassidy</td>
<td>Quakertown</td>
<td>3607 Locust St.</td>
</tr>
<tr>
<td>Calvin F. Heckler</td>
<td>Philadelphia</td>
<td>40 Bullitt Bldg.</td>
</tr>
<tr>
<td>Harry A. Mackey</td>
<td></td>
<td>1618 Arch St.</td>
</tr>
<tr>
<td>David Walleisteen</td>
<td></td>
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<tr>
<td>Scott Wilson</td>
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</table>

This course has for its aim to broaden and deepen the foundation of legal education. The first step required for the student's progress is the thorough training of a Law School. In the drill of an ordinary course at such an institution he acquires a practical experience in the machinery of litigation, and he also acquires the lawyer's process of handling cases or of reasoning from them by analogy, while at the same time he masters the leading principles as they are applied in the main departments of law.

The advanced student starts with this equipment. His task is now that of the true lawyer, to find out the reason for every legal proposition that is established, and also to discover its relative importance in the hierarchy of principles which make up the system of law. The investigation involves researches in two directions: First, the source of each principle must be discovered, and the germ, when found, must be traced through the changes it has undergone in the course of its growth or decay. The soundness of a principle or the range of its application can thus be illustrated and tested by experience. Owing to the conservative energy of the English race, pre-eminently exemplified in its lawyers, legal doctrines have maintained their continuity in spite of conquests and revolutions, thus furnishing an opportunity for the study of principles in operation under different institutions.
The material for investigating the sources of our law are abundant. The Anglo-Saxon laws exist in a state of exceptional completeness; the Feudal system has been wrought out almost before our eyes and stands before us in its rigid symmetry. The mediaeval trade customs which entered England with commerce have been preserved in municipal statutes; the Pandects are a repository from which common lawyers have pilfered, from Glanville to Story. A lawyer who reads the Digest of Justinian for the first time will be struck by the familiar ideas that he encounters at every turn, and which he thought were inspired by the common law until he met them in Justinian's compilation.

The sources of our law have been explored, but they have not been turned to account. A history of legal thought must be written in order to make our precious archives available, and until that desideratum is obtained the full benefit of experience, which is the only guide for the application of any legal doctrine, will not be at command. In the absence of such a history, the scattered information bearing upon the genesis and evolution of legal tenets must be gathered at a disadvantage.

The second study is to classify the law and reduce it to a system. The profession shares the aspiration of the lay public for a body of law that everyone can understand. It is this professional craving which accounts for the multitude of text-books professing to abridge different parts of the law, and for the frequent attempts to embody sections of the law in a series of propositions. The common aim of the bar and of the public is to simplify the law. The profession, however, knows that this can be accomplished in but one way, and that is by mastering the principles that underlie the different phases of the law. Not only must every part be known, but its relation to every other part must be ascertained in order to organize a system. The epitomes, made of different parts, serve to counteract the segregation of law according to the objects to which it is applied, and to correct this retrograde tendency. The principles that are universal, extracted from digests of all the parts, will form a body by themselves, and the rank of each principle will be regulated by its relative importance. The modifications that the principles undergo in special parts of the law will be the only qualifications requiring special mention. The principles, for instance, of patent law will then be severed from the arts and sciences, and form an integral portion of the legal system. The best professional opinion could readily furnish such an analysis of this, as well as of other specialties. The law is not absorbed by the material in which it works; on the contrary, by classifying matter, the law
brings it under the sway of reason. The law will be simplified because it will be scientific. It will not be petrified by enactment.

COURSE OF STUDY.

The course of study covers two years. The student, however, can begin at the opening of either year, November 1.

One year of the course is devoted to the study of the Roman law and of the principles that have grown out of it.

The text-books used in this course are Hadley's *Introduction to the Roman Law*, Hunter's *Roman Law*, and Holland's *Jurisprudence*. But these text-books serve simply as an outline of the subject. The works of Mackeldey, Austin, Clark, Markby, Hunter, Moyle, Roby, and others in English, besides authors in German and French, are consulted and utilized to fill out the framework of study.

In the analysis of an act, an important element in legal investigation, Aquinas and the Jesuit writers of to-day furnish the only source of information. Walsh's *Tractatus de actibus humanis* is used, though any Roman Catholic manual would serve the purpose.

The year devoted to the study of the Common law is taken up with the Anglo-Saxon law, the Feudal system, and the principles peculiar to the Common law and developed in the course of its history. There is no adequate history of the English law, and the results of German investigations, of great importance during the past fifty years, lie scattered through separate treatises and periodicals, and have not been collected and made accessible to English students. The work of Glasson, *Histoire du droit et des Institutions d'Angleterre*, comprehends in its first and second volumes a summary of the modern researches into the early periods of our law, both Saxon and Norman. The second volume on the Norman period is used as a text-book in connection with Gundermann's *The Common Law* and Digby's *History of the Law of Real Property*. Kemble's *Anglo-Saxons in England* is the only available work in English for the Saxon period, and is adopted as the text-book for the class.

The primary principles of the Common law have been investigated by Judge Holmes, and his work on the Common law will serve as the guide for a study of them. The comparison of English and Continental theories of law is forced upon the profession in controversies between citizens of different countries where the rules of the various systems compete for the control of the legal relations between the parties. The work of Westlake on *Private International Law* is the most convenient text-book, though Story, Wharton, Foote, and other writers will be consulted.
POST-GRADUATE COURSE IN LAW.

ADMISSION AND FEES.

Graduates of any law school of recognized standing and members of the bar are eligible as students in this department. The annual fee for tuition is twenty-five dollars.

EXAMINATIONS AND DEGREES.

Examinations are held annually in May, and are both oral and written.

Graduates of this course receive the Degree of Master of Laws, unless the post-graduate course of law is combined with two other courses of study in the Department of Philosophy. Then the Degree of Doctor of Philosophy is conferred, on conditions stated on PP.

A thesis upon some topic connected with the course is required to be handed in as early as possible during the second year. It is expected to contain an exhaustive analysis of the subject-matter.

For further information apply to Professor James Parsons, 1534 Locust Street, Philadelphia.
DEPARTMENT OF MEDICINE.

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Dr. C. Gilman Smith, 2220 Calumet Avenue, Chicago, Ill.
Dr. C. H. Boardman, 503 Wabasha Street, St. Paul, Minn.
Dr. John L. Elliott, Bay City, Mich.
Dr. W. S. Elk, 70½ Whitehall Street, Atlanta, Ga.
Dr. J. W. Whitbeck, 125 East Avenue, Rochester, N. Y.
Dr. W. T. Bell, Murphy Building, San Francisco, Cal.
Dr. W. D. Hamaker, Meadville, Pa.
Dr. Edward Randall, Jr., Galveston, Tex.
Dr. F. E. Maine, Auburn, N. Y.
Dr. B. M. Walker, Danville, Va.
Dr. Benj. B. Cates, Knoxville, Tenn.

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Edward Martin, M. D., Clinical Professor of Genito-Urinary Diseases.

Roland G. Curtin, M. D., Assistant Physicians.
John K. Mitchell, M. D., Assistant Surgeons.
Henry R. Wharton, M. D., Assistant Surgeons.
Richard H. Harte, M. D., Assistant Surgeons.
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W. CONSTANTINE GOODELL, M. D., Assistant Gynaecologist.
JUDSON DALAND, M. D., Assistant Physician.
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M. HOWARD FUSSELL, M. D., Physician in the Medical Dispensary.
T. MELLOR TYSON, M. D.,-V
WILLIAM B. FENN, M. D., Resident Physicians.

Mary E. P. Davis, Superintendent of the Hospital.
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All communications relating to the Department of Medicine should be addressed to

JOHN MARSHALL, M. D.,
Dean of the Faculty of Medicine, University of Pennsylvania,

The Dean's office is in Medical Hall, where all business is transacted.
## MATRICULATES.

### FOURTH YEAR CLASS.

<table>
<thead>
<tr>
<th>Name</th>
<th>Post Office</th>
<th>Preceptor</th>
</tr>
</thead>
<tbody>
<tr>
<td>Brandon, Joseph W.</td>
<td>Philadelphia</td>
<td>University</td>
</tr>
<tr>
<td>Galloway, Merrill J., A. B.</td>
<td>Philadelphia</td>
<td>University</td>
</tr>
<tr>
<td>Pfohl, S. Frederick</td>
<td>Salem, N. C.</td>
<td>N. S. Siewers</td>
</tr>
<tr>
<td>Rudasill, James E., M. D.</td>
<td>Woodsville, Va.</td>
<td>University</td>
</tr>
<tr>
<td>Simmons, Richard H., M. D.</td>
<td>Shamokin</td>
<td>University</td>
</tr>
<tr>
<td>Wetherill, Henry Emerson, M. D.</td>
<td>Philadelphia</td>
<td>University</td>
</tr>
</tbody>
</table>

Students of the Fourth Year Class, 6.

### THIRD YEAR CLASS.

<table>
<thead>
<tr>
<th>Name</th>
<th>Post Office</th>
<th>Preceptor</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aguilar, Manuel</td>
<td>San José, Costa Rica</td>
<td>University</td>
</tr>
<tr>
<td>Aiken, Thomas F.</td>
<td>Oswego, N. Y.</td>
<td>J. T. Langan</td>
</tr>
<tr>
<td>Alexander, Edmund B.</td>
<td>Los Angeles, Cal.</td>
<td>University</td>
</tr>
<tr>
<td>Angeny, Granville L., Ph.G.</td>
<td>Doylestown</td>
<td>H. H. Sherk</td>
</tr>
<tr>
<td>Ankeney, Clinton Rench, A. B. (Franklin &amp; Marshall)</td>
<td>Clear Spring, Md.</td>
<td>J. E. Beatty</td>
</tr>
<tr>
<td>Aparicio, Guillermo</td>
<td>Guatemala, C. A.</td>
<td>University</td>
</tr>
<tr>
<td>Arey, Clarence O., C. E.</td>
<td>Cleveland, Ohio</td>
<td>University</td>
</tr>
<tr>
<td>Ayars, Robert E.</td>
<td>Bridgeton, N. J.</td>
<td>University</td>
</tr>
<tr>
<td>Backus, Henry N.</td>
<td>Philadelphia</td>
<td>University</td>
</tr>
<tr>
<td>Baldwin, Louis H.</td>
<td>Williamsport</td>
<td>Chas. M. Adams</td>
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<tr>
<td>Balentine, Percy L.</td>
<td>Philadelphia</td>
<td>L. Weber, and D.</td>
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<tr>
<td>Bannister, Murdoch B. S.</td>
<td>Ottumwa, Iowa</td>
<td>W. S. Donahay</td>
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<tr>
<td>(Univ. Mich.)</td>
<td></td>
<td>D. A. La Force</td>
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<tr>
<td>Barrett, Thomas</td>
<td>Irwin</td>
<td>University</td>
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<tr>
<td>Bartley, James P.</td>
<td>Altoona</td>
<td>D. W. Crosthwaite</td>
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<tr>
<td>Bauch, George Franklin, M. D.</td>
<td>Oak Harbor, Ohio</td>
<td>C. B. Parker</td>
</tr>
<tr>
<td>Bauer, Rudolph F.</td>
<td>Philadelphia</td>
<td>L. G. Bauer</td>
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<tr>
<td>Benavides, Francisco Garza</td>
<td>Monterey, Mexico</td>
<td>J. A. Vannort</td>
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<td>Bentley, J. Irving</td>
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<td>University</td>
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<tr>
<td>Berry, Edward Stanley</td>
<td>Mifflintown</td>
<td>W. H. Banks</td>
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<tr>
<td>Bessey, Herman</td>
<td>Odessa, Del.</td>
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<td>Betz, George W.</td>
<td>Philadelphia</td>
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<tr>
<td>Birdach, George G., Ph. G.</td>
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<td>A. D. Birchard</td>
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<td>Bishop, Will Lee</td>
<td>Bay City, Mich.</td>
<td>T. J. Murray</td>
</tr>
<tr>
<td>Black, Nelson M., Ph. G.</td>
<td>Valley City, N. Dak.</td>
<td>David B. Birney</td>
</tr>
<tr>
<td>Blaine, Walter C.</td>
<td>Champaign, Ill.</td>
<td>H. C. Howard</td>
</tr>
<tr>
<td>Name</td>
<td>Post Office</td>
<td>Preceptor</td>
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</tr>
<tr>
<td>Blieden, Max.</td>
<td>Philadelphia</td>
<td>Edward Martin and H. Flood</td>
</tr>
<tr>
<td>Booth, Arthur Woodward</td>
<td>Elmira, N. Y.</td>
<td>S. Creadick</td>
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<td>Boyd, Irwin H.</td>
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<td>University</td>
</tr>
<tr>
<td>Bradley, William N., Ph. G.</td>
<td>Philadelphia</td>
<td>J. S. McKay</td>
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<tr>
<td>Brown, Maurice W.</td>
<td>San Francisco, Cal.</td>
<td>University</td>
</tr>
<tr>
<td>Brown, S. Pope</td>
<td>Potsdam, N. Y.</td>
<td>J. T. Massey</td>
</tr>
<tr>
<td>Bryan, Henry Walter</td>
<td>Wilmington, Del.</td>
<td>H. Darlington</td>
</tr>
<tr>
<td>Buckmaster, Henry G.</td>
<td>Woodside, Del.</td>
<td>L. E. Norris</td>
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<td>Bunting, Josiah T.</td>
<td>Glen Mills</td>
<td>Guy’s Hospital, London</td>
</tr>
<tr>
<td>Butler, Harry, B. S. (Maine)</td>
<td>Hampden, Me.</td>
<td></td>
</tr>
<tr>
<td>Camac, Charles N. Bancker</td>
<td>Philadelphia</td>
<td></td>
</tr>
<tr>
<td>Cargill, Loren B.</td>
<td>Newark Valley, N. Y.</td>
<td>H. L. Knapp</td>
</tr>
<tr>
<td>Carncross, Horace Leedon</td>
<td>Philadelphia</td>
<td>A. A. Stevens</td>
</tr>
<tr>
<td>Carroll, Charles J.</td>
<td>Dennisville, N. J.</td>
<td>Eugene Way</td>
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Armstrong, Alexander  Trenton, N. J.,  Charles B. Leavitt.
Auten, Frank E., B. S.,  Chicago, Ill.,  George A. Hall.
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Bogue, Frederic L.,  Montclair, N. J.,  University.
Bostic, John,  Kahoka, Mo.,  University.
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Bradley, D. Cameron,  Coburn,  University.
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Brown, Harry H.,  Philadelphia,  University.
Brown, Harry M.,  San Bernardino, Cal.,  University.
Brunn, Harold,  University of California.
Bryant, F. Otis, B. E.,  Waymart,  University.
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Buehler, George Van Buskirk,  Pottstown,  F. W. Van Buskirk.
Burkhard, Edwin D.,  Trinidad, Col.,  Henry K. Palmer and George W. Robinson.

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*Pursuing the Four-year Course of Study.
DEPARTMENT OF MEDICINE.

Name.  Post Office.  Preceptor.

(Tufts),

Rank, Edward D.,  Williamstown,  A. B. Gloninger.

Rankin, Irving C., B. Ph.,  Akron, Ohio,  J. V. Cleaver.
(Syracuse),

Ray, George S., A. B.  Meadville,  Chas. P. Woodring.
(Allegheny),

Reed, George A., B. E.,  West Mill Creek,

Reed, J. Ross,  Lockport,

Reinocil, David V., Ph. G.,  Lebanon,

Reese, George W.,  Centrailia,

Rice, T. Harper,  Pottstown,

Richards, D. Bruce, Ph. G.,  Philadelphia,

Richards, William L.,  Wilkes-Barre,

Richmond, George N., A. B.  Greenville, Vt.,
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Ricker, J. Romaine, D. D. S.,  Galveston, Texas,

Rigg, Walter A.,  Reading,

Riley, John D.,  Shenandoah,
*Robinson, Ernest F., B. A.  Lawrence, Kan.
(Univ. Kansas),

Robinson, George Willis,  Bayou La Chute, La.,

Roderick, Edward,  J. L. Kimball.

Rosell, David H.,  Hazleton,

Rothrock, Harry A.,  Philadelphia,

Russell, Andrew Lyle, A. B.  West Chester,
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Savidge, Edgar,  Bulger,

Schleif, William, Ph. G.,  University.

Schreiner, Edward R.,  University.

Scott, William L., A. B.,  University.

*Settle, W. Clarence,  University.

Shaffer, S. Albert,  University.

Shambaugh, George E.,  University.

Ph. B. (University of Iowa),

Sharp, Leedom, L.L. B.,  University.

Shearer, Christopher H.,  University.

Shimer, Sterling D., A. B.  University.
(Lafayette),

(Univ. Chicago),

*Shope, Samuel Z., B. E. D.,  Harrisburg,

Silva, Jose Maria,  Managua, Nic.,

Simmons, Ernest Romaine, A. B. (Berlin), D. D. S.  Philadelphia,

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*Pursuing the Four-year Course of Study.*
DEPARTMENT OF MEDICINE.

FIRST-YEAR CLASS.

Name. Post Office. Preceptor.
Allen, Jesse H., Columbus, Ohio, University. 
Anspach, Brooke M., Williamsport, G. Alvin Hill.
Artelt, Henry, Philadelphia, University.
Atkins, Joseph C., Sunnyburn, W. F. Smith.
Armstrong, John P., Newark, Del., C. Henry.
Baker, W. Eldridge, Centre Square, University.
Baldwin, Edwin C., A. B. (University of Rochester), Rochester, N. Y., John W. Whitbeck
Barnard, Louis H., Philadelphia, University.
Barrett, Thomas J., Youngstown, University.

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Senceman, Theodore,
Seymour, Walter E.,
Sherman, Elbert S.,
Sherrer, Samuel H.,
Shimer, Ira A., A.B.
(Lehigh),
Shryock, Charles R.,
Sinclair, John F., A. B.
(Univ. of Penna.),
Simms, Joseph S.,
Siter, E. Hollingsworth,
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Smith, William C.,
Smyth, Henry F.,
Sowash, Joseph L.,
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A. B. (Kansas University),
Stafford, Samuel P.,
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Sutton, Stansbury,
Swaney, Will G.,
Sweeney, George A.,
Taylor, David T.,
Teller, Howard J.,
Trainor, Robert F., A. B.
(Bucknell),
Trexler, James E.,
Twaddell, Thomas P. H.,
Veale, William M.,
Wagner, Jesse E.,
Wallerstein, Alfred, A. B.
(Harvard),
Weber, Willis Clarence, A. B.
Sunbury,
(Bucknell),
Wells, William E., Ph. B.
(Iowa College),
Post Office.
Thorntown, Ind.,
Watertown, N. Y.,
Philadelphia,
Ashfield,
Girardville,
Germantown,
Atlantic City, N. J.,
Warren, R. I.,
Manasquan, N. J.,
Pittsburg,
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Shippensburg,
Cedar Rapids, Iowa,
Wilmington, Del.,
Philadelphia,
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Philadelphia,
Madison, Wis.,
Glocester, N. J.,
Airville,
Germantown,
Irwin,
Lawrence, Kans.,
Philadelphia,
Delaware Water Gap,
Wilmington, Del.,
Allegheny,
Morgantown,
W. Va.,
Chester,
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Utica, N. Y.,
Williamsport,
Fort Washington,
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Carbondale,
Philadelphia,
Atlanta, Ill.,
Preceptor.
M. H. Rose.
University.
A. G. B. Hinkle.
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James Stein.
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James Collins.
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Wm. Walters.
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N. F. Mossell.
University.
J. B. Shaw.
H. J. Stubbs.
R. S. Sutton.
Jas. P. Fitch.
J. L. Forwood.
William L. Taylor
University.
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### MATRICULATES.

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Students of the First Year Class, 188.

**SPECIAL.**

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### SUMMARY.

- Students of the Fourth Year: 6
- Students of the Third Year: 274
- Students of the Second Year: 325
- Students of the First Year: 188
- Special Students: 3

Total: 796

The total number of new matriculates for the present session, including those admitted to advanced standing, is 238.

### SUMMARY BY STATES.

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<td>Prince Edward Island</td>
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<td>Rhode Island</td>
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<td>South Carolina</td>
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<td>Wisconsin</td>
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<td>796</td>
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ORGANIZATION OF THE MEDICAL SCHOOL.

This venerable Institution, the oldest Medical School in the United States, was founded in 1765 by Dr. John Morgan, who filled in it the first medical professorship created in America. Through Dr. Morgan, the pupil of Hunter in London and of Cullen in Edinburgh, the graduates of this school take a just pride in regarding it as the lineal descendant of the best medical schools of Great Britain in the last century. To Dr. Morgan was soon joined another pupil of Cullen, Dr. Wm. Shippen, as Professor of Anatomy and Surgery, thus forming another tie of relationship to the celebrated University of Edinburgh, whose methods of instruction were substantially adopted here. In the next year Dr. Adam Kuhn was added as Professor of Botany and Materia Medica; and in June, 1768, a "Commencement was held," at which medical honors were bestowed, the first in point of time in America. In 1769, Dr. Benjamin Rush was elected Professor of Chemistry, and Dr. Thos. Bond, Professor of Clinical Medicine.

To the faculty thus composed of Morgan, Shippen, Kuhn, Rush and Bond have succeeded, at various times, professors whose reputation has been national, such as Barton, Wistar, Chapman, Physick, Dewees, Horner, Hare, Gibson, Jackson, George B. Wood, Hodge, James B. Rogers, Carson, the elder Pepper, Francis Gurney Smith, John Neill, Henry H. Smith, Joseph Leidy and D. Hayes Agnew.

The number of its graduates is ten thousand eight hundred and sixteen.

ADMISSION.

Candidates for admission are required: First, to write an Essay, of about three hundred words, as a test of Orthography and Grammar; second, to pass an examination in Elementary Physics (Part I. of Fownes' Chemistry). A candidate who has received a collegiate degree, or passed the matriculate examination of a recognized college, or who has a certificate covering the required subjects from a recognized normal or high school, or a duly organized county medical society that has instituted a preliminary examination—such as that adopted by the Medical Society of the State of Pennsylvania—may enter without examination.

Examinations for admission are held Monday, June 11, and Friday, September 28; but arrangements may be made for examination at
other times throughout the year, except July and August, upon application to the Dean.*

The attention of those expecting to enter upon the study of Medicine is particularly called to the unusual advantages of the course in Natural History in the College Department of the University. Students who have satisfactorily pursued the last two years of that course will be exempted from the preliminary examination.

Candidates for admission to the first year who have had a course in Chemistry, and have performed laboratory work equivalent to that required during the first year in this school, will be permitted, on examination, to omit the Chemistry of the first year and to pursue the Chemistry and laboratory work of the second year during the first year of their Medical course.

College graduates in Arts or in Science who, during their College course, have devoted to the study of the branches named below the number of hours stated, are admitted to the second year of the Medical course without an entrance examination. These studies may have been pursued during any period of the College course leading to a degree. Students entering under these conditions must, during their first session in the Medical Department, take instruction in Materia Medica and Pharmacy and pass examinations in these branches by the end of the session.

General Biology . . . 96 hours. Histology . . . . 72 hours.  
Mammalian Anatomy . 144 " Human Anatomy . 144 "  
Botany . . . . . . . 180 " Physiology . . . . 48 "  
Chemistry . . . . . 216 " Zoology . . . . 96 "  
Physics . . . . . . . 72 " Embryology . . . 72 "

Students who have attended one course in a medical school (not Homoeopathic or Eclectic) are admitted to the second year of the University course, upon passing a satisfactory examination in General Chemistry, Materia Medica and Pharmacy, Histology and in the elements of General Pathology. Students who have attended two courses in a regular medical school are admitted to the third year.

* Examinations for admission will also be held annually during the last week in June in Rochester, N. Y., Meadville, Pa., Atlanta, Ga., Mobile, Ala., Cincinnati, O., Chicago, Ill., Bay City, Mich., St. Louis, Mo., St. Paul Minn., San Francisco, Cal., Galveston, Texas, Anburn, N. Y., Danville, Va., Knoxville, Tenn., Charlottetown, Prince Edward Island. The names of the examiners will be found on page 30.

Students are earnestly requested to be in attendance at the beginning of the Session, as later entrance is attended with great disadvantage.
upon passing a satisfactory examination in General and Medical Chemistry, Materia Medica and Pharmacy, Histology, the elements of General Pathology, Anatomy, and Physiology. Students who have attended three courses in a regular medical school are admitted to the fourth year, upon passing a satisfactory examination in General and Medical Chemistry, Materia Medica and Pharmacy, Histology, the elements of General Pathology, Anatomy, Physiology, Applied Anatomy, General and Special Pathological Anatomy, Therapeutics, Surgery, Obstetrics, and Ophthalmology.

Graduates of regular medical schools in good standing, in which two years' attendance upon instruction is required to obtain the degree in Medicine, are admitted to the third year without an examination.

Graduates of regular medical schools in good standing, in which three years' attendance upon instruction is required to obtain the degree in Medicine, are admitted to the fourth year, with the understanding that they pass examinations in Obstetrics and in Therapeutics either at the beginning or at the end of the fourth year in addition to the regular examinations of that year.

Graduates of colleges of pharmacy in good standing are admitted to the second year upon passing the entrance examination only.

Graduates of dental colleges in good standing are admitted to the second year of the Medical course on passing the entrance examination. They must, in addition, perform the practical work and pass an examination in Materia Medica and Pharmacy of the first year of the Medical course.

Examination for admission to advanced standing for the session 1894-95 will be held Thursday, September 27, at noon.*

COURSE OF STUDY.

The Course of Instruction extends over four years, with one session beginning the first of October and ending on the first Tuesday in June in each year.

The first year is largely occupied with work in the various laboratories of Chemistry, Pharmacy, Osteology, and Histology, and in

* Students from other colleges admitted to the second year who have not had instruction in Practical Normal Histology are expected to make up such deficiency by taking a special course, as the second year's work presupposes a knowledge of the technique of the microscope. Students admitted to the third year must make up deficiencies in Pathological Histology.
Dissection. The first-year student may also attend clinical lectures in General Medicine and General Surgery. In the second year, in addition to didactic and clinical teaching, practical instruction is given in Medical Chemistry, Pathological Histology and Physical Diagnosis. Dissection is continued. Throughout the second, third and fourth years the student is required to attend the general medical and surgical clinics at the University and Philadelphia Hospitals, and during the third and fourth years the clinics in special departments at the former. Special bedside instruction in Clinical Medicine, including Physical Diagnosis, and in Clinical Surgery, is given in the third year. During the fourth year, in addition to special bedside instruction in Clinical Medicine, in Clinical Surgery and in Gynaecology, practical instruction is given in operative surgery and operative obstetrics, in diseases of the nose, throat, eye, ear, and skin, in genito-urinary diseases and in nervous diseases. For this purpose, the third- and fourth-year classes are divided into sections, each of which receives direct personal instruction.

At the beginning of the fourth year the student must select two branches from the following electives, and pursue the study of the two branches as special studies: Electives.—Neurology, Orthopaedic Surgery, Advanced Ophthalmology, Dermatology, Otology, Advanced Hygiene including Bacteriology, Advanced Anatomy, Advanced Physiology, Advanced Pathology, Advanced Medical Chemistry including Toxicology, Pediatrics, Genito-Urinary Surgery and Experimental Psychology. At the end of the fourth year the student will be examined in the two special branches in addition to the regular examinations of that year.

The course of instruction is so arranged as to permit the constant introduction of new material, while retaining the repetition of essential subjects aimed at by the older method. The laboratory instruction is so co-ordinated with the oral teaching as to illustrate the subjects of the lectures.

Advanced students are encouraged to make original researches in the laboratories of Pharmacy, Chemistry, Physiology, Pathology and Experimental Therapeutics.

Students of the Medical Department may attend, without additional charge, the lectures and recitations in any other department, provided that the consent of the Dean of the particular department has first been obtained.
OUTLINE OF THE COURSE.

FIRST YEAR.

Anatomy.—Three lectures per week, ten hours Dissection, including Osteology (alternating with practical Histology).*

Histology.—Two hours laboratory instruction, one hour demonstration.

Materia Medica and Pharmacy.—One lecture per week, two hours laboratory.

General Chemistry, including Chemical Physics.—Two lectures per week, three hours laboratory.

Physiology.—Three lectures per week.

General Pathology.—One lecture per week.

History of Medicine, Medical Terminology, Ethics, etc.—One lecture per week, until January 1.

Physical Diagnosis.—One lecture per week.

General Symptomatology and Diagnosis.—One lecture per week.

Bandaging.—One lecture per week, one hour practice until December 15.

General Clinics.—Medical and Surgical.

Final examinations at the end of the course: General Chemistry, Elementary Anatomy with special reference to Histology and Osteology, Materia Medica and Pharmacy, Elements of General Pathology, and Physical Diagnosis.

SECOND YEAR.

Anatomy.—Three lectures per week, ten hours evening dissection.

Applied Anatomy.—Two lectures per week.

Medical Chemistry.—One lecture per week, three hours laboratory.

Physiology.—Three lectures per week.

General Pathology and Morbid Anatomy.—Two lectures per week, one and a half hours laboratory.

Physical Diagnosis.—One hour per week demonstration.

Therapeutics.—Two lectures per week.

Surgery.—Three lectures per week.

Obstetrics.—Two lectures per week.

General Clinics, Medical and Surgical, including Philadelphia and Pennsylvania Hospital Clinics.

Special Clinics.—(Nervous Diseases, Gynaecology, Diseases of Skin, Eye, Ear, alternating with practical work in Physical Diagnosis and in Pathological Histology.)

Final examinations at the end of the course: Medical Chemistry, Anatomy including Embryology, Physiology, and Physical Diagnosis.

* In the distribution of anatomical material at the beginning of the session, students of the second year are first supplied, and students of the first year may not receive material until about December 1.
THIRD YEAR.

Applied Anatomy.—Two lectures per week.
General Pathology and Morbid Anatomy.—Two lectures per week.
Bacteriology.—One lecture per week for six weeks.
Demonstrations in Morbid Anatomy including Autopsies.—Two hours per week.
Therapeutics.—Two lectures per week.
Theory and Practice of Medicine.—Three lectures per week.
Surgery.—Three lectures per week.
Minor Surgery and Fracture Dressings.—One lecture per week, two hours practice.
Obstetrics*.—Three lectures per week.
Gynecology.—One didactic lecture per week.
Bedside Instruction in Practical Medicine including Physical Diagnosis.†—One hour per week.
Bedside Instruction in Practical Surgery†.—One hour per week.
Dermatology.—One didactic lecture per week until February 1. One hour per week clinical lecture.
Ophthalmology.—One didactic lecture per week, one hour per week clinical lecture.
Otology.—One didactic lecture per week until February 1. One hour per week clinical lecture.
Laryngology.—One didactic lecture per week after February 1.
Genito-Urinary Diseases.—One hour per week practical instruction, after February 1.
General Clinics, Medical and Surgical, including Philadelphia and Pennsylvania Hospital clinics.
Special Clinics (Nervous Diseases, Pediatrics, Gynaecology, Diseases of the Skin, Eye, Ear at both University and Philadelphia Hospitals).

Final examinations at the end of the course: Applied Anatomy, General and Special Pathological Anatomy, Therapeutics, Surgery, Obstetrics, and Ophthalmology. The examinations include questions on Diseases of the Skin and the Ear from lists furnished by the Clinical Professors of those branches.

FOURTH YEAR.

Theory and Practice of Medicine.—Three lectures per week.
Clinical Conference in Medicine.—One hour per week.
Clinical Medicine.—Two clinical lectures per week, two hours per week bedside instruction.

*Students also receive individual practical instruction in pelvimetry and abdominal palpation in addition to the lectures on Obstetrics.
†For these courses the class is divided into sections, so that each student shall receive direct personal instruction.
Clinical Surgery.—Two clinical lectures per week, one hour per week bedside instruction.
Operative Surgery.—One lecture per week and one hour practical instruction after February 1.
Operative Obstetrics.—One hour practice per week until February 1.
Nervous Diseases and Electro-Therapeutics.—One clinical lecture per week, one hour per week practical instruction.
Hygiene.—One lecture per week.
Gynaecology.—One didactic lecture per week, one clinical lecture per week, one hour per week practical instruction.
Paediatrics.—One clinical lecture per week until February 1.
Dermatology.—One clinical lecture per week, one hour per week practical instruction.
Ophthalmology.—One didactic lecture per week, one clinical lecture per week, one hour per week practical instruction.
Otology.—One didactic lecture per week until February 1, one clinical lecture per week, one hour per week practical instruction.
Laryngology and Rhinology.—One hour per week practical instruction.
Autopsies.—One hour per week practical instruction.
Clinical and Operative Obstetrics.—One hour per week practical instruction.
Orthopedic Surgery.—One clinical and didactic lecture per week, one hour per week practical instruction until February 1.
Genito-Urinary Diseases.—One hour per week practical instruction after February 1.
General Clinics, Medical and Surgical, including Philadelphia and Pennsylvania Hospital Clinics.

Final examinations at the end of the course: Theory and Practice of Medicine, Clinical Medicine, Operative Surgery, Clinical Surgery, Operative Obstetrics, Gynaecology and Hygiene, and examinations in two of the following branches which the student must have elected as special studies at the beginning of the fourth year: Neurology, Orthopedic Surgery, Advanced Ophthalmology, Dermatology, Otology, Advanced Hygiene including Bacteriology, Advanced Anatomy, Advanced Physiology, Advanced Pathology, Advanced Medical Chemistry including Toxicology, Paediatrics, Genito-Urinary Surgery, and Experimental Psychology.

TEXT-BOOKS.

FIRST YEAR.

Chemistry: Marshall's First-year Notes; Fownes' Chemistry; Medicus' Qualitative Analysis.
Wurtz's Elements of Modern Chemistry; Richter's Inorganic Chemistry.
DEPARTMENT OF MEDICINE.

Anatomy: Leidy; Pierson's Normal Histology.
Physiology: Waller or Foster.
Pathology:

Physical Diagnosis: Tyson.
Materia Medica: H. C. Wood; Mann on Prescription Writing.

SECOND AND THIRD YEARS.

Medical Chemistry: Marshall's Second-year Notes; Greene; Tyson's Practical Examination of Urine; Marshall & Smith's Analysis of Urine.
Anatomy: Leidy.
Physiology: Foster.
General Pathology and Morbid Anatomy: Ziegler; Woodhead's Practical Pathology; Abbott's Principles of Bacteriology.

Therapeutics: H. C. Wood.
Surgery: Ashhurst's Principles and Practice of Surgery; Agnew's Surgery.
Obstetrics: Lusk's Midwifery.
Gynaecology: Goodell's Lessons in Gynaecology.
Physical Diagnosis: Tyson.
Skin Diseases: Duhring.

THIRD AND FOURTH YEARS.

Surgery: Ashhurst's Principles and Practice of Surgery; Agnew's Surgery.

Ashhurst’s International Encyclopaedia of Surgery; Wharton’s Minor Surgery and Bandaging; Davis on Bandaging.
ORDER OF LECTURES.


Obstetrics: Lusk's Midwifery.

Gynecology: Goodell's Lessons in Gynecology.

Diseases of Children: Starr; Ashley and Wright.

Medical Jurisprudence:

Skin Diseases: Duhring.

Practice of Medicine: A Textbook of Medicine, edited by Pepper; Osler; Strümpel. Musser's Medical Diagnosis.


Hygiene: Parks' Practical Hygiene, (last edition by Natter).

ORDER OF LECTURES, DAILY.—FIRST YEAR.—1894-5.

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<td>4½ P.M.</td>
<td>Pharmacy, Lab. Half the Class.</td>
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<td>Reichert. Physiology.</td>
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<td>Pharmacy, Lab. Half the Class.</td>
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For the study of Histology, Osteology and Syndesmology, and Bandaging, the class is divided into sections, one of which is occupied at a time. Students not thus engaged dissect or, if not otherwise occupied, may attend general clinics.—SEE SPECIAL ROSTER.

† U. H. University Hospital.
ORDER OF LECTURES,* DAILY.—SECOND YEAR.—1894-5.

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<td>11 A.M.</td>
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<td>3 P.M.</td>
<td>Piersol, Morbid Anatomy</td>
<td>Reichert, Wood Therapy</td>
<td>Morbid Anat., 1 sec. 2 hours.</td>
<td>Piersol, Anatomy</td>
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<td>4½ P.M.</td>
<td>Dissection</td>
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<td>7½ to 9 P.M.</td>
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For the study of Pathological Histology and Physical Diagnosis, the class is divided into sections, one of which is occupied at a time; Second-year students not thus engaged attend clinics. * Subject to modification. † U. H. University Hospital.

ORDER OF LECTURES,* DAILY—THIRD YEAR.—1894-5.

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<td>1 P.M.</td>
<td>Ward Classes, Surg., U. H.†</td>
<td>Ashhurst, Surgery</td>
<td>Norris, Clinic in Dermatology of the Skin, U. H.†</td>
<td>Norris, Clinic in Dermatology of the Skin, U. H.†</td>
<td>Norris, Clinic in Dermatology of the Skin, U. H.†</td>
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<td>1½ P.M.</td>
<td>Ashurst, Anatomy</td>
<td>Hirst, Obstetrics</td>
<td>Norris, Clinic in Dermatology of the Skin, U. H.†</td>
<td>Hirst, Obstetrics</td>
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<td>3 P.M.</td>
<td>Wharton, Minor Surgery, Lect. until Feb. 1</td>
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<td>5½ P.M.</td>
<td>Pepper Practice</td>
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For WARD CLASS instruction and Obstetrical Demonstrations the Third-year class is divided into sections. See Special Roster.
* Subject to modification. † U. H. University Hospital.
ORDER OF LECTURES.* DAILY.—FOURTH YEAR.—1894-5.

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<th>Hour</th>
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ROSTER

OF BEDSIDE INSTRUCTION AND SPECIAL CLINICS FOR STUDENTS OF THE THIRD-YEAR. SESSION 1893-1894.

For attendance upon these Courses, the Third-year Class is divided into four sections, A, B, C and D, which attend as follows:

First period, from Monday, Oct. 9, to Friday, November 24, inclusive:

**Monday** | **Tuesday** | **Wednesday** | **Thursday** | **Friday**
---|---|---|---|---
Prof. Tyson | B | D | — | A
" White | D | — | A | B
" Penrose | A | B | C | —
Special Clinics | C | A & C | B & D | C & D

Second period, from Monday, Nov. 27, to Friday, Jan. 26, inclusive:

**Monday** | **Tuesday** | **Wednesday** | **Thursday** | **Friday**
---|---|---|---|---
Prof. Tyson | C | B | — | D
" White | A | — | B | C
" Penrose | B | C | D | —
Special Clinics | D | A & D | A & C | A & B
Third period, from Monday, Jan. 29, to Friday, March 16, inclusive.

Prof. Tyson . . . . . . D A — C
" White . . . . . . B — C D

Fourth period, from Monday, March 19, to Friday, May 4, inclusive.

Prof. Tyson . . . . . A C — B
" White . . . . . . C — D A

The instruction is given at the University Hospital at 1 o'clock. Professor Tyson will meet the sections of the Third Class in the Wards and Medical Dispensary; Professor Penrose in Room G, Gibson Wing; and Professor White in the Lower Lecture Room. The Special Clinics are held in the Upper Lecture Room.

This arrangement enables each section to attend, during an equal period of the term, the clinical lectures on special subjects, as follows:

Monday,  Tuesday,  Wednesday,  Thursday,
1 p. m.  1 p. m.  12 m.  1 p. m.

Prof. RANDALL,  Prof. DUHRING,  Prof. WOOD,  Prof. NORRIS,

The entire Third and Fourth-year Classes attend the General Medical and Surgical Clinics, held on Wednesday and Saturday, from 12 to 2 o'clock and, with the exception of two sections which attend in rotation, the Gynecological Clinic on Friday at 1 o'clock in the Upper Lecture Room of the University Hospital as well as the Medical Clinic on Thursday, at 12 o'clock, and the Third-year Class attends the Demonstrations in Morbid Anatomy and Autopsies by Professor Guitéras and Dr. Cattell.

SPECIAL ROSTER OF LABORATORY INSTRUCTION IN HISTOLOGY, OSTEOMETRY AND SYNDROMOLOGY, FOR STUDENTS OF THE FIRST-YEAR, SESSION 1894-1895.

For instruction in these laboratories, the First-year Class is divided into four sections, A, B, C, D, which attend throughout the entire session as follows:

Monday.  Tuesday.  Wednesday.  Thursday.  Friday.
Histology,  A  B  C  D  E
Osteology,  B & C — — A & D

All students whose time is not occupied during the above hours dissect from 12 to 2 daily, except Friday, when they dissect from 9 to 11.
GRADUATION.

At the end of the fourth year, a student who has satisfactorily passed all the required examinations receives the Degree of Doctor of Medicine on the following conditions:

I. He must be 21 years of age and of good moral character.

II. He must have passed satisfactory examinations in all of the required branches of the curriculum, must have attended the practical instruction in all departments, and his last year of instruction must have been at this school.

III. He must have attended at least one case of Obstetrics.

IV. After receiving notice of having successfully passed the final examination, he must enter his name on the Register of Candidates for the Degree.

V. He must be present at Commencement, unless excused by the Dean of the Faculty.

ARRANGEMENT OF SESSION.

The Academic Year consists of one session beginning in October and ending early in June.

The Session, 1894–95, will begin on Monday, October 1, and will end at Commencement, June 4, 1895.

EXPENSES.

First Year.

Matriculation Fee ........................................ $3.00
For general ticket, admitting to all the lectures and including all the laboratory work and dissection assigned to this year ............................................................... $150.00
Dissecting material ..................................... $1 a part.

The University of Pennsylvania is recognized by the Royal College of Physicians, London, and Royal College of Surgeons, England, to the extent that its graduates are exempt from the first examination and admitted to the second and third examinations of the joint examining board, on exhibiting their Diploma together with evidence of having passed a preliminary examination in general education and evidence of four years' study, without necessarily presenting all the certificates called for, and without taking further studies in England.

Graduates of the University of Pennsylvania are also admitted on presentation of the diploma and certificates to verify the curriculum, together with evidence of a satisfactory preliminary examination or degree in Arts, to the final examination for the triple qualification of the Royal Colleges of Physicians and Surgeons of Edinburgh, and Faculty of Physicians and Surgeons of Glasgow.
DEPARTMENT OF MEDICINE.

Second Year.
For general ticket, admitting to all the lectures and including all the laboratory work and dissection assigned to this year $150.00
Dissecting material 1 a part.

Third Year.
For general ticket, admitting to all the lectures and practical work assigned to this year $150.00

Fourth Year.
For general ticket, admitting to all the lectures and the practical courses of this year required for graduation (no graduation fee) $150.00
Material for operating 1 a part.

The Tuition fee of $150 each year is on condition that it is paid before November 1. If paid after October 31, the fee will be $155 for the year. If a division of payments is desired, $80 are to be paid before November 1, and $75 before February 1.
At least twenty-five dollars must be paid on account of tuition before the student can be admitted to the chemical laboratory.
Under no circumstances are any changes made in the established fees. The only free scholarships granted are those under the regulations hereafter referred to.

FEES FOR SPECIAL COURSES.
(Students taking special or partial courses, if not already matriculated, or if not graduates of the School, are required to pay the matriculation fee in addition to the fees named below.)
For any single Course of Lectures, except Materia Medica $20.00
For the Course of lectures in Materia Medica 10.00
For Practical Course in the Chemical Laboratory 25.00
For the Course in Practical Gynaecology of the fourth year 25.00
For any one of the remaining Practical Courses 15.00

Graduates of the School are admitted to the Lectures free of charge; but they are required to pay the fees for any practical courses they may take.
At the beginning of the first year, each student is required to make a deposit of $5 with the Professor of Chemistry, to cover “breakage” in the chemical laboratories. Any balance remaining at the end of the session is returned.
Board can be obtained in Philadelphia for $4.50 per week and upward.
SCHOLARSHIPS.

A competitive examination of candidates to fill three free scholarships is held annually. (In 1894, on Wednesday, September 26, at twelve o'clock noon.) Each candidate will be required—

First. To furnish satisfactory evidence that he is without means to defray the expenses of a medical education.

Second. To write a brief autobiography, of about 300 words in length, which will serve as a test of his qualifications in orthography and grammar.

Third. To pass a written examination in Latin prose translation on the first three books of Caeser, and a written examination in Physics, which may embrace questions relating to the general properties of Matter, Mechanics, Heat, Light and Electricity. The examination in Physics is not confined to the subject-matter of any text-book, but Balfour Stewart's Physics covers the ground as nearly as any.

Fourth. To pay an examination fee of $5, which is not returned, but is transferred to the matriculation fee in case the candidate is successful.

Candidates who propose to present themselves for examination will send their names, accompanied by the certificate required by the first condition, to the Dean of the Faculty of Medicine, before September 15, and appear without further notice.

FACILITIES FOR INSTRUCTION.

The instruction in the Medical Department is conducted in the Medical Hall, the Laboratory Building, the Hospital of the University, Maternity Pavilions, Wistar Institute of Anatomy and the Laboratory of Hygiene.

The Medical Hall contains the Laboratories of Histology, Osteosyndesmology, Physiology, Pathology, Pharmacy and Experimental Therapeutics.

The Histological Laboratory is under the supervision of the Professor of Anatomy and the Demonstrator of Histology. The Laboratory is furnished with excellent microscopes and all apparatus necessary to enable the student to become practically familiar with the most approved methods of microscopical technology, as well as with the Normal Histology of all the tissues and organs. Special facilities are afforded for original research and work in Practical Embryology; for this purpose the Laboratory is open throughout the year, except during July and August.
THE OSTEO-SYNDESMOLOGICAL LABORATORY is under the supervision of the Professor of Anatomy and Demonstrator of Osteology. In this Laboratory, the First-year student is required to make himself familiar with the skeleton and the articulations as a part of his instruction in practical anatomy. To this end separate bones are loaned the student, which he is permitted to take home for study.

THE PHYSIOLOGICAL LABORATORY is under the personal direction of the Professor of Physiology, who devotes his entire time to the subject, aided by the Assistants in Physiology. It is furnished with every form of apparatus likely to be used by the practical physiologist. Every facility is afforded advanced students and graduates pursuing special studies in Physiology. The Laboratory is open throughout the year, except during July and August.

THE PATHOLOGICAL LABORATORY, under the direction of the Professor of General Pathology and Morbid Anatomy and the Demonstrators, was opened in 1874, and attracts, from all sections of the country, many physicians and students who desire special preparation in Pathological Histology, Bacteriology and Experimental Pathology. It is furnished with microscopes and all the appliances requisite for practical study and for original research. This Laboratory is supplied with a complete outfit for the investigation of Bacteria in their relation to infectious diseases, and for the study of the lower fungi.

Each student of the Second year is provided with a separate table and microscope, with material and reagents, and receives personal instruction in Pathological Histology, in Mycology, and in the Microscopy of the Urine.

Each student of the Third year receives advanced practical instruction in Morbid Anatomy, and in the performing of autopsies. Weekly demonstrations of the gross appearance of specimens, embracing all known morbid products, mostly in fresh condition, together with the microscopic sections, are features of this course. The practical work is obligatory for students of the Second and the Third years.

Special instruction and guidance in original research are given by the demonstrators to advanced students.

The Laboratory is open throughout the year, except during July and August.

THE PHARMACEUTICAL LABORATORY is in charge of the Professor of Materia Medica and Pharmacy and the Instructors in Pharmacy. It is furnished with all necessary apparatus. In it the student learns not only the various pharmaceutical processes, but also that familiarity with drugs which can be acquired only by handling them.
THE LABORATORY BUILDING.

THE LABORATORY OF EXPERIMENTAL THERAPEUTICS, under the direction of the Professor of Materia Medica and Therapeutics, is furnished with all the apparatus and instruments necessary for the study of the physiological actions of medicines.

THE DEPARTMENT OF PRACTICAL OBSTETRICS is under the supervision of the Professor of Obstetrics and the Demonstrator. The course includes operations on the cadaver and practice with the manikin, while lying-in cases are given to advanced students. (See also under MATERNITY PAVILIONS.)

THE WISTAR AND HORNER MUSEUM, founded nearly one hundred years ago, has been annually augmented, and is unsurpassed in the United States for the number and variety of its specimens illustrating the normal and morbid anatomy of every part of the human body. It also contains a large number of preparations in comparative anatomy, used in illustrating the lectures. By the munificence of General Isaac J. Wistar, a commodious building named THE WISTAR INSTITUTE OF ANATOMY, has recently been erected opposite the Medical Hall, in which the collections of the Museum are contained. The Museum is open daily, except Sunday, from 1 P.M. to 3.30 P.M. throughout the season, to matriculated students.

THE CABINET OF MORBID ANATOMY, collected by Dr. George B. Wood, and given by him to the University, contains an extensive series of wet preparations, drawings, and models in wax and other materials, a collection unrivalled in extent and value, for illustrating diseases of the internal organs and of the skin.

The late distinguished Professor of Obstetrics, Dr. Hugh L. Hodge, enriched the facilities of instruction in that special branch by the gift of his valuable Cabinet.

Through a like liberality of the late Dr. Henry H. Smith, Professor of Surgery, and of the late Dr. John Neill, Professor of Clinical Surgery, the University received further extensive and valuable gifts of morbid specimens, models and drawings; and the late eminent Professor of Surgery and Honorary Professor of Clinical Surgery, Dr. D. Hayes Agnew, generously presented his entire collection for the use of the surgical chair.

THE LABORATORY BUILDING.

The first floor is arranged for the Operating-room or Infirmary of the Dental Department, and has the necessary waiting-rooms, etc., adapted to the requirements of this department. The entrance to the operating-room is on Spruce street.

The second and third floors are fitted up as chemical laboratories;
on the second floor is the Laboratory of General Chemistry, and on the third floor that of Medical Chemistry. In addition to the main room, on each story, there are four balance-rooms, provided with instruments for attaining accuracy in chemical research.

The fourth floor is occupied by the Dissecting-room.

CHEMICAL LABORATORIES.—The Laboratories for Practical Chemistry are under the supervision of the Professor and Assistant Professor of Chemistry, with assistants. Students of the first year devote three hours each week in the Laboratory to the study of Qualitative Analysis. The course includes chemical manipulations and the detailed study of the chemical reactions of the principal metals, acids, and their combinations, with the general principles of Qualitative Analysis, especially as they relate to the detection and separation of metals and compounds of importance to the physician. Each student is provided with a separate table and apparatus, and is required to exhibit by formulæ, on paper, all reactions involved in his tests.

Students of the second year devote three hours per week to practical work in the Laboratory. The course embraces an introduction to the general principles of Quantitative Analysis and the principles of Volumetric Analysis, with the practical examination of urine and animal fluids, and the recognition and recovery of poisons from the animal body and complex mixtures.

DISSECTING-ROOM.—In constructing the new Dissecting-room of the University, care was taken to provide everything that experience suggested as being necessary or desirable. The room is at the top of the Laboratory Building, and is one hundred and forty feet in length by forty feet in width. It is lighted by windows on all sides, and by skylights. The most perfect ventilation is thus secured. The tables have stone tops, which cannot absorb moisture, and are kept perfectly clean. There are numerous washstands with hot and cold water, and private closets for the use of each student. Cleanliness is rigidly enforced. The preservation of the cadaver has been so successfully accomplished as almost to do away with the dangers of dissecting wounds. Dissection is legalized in Pennsylvania.

The room is open from October 1 to the latter part of June, under the supervision of the Professor of Anatomy and the Demonstrators.

PRACTICAL SURGERY.—The applying of bandages is taught to students in their first year, while the use of fracture-dressings is taught in the third year, and surgical operations on the cadaver are a part of the practical instruction to students of the fourth year, under the supervision of the Professor and Demonstrators of Surgery. Instruments and splints are supplied without expense to the student.
THE STILLÉ MEDICAL LIBRARY.

The Stillé Medical Library, the judicious selection and generous gift of Professor Alfred Stillé, presented to the University in 1879, has received numerous additions, and now contains over six thousand volumes and five thousand pamphlets. It is appropriately placed in the New Library Building.

THE HOSPITAL OF THE UNIVERSITY OF PENNSYLVANIA.

The University Hospital, constructed according to established principles of hospital architecture, is provided with all the appliances pertaining to such institutions of the best class. It is adjacent to the Medical Hall, and forms an integral portion of the Medical Department. In its various departments, during 1892, there were treated 10,588 individual cases, representing almost all of the known medical, surgical, and gynaecological affections.

Attendance on the Clinical Instruction given in its amphitheatres and its wards is a part of the daily duty of the students, and ample opportunities are afforded the students to gain a personal and practical acquaintance with Clinical Medicine, Clinical Surgery, Gynaecology and the Specialties. These subjects are taught by the several Clinical Professors.

The new wing in the University Hospital, for chronic diseases, especially of the heart and lungs, is completed, and thereby unusually good opportunities are afforded for the study of these important affections. The wing has been erected by the liberality of Mr. Henry C. Gibson; and its hundred beds are rapidly being endowed by friends of the University. The Peter Hahn Ward, endowed by the late Dr. George B. Wood, has been opened for the admission of patients.

The resident physicians of the University Hospital are selected by competitive examination from among the graduating class of the University. The next examination will be held Thursday, May 31, 1894, at 5 P. M.

MATERNITY PAVILIONS.

The first pavilion of the Maternity department of the University Hospital was opened in the autumn of 1889. The second pavilion was opened in 1891. The Hospital has a present capacity of ten confinement cases a month. Two students of the graduating class are assigned to each case four weeks before the expected delivery. Under
the supervision of a demonstrator a thorough examination is made of the patient's history and present condition, with special reference to the urine, pelvis and abdomen. The labor is conducted by the students in charge of the case, under the instruction of a resident physician, and daily visits are made, during the puerperium, to the mother and child. The patient's safety is guarded by a strict system of antisepsis, and unnecessary exposure is avoided by giving to each woman a separate room during her confinement. The students fill out an elaborate record of the case, which is handed to the Professor of Obstetrics.

OTHER HOSPITALS AND HOSPITAL, CLINICS.

In addition to the official clinical lectures and bedside instruction delivered at the University Hospital, medical students have the opportunity of attending clinical lectures in other hospitals and in private classes formed for the special study of disease.

Close to the grounds of the University is the Philadelphia Hospital, with its thousand beds. Here are delivered twice a week Clinical Lectures on Medicine, Surgery, and the Diseases of Women and Children. Lectures on Clinical Medicine and Surgery are also delivered twice a week during the greater part of the year by the Medical Staff of the Pennsylvania Hospital. Instruction in Clinical Surgery and Children's Diseases is also given at the Children's Hospital. There are also weekly Clinics in Medicine and Surgery at the German Hospital. In the Southeastern Hospital and Dispensary students of the graduating class are lodged, in rotation, to attend confinement cases in the patients' homes. To these institutions students are admitted without charge.

During the summer, private classes are formed for Clinical Instruction, for which a moderate fee is charged.

Appointments of Resident Physicians, amounting to thirty-five or more, are made annually in the different hospitals of the city and in the Philadelphia Dispensary. Except in one or two Hospitals these positions are now filled by competitive examination of candidates.

From the preceding summary it is evident that a prolonged residence in Philadelphia must be of the utmost value to the student, by enabling him to pursue a systematic course of study and to become practically familiar with the scientific methods of investigating disease, and with the principles and results of its treatment.
COLLEGE MEDICAL SOCIETIES.

THE STILLE, H. C. WOOD, WILLIAM PEPPER, D. HAYES AGNEW, JOHN ASHURST, JR., AND JOHN GUITÉRAS MEDICAL SOCIETIES are composed of senior students. Their meetings are held bi-weekly during the session, for reading and discussing papers relating to the practice of medicine and surgery, and to pathology.

PRIZES TO BE AWARDED JUNE, 1894.

THE ALUMNI MEDAL is offered by the SOCIETY OF THE ALUMNI of the Medical Department of the University to the member of the graduating Class who attains the highest general average in examinations.

An ALUMNUS offers a Prize of $100 to the member of the class graduating in June, 1894, who presents the best thesis descriptive of original research in Physiology.

An ALUMNUS offers a Prize of $50 to the member of the class graduating in June, 1894, who attains the highest average in the examinations in Pathology.

The Professor of Obstetrics offers a Prize of an Obstetrical Forceps to the member of the Graduating Class furnishing the best report of a case of Obstetrics occurring in the University Maternity Hospital.

The Professor of Clinical Medicine offers a prize of a Thoma-Zeiss Blood-Counting Apparatus and a Fleischl's Haemometer for the best report of his clinic during the session.

The Professor of Clinical Surgery offers a Prize of a Surgical Pocket-case for the best report of his clinics during the session; also a Prize of a copy of Treves' Operative Surgery to one member of each of the four Surgical Ward Class sections for reports of that service.

The Clinical Professor of Orthopaedic Surgery offers a Prize of an Antiseptic Minor Operating Case for the best practical work in Orthopaedic Surgery, or for an acceptable original design in Apparatus.

The Dr. Louis J. C. KIMMEL Prize of an Antiseptic Minor Operating Case is offered to the student who presents the best thesis on a surgical subject.

The Clinical Professor of Genito-Urinary Diseases offers a Prize of a copy of Treves' Operative Surgery for the best thesis on a clinical study of cases.

A Prize of a Surgical Pocket-case is offered by the Demonstrator of Anatomy to the member of the Graduating Class who presents the best record of anomalies found in the anatomical rooms.

Two Prizes are offered by the Demonstrator of Surgery for proficiency in Fracture Dressings, Operating and Bandaging; a Pocket-case
of instruments to a student of the first year class; a Pocket-case of instruments to a member of the Graduating Class.

A Prize of a copy of Ashhurst's Surgery is offered by the Demonstrator of Osteology to the member of the First-year Class who passes the best examination in Osteology.

A Prize of a case of Autopsy Instruments is offered by the Demonstrator of Morbid Anatomy for the best report of the demonstrations in Morbid Anatomy.

A Prize of a Haemocytometer is offered by the Instructor in Clinical Medicine to the member of the First-year Class who presents the best report of the lectures on Physical Diagnosis.

A Prize of Twenty-five Dollars is annually offered by the D. Hayes Agnew Surgical Society for the best anatomical preparation made in the dissecting-room, to be deposited in the Wistar and Horner Museum.

The Joseph Zentmayer Prize of a Histological Microscope, with two object-glasses and two eye-pieces is offered by the successors of Joseph Zentmayer to the student passing the best examinations in Histology and Embryology, the average to be made from the combined marks of the separate examinations on these branches.
HOSPITAL OF THE UNIVERSITY OF PENNSYLVANIA.

JOHN S. BILLINGS, M. D., LL. D., DIRECTOR.

BOARD OF MANAGERS.
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MRS. LEWIS FOX.

CHAIRMEN OF STANDING COMMITTEES.
ON FINANCE: WILLIAM PEPPER, M. D.
ON PROPERTY AND REPAIRS: W. F. NORRIS, M. D.
ON SUPPLIES: HORACE Y. EVANS, M. D.
ON LIBRARY AND MUSEUM: JOHN SAILER.
The names of the Medical Staff and Officers of the Hospital are printed in the first part of this Catalogue.

The University Hospital is under the immediate direction of a Board of Managers, constituted as above. It is situated on a lot of ground between 34th and 36th Streets, and Spruce and Pine Streets, given by the City of Philadelphia to the University. The main building and one wing were opened for the reception of patients and for purposes of clinical instruction in 1874. In 1882 a new wing was added, through the liberality of Mr. Henry C. Gibson, for patients suffering from Chronic Diseases.

The Main Building, besides the offices and the rooms of the officers, has a large clinical Amphitheatre, which will seat six hundred students, and a smaller one seating one hundred and fifty. It also has twelve rooms for private patients. The wing adjoining has four wards, with a capacity of one hundred and ten patients, and sixteen private rooms. The wing for Chronic Diseases has room for sixty-two patients in its four wards. There is, therefore, full accommodation for one hundred and eighty-six patients. In the basement are surgical and medical dispensaries, also special dispensaries for diseases of the throat and nose, diseases of children, diseases of the skin, the eye and the ear, nervous diseases, diseases of women, for orthopaedics and for venereal diseases, for out-door patients. In connection with the Orthopaedic Dispensary is a workshop, in which braces and other appliances are made.

The hallways are well lighted and spacious, and can be used as wards, should there be any sudden demand which the capacity of the regular wards could not meet.

The Hospital is also well adapted to purposes of teaching. A large part of the instruction given to the students in the Medical School is given here, as will be seen by reference to the rosters.

All cases of accident occurring in the State of Pennsylvania, which are brought to the Hospital within twenty-four hours after their occurrence, are admitted at any hour of the day or night. An ambulance will be sent for such cases, if notice is given by telephone or messenger.

Charity patients are admitted by the members of the Medical Staff on a written order to the superintendent; provided that a bed be vacant in the department to which the member of the Medical Staff is attached.

Paying patients are received at the Hospital on application to the Superintendent, subject to the approval of the proper attending medical officer. The charge in the wards is $7.00 a week; in the private
rooms, of which there are twenty-eight, the prices range from $14.00 to $30.00 a week. The friends of the patients can be accommodated in the Hospital, under certain circumstances, but it is better for them to board in the neighborhood, where rates range from $5.00 per week upwards.

No patient with acute venereal disease, or mania-à-potu, is admitted as a free patient, but is charged such rates for board as may be agreed upon. There are special apartments for mania-à-potu patients.

Visitors are admitted to see patients in the private rooms at convenient hours.

Visitors are admitted to the wards on week-days between 3 and 4 P.M., and on Sundays from 2 to 3 P.M.

There are elected annually from the graduating class of the Medical School four Resident Physicians, who come on duty for fifteen months at intervals of three months.

An Annual Report of the Hospital is published, giving detailed statistics of the year. Copies can be had on application to the Superintendent.

Communications concerning the business of the Hospital and the admission of patients should be addressed to the Superintendent, Miss M. E. P. Davis, and not to the Dean of the Medical Faculty.

The Training School for Nurses, attached to the Hospital of the University, was organized in 1886. In that year a "Home for Nurses" was erected in memory of Mrs. Richard D. Wood by her children, and has since then been considerably enlarged by the same generous donors. The building was completely furnished by the women members of the Training School Committee, and every provision is made for the healthful and comfortable home life of the pupil nurses. Hitherto the course of instruction has covered a period of two years, but beginning with the autumn of 1894 the course will be extended to three years. Besides the regular ward and class instruction, courses of lectures are given in Hygiene, Anatomy, Physiology, Medical and Surgical Nursing, Materia Medica, Toxicology, Urinalysis, Use of Splints, Bandaging, Gynaecology, Obstetrics, Diseases of Children, Diseases of Eye, Ear and Nervous System, Rest Cure, Electro-therapeutics, Massage, Care of the Insane, Contagion, Nutrition and Cookery for the Sick. The graduates have been in 1888, 8; 1889, 17; 1890, 6; 1891, 19; 1892, 6, and in 1893, 14, as follows:

Katie Brennan, do.
Elizabeth M. Brophy, do.
Katharine E. Damm, do.
Emma B. Derno, do.
Mary R. Edwards, do.
Emma C. Fox, do.
Ellen S. Massey, do.
M. Janet Musser, do.
Sarah Rudden, do.
Phandora Simpson, do.
Capitola A. Trautman, do.

All communications relating to the School for Nurses should be addressed to

JANE A. DELANO,
Instructor of Nurses.
AUXILIARY DEPARTMENT OF MEDICINE.

FACULTY.

WILLIAM PEPPER, M.D., LL. D., PROVOST, and ex-officio President.
EDWARD D. COPE, A.M., PH. D., Professor of Zoölogy and Comparative Anatomy.
WILLIAM POWELL WILSON, Sc. D., Professor of Botany.
JOHN S. BILLINGS, M.D., LL. D., Professor of Hygiene.
CHARLES K. MILLS, M.D., Professor of Medical Jurisprudence, and DEAN of the Faculty.
AMOS PEASLEE BROWN, E. M., Ph. D., Professor of Mineralogy and Geology.

MATRICULATES.

Armstrong, Alex.,
Beattie, John,
Booth, Arthur W.,
Bunting, J. T.,
Crane, William H.,
Dubell, J. E., M. D.,
Pitzpatrick, W. J.,
Franklin, Melvin M.,
Fritz, Clarence H.,
Galloway, Merrill J.,
Gans, Sig. L.,
Garvin, May Bell,
Gomberg, Max B,
Gross, Hermann W.,
Harrington, T. L., B. S.,
Hemsath, John,
Hollingshead, S. W.,
Koenig, Augustus O., V. M. D.,
Lindsay, Roland S.,
McCaffery, George W., M. D.,
McGowan, J. A.,
McKinley, Archie S.,
Oenslager, John, Jr.,
Parker, Hermann B.,
Pollak, Berthold S.,

Trenton, N. J.
Lebanon, Pa.
Elmira, N. Y.
Glen Mills, Pa.
Mount Holly, N. J.
do.
do.
do.
do.
do.

Providence, R. I.
Boston, Mass.
Oshkosh, Wis.
Zehner, Pa.
Pemberton, N. J.
do.
do.
do.
do.
do.

Harrisburg, Pa.
Bryn Mawr, Pa.
Vienna, Austria.
The Auxiliary Faculty of Medicine supplements the customary course of Medical instruction by lectures on branches of Science essential to the thorough education of the physician. The course is essentially post-graduate. There can be no matriculation by Medical students until the student has entered upon his second year of Medical study. His second year in this department should be taken in connection with the fourth year of Medical instruction for which the University now provides, or after graduation.

The session for 1894-95 will begin the first Monday in October and continue until June. The matriculation book will be closed after November 1st, except to such students as show the Dean good reason for further indulgence.

**COURSES OF STUDY.**

**Zoology and Comparative Anatomy.**—The instruction is given in the School of Biology, the announcement of which can be consulted, or information can be obtained directly from the professor.

**Botany.**—The instruction is given in the School of Biology, the announcement of which can be consulted, or particulars can be obtained from the professor. Elementary Botany is taken the first year. Advanced Botany is taken the second year, and must be preceded by Elementary Botany, or a satisfactory examination in the latter must be passed.

**Hygiene.**—Two courses of lectures on General Hygiene are delivered, and students can arrange to take laboratory work with the Director, or First Assistant, at the Laboratory of Hygiene. For particulars the announcement of the Laboratory of Hygiene can be consulted.

**Medical Jurisprudence.**—The instruction is chiefly on subjects of Legal Medicine on which the physician may be called upon to give
FEES—CERTIFICATES—SPECIAL STUDENTS.

EVIDENCE IN A COURT OF JUSTICE. It includes the discussion of the medico-legal bearings of such subjects as: Methods of Legal Procedure; Medical Evidence; Insanity; Idiocy and Imbecility; Nervous Affections of Medico-Legal Interest; Feigned and Factitious Diseases; Inebriety, Drunkenness and Drug Habits; Personal Identity; Modes of Dying and the Phenomena and Signs of Death; Post-Mortem Investigations; Blood and other Stains; Age and Sex of the Living and of the Dead; Birth, Legitimacy and Survivorship; Violent Deaths, Homicidal, Suicidal and Accidental; Rape and Unnatural Sexual Offenses; Pregnancy, Delivery, Criminal Abortion and Infanticide; Marriage and Divorce; Life Insurance; and Medical Malpractice.

MINERALOGY AND GEOLOGY.—Students take the lectures and laboratory work on these subjects in the College. The instruction given is indicated in the Subjects of Instruction offered by the College Faculty, under Mineralogy 5, and Geology 3.

FEES.

The lectures are free to the Medical students and to Medical graduates of this University. Other matriculates pay a matriculation fee of five dollars, and a special tuition fee for each professor’s course, or for all the courses.

CERTIFICATES.

Graduates in Medicine of not less than one year’s standing, of this University, or of other approved Medical Schools, who have taken for at least two years the lectures and laboratory work prescribed in the courses in Comparative Anatomy, Zoology, Botany, Medical Jurisprudence, Toxicology, Mineralogy, Geology and in Hygiene, and have passed satisfactory examinations, and presented to the Dean one month before final examination an original thesis acceptable to the Faculty, upon some subject connected with these studies, will be recommended to the Board of Trustees for a special Certificate of the Department, signed by the members of the Faculty.

SPECIAL STUDENTS.

The lectures and laboratories of the Department are open to other persons than those engaged in the study of Medicine. Admission may be obtained from the Dean, either to the whole course of lectures or
to the lectures on a single branch. To such special students, and to medical students attending special courses, the Faculty may give, on satisfactory evidence of attendance and proficiency, the proper Certificates.

DEGREES.

A student in the Auxiliary Department of Medicine, who is a Baccalaureate graduate in Arts or Science of this University or of an American college whose degrees are accepted by this University as equivalent to its own, may become a candidate for the degree of Doctor of Philosophy on fulfilling certain requirements prescribed by the Faculty of Philosophy of the University. He may choose his three required subjects from the following studies: Botany, Zoology, Geology, Mineralogy, and Bacteriological Hygiene. One of these subjects he must designate as his major, the other two as his subordinate, or minor subjects. Before being permitted to appear for final examination, he must present a satisfactory thesis on some topic covered by his major study. If the student is pursuing a course in Medicine, he will not be permitted to enter on his work for the degree of Doctor of Philosophy until the beginning of the fourth year, in which provision is made for these subjects. He must give his undivided attention to the subjects selected, for at least one year after graduation in Medicine. It is to be clearly understood that the student will be permitted to appear for examination only, when in the judgment of the professors in charge of his courses, he has fully completed all the required work.

When applying for examination the candidate must exhibit his medical diploma to the Dean, and show that he has paid all the University fees.

Candidates must be present at Commencement, unless excused by the Faculty.

ORDER OF LECTURES.—FIRST YEAR.—1893-94.

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<td>3 to 5 P. M.</td>
<td>Brown. Mineralogy. Room 15. College H.</td>
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### SECOND YEAR

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<td>9 to 10 A.M.</td>
<td><strong>Cope.</strong> Zoology and Com. A. Biolog. H.</td>
<td><strong>Cope.</strong> Zoology and Com. A. Biolog. H.</td>
<td><strong>Cope.</strong> Zoology and Com. A. Biolog. H.</td>
<td><strong>Brown.</strong> Geology. Room 15, College H.</td>
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<td>2:30 to 3:30 P.M.</td>
<td><strong>Mills.</strong> Medical Jurispr. Medical H.</td>
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The Course on Zoology and Comparative Anatomy can be taken either in the first or in the second year.

### Principal Text-books:

- Cope's *Syllabus of Lectures on Geology and Palaeontology.*
- Packard's *Elements of Zoology.*
- Huxley's *Elements of the Comparative Anatomy of Vertebrates and Invertebrates.*
- Gray's *Text-book of Botany, Vols. I. and II.*
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- Parke's *Practical Hygiene* (by Natter).
- Billings' *Ventilation and Heating.*
- Abbott's *Principles of Bacteriology.*
- Wormley's *Micro Chemistry of Poisons.*
- Richter's *Chemistry.*
- Reese's *Medical Jurisprudence and Toxicology.*
- Taylor's *Medical Jurisprudence.*
- E. S. Dana's *Text-book of Mineralogy.*
- J. D. Dana's *Manual of Geology.*
- J. H. Williams' *Elements of Crystallography.*
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### Works of Reference:

- Sach's *Text-book of Botany.*
- Le Maout and Decaisne's *General System of Botany, Descriptive and Analytical.*
- Cooke and Berkley on *Fungi.*
- Gegenbaur's *Elements of Comparative Anatomy.*
- Wiedersheim's *Anatomy of Vertebrates.*
- Balfour's *Comparative Embryology.*
Auxiliary Department of Medicine.

Buck's *Hygiene and the Public Health*.
Rohe's *Text-book of Hygiene*.
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J. D. Dana's *System of Mineralogy*.
Bauermann's *Systematic Mineralogy*.
Le Conte's *Elements of Geology*.
Lyell's *Principles of Geology*.

For further information regarding this Department, address,

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THE WISTAR INSTITUTE OF ANATOMY
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The Wistar Institute of Anatomy was founded in 1892 for the preservation and increase of the Wistar and Horner Museums and the promotion of advanced study and research in Anatomy and Biology. Dr. Casper Wistar, Professor of Anatomy from 1808 to 1818, made a valuable collection of anatomical preparations for the illustration of his teachings, and after his death these were presented by his widow, Mrs. Elizabeth Mifflin Wistar, to the University. The successors of Dr. Wistar in the Chair of Anatomy constantly added to the collection, the most conspicuous of these additions being that made by Dr. William E. Horner, in 1853, whose name was thenceforth added to its title.

The combined Anatomical Museum, as it was the first public one in America, has continued to be the largest, and the establishment of the Wistar Institute insures for it a protection and growth commensurate with its importance to Medical and Biological Science. It is, and always will be, the storehouse of illustrations to be used in the undergraduate instruction in these sciences in their several schools, but its great and ever-increasing wealth of material affords the most liberal opportunity for post-graduate study and original investigation. For the furtherance of these purposes, General Isaac J. Wistar has generously given to the Institute a large and costly fire-proof building, with ample and secure accommodation of the Museum and its expected increments, and a sufficient endowment to provide means for beginning the advanced and original work for which it is intended. Well-equipped laboratories and offices adjoin the Museum proper, and every facility is provided for the work of original investigators under the supervision of a competent Director and skilled assistants. The Institute is a distinct corporation, its property and funds held under a separate trust, but so organically united with the University as to constitute one of its departments, and to be, within the limits of the foundation, under its control. It is governed by a Board of Managers,
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EDMUND W. HOLMES, M. D., Demonstrator of Anatomy.

ROBERT FORMAD, V. M. D., Demonstrator of Normal Histology.
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* Not in attendance.
## Name

- Rous, Armand
- Sandusky, Frederick R.
- Saxenmeyer, George B.
- Shaver, James Harry
- Sorg, Daniel E.
- Spangler, Adam C.
- Stilson, Ira B.
- Sturtevant, Harry C.
- Tann, Isaac R.
- Taylor, Fred G.
- Traynor, Philip A.
- Van Valin, Clyde A.
- Walker, Albert
- Watson, David S.
- Wells, Frederick M.
- Wells, William C.
- Wilson, Colin F.
- Wishart, Edward R.
- Yale, William H.

## Residence

- Vevay, Ind.
- Shelbyville, Tenn.
- Philadelphia, Pennsylvania
- Marathon, N. Y.
- Pittsburgh, Pennsylvania
- Middleburg, Pennsylvania
- Philadelphia, Pennsylvania
- Glenbrook, Conn.
- Philadelphia, Pennsylvania
- Pittsburgh, Pennsylvania
- Elk horn, Wis.
- Wilmington, Del.

## Preceptor

- University
- University
- University
- University
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- University
- University

## Name

- Adams, William C.
- Armstrong, George M. S.
- Arosemena, Harmodio
- Avil, Francis Savoy
- Baldwin, Frank G.
- Beard, Fayette H.
- Belding, Fred S.
- Bender, Charles Dana
- Benz, John C.
- Blaker, Charles S.
- Brown, Byron A.
- Buchholz, Augustus C.
- Bull, Alfred E.
- Byrkit, Guy M.
- Carr, Robert L.
- Cauffman, Theophilus F.
- Christine, Charles A., Jr.
- Clay, Samuel T.
- Clemens, Thomas J.
- Colborn, Charles W.
- Connolly, Albert L.
- Cornell, J. Harold

## Residence

- Panama, U. S. of Colombia
- Philadelphia, Pennsylvania
- Ansonia, Conn.
- Hanover, Pennsylvania
- Rochester, N. Y.
- Meadville, Pennsylvania
- Oswego, N. Y.
- Trevose, Pennsylvania
- Cohocton, N. Y.
- Syracuse, N. Y.
- Wilkes-Barre, Pennsylvania
- Red Oak, Iowa
- Greenville, N. C.
- Sea Isle City, N. J.
- Philadelphia, Pennsylvania
- Hanover, Pennsylvania
- Philadelphia, Pennsylvania
- Ashley, Pennsylvania
- Honesdale, Pennsylvania

## Preceptor

- Chas. O. Morris
- Thos. M. Armstrong
- University
- University
- University
- Homer Belding
- Cyrus See
- W. Lewis
- University
- University
- University
- W. I. Brenizer
- University
- University
- University
- Thos. T. B. Knight
- D. L. James
- John McDougall
- Geo. Janvier Paynter
- University
- University
- University
MATRICULATES.

<table>
<thead>
<tr>
<th>Name</th>
<th>Residence</th>
<th>Preceptor</th>
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<tbody>
<tr>
<td>Crist, Nile</td>
<td>Hummelstown,</td>
<td>J. B. Crist.</td>
</tr>
<tr>
<td>Decker, Clyde</td>
<td>Newton, N. J.,</td>
<td>University.</td>
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<tr>
<td>Denis, Herbert B.</td>
<td>Red Bank, N. J.,</td>
<td>J. D. Throckmorton.</td>
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<tr>
<td>Dobbyn, G. Henry S.</td>
<td>Beechworth, Aus.,</td>
<td>University.</td>
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<tr>
<td>Dowden, James A.</td>
<td>Binghamton, N. Y.,</td>
<td>B. Dolan.</td>
</tr>
<tr>
<td>*Drayton, Clarence Eugene</td>
<td>Bridgetown,</td>
<td>University.</td>
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<tr>
<td>Earley, John, Jr.</td>
<td>barbadoes, W. I.,</td>
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<td>Eisenhart, Will S.</td>
<td>Titusville,</td>
<td>University.</td>
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<tr>
<td>Ellis, Malcolm</td>
<td>Franklin,</td>
<td>C. D. Elliott.</td>
</tr>
<tr>
<td>Farrar, William</td>
<td>S. Paulo, Brazil,</td>
<td>Guilherme Ellis.</td>
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<td>Gamble, Stanley</td>
<td>London, Ohio,</td>
<td>University.</td>
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<tr>
<td>Gilbert, V. Walter</td>
<td>Butler,</td>
<td>O. K. Waldron.</td>
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<tr>
<td>Graeber, Nicholas J., Jr.</td>
<td>Philadelphia,</td>
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</tr>
<tr>
<td>Graham, William C.</td>
<td>Ashland,</td>
<td>University.</td>
</tr>
<tr>
<td>*Graves, William H.</td>
<td>Lancaster, Ohio,</td>
<td>Chas. W. Outcault.</td>
</tr>
<tr>
<td>Grey, Pearl Zane</td>
<td>Syracuse, N. Y.,</td>
<td>University.</td>
</tr>
<tr>
<td>Guest, George C.</td>
<td>Columbus, Ohio,</td>
<td>L. M. Grey.</td>
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<td>Hickman, Harry B.</td>
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<td>Frederick Saurers.</td>
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<td>Holcombe, Roy J.</td>
<td>Lewes, Del.,</td>
<td>University.</td>
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<td>Houck, Oliver</td>
<td>Rochester, N. Y.,</td>
<td>F. H. Sanford.</td>
</tr>
<tr>
<td>*Isbell, C. Harold</td>
<td>Laanna,</td>
<td>University.</td>
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<tr>
<td>Juster, William J.</td>
<td>Lakeville, Conn.,</td>
<td>Geo. L. Hurd.</td>
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<tr>
<td>Keeler, J. Ernest</td>
<td>Bucharest,</td>
<td>University.</td>
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<td>Knapp, Fred F.</td>
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<tr>
<td>Kurtz, Harry L.</td>
<td>Newark Valley,</td>
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<tr>
<td>Lawshe, Allison R.</td>
<td>N. Y.,</td>
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<tr>
<td>McCarty, Walter W.</td>
<td>Dillsburg,</td>
<td>University.</td>
</tr>
<tr>
<td>McLaughlin, J. Harry</td>
<td>Connellsville,</td>
<td>University.</td>
</tr>
<tr>
<td>Matheny, Sherman M.</td>
<td>Des Moines, Ia.,</td>
<td>A. L. McCarty.</td>
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<tr>
<td>Meaker, Lucius F.</td>
<td>Wilmington, Del.,</td>
<td>F. E. Smith.</td>
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<tr>
<td>Miller, Raymond S.</td>
<td>Worchester, Mass.,</td>
<td>University.</td>
</tr>
<tr>
<td>Murphy, Fred</td>
<td>Ellwood City,</td>
<td>University.</td>
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<td>Musser, Andrew S.</td>
<td>Auburn, N. Y.,</td>
<td>University.</td>
</tr>
<tr>
<td>Ozias, J. Howard</td>
<td>Aaronsburg,</td>
<td>J. E. Ward.</td>
</tr>
<tr>
<td>Parry, George C.</td>
<td>Aaronsburg,</td>
<td>University.</td>
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<tr>
<td>Pottle, Fred E.</td>
<td>Ogdensburg, N. Y.,</td>
<td>University.</td>
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<tr>
<td>Prichett, Harry S.</td>
<td>Quakertown,</td>
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<tr>
<td></td>
<td>Bangor, Maine,</td>
<td></td>
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<tr>
<td></td>
<td>Minneapolis,</td>
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<tr>
<td></td>
<td>Minn.,</td>
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</table>

*Not in attendance.*
Name.
Rabb, Charles W.,
*Reynolds, Francis B.,
Reynolds, Harry F.,
Schermerhorn, Alfred R.,
Schoen, Albert,
Schultz, Frank H.,
Sears, Blake A.,
Seymour, James C.,
Shapard, Herbert H.,
Shiffler, Vane G.,
Smith, Edbert A.,
Smith, Frank R.,
Speirs, George C.,
Stauffer, Nathan P.,
Tracy, William D.,
Turner, William K., Jr.,
Watson, Walter M.,
Weaver, Bert J.,
Webster, William L.,
Wharton, Charles M.,
Yeakel, William A. B.,
*Yturraldo, Florencio,

Residence.
Bloomburg,
So. Amenia, N.Y.,
So. Gibson,
Philadelphia,
Peoria, Ill.,
Lancaster, Ohio,
Ithaca, N.Y.,
Omaha, Neb.,
Austin, Texas,
Lebanon,
No. Hammond, N. Y.,
No. Hammond, N. Y.,
Hartford, Conn.,
Phoenixville,
Worcester, Mass.,
Philadelphia,
Wilmington,
Elkhorn, Wis.,
So. Hammond, N. Y.,
Smyrna, Del.,
Old Zionsville,
Veracruz, Mexico,

Preceptor.
University.
University.
University.
University.
University.
J. B. & F. B. Howe.
University.
Wm. S. Huber.
D. L. Coe.
University.
University.
University.
F. H. Kendrick and O. F. Harris.
University.
H. N. Jackson.
J. R. Dickson.
University.
University.
H. A. Tunison.

Total, 88.

SPECIAL STUDENTS.
Baker, Arthur E., L.D.S.,
Morales, Luis F.,
Reiniger, Albert,
Souza, Lourival M. de,

London, Eng.,
Granada, Nicaragua,
Stuttgart, Germany,
Pelotas, Brazil,

London Dental Hospital.
University.
University of Berlin.
Faculty of Medicine,
Rio de Janeiro,

Total, 4.

Students of the Third Year .......... 64
Students of the Second Year .......... 75
Students of the First Year .......... 88
Special Students ................. 4

231

The total number of new matriculates the present session, including those admitted to advanced standing, is 119.
Since the foundation of the Department the total number of graduates has been 716.

* Not in attendance.
<table>
<thead>
<tr>
<th>State</th>
<th>Students</th>
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<tbody>
<tr>
<td>Alabama</td>
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<td>Arkansas</td>
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<td>Brazil</td>
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<td>California</td>
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<td>Connecticut</td>
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<td>Cuba</td>
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<td>Delaware</td>
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<td>District of Columbia</td>
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<td>Ecuador</td>
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<td>England</td>
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<td>France</td>
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<td>Germany</td>
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<td>Illinois</td>
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<td>Indiana</td>
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<td>Iowa</td>
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<td>Maine</td>
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<td>Massachusetts</td>
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<tr>
<td>Mexico</td>
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<td>Minnesota</td>
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<td>Nebraska</td>
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<td>New Jersey</td>
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<td>New York</td>
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<td>New Zealand</td>
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<td>Roumania</td>
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<td>Turkey</td>
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<td>Uruguay</td>
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<td>Virginia</td>
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<td>West Virginia</td>
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<td>Wisconsin</td>
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<tr>
<td>Total</td>
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</table>

Students from the United States and Canada: 190
Students from foreign countries: 41
The course of instruction is graded and extends over three years, with one session of eight months, beginning first of October and ending early in June in each year. This is followed by a short session which is of a practical character, and confined entirely to the Operating and Mechanical rooms. This course is optional and begins the day following Commencement and ends the last of June.

Laboratory instruction of each student, not only in Practical Dentistry, but also in Practical Chemistry and Histology, forms a prominent feature in this Department.

The appointments of the Lecture rooms, Operating room and Laboratories are as complete as any in America.

During the regular session, the following is the arrangement of studies:

**ORDER OF LECTURES AND PRACTICAL WORK.**

**FIRST YEAR.**

<table>
<thead>
<tr>
<th>Hour</th>
<th>Monday</th>
<th>Tuesday</th>
<th>Wednesday</th>
<th>Thursday</th>
<th>Friday</th>
<th>Saturday</th>
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<tbody>
<tr>
<td>10 A.M.</td>
<td>Wormley. General Chemistry.</td>
<td>Wormley. General Chemistry.</td>
<td>9 A.M. Laboratory Instruction in Mechanical Dentistry.</td>
<td>9 A.M. Chemical Laboratory Three hours.</td>
<td>Harte. Osteology.</td>
<td>9 A.M. Instruction in Mechanical or Operative Dentistry.</td>
</tr>
<tr>
<td>11 A.M.</td>
<td>Laboratory Instruction in Mechanical Dentistry.</td>
<td>Laboratory Instruction in Mechanical Dentistry.</td>
<td>12 M. Laboratory Instruction in Mechanical Dentistry.</td>
<td>12 M. Operative Clinic. Two hours.</td>
<td>Operative Clinic.</td>
<td>Operative Clinic.</td>
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<tr>
<td>12 M.</td>
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<td></td>
<td>12 M. Laboratory Instruction in Mechanical Dentistry.</td>
<td>12 M. Operative Clinic. Two hours.</td>
<td>Operative Clinic.</td>
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<td>1 P.M.</td>
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<td></td>
<td></td>
<td>Operative Clinic.</td>
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<tr>
<td>2 P.M.</td>
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</table>

For the study of Practical Histology the class is divided into sections, one of which is occupied at a time. Those of the First-year students not thus engaged attend the Mechanical Clinics.
ORDER OF LECTURES.

SECOND YEAR.

<table>
<thead>
<tr>
<th>Hour</th>
<th>Monday</th>
<th>Tuesday</th>
<th>Wednesday</th>
<th>Thursday</th>
<th>Friday</th>
<th>Saturday</th>
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</thead>
<tbody>
<tr>
<td>9 A.M.</td>
<td>Laboratory of Mechanical Dentistry, or Operative Clinic, Crown and Bridge Work.</td>
<td>Laboratory of Mechanical Dentistry, or Operative Clinic, Crown and Bridge Work.</td>
<td>Laboratory of Mechanical Dentistry, or Operative Clinic, Crown and Bridge Work.</td>
<td>Laboratory of Mechanical Dentistry, or Operative Clinic, Crown and Bridge Work.</td>
<td>Laboratory of Mechanical Dentistry, or Operative Clinic, Crown and Bridge Work.</td>
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<td>Operative Clinic.</td>
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<td>Operative Clinic.</td>
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<tr>
<td>12 M.</td>
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</tr>
<tr>
<td>1 P.M.</td>
<td>Operative Clinic.</td>
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<td>Operative Clinic.</td>
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</table>

The curriculum of the first and second years is identical for Medical and Dental students so far as Chemistry, Histology, Anatomy and Physiology are concerned.

THIRD YEAR.

<table>
<thead>
<tr>
<th>Hour</th>
<th>Monday</th>
<th>Tuesday</th>
<th>Wednesday</th>
<th>Thursday</th>
<th>Friday</th>
<th>Saturday</th>
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<tbody>
<tr>
<td>10 A.M.</td>
<td>Operative Clinic.</td>
<td>Operative Clinic.</td>
<td>Operative Clinic.</td>
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<td>Operative Clinic.</td>
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<tr>
<td>12 M.</td>
<td>Medical and Surgical Clinics, University Hospital.</td>
<td>Operative Clinic.</td>
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<td>Operative Clinic.</td>
<td>Operative Clinic.</td>
<td>Operative Clinic.</td>
<td>Operative Clinic.</td>
<td>Operative Clinic.</td>
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<td>2 P.M.</td>
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<tr>
<td>3½ P.M.</td>
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<td>4½ P.M.</td>
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<tr>
<td>5½ P.M.</td>
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</tr>
</tbody>
</table>

The curriculum of the first and second years is identical for Medical and Dental students so far as Chemistry, Histology, Anatomy and Physiology are concerned.
OPERATING-ROOM, LABORATORIES, ETC.

The department possesses the means for thorough training, both theoretical and practical, not surpassed, it is believed, by any other institution. The Operating-Room is 140 feet in length by 40 feet in width, and lighted by windows on all sides. In front of each window are placed a Morrison chair, a handsome nickel-plated movable bracket, and a neat walnut table. Battery wires are arranged to a number of the chairs for the use of electric pluggers.

The Mechanical Laboratory is supplied with all modern appliances, and is under the care of able and experienced mechanicians. Special clinics will be given in continuous gum and crown and bridge work.

The extensive Chemical Laboratories are under the charge of the Assistant Professor of Chemistry.

The Dissecting-Room is large, well lighted, thoroughly ventilated, and is furnished with ample material for the successful prosecution of anatomical studies.

In order to facilitate work in the practical departments, and to fully employ the student's time, the regular session is so arranged that the first-course student is required to devote the morning hours equally between dental, histological, and chemical laboratory work.

During the second and third years the student has the entire forenoon of each day for practical dental work. Ample opportunity is afforded for practice in operative and mechanical dentistry. In the latter branch, the students of the first year are divided into sections, thus devoting the time not otherwise engaged to practice in the operative and mechanical rooms.

It is believed that this plan of grading the course, and of affording the First-year student an opportunity of coming forward for examination in the branches of chemistry, histology, and materia medica, and the Second-year student upon anatomy and physiology, will not only prove an economical arrangement of his time, but will really facilitate his labors in the acquirement of knowledge in the remaining branches.

OUTLINE OF THE COURSE, SESSION 1894-95.

The First-year students will be required to attend the following branches and pass final examinations upon Materia Medica, Chemistry and Histology at the close of the term. If the student fail to pass, a second examination is afforded him at the beginning of the next Winter Session.

1. Chemistry, in the Chemical Laboratory, three hours, Thursday morning, and the lectures on this branch Monday and Tuesday of each week.
COURSE OF INSTRUCTION.

2. Dental Materia Medica. One lecture, Saturday of each week.

3. General and Special Histology in the Histological Laboratory, two hours, and Anatomical Demonstrations, one hour each week.

4. The morning hours, not otherwise occupied, will be devoted to practical work in the Mechanical Laboratory.

5. On the afternoon of each week-day, except Saturday, the students of the First-year class will be trained in operative work, either out of the mouth on extracted teeth, or in simple cavities in the living subject.

6. They will, in addition to subjects named, attend lectures on Osteology, Anatomy, Physiology, Operative and Mechanical Dentistry.

SECOND YEAR.

1. Students of the Second year will repeat Anatomy and Physiology, Operative and Mechanical Dentistry, and add thereto Dental Pathology and Therapeutics.

2. They will repeat Operative and Mechanical Work, with the privilege of the Operating-Room and appliances during the morning, as well as the afternoon clinics.

3. The final examinations of the Second year, at the close of the term, will be upon Anatomy and Physiology.

THIRD YEAR.

1. Students of the Third year will repeat the practical work in Operative and Mechanical Dentistry, and the lectures on these subjects, together with Dental Pathology and Therapeutics.

2. At the close of the term they will be required to pass examinations in these branches.

COURSE OF INSTRUCTION.

The lectures on OPERATIVE DENTISTRY AND DENTAL HISTOLOGY embrace the comparative anatomy of the teeth, the functions and microscopical peculiarities of the dental organs, the development of teeth, their component tissues, a full description of the materials and instruments used in operative dentistry, a thorough elucidation of all dental operations, such as filling, extracting, regulating, the pathological relations of the teeth to the other parts of the system, and a minute description of all diseases related to dental surgery or of interest to the dentist. The methods taught are demonstrated in clinics.

The instruction in MECHANICAL DENTISTRY AND DENTAL METALURGY embraces the proper fitting up of a dental laboratory, the use of tools, the melting, refining, alloying and working of metals and alloys used by the dentist; the chemical and physical properties of
materials pertaining to ceramic dentistry, their preparation, and the most approved formulas for compounding bodies and enamels for the manufacture of block teeth and continuous gum work; the history and properties of all substances used in making artificial dentures, as well as the mechanical treatment of cleft palate, including the several methods of constructing obturators for such cases, whether congenital or acquired. The lectures in this department also include every approved mechanical means of correcting irregularities of the teeth, and are amply illustrated by specimens, models, diagrams, and practical application in the laboratory, under the supervision of accomplished mechanical dentists. Special attention will be directed to crown and bridge work, the higher branches of plate work, the continuous gum process, and carving teeth.

Every student is required to furnish his own bench tools for metal and rubber work, and will be provided with a place in which they can be locked when not in use.

The lectures on CHEMISTRY embrace the study of chemical physics and principles of chemical philosophy, together with a detailed consideration of the principal elementary substances and their compounds, and of the fundamental principles of organic chemistry, including the classification of organic compounds, and the special study of typical members of the different classes. Special attention is also given to the laws of chemical affinity, and the conditions under which they are modified, especially as they relate to the preparation of mixtures and prescriptions.

The course in practical chemistry in the laboratory includes exercises in chemical manipulation, the study of the chemical properties of the principal metals, the reactions of acids and their combinations, and the general principles of qualitative analysis, especially as they relate to the detection and separation of the metals and compounds which are of interest to practitioners in all branches of dentistry. Each student is provided with a separate table and apparatus, and is required to perform all the usual chemical manipulations under the direction of demonstrators, as well as to exhibit by formulas, on paper, all reactions involved in his tests.

HUMAN ANATOMY is taught in its relations to all the departments of medicine, including dentistry. The lectures are illustrated by fresh dissections of the human body, and by a rich museum of anatomical specimens, large and well-executed models, and drawings.

The course on PHYSIOLOGY includes lectures, with demonstrations, on the entire human physiology and on physiological chemistry. The study of the physiology of each organ is preceded by a full consideration
of its histology. The course is amply illustrated by appropriate diagrams, chemico-physiological experiments, and vivisections.

The lectures on DENTAL PATHOLOGY include such portions of general pathology as have a bearing upon the special subjects taught. Dentition and its possible pathological results receive careful attention, followed by a detailed consideration of all the diseases to which the teeth and surrounding parts are liable, the character—normal and abnormal—of the oral secretions, and the direct and remote relations which the pathological conditions of the mouth sustain to other portions of the system.

The treatment required under each head is explained, and the recognized processes by which to secure a return to normal conditions are minutely detailed.

MATERIA MEDICA will be taught with special reference to the character and value of those remedies that have any bearing upon dental therapeutics.

In addition to the lectures and demonstrations by the Professor of Anatomy, practical instruction in General and Special HISTOLOGY will be given in the histological laboratory to the students of the first year, the class being divided into sections. The laboratory is furnished with excellent microscopes, and all apparatus necessary to enable the student to become familiar with the most approved methods of microscopical technology, as well as with the minute structure of all the tissues and organs. Especial facilities are afforded for original research; for this purpose the laboratory is open throughout the year, except during July and August.

CLINICAL INSTRUCTION.

Seven hours daily (except Saturday) are spent in actual practice under the supervision of the Demonstrators; on Saturdays, from 9 A.M. to 1 P.M. Every student is required to provide his own instruments, except those for extracting. He is expected to keep them in perfect order, and will be furnished with a place in which they can be locked when not in use.

The preparation of Crown and Bridge Work, and Continuous Gum Dentures, will be under the charge of specially qualified Demonstrators. The increasing demand for both these forms of artificial appliances has rendered necessary enlarged facilities for instruction in metal working in the mechanical laboratory, and the students are required to become familiar with the manipulation of metals equally with the preparation of other and more common materials.
INFIRMARY AND LABORATORY.

The Infirmary and Laboratory are open to the students for practice every day during the week, excepting Saturday afternoon, this being reserved for Clinics that may be given by members of the faculty or instructors.

The Infirmary and Laboratory are open throughout the year, except during July and August.

THE LIBRARY.

The Library has been erected in the most substantial manner and, at the same time, with an architectural elegance probably not surpassed by any building devoted to a similar purpose in the country. The various valuable collections belonging to the University will be deposited there in special rooms prepared for the purpose.

The students have free access to the Reading-room.

MUSEUM AND CABINETS.

THE WISTAR AND HORNER MUSEUM, founded nearly one hundred years ago, and annually augmented, is unequaled in the United States for the number and variety of its specimens of the normal and the morbid anatomy of the human body. It also contains a large number of preparations in Comparative Anatomy, a rich collection relating to Dentistry, such as the different stages of dentition, abnormal conditions of the teeth, mandibles of the lower animals, etc., and an extensive collection of models. It is open every week-day from 1 p.m. to 3:30 p.m., throughout the sessions. The matriculation fee in this department confers admission to the Museum.

ARRANGEMENT OF THE REGULAR SESSION.

The Collegiate Year consists of one session, beginning in October and ending early in June.

The Session 1894-95 begins on Monday, October 1, 1894, and ends at Commencement, June 4, 1895.

Students are earnestly requested to be in attendance at the beginning of the Regular Session, as later entrance is attended with serious loss in lectures and practical work.
CONDITIONS OF ADMISSION.

Candidates for admission are required: *First*, to write an essay (not exceeding a page of foolscap), as a test of Orthography and Grammar; *second*, to pass an examination in the English branches—viz., Grammar, Arithmetic, History and Geography.

A candidate who has received a collegiate degree, or passed the matriculate examination of a recognized college, or who has a certificate from a normal, high or grammar school, or a teacher’s certificate, properly attested, may enter without examination.

Students who have attended one full term in another dental school recognized by the Faculty, or who have attended one or more courses in a reputable medical college, will be admitted to the Second year, subject to the rules governing examinations.*

Graduates of a recognized medical school will be admitted to the Second-year class without examination.

GRADUATION.

At the close of the Third year, a student who has passed all examinations satisfactorily receives the Degree of Doctor of Dental Surgery (D.D.S.), on the following conditions:

I. He must be of age and of good moral character.

II. He must have passed a satisfactory examination in all the branches of the curriculum, must have attended the practical instruction in all departments, and his last course of instruction must have been at this school.

III. He must have dissected at least two parts, must have performed thoroughly, and to the satisfaction of the Professor of Operative Dentistry all the usual dental operations, must have undertaken at least one artificial case, and brought it completed, with the patient, to the Professor of Mechanical Dentistry, thirty days before the close of the term, and must have prepared for presentation to the Professor of Mechanical Dentistry, before the 1st of May, a specimen case to be deposited in the College collection. The operations, as well as the work on the artificial case, must have been performed at the College Building.

IV. After notice of having successfully passed the final examination, he must enter his name on the Register of Candidates for the Degree.

V. He must be present at Commencement, unless excused by the Dean of the Faculty.

*All applicants for advanced standing must pass the examinations of the years they desire to omit, or furnish proof that they have passed equivalent examinations in some recognized dental or medical school.
TEXT-BOOKS AND WORKS OF REFERENCE.

TEXT-BOOKS.

Operative Dentistry:
Harris' Principal and Practice. Twelfth edition.

Mechanical Dentistry and Metallurgy:
Richardson, Mechanical Dentistry.
Essig, Dental Metallurgy.

Materia Medica:
Gorgas, Dental Medicine.

Chemistry:
Marshall's First-year Notes.
Medicus, Qualitative Analysis.

Histology:
Piersol.

Anatomy:
Gray.

Physiology:
Yeo or Foster.

Surgery:
Ashhurst's Surgery.
Agnew's Surgery.
Billroth's Surgical Pathology.

WORKS OF REFERENCE.

Taft's Operative Dentistry.
Guilford's Orthodontia.
Farrar's Irregularities of the Teeth and their Correction.

Wildman's Instruction in Vulcanite Work.
Kingsley's Oral Deformities.

H. C. Wood's Therapeutics.
Wood & Bache's Dispensatory.

Fownes' Chemistry.
Mitchell, Dental Chemistry.

Miller's Micro Organisms of the Human Mouth.

Leidy's Anatomy.
Tomes' Dental Anatomy.

Tyson's Cell Doctrine.

EXPENSES.

First Year.
Matriculation Fee (paid once only) ................... $5 00
Tuition Fee ........................................ 100 00

Second Year.
Tuition Fee ........................................ $100 00
Fee for Dissection ................................... 10 00
Dissecting Material ................................. $1 a part.

Third Year.
Tuition Fee ........................................ $100 00
Graduation Fee ...................................... 30 00
For each additional year ............................. 100 00
The payment of the $100 Tuition Fee may be divided as follows: $50 on entering, and the balance on or before November 1st. If any part is left unpaid after this date, $10 will be added to the Tuition Fee.

At the beginning of the first year, each student is required to make a deposit of five dollars with the Professor of Chemistry, to cover "breakage" in the chemical laboratories. Any balance remaining is returned. At least twenty-five dollars must be paid on account of tuition, before the student can be admitted to the Chemical Laboratory.

Instruments for the first year can be procured at from $35 to $50. A Dental Engine for the second year, costing from $30 to $50, will complete the outfit. These instruments will all be required in general practice.

Board can be obtained in Philadelphia for $4 per week and upward. Further information may be obtained from

JOHN A. REIMOLD,
Clerk, University.

The subjoined reports give some conception of the character and of the mass of work performed in the Operative and Mechanical Departments; but the amount of costly material and of careful attention necessary for the insertion of 3579 gold fillings can be appreciated only by the experienced operator.

The number of patients (6833) exhibits not only a gratifying confidence in the management of these departments, but also the value of the service to a large class of persons of limited means.

**OPERATIVE DEPARTMENT.**

**SESSION OF 1892-93.**

<table>
<thead>
<tr>
<th>Number of Patients</th>
<th>6833.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gold Fillings</td>
<td>3,579</td>
</tr>
<tr>
<td>Tin Fillings</td>
<td>1,066</td>
</tr>
<tr>
<td>Cement Fillings</td>
<td>1,553</td>
</tr>
<tr>
<td>Amalgam Fillings</td>
<td>494</td>
</tr>
<tr>
<td>Gutta Percha Fillings</td>
<td>784</td>
</tr>
<tr>
<td>Canal Fillings</td>
<td>321</td>
</tr>
<tr>
<td>Pulps capped</td>
<td>355</td>
</tr>
<tr>
<td>Pulps devitalized</td>
<td>315</td>
</tr>
<tr>
<td>Pulps extracted</td>
<td>361</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>8,828</strong></td>
</tr>
</tbody>
</table>
Operative Department.—(Continued.)

<table>
<thead>
<tr>
<th>Condition</th>
<th>Quantity</th>
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</thead>
<tbody>
<tr>
<td>Total brought forward</td>
<td>8,828</td>
</tr>
<tr>
<td>Pulpitis</td>
<td>791</td>
</tr>
<tr>
<td>Treatment Pulp Canals</td>
<td>1,048</td>
</tr>
<tr>
<td>Pericementitis</td>
<td>118</td>
</tr>
<tr>
<td>Alveolar Abscess</td>
<td>156</td>
</tr>
<tr>
<td>Inflammation of Gums</td>
<td>217</td>
</tr>
<tr>
<td>Pyorrhea Alveolaris</td>
<td>132</td>
</tr>
<tr>
<td>Salivary Calculi</td>
<td>1,145</td>
</tr>
<tr>
<td>Teeth and Roots extracted</td>
<td>3,283</td>
</tr>
<tr>
<td>Total</td>
<td>15,718</td>
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</table>

Amount of gold used for fillings, and exclusive of that used for plate and crown work in Laboratory, 42 ounces (3 lbs. 6 ounces).

Mechanical Department.

Session of 1892–93.

<table>
<thead>
<tr>
<th>Type of Work</th>
<th>Quantity</th>
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<tbody>
<tr>
<td>Full cases</td>
<td>304</td>
</tr>
<tr>
<td>Partial cases</td>
<td>229</td>
</tr>
<tr>
<td>Pivot teeth and Crown Work</td>
<td>88</td>
</tr>
<tr>
<td>Repairing cases</td>
<td>38</td>
</tr>
<tr>
<td>Regulating cases</td>
<td>24</td>
</tr>
<tr>
<td>Gold Bridge Work</td>
<td>23</td>
</tr>
<tr>
<td>Total</td>
<td>706</td>
</tr>
</tbody>
</table>
DEPARTMENT OF VETERINARY MEDICINE.

FACULTY.

WILLIAM PEPPER, M.D., LL.D., Provost, and ex-officio President.
HORATIO C. WOOD, M. D., LL. D., Professor of Materia Medica, Pharmacy, and General Therapeutics.
THEODORE G. WORMLEY, M. D., LL. D., Professor of Chemistry and Toxicology.
JOHN GIITÉRAS, M. D., Professor of General Pathology and Morbid Anatomy.
JOHN MARSHALL, M. D., Nat. Sc. D., Assistant Professor of Chemistry, and Dean of the Faculty.
SIMON J. J. HARGER, V. M. D., Professor of Veterinary Anatomy and Zootechnics.
LEONARD PEARSON, B. S., V. M. D., Professor of the Theory and Practice of Veterinary Medicine.
LEO BRESISCHER, M. D., V. M. D., Professor of Comparative Physiology.
JOHN W. ADAMS, A. B., V. M. D., Assistant Professor of Veterinary Surgery and Obstetrics.

DEMONSTRATORS.

ALEXANDER GLASS, V. S., Lecturer on the Theory and Practice of Canine Medicine.
ROBERT FORMAD, V. M. D., Lecturer on Veterinary Sanitary Science, and Demonstrator of Normal and Pathological Histology and of Morbid Anatomy.
WILLIAM H. RIDGE, V. M. D., Demonstrator of Veterinary Obstetrics.
EDWIN S. MUIR, Ph. G., V. M. D., Instructor in Veterinary Materia Medica and Pharmacy.
B. FRANK SENSEMAN, V. M. D., Demonstrator of Veterinary Anatomy.

(313)
JOHN HARSHBERGER, Ph. D., Instructor in General Biology, 
Botany and Zoology.

CHARLES E. COTTON, V. M. D., Assistant Demonstrator of Veter-
inary Anatomy.

FRANZ ENGE, Demonstrator of Forging and Horse-shoeing.

All communications should be addressed to

JOHN MARSHALL, M. D., Dean, 

MATRICULATES, 1893-94.

THIRD YEAR Class.

Name. Residence.
Andrews, Frank H., Syracuse, N. Y.
Black, Horace G., Hammonton, N. J.
Carter, John Morris, Chatham.
Castor, Thomas, Frankford.
Cole, Calvin C., Dover, Del.
Dilkes, G. Walter, Barnesboro, N. J.
Fairley, James, Philadelphia.
Fouse, Clyde Evert, Philadelphia.
Gray, G. Walton, Philadelphia.
Green, L. Kenneth, Philadelphia.
Grogan, Joseph P., Booth's Corner.
Harder, George E., Baltimore, Md.
Hendren, Samuel G., Philadelphia.
Kellner, Edward L., Roxborough.
Knight, Emil, Philadelphia.
Marshall, Clarence J., Rochester, N. Y.
Moore, Enoch H., Rome.
Mount, Ellsworth, Bridgeton, N. J.
Rectenwald, John J., Burlington, N. J.
Richardson, A. G. G., Pittsburgh.
Salinger, Arthur, Ithaca, N. Y.
Shannon, Frank T., Philadelphia.
Smith, Harry F., Lexington, Ky.
Swank, George K., Philadelphia.
Weicksel, Harvey J. S., East Mauch Chunk.

SECOND YEAR Class.

Name. Residence.
Black, R. Markley, Cecilton, Md.
Boyd, Charles W., Allegheny City.
Brackbill, Marsh L., Strasburg.
Cox, Harry B., Philadelphia.
Felber, Frederick L., Baltimore, Md.
### MATRICULATES.

<table>
<thead>
<tr>
<th>Name</th>
<th>Residence</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gross, Harry E.</td>
<td>Philadelphia</td>
</tr>
<tr>
<td>Hagenbuch, Bert.</td>
<td>Mahanoy City</td>
</tr>
<tr>
<td>Hogg, Edwin</td>
<td>Kirkwood</td>
</tr>
<tr>
<td>Houck, Ulysses G.</td>
<td>Berwick</td>
</tr>
<tr>
<td>Huston, Charles A.</td>
<td>Philadelphia</td>
</tr>
<tr>
<td>Kille, Wilmer B.</td>
<td>Masonville, N. J.</td>
</tr>
<tr>
<td>Lacock, J. Stewart</td>
<td>Allegheny City</td>
</tr>
<tr>
<td>Lienhardt, Richard</td>
<td>Wayne</td>
</tr>
<tr>
<td>Martin, W. Walter</td>
<td>Philadelphia</td>
</tr>
<tr>
<td>Mecray, James M.</td>
<td>Maple Shade, N. J.</td>
</tr>
<tr>
<td>Mitton, Philip G.</td>
<td>Philadelphia</td>
</tr>
<tr>
<td>Oesterling, Harry E.</td>
<td>Wheeling, W. Va.</td>
</tr>
<tr>
<td>Phipps, William P.</td>
<td>Lionville</td>
</tr>
<tr>
<td>Reagen, William J.</td>
<td>Philadelphia</td>
</tr>
<tr>
<td>Robert, Joseph C., B. Sc.</td>
<td>Centreville, Miss.</td>
</tr>
<tr>
<td>Shaw, John</td>
<td>Wilmington, Del.</td>
</tr>
<tr>
<td>Shumway, D. Gardner</td>
<td>Hancock, Mass.</td>
</tr>
<tr>
<td>Stauffer, Willis B.</td>
<td>Philadelphia</td>
</tr>
<tr>
<td>Tegtmeier, August</td>
<td>Philadelphia</td>
</tr>
<tr>
<td>Underhill, Benjamin M.</td>
<td>Knoxville, Iowa.</td>
</tr>
<tr>
<td>Wolff, Carl H.</td>
<td>Philadelphia</td>
</tr>
</tbody>
</table>

---

### FIRST YEAR CLASS.

<table>
<thead>
<tr>
<th>Name</th>
<th>Residence</th>
</tr>
</thead>
<tbody>
<tr>
<td>Beaver, Eugene</td>
<td>Conshohocken</td>
</tr>
<tr>
<td>Bertram, Fred. de M.</td>
<td>Philadelphia</td>
</tr>
<tr>
<td>Clark, David H.</td>
<td>Willimantic, Conn.</td>
</tr>
<tr>
<td>Christman, Herman A.</td>
<td>Philadelphia</td>
</tr>
<tr>
<td>Craven, Geo. W.</td>
<td>Newtown</td>
</tr>
<tr>
<td>Drummond, Gilbert G.</td>
<td>Philadelphia</td>
</tr>
<tr>
<td>Ely, William B.</td>
<td>Merion</td>
</tr>
<tr>
<td>Frantz, Charles M.</td>
<td>Pleasant Corner</td>
</tr>
<tr>
<td>Gardiner, Walter W.</td>
<td>Mt. Laurel, N. J.</td>
</tr>
<tr>
<td>Hausmann, John F.</td>
<td>Philadelphia</td>
</tr>
<tr>
<td>Heaton, Robert D.</td>
<td>Ashland</td>
</tr>
<tr>
<td>Heberton, Chas. M.</td>
<td>Cynwyd</td>
</tr>
<tr>
<td>Hughes, Geo. L.</td>
<td>Moorestown, N. J.</td>
</tr>
<tr>
<td>Johnson, Levi</td>
<td>Philadelphia</td>
</tr>
<tr>
<td>Johnston, S. Harry</td>
<td>Philadelphia</td>
</tr>
<tr>
<td>Luffbartly, W. H., Jr.</td>
<td>Philadelphia</td>
</tr>
<tr>
<td>Maginn, Jos. F.</td>
<td>Philadelphia</td>
</tr>
<tr>
<td>Mahaffy, Jas. R.</td>
<td>Wilmington, Del.</td>
</tr>
<tr>
<td>Martien, Henry D.</td>
<td>Philadelphia</td>
</tr>
<tr>
<td>Miller, Chas. H.</td>
<td>Duncannon</td>
</tr>
<tr>
<td>Mohler, John R.</td>
<td>Philadelphia</td>
</tr>
<tr>
<td>Rayner, Moncure R.</td>
<td>Chestnut Hill</td>
</tr>
<tr>
<td>Rochester, J. R. F.</td>
<td>Denton, Md.</td>
</tr>
<tr>
<td>Stehle, Fred., Jr.</td>
<td>Philadelphia</td>
</tr>
<tr>
<td>Watt, William R. H.</td>
<td>Pittsburgh</td>
</tr>
<tr>
<td>White, Ernest A.</td>
<td>New Orleans, La.</td>
</tr>
</tbody>
</table>

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Total, 26.
This Department provides a thorough education in all that pertains to Veterinary Medicine. Its facilities for instruction are unsurpassed in this country, and its courses extend from the first elements of Medicine to the latest researches in Veterinary Science, at home and abroad. At every step the student is drilled under the personal guidance of Professors in all the practical and technical details of the profession. Too much stress cannot be laid on the importance of thus combining, at every step, theory and practice. It is solely by thorough and extensive training in this way that the practitioner can meet the complex problems of Veterinary Pathology—problems which, owing to the lack of communication between the practitioner and his patients, demand a higher degree of trained powers of observation than the usual cases of ordinary medical practice.

The buildings are erected in what is to be the Botanical Garden of the University. They have a street frontage of over 600 feet, and consist of a spacious Amphitheatre, Museum, Dissecting-Room, Histological and Botanical Laboratory, Hospital, with hot and cold baths for horses; Blacksmith Shop, with eight forges; Pharmaceutical Laboratory, etc., etc. The floors are laid in cement, with the most approved drainage. The Hospital is capable of accommodating over seventy horses, dogs, or other animals.

A building, known as the Hospital for Dogs, has recently been erected, and is provided with unsurpassed facilities for the treatment of dogs and small animals. Throughout the building, there are polished granolithic floors, and wainscoting of enameled tile to a height of five feet. The Hospital is heated by steam, and there is a complete supply of hot and cold water in each room, separate rooms being provided for baths. The rooms in this building are non-communicating, thus making it possible to completely isolate animals suffering with contagious diseases.

### SUMMARY

<table>
<thead>
<tr>
<th>Students of the Third Year</th>
<th>25</th>
</tr>
</thead>
<tbody>
<tr>
<td>Students of the Second Year</td>
<td>26</td>
</tr>
<tr>
<td>Students of the First Year</td>
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<tr>
<td>Special Student</td>
<td>1</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>78</td>
</tr>
</tbody>
</table>

Name: Hart, John R.,
Residence: Philadelphia
ADMISSION.

Candidates who have received a college degree, or have passed the matriculate examination of a recognized college, or who have a certificate from a recognized Normal or High School, or from a duly organized County Medical Society that has instituted a preliminary examination—such as that adopted by the Medical Society of the State of Pennsylvania—are admitted on such certificates.

Other candidates must present evidence that their preliminary education has been such as to enable them to profitably follow the course of instruction given in the Department.

Graduates of recognized Medical Schools, or of recognized Veterinary Schools which require three years' attendance, may enter the third year without examination. Students who have attended one or more sessions in a recognized Veterinary or Medical School will be allowed credit for time, but must pass an examination upon entering.

Graduates of recognized Colleges of Pharmacy are admitted to the first year without an entrance examination, and on passing examinations in General Chemistry and Materia Medica and Pharmacy, are excused from attending lectures on those branches and from performing the practical work of the first year in the Chemical and Pharmaceutical laboratories.

SCHOLARSHIPS.

I. STATE SCHOLARSHIPS.—There are twelve of these, founded by the Trustees in 1889, and granted on nomination of the Governor of the Commonwealth. They entitle the holder to free tuition in the regular course. Candidates are subject to the same conditions of admission as other students. These conditions must be fulfilled and the Governor's certificate of nomination presented on entering by October 1st.

II. CITY PRIZE SCHOLARSHIPS.—Under agreement of the Trustees with the Board of Education of the City of Philadelphia, three of the City Prize Scholarships are available in the Veterinary Department. Nominations to them are made by the proper Committee of the Board of Education. Nominations to these scholarships must be handed to the Dean on or before October 1st of the current year.

INSTRUCTION.

The Course of Instruction extends over three years, with one session beginning the first of October and ending the first of June in each year. The following are the studies:
FIRST YEAR.—Chemistry, Materia Medica and Pharmacy, General Biology, Physiology, Histology, Zoölogy, and Veterinary Anatomy.

SECOND YEAR.—Medical Chemistry, Botany, Physiology, Therapeutics, General Pathology and Morbid Anatomy, Veterinary Anatomy, Zoölogy, Veterinary Surgery, Theory and Practice of Veterinary Medicine, Theory and Practice of Canine Medicine, and Horseshoeing.

THIRD YEAR.—Therapeutics, General Pathology and Morbid Anatomy, Veterinary Surgery and Operative Surgery, Theory and Practice of Veterinary Medicine, Theory and Practice of Canine Medicine, Veterinary Sanitary Science, Obstetrics, and Zoötechnics.

In the Second year the student attends Clinics, and serves as aid in the Hospital; in the Third year he is placed in charge of sick animals, and is required to prepare Clinical Reports and make Autopsies. He also makes visits to breeding and dairy farms and to slaughter-houses, in order to familiarize himself with the races of animals, the economical means employed in their care, and the varieties of butcher meat. Third year students are assigned, in alphabetical order, to reside in the Hospital for two weeks at a time to act as assistants to the House Surgeon. Graduates of the Veterinary Department are admitted to the third year of the Medical Department of the University with the understanding that they perform the required amount of dissecting and pass the examination in human anatomy. Of the third-year studies of the Medical Department they are exempt from the practical work and examination in Pathology and Morbid Anatomy.

CHEMISTRY.

CHEMICAL LABORATORIES.—The working laboratories for Practical Chemistry are in a special laboratory building, and are under the supervision of the Professor of Chemistry and the Assistant Professor of Chemistry, with assistants. Students of the First year devote three hours each week in the Laboratory to the study of Qualitative Analysis. The course includes chemical manipulations and the detailed study of the chemical reactions of the principal metals, acids, and their combinations, with the general principles of Qualitative Analysis, especially as they relate to the detection and separation of metals and compounds of importance in Veterinary Medicine. Each student is provided with a separate table and apparatus, and is required to exhibit by formulæ, on paper, all reactions involved in his work.

Students of the Second year devote three hours per week to practical work in the Laboratory. The course embraces an introduction to
the general principles of Quantitative Analysis and the principles of Volumetric Analysis, with the practical examination of urine and animal fluids, and the recognition and recovery of poisons from the animal body and from complex mixtures.

MATERIA MEDICA AND PHARMACY.

Materia Medica is taught in a series of about thirty-five lectures by the Instructor in Materia Medica, and Pharmacy is taught by lectures and practical work in the Pharmaceutical Laboratory. These courses include the study of all the drugs and preparations in the U. S. Pharmacopoeia which are of use in Veterinary Medicine, with the addition of other remedies, the use of which is adapted specially to any one class of animals studied in Veterinary Medicine (Herbivora or Carnivora). The student is required to handle the various drugs, in order to recognize their physical characteristics, to make the ordinary pharmaceutical preparations, (infusions, tinctures, extracts, powders, balls, ointments and blisters), and is instructed practically in the manual required for the administration of remedies in powder, ball or fluid form to the Horse, Ox, Hog, and Carnivora.

During the Second year details of two students each, in alphabetical order, serve two weeks in the Pharmacy of the Hospital, preparing all prescriptions used in this department.

COURSE IN GENERAL BIOLOGY.

In this course students are given practical training in the methods employed in biological research. They are thus prepared to undertake the study of botany, zoology, histology, embryology, etc., without loss of time and with considerable facility in the use of the instruments and processes required in these branches. This is especially true in the bearing of the training on the histological work that will be required of veterinarians.

The consideration of the structure of plants and animals is approached by analysis into regions, parts, organs, tissues, cells; the synthetic method is then adopted, and the careful study of cell activities, cell modifications, cell aggregates, leads to an appreciation of the importance of comparative anatomy for purposes of classification, for the comprehension of the development, descent, and evolution of plant and animal forms. Method is impressed by a study of a series of types, and an endeavor is made to furnish students with
clear abstract ideas of systematic groups, by the observation of as large a number of individual forms as possible. In short, the purpose of this course is to impress upon the student's mind the fundamental truths of biology; to train him in its methods, and to teach him the value of the connection between Medicine and biological sciences.

Mere facts are not given the prominence generally accorded them in the lecture-room of the specialist, and the practical, methodical training in observation and deduction leaves the student in a position peculiarly favorable to the prosecution of original investigation.

PHYSIOLOGY.

The course in Physiology consists of Lectures and Demonstrations in which the chemical and physical processes and constituents of the animal body are considered, and the different functions traced from their appearance in the lowest animal forms to their highest development in the domestic animals and man. Especial attention is given to the nutritive functions in the domestic animal, rules being given for the adjustment of diet to the work required of the animal, whether in beasts of burden, milk or wool producers, or in animals destined for food purposes. The lectures are fully illustrated by experiments, diagrams, and tables. In connection with the course, the students are required to work in the Physiological Laboratory, where they study the chemical properties and general characteristics of Foodstuffs, the Analysis of Milk, the Action of the Digestive Juices, etc., etc.

A series of Review examinations are held by the Professor, to insure the thorough comprehension by the students of the subject-matter of the Lectures.

The Physiological Laboratory is fitted with the most approved instruments for physiological research, and opportunity is offered to advanced students for conducting original research under the immediate supervision of the Professor.

BOTANY.

The Botanical instruction requires five hours a week during the second half of the second year.

Two objects are kept in view. The first is to give such a general idea of the anatomy and physiology of plants, of the principles of classification, and of the doctrines of evolution, as are essential to every one claiming to have a scientific education. This should be
ZOOLOGY.—ANATOMY.

The instruction in Descriptive Anatomy extends over two entire sessions, and embraces the study of the Bones, Articulations, Muscles, Digestive tract, Respiratory apparatus, Urino-genital organs, organs of circulation of the Blood and Lymph, Nervous System, organs of Special Sense, and Embryology of the Horse, the Mule, the Ass, the

21
DEPARTMENT OF VETERINARY MEDICINE.

Ox, Sheep and Goat, Hog, Dog, Cat and Poultry. Constant dissection is required. The horse is used as the type until the parts have been thoroughly learned, and the student is then given other animals, to learn the differences which exist. During the first year the dissections are made with special reference to the bones, articularations, and muscles, while the second year is devoted to the blood vessels and nerves. The dissections are under the supervision of the Professor of Anatomy, aided by the Demonstrators. A detail is made of students of the second year, who dissect in the Laboratory of the Professor of Anatomy, preparing the parts to be used in his lectures.

The dissecting-room is unsurpassed in convenience and cleanliness. The floors are of cement, the hot and cold water facilities are ample, and the room is thoroughly lighted during the day by windows on both sides, and at night by gas over each table. Iron wagons with movable posts, allowing the animals to be placed in any required position, serve as dissecting-tables.

HISTOLOGY

is taught in connection with the chair of anatomy. The Laboratory is fitted with the most approved apparatus for microscopic and biological research. The anatomical elements are studied from the tissues of each of the classes of domestic animals included in Veterinary Medicine, in order to allow the student to appreciate the minute differences of structure which have been the cause of such gross error in the work of Histologists, who have confined themselves to the tissue of a limited number of animals.

HORSE-SHOEING.

The course in Shoeing for second-year students embraces about twenty lectures illustrated by charts, prepared hoofs, and shoes, and practical demonstrations upon the living horse at rest and in motion. Instruction is given under the following headings:

1. The Foot.—Bones, joints, ligaments, tendons, blood vessels, nerves, elastic structures, keratogenous tissues, and horn capsule.
2. Foot in Relation to the entire Limb.—Attitude of limb, form of foot and hoof, gait, growth of horn, and hoof mechanism.
3. Trimming of hoof, making of shoe, fitting and nailing.
4. Shoeing for interfering and forging.
5. Winter shoeing.
6. Hoof nurture.
THERAPEUTICS.

7. Pathological Shoeing.—Pricking, nailing, calking, corns, laminitis, keraphylocele, keratocele.
8. Changes in Form of the Hoof.—Flat and drop-sole, club-foot, contracted heels, slanting hoof, crooked hoof, ossification of lateral cartilages.
9. Solutions of Continuity of Hoof.—Seams, cracks, loose wall, hollow wall, and thrush.

This course, extending over two sessions of the Medical Department, is devoted specially to the physiological action of drugs.

GENERAL, PATHOLOGY AND MORBID ANATOMY.

Instruction in General Pathology and Morbid Anatomy is given to the students of the Second and Third years. It consists of Lectures: 1st, on General Pathological Anatomy, in which are treated the Degenerations, Atrophy, Hypertrophy, Inflammations, and Tumors; 2d, on Special Pathological Anatomy, in which is considered the morbid anatomy of each organ of the body. In addition to this, the students of the Second year are practically taught Pathological Histology in the Pathological Laboratory, while to the students of the Third year are given weekly demonstrations in Microscopic and Gross Morbid Anatomy. For the latter purpose there are at hand a more than sufficient number of morbid specimens, both fresh and alcoholic.

In the final examinations the practical as well as the theoretical knowledge of the candidate is tested.

THEORY AND PRACTICE OF VETERINARY MEDICINE.

The instruction in the Theory and Practice of Medicine, completed in two years, is given under the following headings:

GENERAL PATHOLOGY.

1. Origin of Veterinary Medicine, Medical Doctrines, Classes of Disease.
2. ETIOLOGY.—Effects on the various domestic animals of Locality, Climate, Food, Water, Habitation, Work, Individual, Race, Sex and
DEPARTMENT OF VETERINARY MEDICINE.

HereditaryDisposition, Temperament, Constitution, Exciting Causes, Poisons, Specific Causes, Medical Constitution, Idiosyncrasy, and Immunity.

3. SYMPTOMATOLOGY and SEMIOLOGY.

4. PHYSICAL DIAGNOSIS.—Percussion, Auscultation, Examination of Blood and Urine.

5. DIAGNOSIS.

6. PROGNOSIS.

7. AUTOPSIAS.

SPECIAL PATHOLOGY.

DISEASES OF RESPIRATORY SYSTEM.

CONTAGIOUS AND ZYMOTIC DISEASES.—With the laws of Sanitary Police in force in various parts of the United States and in Europe.

DISEASES OF THE DIGESTIVE APPARATUS.

" " URINO-GENITAL APPARATUS.

" " NERVOUS SYSTEM.

" " CIRCULATORY SYSTEM.

" " EAR.

" " EYE.

" " SKIN.

PARASITIC DISEASES AND HELMINTHS.

SURGERY.

This branch of Veterinary Science is taught by a Graded Course of Didactic Lectures, and by Clinical Instruction, extending over a period of two years, taking in the Second and Third-year classes.

One year is devoted to General Surgery, and comprises a course of about one hundred lectures. The remaining year is devoted to the study of Special Surgery, and comprises a course of about ninety lectures.

In addition to this, the Second and Third-year classes are given two hours of Clinical Instruction daily, from 8 to 10 A. M.

The Hospital and free clinics furnish an abundance of material for practical instruction, which is one of the special features of the school. In no other school in America is this mode of instruction as thoroughly carried out as here.

The Senior Class is required to devote ten hours of each week to Practical Operative Surgery, when the modus operandi of every operation likely to occur in Veterinary practice is taught.
Instruction in Bandaging and Dressing is given in connection with Operative Surgery.
The lectures on General Surgery are comprised under the following headings:—

GENERAL SURGERY.

I. INFLAMMATION.—Varieties and Terminations.

II. INJURIES AND INFLAMMATION OF SOFT TISSUES—
   2. Antisepsis.
   3. Diseases due to wound infection.
   4. Sub-cutaneous injuries of soft tissues.

III. GANGRENE, ABSCESS, FISTULA.

IV. DISEASES OF MUSCLE AND TENDON.

V. " " NERVES.

VI. " " JOINTS.

VII. " " TENDINOUS SHEATHS AND BURSÆ.

VIII. " " BLOOD AND LYMPH VESSELS, AND LYMPH GLANDS.

IX. " " THE OUTER SKIN.

X. " " BONES.

XI. TUMORS—
   (a) Connective tissue tumors.
   (b) Muscle tumors.
   (c) Nerve tumors.
   (d) Epithelial tumors.

XII. OPERATIVE SURGERY—
   2. General and Local Anæsthesia.
   3. Methods of Dividing Tissue. Amputations, Exarticulations, etc.
   5. Blood-letting and Scarification.
7. Actual and Potential Cautery.
8. Castration of Male and Female Animals.

CLASSIFICATION OF LECTURES ON SPECIAL SURGERY.

I. Diseases of the Fore Limbs:—Fractures, Shoulder-lameness, Shoe-boil, Splints, Corns, Quittors, Keraphylocele, Keratocele, Burnt Sole, Pricking, Cracks, Street-nail, Laminitis, Navicular Disease, Thrush, etc.

II. DISEASES OF HIND-LIMBS.

III. " " THE HEAD

IV. " " " NECK.

V. " " " BREAST.

VI. " " " TRUNK.

VII. SURGICAL DISEASES OF THE STOMACH AND INTESTINES.

VIII. DISEASES OF THE RECTUM AND ANUS.

IX. " " " URINARY APPARATUS.

X. " " " MALE GENERATIVE ORGANS.

XI. " " " FEMALE "

XII. " " " VERTEBRÆ AND PELVIS.

OBSTETRICS.

A full course of instruction is given in this branch to Senior students, about forty lectures being devoted to this subject. Practical instruction will be mainly confined to demonstrations on the manikin, although, whenever possible, cases of natural labor will be used, to the best advantage of the student.

The course of instruction is classified as follows:—

OBSTETRICAL ANATOMY.—Anatomy of the hard and soft parts.

ORGANS OF GENERATION.—External—Internal, Reproduction, Fecundation, Changes and Development of the Embryo, Differences in Ruminants, Pig, Bitch and Cat; Gestation, Pathology of Gestation,
Diseases of Pregnant Animals, Accidents, Normal Parturition, Presentations, Maternal and Foetal Dystokia, Diseases of the Foetus, Monstrosities, Dystokia from Malpresentation, Obstetrical Operations, Accidents of Parturition, Diseases, and Abnormalities of the young animal.

**ZOOTECHNICS AND HYGIENE**

include the study of the Origin and Domestication of animals employed for profit by man, the laws of Breeding and Production, Heredity, Race Characteristics, and Individual Impression, the effect of Climate, Aliment, Work, and the means to be employed in the selection and Handling of Animals so as to derive from them the most economical benefit, whether as motors, as wool or milk producers, or as articles of food.

**VETERINARY SANITARY SCIENCE AND INSPECTION OF MEAT AND MILK.**

This branch is taught by a series of lectures in which the following topics are fully discussed: Origin of Sanitary Science; Enzoötic, Epi- zoötic and Panzoötic Diseases; Influence of Civilization and Traffic on Animal Plagues; Aptitude; Immunity, Contagion, Infection and Miasm: their origin, nature, diffusion, reception and mode of access; prevention and suppression of contagious diseases; general prophylactic, preventive and repressive measures; utilization of the carcasses. Disinfection and disinfectants. Inspection of meat: general physical and chemical properties of the meat of various animals used for food; principal qualities of meat; noxious and injurious meat; meat undergoing putrid decomposition; meat in constitutional or blood diseases; meat in cachectic conditions; meat infected with animal parasites; echinococcae, cisticercus, psorospermien and trichinae. Meat infected with vegetable parasites; actinomycosis, anthracoid diseases, contagious pleuro-pneumonia, tuberculosis, etc. Inspection of milk; physical properties and chemical constituents. Adulterated milk and its detection. Abnormal constituents of milk.

**MUSEUM.**

The Museum of this department has grown rapidly since the organization of the Veterinary Department, both through the preparations made in the dissecting-room, and through the liberality of Veterinarians. It contains a large number of anatomical and pathological
DEPARTMENT OF VETERINARY MEDICINE.

veterinary specimens. Valuable and rare specimens are constantly added to it from the animals which die in the extensive Zoological Garden of the city.

HOSPITAL.

The Hospital offers the most extensive and complete accommodations for sick animals to be found in America.

Third-year students are placed directly in charge of cases, and, under the direction of the House Surgeon, keep the Clinical Records, administer the medicines, attend to the surgical dressings, and are allowed, under the supervision of the Clinical Professors, to perform whatever operations regard the safety of the animal permits. Two students from the Third-year class are assigned, in alphabetical order, to reside in the Hospital for two weeks at a time. They receive the animals as they enter the Clinic of the Hospital.

A detail from the Second-year class compounds all medicines used in the Hospital.

The large number of animals in the wards of the Hospital and those from the extensive Free Dispensary practice of the Hospital treated at the clinic daily, from 8 to 10 A.M., furnish abundant material for clinical lectures and practical instruction.

2053 animals were treated in the Hospital during the year ending August 31, 1893.

HORSE-SHOEING.

In addition to shoeing for lameness, a large amount of ordinary shoeing is done at the forges of the Hospital, affording ample experience in methods demanded by different classes of horses, and by the various forms of the horse's foot.

EXAMINATIONS AND DEGREE.

Examinations are held at the close of each year. These the student must duly pass before he is allowed to proceed to the studies of the next year. At the close of the course, and after passing a satisfactory examination, the student receives the degree of Veterinariae Medicinae Doctor (V. M. D.).

PRIZE.

The J. B. LIPPINCOTT PRIZE of One Hundred Dollars is awarded to the member of the Graduating Class who, in the three years spent in the Veterinary Department of the University, attains the highest general average in examinations.
THE VETERINARY SOCIETY.

This society is composed of students of the Veterinary Department. Membership is open to all the students of the department. Meetings are held bi-weekly during the college year for reading and discussing papers pertaining to Veterinary Science.

FEES.

Matriculation Fee (paid once only), five dollars. Tuition Fee, one hundred dollars each year, to be paid before November 1st. If the tuition is paid after October 31st, ten dollars will be added, making the fee $110 for the year, and of this amount sixty dollars are to be paid by November 1st and fifty dollars before February 1st.

Material for dissection and for operative surgery is charged for at the rate of one dollar per part.

At the beginning of the first and second years each student is required to make a deposit of five dollars with the Professor of Chemistry, to cover "breakage" in the chemical laboratories. Any balance remaining is returned. At least twenty-five dollars must be paid on account of tuition before the student can be admitted to the chemical laboratory.

For further information, address John Marshall, M. D., Dean of Veterinary Department, Thirty-sixth and Pine Streets, Philadelphia, Pa.

EXPENSES.

First Year.

Matriculation Fee $5 00
Tuition Fee 100 00
Dissecting Material, about 5 00

$110 00

Second Year.

Tuition Fee 100 00
Dissecting Material, about 5 00

$105 00

Third Year.

Tuition Fee 100 00
Material for Operative Surgery, about 8 00

$108 00
Board can be obtained in Philadelphia for $4.50 per week and upward.

Books and instruments in the first year of the course will cost about $28.00; in the second year they will cost about $25.00; and in the third year the case of surgical operating instruments, about $31.00. Nearly all of the instruments used in the course are those which the graduate will need in practising his profession.

TEXT AND REFERENCE BOOKS.

FIRST YEAR.

Chemistry.—Marshall's First-year Notes; Fownes; Medicus' Qualitative Analysis.

Materia Medica and Therapeutics.—H. C. Wood; Finlay Dun's Veterinary Medicine; Mann's Prescription Writing.

Anatomy.—Chauveau's Comparative; Goubaux and Barrier's Exterior of the Horse, translated by Harger.

Histology.—Piersol's Text-book of Histology.

Physiology.—Smith's Physiology of the Domesticate Animals.

Zooology.—Nicholson's Manual

Horse-shoeing.—Fleming.

SECOND AND THIRD YEARS.

Theory and Practice of Veterinary Medicine.—Robertson's Practice of Equine Medicine; Williams' Principles and Practice of Veterinary Medicine; Steele's Diseases of the Ox; Fleming, Manual of Veterinary Sanitary Science and Police; Steel, Canine Diseases.

Surgery.—Fleming's Operative Veterinary Surgery; Williams' Principles and Practice of Veterinary Surgery; Zundel on the Horse's Foot; Liautard, Lameness of Horses.

Medical Chemistry.—Marshall's Second-year Notes; Greene; Tyson's Practical Examination of the Urine; Marshall and Smith's Chemical Examination of the Urine; Remsen's Organic Chemistry.

Botany.—Bessey's; Gray's Lessons, and Manual.

Obstetrics.—Fleming.
### ROSTER—1893-1894. First Year.

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<th>HOUR</th>
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<tr>
<td>9 A.M.</td>
<td>*Wormley Chemistry</td>
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<td>*Marshall, Chemical Lab</td>
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<td>10 A.M.</td>
<td>*Wormley Chemistry</td>
<td>*Wormley Chemistry</td>
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<td>Harger, Anatomy</td>
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<td>11 A.M.</td>
<td>Harger, Anatomy</td>
<td>Breisacher, Physiology</td>
<td>Harger, Anatomy</td>
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<td>12 M.</td>
<td>Breisacher, Physiology</td>
<td>Breisacher, Physiology</td>
<td>Dissection</td>
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<tr>
<td>2 P.M.</td>
<td>Harshberger, Laboratory, Gen. Biology, Until February 1st</td>
<td>Muir, Materia Medica</td>
<td>R. Formad, Histological Laboratory, Two hours. After February 1st</td>
<td>Harshberger, Laboratory, Gen. Biology Until February 1st</td>
<td>Harshberger, Zoology</td>
<td>Dissection</td>
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<tr>
<td>3 P.M.</td>
<td>Harshberger, General Biology, until Feb. 1st</td>
<td>Muir, Pharmacut' I Laboratory</td>
<td>Harshberger, Laboratory, Gen. Biology, Until February 1st</td>
<td>Harshberger, Zoology</td>
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Lectures marked * are delivered in the Medical Department.

### ROSTER—1893-1894. Second Year.

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<td>8 A.M.</td>
<td>Pearson, Clinic</td>
<td>Adams, Clinic</td>
<td>Harger, Clinic</td>
<td>Pearson, Clinic</td>
<td>Adams, Clinic</td>
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<tr>
<td>9 A.M.</td>
<td>Pearson, Practice</td>
<td>Adams, Surgery</td>
<td></td>
<td>*Wormley, Medical Chemistry</td>
<td>*Guiteras, Morbid Anatomy</td>
<td>*Marshall, Chemical Laboratory</td>
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<tr>
<td>10 A.M.</td>
<td>Harger, Anatomy</td>
<td>*Guiteras, Morbid Anatomy</td>
<td>Pearson, Practice</td>
<td>Harger, Anatomy</td>
<td>Adams, Surgery</td>
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<tr>
<td>11 A.M.</td>
<td>Freisacher, Physiology</td>
<td>Breisacher, Physiology</td>
<td>Adams, Surgery</td>
<td>Breisacher, Anatomy</td>
<td>Harger, Anatomy</td>
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<tr>
<td>2 P.M.</td>
<td>Harshberger, Laboratory, Botany, Two hours. After Feb. 1st</td>
<td>Glass, Canine Practice</td>
<td>Dissection</td>
<td>R. Formad, Pathological Histology Laboratory, Before February 1st</td>
<td>Harshberger, Laboratory, Botany, After Feb. 1st</td>
<td>Dissection</td>
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<tr>
<td>3 P.M.</td>
<td>Harshberger, Practice</td>
<td>Pearson, Practice</td>
<td>Dissection</td>
<td>Adams, Horseshoeing</td>
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<td>4 P.M.</td>
<td>Harshberger, Botany</td>
<td>Dissection</td>
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<td>*Wood, Therapeutics</td>
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<td>4 P.M.</td>
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<td>Adams. Horseshoeing.</td>
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Lectures marked * are delivered in the Medical Department.
VETERINARY HOSPITAL OF THE UNIVERSITY OF PENNSYLVANIA.
Thirty-sixth and Pine Streets, Philadelphia.

BOARD OF MANAGERS:
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WILLIAM HUNT, M. D., WALTER R. FURNESS,
H. PRATT MCKEAN, JR., CHARLEMAGNE TOWER, JR.,
JOHN C. SIMS, JR.

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SIMON J. J. HARGER, V. M. D., Professor of Veterinary Anatomy and
Zoötechnics.
LEONARD PEARSON, B. S., V.M.D., Assistant Professor of the Theory
and Practice of Veterinary Medicine.
JOHN W. ADAMS, A. B., V. M. D., Professor of Veterinary Surgery
and Obstetrics.
CHARLES E. COTTON, V. M. D., House Surgeon.

FRANK R. TROWBRIDGE, Clerk to the Hospital.

The Hospital of the VETERINARY DEPARTMENT OF THE UNIVERSITY OF PENNSYLVANIA is supplied with every possible facility for the best handling and care of sick and injured animals of all kinds.
An AMBULANCE is provided for the conveyance of sick and lame horses. For this service the charges are made according to distance traveled.
Animals are admitted into the Hospital at any time, DAY or NIGHT.
A Free Dispensary Clinic is conducted by the members of the Hospital staff daily, except Sunday, between 8 and 10 A. M.
DEPARTMENT OF VETERINARY MEDICINE.

The animals are under the professional care of the Hospital Staff and of the House Surgeon, who resides in the Hospital.

2053 animals were treated in the Hospital during the year ending August 31, 1893.

A competent Farrier is attached to the Hospital, who is prepared to do a LIMITED AMOUNT OF ORDINARY SHOEING in addition to SHOEING FOR LAMENESS; the LATTER ONLY under the direction of the Hospital Staff.
LABORATORY OF HYGIENE.

STAFF OF THE LABORATORY.

Director.—JOHN S. BILLINGS, M. D.
First Assistant.—A. C. ABBOTT, M. D.
Assistant in Bacteriology.—INGERSSOLL OLMSTED, M. B.
Assistant in Chemistry.—HILL SLOANE WARWICK, M. D., Ph. D.
THOMAS A. SCOTT Fellow in Hygiene.—MAZYCK P. RAVENEL, M. D.

MATRICULATES.

David Hendricks Bergey, M. D., North Wales, Pa.
George H. Torney, M. D., 3927 Pine St.
(U. S. Army),
Albert E. Truby,
Willard F. Truby,
Clarence O. Arey, C. E.,

City Address.

Otto, N. Y.,
Otto, N. Y.,
University.
University.

ANNOUNCEMENT OF COURSES OF INSTRUCTION GIVEN DURING 1893–94.

I. A Course in Practical Hygiene,

comprising lectures and practical work in the Laboratory upon the following subjects:

(1) Water.—Physical, chemical and bacteriological investigation of water supplies; methods of obtaining samples; qualitative and quantitative analysis for impurities; collection, storage and purification of water intended for domestic use; effects of filters, aeration, etc.

(2) Disposal of refuse, cremation of garbage, etc.

(3) Sewage disposal, sewers and house-drainage.

(4) Soils and building sites, physical, chemical and bacteriological investigations, soil moisture, ground air.

(335)
(5) The atmosphere, climate and meteorological observations and records, chemical analysis, bacteriological investigation, methods of investigation, methods of ventilation and heating.
(6) Foods—adulteration, milk and meat inspections.
(7) Clothing—microscopic examination, poisonous dyes.
(8) Lighting—gas, electricity, illuminating oils.
(9) Management of contagious diseases. Practical tests of different methods of disinfection, chemical and thermal; notification, isolation and quarantine.
(10) Vital statistics, registration and methods of tabulation.
(11) Offensive and dangerous trades.
(12) Sanitary jurisprudence, law of nuisances, duties of health officers, etc.

The above course of instruction begins the first Monday in October, and occupies eight weeks—five days a week—from 9 A.M. to 12 M. The Laboratory is open until 5 P.M. for those students in this course who wish to continue work in the afternoon.

The fee for this course is $50, payable in advance.

II. AN ELEMENTARY COURSE IN BACTERIOLOGY.

This course covers the following subjects:
(1) Apparatus employed—sterilizers, incubators, pressure regulators, thermostats, etc.
(2) Culture media, methods of preparation, sterilization methods.
(3) Microscopic characteristics of cultures of bacteria in general and of special forms.
(4) Methods of obtaining, from mixtures of different bacteria, individual species in pure cultures.
(5) Microscopic technique. Use and care of instruments, staining from cultures, section cutting and staining and mounting of tissues.
(6) Pathogenic bacteria, isolation, identification and inoculation.
(7) Immunity, preventive inoculations and preparation of vaccines.
(8) Disinfection, thermal and chemical, methods and apparatus, modes of testing efficiency.
(9) Antisepsis and asepsis in surgery and obstetrics, preparation of dressings, instruments, operator and assistants and of patients.
(10) Bacteriological investigation of water.
(11) Bacteriological investigation of air.
(12) Bacteriological investigation of soil.

This course commences on the first Monday in October, and continues eight weeks, five days a week, from 9 A.M. to 12 M., with the privilege of continuing work until 5 P.M. It will be repeated,
beginning the first Monday in February, and continuing eight weeks, five days a week, from 2 until 5 P.M. The fee for this course is $25, payable in advance.

III. A Course in Clinical Bacteriology and Chemistry.

This course includes the following studies:

1. Use of the microscope.—Blood, method of obtaining and preparing specimens for microscopic examination; normal constituents of; estimation of the relative number of corpuscles as determined by the hæmocytometer; estimation of the proportion of hæmoglobin; spectroscopic examination of the blood, especially in its bearing upon carbon-monoxide poisoning; examination of the blood in malaria and other diseases.

2. Chemical, microscopical and bacteriological study of urine, milk, gastric juice, saliva, vomited matters and intestinal evacuations.

3. Bacteriological methods generally in clinical work, especially in their relation to diphtheria, tuberculosis, pneumonia, typhoid fever, Asiatic cholera and surgical infections.

This course begins the first Monday in November, and continues eight weeks, five days in the week, from 9 A.M. to 12 M. It will be repeated in the spring, beginning the first Monday in May, and continuing eight weeks, five days a week, from 2 to 5 P.M.

The fee for this course is $25, payable in advance.

IV. A Course in Advanced Bacteriology.

1. A course of instruction in advanced bacteriology, consisting of special research adapted to each student, begins on the first Monday in December, and continues for eight weeks, five days per week, from 9 A.M. until 12 M., with the privilege of continuing work until 5 P.M.

The fee for this course is $25, payable in advance.

V. A Course in Physiological Chemistry with Special Attention to the Study of the Products of Bacterial Growth.

1. This course will consist of lectures and demonstrations, and of practical work by the students. The practical work will consist of an introduction to the preliminary methods of physiological chemical research, with outlines of gravimetric and volumetric analysis, and the proximate and ultimate analysis of the more important compounds found in the body, including a study of carbohydrates, proteids, albuminoids, ferments and pigments; fermentation and its resulting compounds; ferments, organized and unorganized, poisonous albumins (toxalbumins), ptomaines and leucomains.

Special attention will be directed to the methods for the production
and isolation of certain compounds possessing immunifying and antitoxic properties, and to the study of their characteristic differential reactions. The course will begin Tuesday, January 2, 1894, and continue for twelve weeks, five days in the week, from 9 A. M. to 12 M., with the privilege of continuing work until 5 P. M.

FEES.

The fee for this course is $30, payable in advance. It is desirable that all individuals wishing to take this course shall have had the course in Clinical Bacteriology and Chemistry.

By the payment of $100 individuals can obtain a ticket that will entitle them to attend all courses given in the Laboratory during the academic year. They will make the usual caution deposit and pay the regular price for materials that are sold in the courses. For students taking all the courses a special examination will be given at the end of the term to those desirous of obtaining a certificate of qualification to perform the duties of health officers.

GENERAL REGULATIONS.

Individuals who have had courses in the Laboratory and have demonstrated their capacity for independent work, or those coming from other laboratories with proper recommendations and desirous of making special researches coming within the scope of this Laboratory, can obtain the privilege of working in the Laboratory by the payment of the sum of $15. This does not include attention from the instructor for any definite or fixed time, but only pays for the place in which to work. The Laboratory reserves the right to refuse these privileges to any one who is not prepared to pursue independent studies of the proper character. Individuals to whom these privileges are granted must submit to the rules and regulations of the Laboratory. They will make the usual caution deposit and pay the regular prices for materials.

Should the work of an independent student be of such a nature as to advance either the teaching or to contribute to the value of researches being conducted as the property of the Laboratory, it is within the power of the Director to offer to such student the privileges of the Laboratory without the payment of the regular fee, providing the work of the student is placed at the disposal of the Laboratory, due credit being given to him for his work thus utilized.

All students taking courses or otherwise working in the Laboratories must make a deposit of $25 in addition to the regular fees. This is to insure the Laboratory against loss by breakage, etc. All
accounts held by the Laboratory against students for breakage and materials used will be deducted from the caution deposit and the remainder of the deposit returned to the student at the end of the course unless otherwise arranged for.

Only those students who give evidence of fitness to profit by the courses will be received. It is very desirable that students should have some practical knowledge of chemical manipulation and of the use of the microscope.

The rules of the Laboratory, as to order and discipline, must be observed, and the right is reserved to ask the withdrawal of any student who does not obey them.

Applications for admission to any of the above courses should be addressed to

DR. A. C. ABBOTT,
LABORATORY OF HYGIENE,
UNIVERSITY OF PENNSYLVANIA.

THE THOMAS A. SCOTT FELLOWSHIP IN THE LABORATORY OF HYGIENE OF THE UNIVERSITY OF PENNSYLVANIA.

Since the opening of the Laboratory this Fellowship has been founded and generously endowed by Mrs. Scott as a memorial of the late Thomas A. Scott, Esq., of Philadelphia. Its object is to aid young men of talent who desire to become investigators or teachers in the field of sanitary science, and to promote the increase of knowledge in that department.

The power of appointment to this Fellowship rests with the Board of Trustees of the University, who will act upon recommendation made to it by the Electors to the Fellowship, comprising the Provost of the University, the Chairman of the Committee of the Board of Trustees of the Laboratory of Hygiene, and the Director of the Laboratory.

The salary attached to the position is the income arising from $10,000, the amount of endowment of the Fellowship.

REGULATIONS GOVERNING THE THOMAS A. SCOTT FELLOWSHIP IN HYGIENE.

(1) Applications must be made in writing to the Provost of the University of Pennsylvania, and should be forwarded prior to May 1 of the year of the candidature.

(2) The holder of the Fellowship shall not be more than thirty years of age at the time of his appointment.
(3) The application must be accompanied by evidence of a liberal education, such as the diploma of a college of good repute (the appointment being regarded as an equivalent to the baccalaureate degree, by evidence of decided taste and ability in the direction of special study and scientific work, such as an example of some work already performed, and of good moral character, such as testimonials from his last instructors.

(4) The holder of the fellowship will be expected to perform such duties as may be allotted to him by the Director of the Laboratory in connection with his course of study, to act, when called upon, as examiner or assistant examiner; to use his influence for the promotion of the objects and good order of the Department, and, in general, to forward the efficiency of the University as far as may be in his power.

(5) He will be expected to devote his time, under the direction of the head of the Department, to the prosecution of special studies having relation to the causation and prevention of disease or to the improvement of health, and before the close of the year to give evidence of the progress he has made by presenting a thesis, the report of the results of his research, the delivery of special lectures, or some similar method which will be satisfactory to the Electors.

(6) While holding the Fellowship he will not be permitted to engage in any work other than that directly bearing upon the interests of the Department.

(7) All work performed is to be considered the property of the Laboratory, and to be published only with the consent and approval of the Director of the Department.

(8) The Fellow will be expected to aid in the instruction at the Laboratory by lectures or otherwise, as may be directed, but will not be permitted to teach in any other institution during the time of holding the Fellowship.

(9) He may be reappointed at the end of the year, but only for exceptional reasons.

(10) The holder is exempt from tuition fees. In case of resignation, promotion or removal from the Fellowship, payments will be made for the time during which the office shall have been actually held.

(11) The Electors have the right to declare the Fellowship vacant if its holder prove in their opinion unworthy, and no further salary shall be paid to the person thus removed.
THE LIBRARY.

GREGORY B. KEEN, A. M., Librarian.
MORRIS JASTROW, Jr., Ph. D., Assistant Librarian.

ASSISTANTS.
WALThER KOENIG, Ph. D.,
AGNES M. MULHOLLAND,
FRANCES F. TIMNEY,
CHARLOTTE E. STEWART.

S. STANGER ISZARD, A. M., LL. B.,
Librarian of Department of Law.
JEAN B. SKIDMORE,
Librarian of School of Architecture.

The Library is one of the original departments of the University, possessing among its treasures works presented to the Academy of Philadelphia in 1749, others purchased by a Committee, of which Benjamin Franklin was chairman, in 1750, and still others given by the Rev. William Smith, D.D., first Provost of the College of Philadelphia, and by Louis XVI. and other early friends and patrons. It now contains about 115,000 bound volumes, and considerably more than that number of unbound volumes and pamphlets.

It comprises a fine collection of public documents, dating from the institution of the Federal Government, and has been for some time an official depository of the Government for later publications.

Valuable additions have been made to the departments of history and literature from the income of the Tobias Wagner Library Fund, given to the University in memory of a deceased Trustee.

The Colwell Library, the munificent gift of the late Stephen Colwell, consists of over 7000 volumes, and is one of the most complete collections of works on Finance and Political Economy in the world. It contains nearly everything of importance on these subjects in the English, French and Italian languages published before 1860.
It is supplemented by the Carey Library, the bequest of the late Henry C. Carey, which embraces many books of more recent date, is especially rich in statistics, European government reports, and the like, and includes about 3000 English pamphlets, bound in chronological order, and covering the period from the close of the seventeenth century to our time. The pamphlets were presented to Mr. Carey by Mr. McCalmont, of London.

The Evans Rogers Library is composed of standard works on drawing, mathematics, astronomy, physics, surveying and explorations as well as of technical works on roads, strength and properties of materials, railroads, tunnels, canals, water supply, drainage, architecture, mechanics, navigation, harbor improvements, and park and landscape engineering. It contains, also, a valuable collection of reports of American, English, and French Engineering Societies, periodicals, Coast Survey and hydrographic charts, maps, diagrams, and drawings.

The Wetherill Library consists of works on Chemistry.

The Allen Library includes about 5000 volumes relating to Bibliography, Greek and Latin Literature, Military Science, and Shakespeare, selected with great care by their former owner, the late Professor George Allen, LL. D., of the University.

The Henry Seybert Library of Modern Spiritualism embraces a large collection of works on that and cognate subjects.

The McCambe Library comprises nearly 1000 volumes in Chinese and Japanese, and over 200 in European languages concerning the history and literature of China and Japan.

The Krauth Library, founded by the Society of the Alumni of the College in honor of the late Vice-Provost of the University, the Rev. Charles P. Krauth, D. D., and the Benjamin Bartis Comegys, Jr., Library, comprehend the subjects of Intellectual and Moral Philosophy.

The Crawford Library, the gift of Major-General Samuel Wylie Crawford, M. D., LL. D., consists of over 1000 volumes on a great variety of subjects, literary, scientific and historical.

The Heyden and Leidy Libraries comprise works on geology, palaeontology, zoology and botany.

The Stillé and William Pepper Libraries embrace works on the subject of medicine.

The Biddle Law Library comprises the noted collection of American, English, Scotch, and Irish Reports, numbering over 5000 volumes, formerly the property of the Hon. Benjamin H. Brewster, and the gift of George W. Biddle and family, in memory of the late
George Biddle. Provision has been made for the annual increase of this library, which now comprises over 9,000 books. There are also many works on Roman jurisprudence and the civil code, from the library of the late Judge Bouvier, presented by his son-in-law, R. E. Peterson, M. D.

The Pott Library, purchased by private subscription, embraces the philological library of the late Professor F. A. Pott, of the University of Halle, containing about 4,000 works, representing almost every language and dialect of any prominence. It is especially rich in the departments of Sanskrit and the Romance and Teutonic languages, particularly the German dialects, as well as in the Greek and Latin tongues. It includes a good collection of books on the alphabet and its history, and a remarkably fine collection on gypsy dialects and proper names.

The library of Semitic Philology and Literature comprises a very fine Arabic collection numbering about 1,000 volumes, a collection on Semitic Epigraphy (Phoenician, Palmyrene, Moabite, Himiaritic), aggregating 125 volumes, and an Assyrian collection, besides several hundred volumes on Hebrew, both of the classical and Rabbinical period, Biblical commentaries, etc. The nucleus of a manuscript collection has been formed through the purchase of Arabic and Ethiopic manuscripts.

Mr. Joseph Wharton has given twenty-five thousand dollars as an endowment fund for the perpetual increase of the library of Economic Science.

The Leutsch Library, formerly the property of the late Professor Ernst von Leutsch, of Göttingen, purchased during the past year, comprises over 20,000 volumes, and is believed to be the finest classical library in America.

The J. B. Lippincott Library, founded by the family of a late Trustee of the University, embraces an ever-growing collection of books in English Literature.

The Library of the School of American History and Institutions consists of about 12,000 volumes, classified and arranged as follows: National Documents, a practically complete legislative record of the Government of the United States, 1789–1892; State Documents; Canadian Public Documents, 1843–1890; Municipal Ordinances and Documents of American Cities; the Laws of the States and Territories, 1840–1890; the Laws of the United States; the John A. Jameson Library of American Constitutional Conventions, Debates, Journals, etc.; the Robert Purvis Collection of Anti-Slavery Literature; the Friends' Library; Works on American History and Government;
The Library.

Works of American Statesmen; a Working-Library set apart for the use of students in the School of American History and Institutions, with special reference to the lectures delivered in that School; and a small collection of pamphlets and newspapers.

Finally, there has just been added to the Library a large collection of books upon Psychology.

The Library is open daily, except Sundays and holidays, from 8.30 a.m. to 5.30 p.m., and both professors and students are permitted to take books out. Free use of the Library for consultation is accorded to graduates and the public.
DEPARTMENT OF ARCHAEOLOGY AND PALÆONTOLOGY.

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This Department was instituted in 1889 as the Museum of Archaeology and Palæontology, to provide for instruction and original research in these studies, and the incidental formation of collections for their illustration. In 1891, in consequence of the great interest manifested in this Museum and the successful extension of its work, it was constituted a Department of the University. Its collections, which are now contained in halls devoted to them in the Library, comprise the large and valuable collection of Assyrian antiquities obtained by the Babylonian Expedition sent out by the University under Dr. Peters. These objects are now being arranged and studied for publication. Also an Egyptian collection, consisting in greater part of the results of recent explorations in Egypt, and arranged with especial reference to its ethnological and historical import. An American collection, derived largely from explorations conducted under the direction of its Curator, very thoroughly illustrates the pre-historic
antiquties of the United States, and is supplemented by a series of
Mexican and Central American objects, and specimens of the dress,
arms and utensils of the existing Indians. The Oriental Section
already contains valuable archaeological and ethnological specimens
from India, China and Japan. There are also important series of
objects from the South Pacific and Equatorial Africa, and a number of
special collections, comprising games, objects used in worship, etc.
The extremely valuable collection of engraved gems, formerly depos-
ited by Mr. Maxwell Sommerville, has been made over by him to the
Department to form a new Section of Glyptics. It has been enlarged
by important additions during the past year. It is the aim of the De-
partment to bring together materials for study, and to further original
work and exploration.
The Department is governed by a Board of Managers annually
elected, of whom thirty are named by the University Archaeological
Association and six by the Trustees of the University.
For inspection of the Museums, or the prosecution therein of
special studies, application may be made to one of the above-named
Curators.

UNIVERSITY ARCHAEOLOGICAL ASSOCIATION.

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Treasurer:
MRS. J. DUNDAS LIPPINCOTT.

Secretary:
STEWART CULIN, 105 South Twenty-second Street.

This Association was formed to co-operate with the Museums which
have been practically created by its efforts. It elects from its mem-
bership thirty of the Board of Managers of the newly constituted
Department of Archæology and Palæontology, and its objects are to secure funds for explorations and to promote an interest in its special work by publications and by lectures. The annual membership fee is five dollars, payable in January, undergraduates of the University being admitted to membership upon an annual payment of two dollars. Its funds are administered with strict reference to the purpose of the subscription. For admission to membership and other information, application may be made to Stewart Culin, Secretary, 105 South Twenty-second Street.
DEPARTMENT OF PHYSICAL EDUCATION.

This Department carries into practical operation the conviction that during the period of growth the body needs quite as much training as the mind, and that an institution of learning holding out incentives to intellectual progress should not overlook the bodily progress, without which all intellectual prizes, when won, are useless.

The means are supplied in the Athletic Grounds, lying near and partly surrounded by the University buildings. They comprise four acres, which have been fenced, graded and improved, a fine quarter-mile track laid, the middle of the lot prepared for base-ball, foot-ball, etc., and a grand-stand erected. Competent persons have been engaged to supervise and restrict the use of the grounds, and to see, as the Trustees intend, that the purpose of Physical Education, as well as of healthful relaxation, shall be thoroughly carried out. The boat-house of the Athletic Association, situated on the Schuylkill above the dam, is open to all matriculates in the Department of Physical Education upon the payment of a small amount extra. Additional boating facilities have been secured by the erection of a new boat-house at the South Street Bridge. This is only a few rods from the University buildings, and will be in use during fall and open days of the winter, while the spring and summer work will be done as heretofore at the upper boat-house in Fairmount Park.

The University has also fitted up a gymnasium, wherein are to be found appliances for the proper, systematic and symmetrical development of the body. These are to be used by each student only after undergoing his physical examination and receiving advice from the Director of this Department as to the particular needs of his body, and as to the weak points which need strengthening and development. This advice is founded upon a careful study not only of his present condition, but also of his personal and family history, taking thus into consideration hereditary predisposition to disease, where any exists.

The system consists in personal supervision of each student, who, immediately after entrance, receives a thorough physical examination
in regard to his general health, strength and muscular development, which is duly recorded. The examination is repeated once yearly, and the record thus shows the improvement or deterioration of each student, and the amount and the quality of exercise each one demands. All have their work directed by proper methods, so that the result may be a harmonious and symmetrical development of the entire organism.

In the competitive sports the greatest care is exercised in recommending training for athletic contests. Only those students are advised to train for special events who have shown themselves naturally adapted to work of that kind.

Students in the Freshman Class are required to attend one lecture a week throughout the year.

The Director of Physical Education requires all students in the class to pass an examination semi-annually, unless their work has been of sufficient merit to warrant an exemption therefrom.

Lectures comprise Bodily Hygiene, Anatomy, Physiology, and Physiology of Bodily Exercise, and Swedish System.

BOOKS OF REFERENCE.

Anatomy—Leidy's or Gray's.
Physiology—Foster's or Yeo's.
Physiology of Bodily Exercise—Le Grange.

For further information address Dr. Randolph Faries, Director of Physical Education.
THE LECTURE ASSOCIATION
OF THE
UNIVERSITY OF PENNSYLVANIA.

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WILLIAM PEPPER, M.D., LL.D.

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MRS. HUNT, 1300 Spruce St.

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(351)
THE LECTURE ASSOCIATION.

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Mrs. John E. Reyburn, Mrs. Ida Wood,
Miss Agnes Repplier, Mr. Walter Wood,
Mr. J. G. Rosengarten, Mr. Ellis Yarnall.

This Association, organized in 1887, was formed to establish a system
of public lecture courses, in connection with the University, by its
own professors and other eminent teachers. It has succeeded in pre-
senting annually a series of able and most instructive courses, free to
the matriculates of the University, and largely patronized by the
general public.

The following courses are announced by the Lecture Association for
1893–94, beginning January 4:

LECTURES AND SUBJECTS.


I. A Course of Six Lectures on The Augustan Age.

1. Thursday, January 4, at 4 p.m.—General Introduction and Daniel
   De Foe.
2. Monday, January 8, at 4 p.m.—Addison.
3. Thursday, January 11, at 4 p.m.—Addison.
4. Monday, January 15, at 4 p.m.—Pope.
5. Thursday, January 18, at 4 p.m.—Pope.
6. Monday, January 22, at 4 p.m.—Swift.

Course Ticket, $2.00.

Horace Howard Furness, Ph. D., L. H. D., L. L. D.,

II. Four Readings from Shakespeare.

1. Thursday, January 25, at 4 p.m.—Henry the Fifth.
2. Monday, January 29, at 4 p.m.—Richard the Third.
3. Thursday, February 1, at 4 p.m.—Midsummer Night’s Dream.
4. Monday, February 5, at 4 p.m.—Hamlet.

Course Ticket, $1.50.
III. A Course of Six Lectures. (Illustrated.)

Talks upon Spanish History.

1. Thursday, February 8, at 4 p.m.—Primitive Spain: beginning 711.
2. Monday, February 12, at 4 p.m.—Moorish Spain: 711 to 1492.
3. Thursday, February 15, at 4 p.m.—The Reconquest: The Age of Heroes and Ballads, 718 to 1492.
5. Monday, February 26, at 4 p.m.—Arts and Letters in the Golden Age.
6. Thursday, March 1, at 4 p.m.—Modern Spain under the Bourbons: Spanish Life and Customs: 1700 to the present.

Course Ticket, $2.00.

IV. A Course of Four Lectures. (Illustrated.)

An Introduction to the Study of Japanese Art.

1. Monday, March 5, at 4 p.m.—The Five Periods of Japanese Art.
2. Friday, March 9, at 4 p.m.—Early Japanese Sculpture.
3. Monday, March 12, at 4 p.m.—Japanese Painting from the Fifteenth Century.

Course Ticket, $1.50.

Excepting the Course by Professor Fenollosa on Japanese Art, the Lectures will be given in Association Hall, Fifteenth and Chestnut Streets, on Mondays and Thursdays, at 4 o'clock, p.m., omitting February 22. The Course by Professor Fenollosa will be given at the Academy of Fine Arts, Broad and Cherry Streets, on Mondays and Fridays, at 4 o'clock p.m., with a loan collection of Japanese Art.

The annual fee for membership, entitling each member to a ticket (non-transferable) admitting to all lectures, is Five (5) Dollars. Annual membership tickets, tickets for separate Courses, and single tickets, can be bought at Boner's, 1314 Chestnut Street, and at the Halls, on the afternoons of the Lectures.

For further information or membership, address Mrs. Hunt, Secretary and Treasurer, 1300 Spruce Street.
THE ATHLETIC ASSOCIATION.

The Athletic Association of the University of Pennsylvania, an incorporated organization, directs and controls all the athletic affairs of the institution.

The Board of Directors is composed of ten graduates and five undergraduates, so that not only do the students and alumni thus unite in directing the course and policy of the University in all athletic matters, but the graduate advisory feature, merely a court of appeal at other institutions, is here in active direction and absolute control. The Board stands in the light of a co-operative committee to the several faculties and the Board of Trustees, and through the membership roll, comprising graduates and undergraduates, the sentiment and support of all is centralized. The Board of Directors, through subordinate committees of two graduates and three undergraduates upon each branch, direct all athletics as a unit.

The Board of Trustees assigned to the Association the grounds situated at Thirty-sixth and Spruce streets, for outdoor athletic training and exhibitions of all kinds, the Association being responsible for their proper preservation, etc. These grounds contain one of the best quarter-mile tracks in the country, a good base-ball diamond, and a fine foot-ball field. The seating capacity is about 3000, a large proportion of which is under cover. These grounds, however, are found to be too small for the present needs of the Association; and within the past year the Board of Trustees, recognizing this fact, and realizing that in the near future the ground will be required for new buildings, has granted the Athletic Association the use of the property bounded by South, Marston and Thirty-third streets, and lying immediately west of the Philadelphia, Wilmington and Baltimore Division of the Pennsylvania Railroad. These grounds will be known as "Franklin Field." The improvement of the property has already been commenced, and will be pushed to completion as rapidly as the necessary funds for the purpose are received. The plan contemplates the erection of a field house, containing a tank and cage for winter practice, dressing rooms, etc., in one corner, and also a track, base-ball field and foot-ball field with properly located stands, beside ample space for practice.
THE ATHLETIC ASSOCIATION.

The officers of the Association are:

President,
H. LAUSSAT GEYELIN, '77 C.

Vice-President,
GEORGE WHARTON PEPPER, '87 C.

Secretary,
CLIFFORD PEMBERTON, '81 C.

Treasurer,
J. HARTLEY MERRICK, '90 C.

Board of Directors,
JOHN C. SIMS, '65 C.
H. LAUSSAT GEYELIN, '77 C.
THOMAS G. HUNTER, '82 C.
JOHN C. BELL, '84 L.
THOMAS W. HULME, '89 C.
LOUIS C. MADEIRA, JR., '72 C.
CLIFFORD PEMBERTON, '81 C.
FRANK B. ELLIS, '93 L.
J. HARTLEY MERRICK, '90 C.
GEO. WHARTON PEPPER, '87 C.
E. ST. ELMO LEWIS, '94 L.
HENRY W. THORNTON, '94 C.
GUY C. ROBB, '94 D.
CLARENCE J. MARSHALL, '94 V.

Committees.
Foot-ball—Mr. BELL, Chairman.
Base-ball—Mr. MADEIRA, Chairman.
Track Athletics—Mr. GEYELIN, Chairman.
Rowing—Mr. HUNTER, Chairman.
Cricket, Tennis, Shooting and Lacrosse—Mr. PEPPER, Chairman.
ALUMNI ORGANIZATIONS.

The Alumni of the University, of whom there have been over 15,000, are organized according to the departments from which they were graduated, there being five general societies, representing the College and the Departments of Medicine, Law, Dentistry and Veterinary Medicine. These societies are treated of under the heading of the several Departments. There is also the Central Committee of the Alumni, representing all Departments of the University. The organization of this Committee, and of local alumni societies in different parts of the United States, is given below.

Alumni of all Departments are invited to address freely the officers of the University for information concerning courses, etc. A list of addresses of the graduates of all Departments of the University is kept in the office of the Assistant Secretary, who should be notified of any change.

CENTRAL COMMITTEE OF THE ALUMNI.

This organization, the result of a growing desire among the Alumni at large for a definite influence in the affairs of the University, was established by the Board of Trustees, March 7, 1882. Under the Revised Statutes, Sec. 34, the Central Committee is authorized, for every third vacancy which may occur in the Board of Trustees, to nominate four candidates, one of whom may be chosen a member of the Board; if none of these be elected, others are to be nominated until the vacancy is filled. The Central Committee arranges itself in certain sub-committees, one for each Department, whose duty it is, from time to time, to attend the examinations, recitations, and other exercises of that Department, and to confer with the Professors and Faculty thereof on all matters tending to improvement. It appoints, also, a Committee on Property and Endowment, to which the Treasurer of the University sends annually a copy of his report to the Board of Trustees.

The officers of the Central Committee are a President, a Secretary and a Treasurer, elected annually. The members are thirty in number, six elected annually for a term of five years, by the duly qualified electors, as defined below, voting by ballot, in person, on Commencement Day, in Philadelphia. Of the six so selected, two must be
graduates of the College of at least three years’ standing, two of the Medical Departments, and two of the Law Department. All persons are qualified electors who have received a degree, honorary or in course, from the University, except members of the Board of Trustees and other officers of government or instruction, none of whom are eligible as members of the Central Committee. Preliminary to the annual election a list of eighteen eligible names is mailed to the Alumni, who select six of the number as their regular nominees. At the election, however, any other duly qualified persons may be voted for.

All Alumni are cordially urged to bring to the attention of the Committee any matters or suggestions affecting the welfare of the University. Alumni who have not heretofore received postal-card ballots for the preliminary nominating election, but desire them, should send name and address, with degree and year of graduation, to the Secretary.

MEMBERS OF THE CENTRAL COMMITTEE.

1894.

R. Dale Benson, A. M.,
J. Douglass Brown, Jr., A. M., LL. B.,
Claudius H. Mastin, M. D., LL. D.,
G. Colesberry Purves, A. M., LL. B.,
Effingham B. Morris, A. M., LL. B.,
William H. Bennett, A. M., M. D.,
510 Walnut St., Philad’a.
Drexel Building, do.
Mobile, Alabama.
Girard Building, do.
332 S. 15th St., do.

1895.

Archibald R. Montgomery, A. M.,
Rev. Charles Wadsworth, Jr., A. M.,
Edward L. Duer, A. M., M. D.,
Wharton Sinkler, A. M., M. D.,
Hampton L. Carson, A. M., LL. B.,
William R. Philier, A. M., LL. B.,
221 S. Sixth St., Philad’a.
2038 Sp. Garden St., do.
1606 Locust St., do.
Drexel Building, do.
1340 Chestnut St., do.

1896.

Henry Budd, A. M.,
William H. Klapp, A. M., M. D.,
Herbert M. Howe, M. D.,
Robert H. Neilson, A. M.,
J. Sergeant Price, LL. B.,
Dwight M. Lowry, LL. B.,
727 Walnut St., Philad’a.
2132 Pine St., do.
1606 Locust St., do.
215 S. Fifth St., do.
709 Walnut St., do.
Drexel Building, do.

1897.

James W. Robins, D. D.,
H. Laussat Geyelin, A. M., LL. B.,
J. Levering Jones, LL. B.,
Alfred Whelen, M. D.,
William L. Winner, D. D. S.,
John Marshall Gest, A. M., LL. B.,
Merion Station, P. R. R.
Girard Building, Philad’a.
Drexel Building, do.
123 S. Twentieth St., do.
309 N. Sixth St., do.
400 Chestnut St., do.
THE COLLEGE.

The Society of the Alumni is composed of graduates of the College of the University of Pennsylvania, and of such other matriculates of that department as have been elected to membership by the Board of Managers of the Society.

The object of the Society is to sustain and advance the general interests of the University of Pennsylvania (of the College in particular), and to form an organized union of its graduates.

The Society holds its annual meeting followed by a collation on the evening of Commencement Day. The ordinary business of the Society during the year is conducted by a Board of Managers, elected at the annual meeting.

MEMBERSHIP.—(1) Graduates of the College are entitled to membership in the Society on notification of their intention to the Treasurer and payment of the initiation fee and dues. (2) Holders of certificates in any of the courses of the College are entitled to membership on election by the Board of Managers and payment of the initiation fee and dues. (3) Any person who shall not have been graduated from the College, but who shall have been graduated, and who shall have been a member for at least one year of a class in that department which shall have been graduated, and shall have been in good standing upon leaving his class, may become a member upon election by the Board of Managers and payment of the initiation fee and dues.

The annual dues of the Society are two dollars. Members of more than five years' standing may become life members on the payment of the sum of twenty dollars; other members on the payment of the sum of twenty-five dollars. All members who have paid their dues are entitled to a card to the annual collation.

Notification of an intention to join the Society should be sent to the Treasurer, Edward W. Mumford, College Hall, who will gladly propose the names of such as are eligible for membership under the amendment.
The Society has nearly completed, after eight years' work, a Catalogue of all Matriculates in the College. Any one having new or additional information about himself, or others, and wishing it to be inserted, is requested to send the same without delay to Dr. Persifor Frazer, 1042 Drexel Building, Philadelphia.

The officers of the Society are as follows:

**President.**—George Tucker Bispham, '58.

**Vice-Presidents.**—William S. Blight, '46.
John W. Faries, '31.
Charles C. Harrison, '62.
Joseph G. Rosengarten, '52.

**Recording Secretary.**—Professor Felix E. Schelling, '81, College Hall, University.

**Corresponding Secretary.**—J. Hartley Merrick, '90.

**Treasurer.**—Edward W. Mumford, '89, College Hall, University.

**Historiographer.**—Gregory B. Keen, '61.

**BOARD OF MANAGERS.**

John B. Gest, '44,
William Brooke Rawle, '63,
Henry Budd, '68,
William H. Burnett, '69,
Walter George Smith, '73,
W. Wilkins Carr, '73,
Edward G. McCollins, '78,
H. Laussat Geyelin, '77,
Prof. Geo. Stuart Fullerton, '79,
Harry C. Adams, '80,
Clifford Pemberton, Jr., '81,
Professor Edward P. Cheyney, '83,
Miers Busch, '88,
Geo. Quintard Horwitz, '86,
George Wharton Pepper, '87,
J. Somers Smith, Jr., '87,
Jos. Harmar Penniman, '90,
Horace Wood, '91,
Clifford Lewis, Jr., '92,
John Cadwalader, Jr., '93,

**SOCIETY OF THE ALUMNI OF THE LAW DEPARTMENT.**

The object of the Society is "to sustain and advance the interests of the Law Department of the University, and to cherish feelings of brotherhood and amity among its graduates."

The officers are:

**President.**—J. Sergeant Price, '54.

**Vice-Presidents.**—John K. Valentine, '57.
Hon. William B. Hanna, '57.

**Recording Secretary.**—H. Laussat Geyelin, '79.

**Corresponding Secretary.**—Hampton L. Carson, '74.

**Treasurer.**—George Vaux, Jr., '88.
SOCIETY OF THE ALUMNI OF THE DEPARTMENT OF MEDICINE.

The object of this Society is to sustain and advance the interests and influence of the Medical Department by the promotion of sentiments of general brotherhood and amity among the graduates, and by aiding in all efforts to elevate the standard of medical education and to extend the progress of medical science and art.

Any graduate in good standing may become a member by forwarding to the Treasurer the sum of one dollar; and thereafter the annual contribution will be one dollar.

Every member receives a copy of the proceedings of the annual meeting of the Society, and is notified of the Anniversary Reunion, which takes place at Commencement time.

Certificates of Membership furnished to Life Members upon application.

It is urgently requested that the Alumni of the Medical Department of the University of Pennsylvania avail themselves of the opportunity to join the Society, as an increased membership will greatly strengthen the Society and thereby advance its objects. The officers are:

President.—Traill Green, M. D., '35.

Vice-Presidents.—Meredith Clymer, M. D., '37,
W. S. W. Ruschenberger, M. D., '30,
Claudius H. Mastin, M. D., '49,
Hiram Corson, M. D., '28.

Secretary and Treasurer.—Joseph P. Tunis, M. D., '89, 129 South 18th St., Philadelphia.

Chairman of Executive Committee.—S. D. Risley, M. D., '70, 1722 Walnut St., Philadelphia.
ALUMNI ORGANIZATIONS.

The Alumni Society has completed the catalogue of the graduates of the Medical Department by the publication of an appendix, covering the years 1878–87, inclusive. Catalogues may be obtained by addressing or applying to Mr. Wm. H. Salvador, Clerk of the Medical Department, University.

Price: Catalogue, complete ............................................. $1.25
Appendix alone ........................................................... .25

Alumni are requested to send the Secretary of the Society of the Alumni notice of change of residence or other information likely to be of service in perfecting subsequent editions.

THE PHILADELPHIA ALUMNI SOCIETY OF THE MEDICAL DEPARTMENT.

This Society was founded in the spring of 1892, among the Alumni of the Medical Department of the University, living in and near Philadelphia, for the purpose of bringing the Alumni together, more particularly the younger men, so that they may be better acquainted. The meetings are held on the second Tuesday evening of January, March, May and November, and are of a purely social character. The officers are:

President.—Dr. Roland G. Curtin, '66.
Vice-Presidents.—Dr. Samuel D. Risley, '70,
Dr. John H. Packard, '53,
Dr. Albert G. B. Hinkle, '57.

Corresponding Secretary.—Dr. B. F. Stahl, '87, 1502 Arch St., Philadelphia, Pa.
Recording Secretary and Treasurer.—Dr. Ellwood R. Kirby, '87, 334 South 15th St., Philadelphia, Pa.
Executive Committee.—Dr. Judson Daland, '82, Chairman,
Dr. Richard C. Norris, '87,
Dr. Frank W. Talley, '87,
Dr. Chas. Burr, '86,
Dr. Henry W. Cattell, '87.

SOCIETY OF THE ALUMNI OF THE DEPARTMENT OF DENTISTRY.

The object of this Society is to sustain and advance the interests and influence of the Department of Dentistry by promoting sentiments of general brotherhood and amity among its graduates, and by aiding in all efforts to elevate the standard of Dental education and extending the progress of Dental science and art.
Any graduate in good standing, who will conduct himself as required by the Code of Ethics, may become a member of this Society by signing the Constitution, and paying the Treasurer the sum of one dollar.

Any member who shall pay into the Treasury the sum of five dollars, or who shall for five years pay into the Treasury the sum of one dollar yearly, shall become a life member and be entitled to a membership certificate.

The Annual Meeting is held on the day previous to Commencement, and is followed in the evening by the Annual Collation.

Every member receives a copy of the proceedings of the Annual Meeting of the Society.

It is urgently requested that as many as possible of the Alumni of the Department of Dentistry of the University of Pennsylvania will avail themselves of the opportunity to join the organization, as an increased membership will greatly strengthen the Society and advance its objects. The officers are:

President.—Solomon Freeman, D. D. S., '82, New York, N. Y.


Corresponding Secretary.—Harry B. McFadden, D. D. S., '82, 3505 Hamilton St., Philadelphia, Pa.


Alumni are requested to send to the Secretary of the Society of the Alumni notice of change of residence or other information likely to be of service to the Society.

SOCIETY OF THE ALUMNI OF THE DEPARTMENT OF VETERINARY MEDICINE.

All graduates of the Department are eligible for membership. The object is purely social, tending to cultivate fellowship among the graduates and maintain them in closer sympathy with their alma mater. The annual meeting and banquet are held in June, on the evening of Commencement Day. The officers are:
President.—Leonard Pearson, B. S., V. M. D., '90.
1st Vice-President.—Simon J. J. Harger, V. M. D., '87.
2d Vice-President.—Robert Formad, V. M. D., '88.
Secretary.—Charles E. Cotton, V. M. D., '93, 36th and Pine St., West Philadelphia.
Treasurer.—Wm. H. Ridge, V. M. D., '88, Trevose, Pa.

THE NEW ENGLAND ALUMNI ASSOCIATION.

The headquarters of the Association are in Boston, Mass., where the annual reunions are held. The officers are:—

President.—George A. Twitchell, M. D., '43.
Secretary and Treasurer.—Rev. Oliver Huckel, '87, Weymouth, Mass.

THE NORTHWESTERN ALUMNI ASSOCIATION.

Has its headquarters in Chicago, and holds an annual reunion, followed by a banquet. An alumnus of any Department residing in the Northwestern States is eligible for membership. Address the Secretary, Edward C. Knight, 1005 Masonic Temple, Ill.

Officers:—

President.—Charles Gilman Smith, M. D., '51.
Secretary.—Edward C. Knight, B. S., '89.
Vice-Presidents.—Herman Haupt, Jr., M. D., Ph. D., '78.
Professor H. Allen, '54.
Rev. Dr. E. G. Hirsch, '72.
George Henderson, Ph. B., '89.

THE SOCIETY OF THE ALUMNI OF THE DISTRICT OF COLUMBIA.

The object of the Society is to promote alumni interest among graduates living in Washington and vicinity. The officers are:—

President—Professor William B. Taylor, '40.
1st Vice-President.—Dr. H. C. Yarrow, '61.
2d Vice-President.—J. Hubley Ashton, Esq., '54.
Secretary and Treasurer.—Rev. William J. Thompson, '34, 518 Fourth St., S. E., Washington, D. C.
THE NEW YORK SOCIETY OF THE ALUMNI.

The Society exists for the purpose of bringing Alumni together, and for promoting the University's interests in New York. An annual banquet is held in New York City early in the year. For further information, address Henry Galbraith Ward, Esq., '70, 150 Broadway, New York, or these officers:

President.—Charles Carroll Lee, M. D.

Executive Committee.—William B. Boulton, '79; S. Mallet-Provost, '81; Rev. James Alan Montgomery, '87.

THE PENN CLUB OF DELAWARE

Is composed of graduates and former students of all Departments of the University. Its headquarters are in Wilmington, Del., where a dinner and a business meeting are held annually. The officers are:

President.—Alfred Lee.

Vice-President.—Dr. Willard Springer.

Secretary.—Wm. C. Speakman, 307 W. 8th St., Wilmington, Del.

Treasurer.—J. Ferris Belt.

BOARD OF MANAGERS.

Wm. Michael Byrne, Chairman.

Dr. Wm. C. Pearce,

Dr. H. P. Eaves,

Guy E. Wells,

Leonard E. Wales, Jr.

THE NORTHERN OHIO ALUMNI ASSOCIATION.

This Association includes graduates of all Departments residing in Northern Ohio. The Association meets quarterly during the first week of March, June, September and December, the annual banquet being held about March 1. The headquarters of the Association are in Cleveland, and the officers are:

President.—Benjamin L. Millikin, Cleveland.

Vice-Presidents.—Carl Hamann, Cleveland,

Thomas Hubbard, Toledo,

J. F. Marchand, Canton,

J. Vale Cleaver, Akron.

Recording Secretary.—Frank P. Cook, Cleveland.

Corresponding Secretary.—Oscar T. Thomas, 282 Prospect St.

Treasurer.—George F. Woodbury, Cleveland.

* Deceased.
DEGREES, HONORS AND PRIZES.

1892-1893.

HONORARY DEGREES.

MAY 10, 1893.

Doctor of Science:—Daniel G. Brinton, M. D.
Doctor of Laws:—Hon. Hamilton A. Hill.

JUNE 16, 1893.

Doctor of Science:—Gen. Isaac J. Wistar.
Bachelor of Arts:—Hon. F. Amadé Bregy.
Bachelor of Arts:—Prof. Charles Beyland Nancrede, M. D.

DEGREES IN COURSE.

Bachelor of Arts:—
John Cadwalader, Jr.,
Edward Salisbury Clark,
Thomas Luther Coley,
Andrew Wright Crawford,
Edward John Dooner,
John Ervin Gensemer,
George Henry Hallett,
Arthur Wellesley Howes,
David Wendell Hulburd,
Stephen Linnard Innes,
George Johnson,
Samuel Murdoch Kendrick,
Francis Herbert Lee,
Richard Thomas O'Malley,
William Henry Perry,
John Falconer Sinclair,
Charles Sinkler, Jr.,
George Albert Smyth,
Justin Ralph Sypher,
Jesse Starr White,
Robert Newton Willson, Jr.,
Erskine Wright.

Bachelor of Philosophy:—
William Mortimer Crowther,
James Henri Donnelly,
Frank Spencer Edmonds,
Benjamin Evans,
Thomas Sovereign Gates,
James Henry Graham,
John Githens Horner,
James Lawton Kendrick,
Henry Eugene Kohn,
Francis Livingston Laird,
Benjamin Wolf Loeb,
Martin Luther Nicholas,
John Nolen,
Howard DelHaven Ross,
Stoyan Vasil Tsanoff,
William Charles Augustus Ve-
James T. Young.

Bachelor of Science:—
Wm. Young Campbell Anderson,
Elliston Perot Bissell,
Henry Paul Busch,
Charles Alfred Cassanova,
Edward Burton Colket,
Walter Isaac Cooper,
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<tr>
<th>Bachelor of Music:—</th>
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<tr>
<td>Irwin J. Morgan,</td>
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<td>Bowness Briggs</td>
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<td>Charles Allyn Gilchrist,</td>
<td>Henry Ashton Little, A. B.,</td>
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<td>Arthur Maurice Greene, Jr.,</td>
<td>William Henry Lloyd, Jr., A. A.,</td>
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<td>Jesse Moore Greenman,</td>
<td>Samuel Kahn Louchheim, Ph.B.,</td>
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<td>Jansen Haines,</td>
<td>Harry Arista Mackey, A. B.,</td>
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<td>William Charles Hays,</td>
<td>William H. Magill,</td>
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<td>Clinton Gardner Harris,</td>
<td>John Henry Maurer,</td>
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<td>Francis Chambers Harris,</td>
<td>John Elliott McCully,</td>
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<td>Joseph Maurice Haywood,</td>
<td>Walter S. McInnes,</td>
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<td>Joseph J. Gillingham Hibbs,</td>
<td>Frank Henry Mullen,</td>
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<td>George Bickley Houseman,</td>
<td>Frederick Brooke Neilson,</td>
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<td>Geo. Washington Kendrick, 3d,</td>
<td>Edwin Channing Nevin,</td>
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<tr>
<td>Howard Adler Loeb,</td>
<td>P. C. Bernard O’Donovan,</td>
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<td>Thomas Emmett McDermott,</td>
<td>James Anton Pierce,</td>
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<td>Samuel Prioleau Ravenel, Jr., A. B.</td>
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<td>Francis Potts Witmer</td>
<td>Joseph Howard Rhoads,</td>
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<td>H. Bovee Schermerhorn, Ph. B.,</td>
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<td>Reginald Kearney Shober, A. B.,</td>
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<td>William Allen Shryock,</td>
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<td>Richard Saunderson Stoyle,Ph.B.</td>
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<td>William James Suddards,</td>
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<td>John Cassel Swartley,</td>
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<td>John Rittenhouse Umsted, A. B.,</td>
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<td>Marcel Alphonse Viti,</td>
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<td></td>
<td>Charles Henry Woltjen, Jr.</td>
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</table>
Master of Arts—

Alice Minerva Atkinson, A. B., Martin Grove Brumbaugh, M. S.,
Kent Rolla Dunlap, A. B., Eleanor Tibbets, A. B.

Doctor of Veterinary Medicine—

D. E. Buckingham,          Harry D. Paxson,
John F. Connor,            William A. H. Shields,
Percy H. Corson,           Evic A. Smith,
Charles E. Cotton,         Harry F. Smith,
Charles M. Earnest,        James A. Stuart,
Dennis B. Fitzpatrick,     George E. H. Stuart,
George O. Forsyth,         Edward E. Terry,
James O. Greason,          Henry W. Turner,
John Alvin James,          Alexander C. Walls,
Joseph R. Jefferis,        Harry K. Walter,
George O. Jolly,           William T. S. Werntz,
August O. Koenig,          Chris. J. Willgansz,
Frank C. McCurdy, A. B.,   William Young, Jr.
Charles E. Magill,          

Doctor of Dental Surgery:—

Joseph M. McDowell.

Bachelor of Divinity:—

Rev. Wm. Herbert Burk, A. B.,
Rev. Jas. Whalley Diggles, A. B.,
Rev. Charles P. B. Jefferys, A. B.

Doctor of Philosophy—

Rev. Loring Woart Batten, A. B., Francis Clifford Phillips, A. M.,
Amos Peaslee Brown, B. S., E. M., William Henry Samuel, A. M.,
Edward Thomas Devine, A. M., Samuel Christian Schmucker,
John William Harshberger, B. S., A. B.,
Emory Richard Johnson, M. L., Isaac Joachim Schwatt,
Thos. Montgomery Lightfoot, M. S., Rev. Philip Vollmer, A. M.,
Caspar Wistar Miller, Ph. B., Ellis Paxon Oberholtzer, Ph. B.

Practical Chemist:—

Herman Louis Dieck, Jr., B. S., J. Bird Moyer, B. S.

Mechanical Engineer:—

Edward Taggart Child, B. S., Joseph Hunter Lewis, B. S.,
William Francis Kelly, B. S., William M. Scott, B. S.,
George Edmunds Lawrence, B. S., James Alexander Stewart, B. S.

Civil Engineer:—

Clifford Lewis, Jr., B. S., Arthur Gregg Singer, B. S.,
William MacIntyre White, B. S.
CERTIFICATES OF PROFICIENCY.

In Chemistry, to
Vickers Oberholtzer,
Joseph Coleman Saltar,
Julius William Leisel, Jr.,
Victor Lenher,
Alphonse Robert Nicholson,
Elizabeth N. Woolman.

In Biology, to
Eckley Brinton Coxe, Jr.,
George Macy Eckwurzel,
Andrew Muller,
Louise Nichols,
Henry Field Smyth.

In Music, to
Reuben S. Herman,
Carrie E. Turner,
William J. Winther.

In Finance and Economy, to
Edwin Littlefield Blabon,
Frederick S. Gross,
Joseph Samuel Lovering,
Adrian Francois Wellens.

DEGREES IN COURSE.
MAY 10, 1893.

<table>
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<tr>
<th>Name</th>
<th>Post Office</th>
<th>State</th>
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<tbody>
<tr>
<td>Allen, B. Pemberton</td>
<td>Oriskany Falls</td>
<td>New York</td>
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<tr>
<td>Allen, Luther M.</td>
<td>Medford</td>
<td>New Jersey</td>
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<tr>
<td>Alsentzer, Charles F., Ph. G.</td>
<td>Wilmington</td>
<td>Delaware</td>
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<td>George L. Wentz,</td>
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<td>Conshohocken,</td>
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<td>Thomas N. Millikin,</td>
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<tr>
<td>Albert F. Witmer,</td>
<td>Tobago,</td>
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<td></td>
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Of the foregoing, including the graduates of June 16, 1893, there were from—

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**HONORS.**

**Doctor of Dental Surgery—**

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<td>Adams, Walter B.</td>
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<td>Betts, Edward P.</td>
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<td>Cahill, Frank J.</td>
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<td>Goodfellow, Elton C.</td>
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<tr>
<td>Henneberg, Anthony</td>
<td>Geneva, do</td>
<td>Switzerland</td>
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<tr>
<td>Henneberg, Samuel</td>
<td>Philadelphia</td>
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<tr>
<td>Hicks, Edward H.</td>
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<tr>
<td>Keffer, Franklin M.</td>
<td>Omaha, do</td>
<td>Nebraska</td>
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<td>Keim, Charles P.</td>
<td>Orange Free States, do</td>
<td>South Africa</td>
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<tr>
<td>Neebe, Charles W.</td>
<td>Maturin, do</td>
<td>Venezuela</td>
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<td>Regardis, Guillermo</td>
<td>Galveston, Texas, do</td>
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<tr>
<td>Ricker, John R.</td>
<td>Memphis, do</td>
<td>Tennessee</td>
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<td>Rosen, Jaky</td>
<td>Hazelton, do</td>
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<tr>
<td>Sherman, William T.</td>
<td>Clear Ridge, do</td>
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<td>Stevens, Frank K.</td>
<td>Manilla, do</td>
<td>Phillipine Islands</td>
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<td>Vergel de Dois, Antonio</td>
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Total, 16.

**JUNE 16, 1893.**

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**SUMMARY.**

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Total, 17.

**HONORS—1893.**

**IN THE COLLEGE FACULTY.**

At the Examination for Degrees, Honors were awarded as follows:

**ARTS:**

Walter Isaac Cooper, Edward Salisbury Clark, Andrew Wright Crawford, George Hervey Hallett, George Bickley Houseman, George Johnson and Erskine Wright.

**SCIENCE:**

Arthur Maurice Greene, Jr., and Francis Potts Witmer.
FINANCE AND ECONOMY:


Honors awarded in the Sophomore Class:

ARTS:

Roger Ashhurst, Fleming James, Jr., Charles Moore Magee, Owen Josephus Roberts.

SCIENCE:

Edgar Selden Bloom, Bernard Kohn, Ralph Lambert Warren and John Straton Wetherill.

IN THE FACULTY OF LAW.

THIRD YEAR, FIRST GRADE:


SECOND GRADE:


THIRD GRADE:


SECOND YEAR, FIRST GRADE:

Reynolds Driver Brown, Samuel D. Matlack.

SECOND GRADE:


THIRD GRADE:

Charles Wood Coulston, Randolph Sailor, Isaac Price Cadwallader.

FIRST YEAR, FIRST GRADE:

Isaac Hassler, R. S. Smith Pierce Mecutchen.
HONORS.

SECOND GRADE:


THIRD GRADE:

Lawrence John Burr, Pier Dannals, Ellis Lewis, John Thomas Mac-Donald, William Fryburg Brennan.

IN THE FACULTY OF DENTISTRY.

At the Examination for Degrees, Honorable Mention for averages exceeding 90, to
Franklin M. Keffer ........................................ Pennsylvania.
Charles F. Keim ........................................ Pennsylvania.
Frank K. Stevens ........................................ Pennsylvania.

PRIZES—JUNE 16, 1893.

At the University Commencement, June 16, 1893, Prizes were awarded in the College as follows:—

The George W. Childs Prize for the best examination on the subjects required for entrance to the Courses in Arts, to Arthur Edward Weil.

The Anthony J. Drexel Prize for the best examination on the subjects required for entrance to the Courses in Science, to George Alva Grevemeyer.

For the best examination by a member of the Freshman Class on Greek Prose Composition with the accents, to Arthur Edward Weil.

For the best examination on the "Lectures on Quaternions," given to the Voluntary Junior Class. First prize to Paul Renno Heyl; second prize to Arthur Hobson Quinn.

For the best Essay in History and English Literature by a member of the Junior Class—subject, "Henry Crabbe Robinson," to Thomas Kilby Smith.

For the best Declamation by a member of the Sophomore Class, first prize to Victor William Dippell; second prize to William Meredith Hanna.
For the best special examination in Greek Prose Composition, by Freshmen on entering College. First prize, Walter Crispin Lippincott; second prize to Arthur Edward Weil.

The Henry Reed Prize for the best English Essay by a member of the Senior Class—subject, "William Blake, Poet and Artist," to George Johnson.

The Society of the Alumni Prizes for the Best Original Declamation by a member of the Junior Class, first prize to Cheesman Abiah Herrick; second prize to Theodore Heysham, with honorable mention of Tokumatsu Nakajima.

The Henry LaBarre Jayne Prize for the best English Composition by a member of the Freshman Class—subject, "John Greenleaf Whittier," to Robert Thompson Young, with honorable mention of James Madison Stifler, Jr.

The Joseph Warner Yardley Prize for the best Thesis in Political Economy, by a member of the Senior Class—subject, "The Fall in Prices since 1870," to Frank Spencer Edmonds.

The Van Nostrand Prize for a member of the Junior Class in Civil Engineering who attains the highest general average of scholarship, to Joseph Ragland Long.

The Phi Kappa Sigma Fraternity Prize, in honor of their founder, Samuel Brown Wylie Mitchell, M. D., of the Class of 1852, for the best work in Composition done during the year by a member of the Sophomore Class, to Charles Moore Magee, with honorable mention of Fleming James, Jr., and J. Merritt Matthews.

The Society of the Alumni Prize for the best Latin Essay by a member of the Graduating Class, to George Johnson.

The prize for meritorious extra work in German—subject, Schiller's "Braut von Messina," equally divided between Erskine Wright and George Johnson.

The prize for meritorious extra work in French—subject, Molière's "Le Malade Imaginaire," equally divided between Edward Salisbury Clark and George Bickley Houseman.

The Prizes offered by the Assayers and Miners' Gangue of the Class of '86, to students in the department of Pure and Applied Chemistry, equally to Vickers Oberholtzer and Joseph Coleman Saltar.
PRIZES.

The Prize for the best dissected preparation illustrating the anatomy of an animal type, to Henry Field Smyth.

IN THE FACULTY OF LAW.

Charles Henry Burr, Jr., to be Fellow of the Department of Law for three years, with an annual salary of three hundred dollars.

The Faculty Prize of Fifty dollars for the best written examinations with all the Professors, to Reynolds Driver Brown, with honorable mention of Joseph Ryerss Embery, and of Isaac Hassler.

The P. Pemberton Morris Prize of Forty dollars for the best written examination in Evidence Pleading and Practice at Law and in Equity, to Joseph Ryerss Embery, with honorable mention of Charles Henry Burr, Jr.

The Sharswood Prize of Seventy-five dollars for the best Graduation Essay to Charles Henry Burr, Jr., for his essay entitled "The Doctrine of Contributory Negligence."

The Meredith Prize of Fifty dollars for the second best Graduation Essay, to H. Bovee Schermerhorn, for his essay entitled "The Ultra Vires Contracts of Private Corporations."

Honorable mention is made of the following essays:


The Law Oration at the Commencement was delivered by Joseph Ryerss Embery, whose subject was "Land Titles in Pennsylvania."

IN THE FACULTY OF VETERINARY MEDICINE.

The J. B. Lippincott Prize of One Hundred Dollars, awarded to the member of the Graduating Class who, in the three years spent in the Veterinary Department of the University, attains the highest general average in examinations, to Charles E. Cotton, of Prescott, Wis.
IN THE FACULTY OF MEDICINE.

PRIZES.

MAY 10, 1893.

The "Alumni Medal," to the member of the Graduating Class who attained the highest general average in examination, was awarded to John Dutton Steele, Jr., of Philadelphia.

The Prize of a Thoma-Zeiss Blood Corpuscle Counting Apparatus and a Fleischl Hæmometer, offered by the Professor of Clinical Medicine for the best report of his clinics during the session of 1892-93, was awarded to Henry E. Wetherill, of Philadelphia, with Honorable Mention of George C. Jameson, of Avon, Ohio, and E. Albert Woldert, of Tyler, Texas.

The Prize of a pair of Obstetric Forceps, offered by the Professor of Obstetrics, to the member of the Graduating Class furnishing the best report of a case occurring in the University Maternity Hospital, was awarded to Henry E. Wetherill, of Philadelphia, with Honorable Mention of Henry A. Burkhart, of Bethlehem, Pa.

The Prize of a copy of Treves' Surgery, offered by the Professor of Clinical Surgery for the best report of his Clinics, was awarded to James F. Hamilton, of Philadelphia.

The prizes offered by the Demonstrator of Surgery, were awarded as follows: A Surgical Pocket-Case for proficiency in Fracture Dressings, Operating and in Bandaging, to James R. Hunt, of Philadelphia, of the Graduating Class, with Honorable Mention of Luther M. Allen, of Medford, N. J., and Levi B. Cochran, of Oneida Castle, N. Y. A Surgical Pocket-Case to William Stump, of Bel Air, Md., of the First-year Class, for proficiency in Bandaging, with Honorable Mention of James H. Lallou, of Philadelphia, and William H. Dingee, of Philadelphia.

The Prize of a copy of Ashhurst's Surgery, offered by the Demonstrator of Osteology, for the best examination in Osteology, was awarded to Clinton J. Kistler, of Germansville, Pa., of the First-year Class, with Honorable Mention of Delno E. Kercher, of Leona, Kans., and Louis E. Livingood, of Reading, Pa.

The "Zentmayer Prize" of a Microscope for the best examination in Histology and Embryology, was awarded to Patrick H. McGovern, of Sheboygan, Wis., with Honorable Mention of W. Hersey Thomas, of Philadelphia.

The Prize of Twenty-five dollars annually, offered by the D. Hayes Agnew Surgical Society to the student preparing the best anatomical preparation in the dissecting-room, was awarded to Arthur W. Booth, of Elmira, N. Y., with Honorable Mention of Manuel Aguilar, of
Costa Rica; William Stump, of Bel Air, Md., and Henry S. Greenleaf, of Washington, D. C.

The Prize of a case of Autopsy Instruments, offered by the Demonstrator of Morbid Anatomy for the best report of the Demonstrations in Morbid Anatomy, was awarded to Henry E. Wetherill, of Philadelphia.

The Prize of a Hemocytometer, offered by the Instructor in Clinical Medicine to the member of the First-year Class who presents the best report of his lectures on Physical Diagnosis, was awarded to Edward R. Schreiner, of Philadelphia, with Honorable Mention of Joseph F. Griggs, of Pittsburgh, Pa., and Edwin Zugsmith, of Allegheny, Pa.

The following graduates of the Medical Department, Class of 1893, arranged in alphabetical order, were appointed to Hospitals on competitive examination:

University Hospital—
   James R. Hunt,
   John H. Jopson,

Philadelphia Hospital—
   David L. Edsall,
   Wm. A. Hitschler,
   J. Powell Hunter,
   John H. Jopson,
   Charles F. Judson,
   Frederick Krauss,
   Clarence W. Lincoln,

Presbyterian Hospital—
   John P. Arnold,
   James I. Johnston,

German Hospital—
   Henry F. Page.

St. Agnes' Hospital—
   Augustus P. Kunzig,
   William S. Newcomet,

St. Mary's Hospital—
   James S. Kelly,
   Z. M. K. Fulton,

St. Joseph's Hospital—
   Burton K. Chance,

Children's Hospital—
   Charles F. Judson,

Philadelphia Polyclinic Hospital—
   Maurice A. Bunce,
   Alexander R. Craig.

Charles H. Schoff,
J. Dutton Steele.

John A. Lichty,
Dunlop Moore,
John M. Swan, Jr.,
J. Dutton Steele,
Charles A. Vandervoort,
Robert C. Yenney.

Charles H. Miner,
John M. Swan, Jr.

Stephen E. Rice.

Frederick Krauss.

Addison M. Rothrock.

Charles H. Miner.

D. Edward Esterly.
Howard Hospital—
  John R. Forst,
  John A. Johnston,
Methodist Episcopal Hospital—
  Sidney M. Cone.
Central Hospital—
  Henry E. Applebach, '89.
West Penn Hospital, Pittsburgh—
  William J. Gardner.
Mercy and St. Rosalie Hospital, Pittsburgh—
  J. Frank Donehoo,
  David L. Edsall,
City Hospital, Wilkes-Barre, Pa.—
  John A. Lichty.
Cooper Hospital, Camden, N. J.—
  Levi B. Cochran.
Allegheny General Hospital—
  J. Powell Hunter.
King's County Hospital, Flatbush, N. Y.—
  Edgar S. Thomson.
Emergency Hospital, Washington, D. C.—
  Walter L. Pyle.
Lackawanna Hospital, Scranton, Pa.—
  J. Edward Rudasill.

The following graduates were appointed to Hospitals, without examination:

Orthopaedic Hospital—
  Henry P. Boyer, '91.
Wills' Eye Hospital—
  Paul Guilford, '91,
St. Christopher's Hospital—
  Francis W. Bennett.
Philadelphia Dispensary—
  Oscar J. Bowman.
St. Timothy's Hospital—
  George W. Kehl.
Germantown Hospital—
  William R. Dunton.
Episcopal Hospital—
  Henry H. Doan, '90.
  Charles H. Frazier, '92.
  Francis Lieber, '91.
  Edwin S. Potter, '91.
Pennsylvania Hospital—
  Thomas F. Branson.  James P. Hutchinson.

St. Luke's Hospital, Bethlehem—
  Frank J. Kessler.

Harrisburg Hospital—
  Frank M. C. Usher, '92.

Children's Seashore House, Atlantic City, N. J.—
  Walter C. Kite.

Seaside House for Invalid Women, Atlantic City, N. J.—
  James I. Johnston.

St. Joseph's Hospital, Reading, Pa.—
  Harry D. T. Stryker.

Reading Hospital, Reading, Pa.—
  William G. Morgan.

City Hospital, Williamsport, Pa.—
  Byron Gooden.
### SUMMARY.

#### PROFESSORS, LECTURERS AND INSTRUCTORS.

<table>
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<td>Department of Philosophy</td>
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<td>&quot; Medicine, including Hospital Service</td>
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<tr>
<td>Department of Dentistry</td>
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<td>&quot; Veterinary Medicine</td>
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<tr>
<td>Laboratory of Hygiene</td>
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#### ACCOMMODATIONS.

Good board can be had near the University at from five to seven dollars a week. A list of recommended boarding-house may be had on application to E. W. Mumford, Assistant Secretary, at the College Hall, University.

#### EXPENSES.

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### INDEX

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<th>Admission to</th>
<th>PAGE</th>
<th>Admission to College, The</th>
<th>PAGE</th>
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<td>Department of Dentistry</td>
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<td>Laboratory of Hygiene</td>
<td>338</td>
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<td></td>
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<td>Department of Dentistry</td>
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<td>Alumni Organizations</td>
<td>356</td>
<td></td>
<td></td>
</tr>
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<td>American History and Institutions, School of</td>
<td>115</td>
<td></td>
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<td></td>
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<td>Architecture, School of</td>
<td>158</td>
<td></td>
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</tr>
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<td>Admission to</td>
<td>94</td>
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<td>159</td>
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<td>162</td>
<td></td>
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</tr>
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<td>Two-year (Interior Architecture) Course in</td>
<td>163</td>
<td></td>
<td></td>
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<td>Arts and Science, Courses in</td>
<td>99</td>
<td></td>
<td></td>
</tr>
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<td>Admission to</td>
<td>94</td>
<td></td>
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</tr>
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<td>314</td>
<td></td>
<td></td>
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<td>385</td>
<td></td>
<td></td>
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<td>286</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Certificates</td>
<td>287</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Degrees</td>
<td>288</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Faculty</td>
<td>285</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fees</td>
<td>287</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Matriculates</td>
<td>286</td>
<td></td>
<td></td>
</tr>
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<td>Special Students</td>
<td>287</td>
<td></td>
<td></td>
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<td>119</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Admission to</td>
<td>213</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Board and Lodgings</td>
<td>383</td>
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</tr>
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<td>Calendar, University</td>
<td>3</td>
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<td>Central Committee of the Alumni</td>
<td>359</td>
<td></td>
<td></td>
</tr>
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<td>Certificates Admitting to College</td>
<td>94</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Chaplains, University</td>
<td>13</td>
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<td>Chemical Engineer, Degree of.</td>
<td>186</td>
<td></td>
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<td>152</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Admission to</td>
<td>153</td>
<td></td>
<td></td>
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<tr>
<td>Chemistry</td>
<td>171</td>
<td></td>
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</tr>
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<td>Technical Courses in</td>
<td>171</td>
<td></td>
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<td>149</td>
<td></td>
<td></td>
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<td>107</td>
<td></td>
<td></td>
</tr>
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<td>Committees, Standing, Chairmen of Corporation of the University</td>
<td>13</td>
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<td></td>
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<td>235</td>
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<td>338</td>
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<td>339</td>
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<td>Course of Study in...</td>
<td>261</td>
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<td>263</td>
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<td>231</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Degree in...</td>
<td>271</td>
<td></td>
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</tr>
<tr>
<td>Dispensary Service...</td>
<td>285</td>
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<td></td>
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<td>Examinations, Term...</td>
<td>263</td>
<td></td>
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<td>271</td>
<td></td>
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<td>273</td>
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<td>272</td>
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<td>Graduation...</td>
<td>271</td>
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</tr>
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<td>234</td>
<td></td>
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</tr>
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<td>Laboratory of...</td>
<td>274</td>
<td></td>
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</tr>
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<td>Lectures, Order of...</td>
<td>267</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Maternity Pavilions...</td>
<td>277</td>
<td></td>
<td></td>
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<td>Matriculates in...</td>
<td>237</td>
<td></td>
<td></td>
</tr>
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<td>279</td>
<td></td>
<td></td>
</tr>
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<td>Rosters of...</td>
<td>269</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Scholarships in...</td>
<td>273</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sessions, Arrangement of, for 1893-94...</td>
<td>271</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Societies in (Undergraduate)...</td>
<td>279</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Text-books...</td>
<td>265</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Medicine, Auxiliary Department of... (see Veterinary)...</td>
<td>184</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Medicine, Department of Veterinary (see Veterinary)...</td>
<td>184</td>
<td></td>
<td></td>
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<tr>
<td>Metallurgy and Mining, Course in...</td>
<td>173</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Admission...</td>
<td>44</td>
<td></td>
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<td>Mining (see Metallurgy)...</td>
<td>227</td>
<td></td>
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<td>186</td>
<td></td>
<td></td>
</tr>
<tr>
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<td>291</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Archaeology and Palaeontology...</td>
<td>346</td>
<td></td>
<td></td>
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<td>Department of Dentistry...</td>
<td>360</td>
<td></td>
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<td>295</td>
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<td>327</td>
<td></td>
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<td>125</td>
<td></td>
<td></td>
</tr>
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<td>463</td>
<td></td>
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<td>Officers, University, Directory of...</td>
<td>14</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Organization of the University (see Departments)...</td>
<td>34</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Partial Courses in the College...</td>
<td>93</td>
<td></td>
<td></td>
</tr>
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<td>Philosophy, Department of...</td>
<td>27</td>
<td></td>
<td></td>
</tr>
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<td>Admission to...</td>
<td>158</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Courses of Instruction in...</td>
<td>159</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dean of...</td>
<td>186</td>
<td></td>
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<td>365</td>
<td></td>
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<td>367</td>
<td></td>
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</tr>
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<td>Matriculates in...</td>
<td>151</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Professors and Instructors in...</td>
<td>189</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sessions, Arrangement of...</td>
<td>366</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Physical Education, Department of...</td>
<td>349</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Post-Graduate Course in Law (see Law)...</td>
<td>349</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Practical Chemist, Degree of...</td>
<td>186</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Prizes Awarded, 1892-93...</td>
<td>375</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Prizes offered in 1893-94...</td>
<td>365</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Provost of the University...</td>
<td>12</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Requirements for Admission (see Admission)...</td>
<td>12</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Scholarships in...</td>
<td>317</td>
<td></td>
<td></td>
</tr>
<tr>
<td>College, The...</td>
<td>181</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Department of Law...</td>
<td>224</td>
<td></td>
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<td>Department of Medicine...</td>
<td>273</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Department of Veterinary Medicine...</td>
<td>317</td>
<td></td>
<td></td>
</tr>
<tr>
<td>INDEX</td>
<td>PAGE</td>
<td></td>
<td></td>
</tr>
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<td>----------------------------------------------------------------------</td>
<td>------</td>
<td></td>
<td></td>
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<tr>
<td><strong>Science and Technology, Courses in</strong></td>
<td>169</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Admission to</td>
<td>94</td>
<td></td>
<td></td>
</tr>
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<td>Secretary of the University</td>
<td>12</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sessions, Arrangement of, in</td>
<td></td>
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<tr>
<td>Auxiliary Department of Medicine</td>
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<td>College, The</td>
<td>181</td>
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<tr>
<td>Department of Dentistry</td>
<td>308</td>
<td></td>
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<tr>
<td>Department of Law</td>
<td>225</td>
<td></td>
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<tr>
<td>Department of Medicine</td>
<td>271</td>
<td></td>
<td></td>
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<td>Department of Philosophy</td>
<td>206</td>
<td></td>
<td></td>
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<tr>
<td>Department of Veterinary Medicine</td>
<td>317</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Societies (Undergraduate) in</td>
<td></td>
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<tr>
<td>College, The</td>
<td>185</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Department of Medicine</td>
<td>279</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Special Courses in</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>College, The</td>
<td>93</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Department of Law</td>
<td>220</td>
<td></td>
<td></td>
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<tr>
<td>Department of Medicine</td>
<td>272</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Department of Philosophy</td>
<td>153</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Students (see Matriculataes).</strong></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td><strong>Summary of</strong></td>
<td></td>
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</tr>
<tr>
<td>College, Undergraduates</td>
<td>48</td>
<td></td>
<td></td>
</tr>
<tr>
<td>University, General</td>
<td>383</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Text-books in</strong></td>
<td></td>
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<td></td>
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<tr>
<td>Auxiliary Department of Medicine</td>
<td>289</td>
<td></td>
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</tr>
<tr>
<td>Department of Dentistry</td>
<td>310</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Department of Law</td>
<td>221</td>
<td></td>
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<tr>
<td>Department of Medicine</td>
<td>265</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Department of Veterinary Medicine</td>
<td>330</td>
<td></td>
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<tr>
<td><strong>Post-Graduate Course in Law</strong></td>
<td>229</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Title, Legal, of University</strong></td>
<td>10</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Towne Scientific School, The</td>
<td>91</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Training School for Nurses, The</td>
<td>283</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Trustees, University</td>
<td>12</td>
<td></td>
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<tr>
<td>Chairmen of Standing Committees of</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Tuition (see Fees).</strong></td>
<td>13</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>University Calendar</strong></td>
<td>3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Chairmen of Trustees' Committees</td>
<td>13</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Chaplains</td>
<td>13</td>
<td></td>
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<tr>
<td>Corporation</td>
<td>12</td>
<td></td>
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<tr>
<td>Departments</td>
<td>11</td>
<td></td>
<td></td>
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<tr>
<td>History</td>
<td>5</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hospital</td>
<td>281</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Library</td>
<td>341</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Officers</td>
<td>14</td>
<td></td>
<td></td>
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<tr>
<td>Organization (see Departments)</td>
<td></td>
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<tr>
<td>Provost</td>
<td>12</td>
<td></td>
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<tr>
<td>Treasurer</td>
<td>12</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Summary</td>
<td>383</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Trustees</td>
<td>12</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Vice-Provost</strong></td>
<td>14</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Veterinary Medicine, Department of</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Admission to</td>
<td>313</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Course of Study in</td>
<td>317</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dean of Faculty of</td>
<td>315</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Degree in</td>
<td>328</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Examinations in</td>
<td>328</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Expenses (see Fees)</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>Faculty and Instructors in</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fees in</td>
<td>330</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hospital of</td>
<td>333</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Matriculataes</td>
<td>334</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Museum of</td>
<td>327</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Prizes offered in 1893-94</td>
<td>328</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rosters of</td>
<td>331</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Scholarships in</td>
<td>317</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Text-books in</td>
<td>330</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Vice-Provost of University</td>
<td>14</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Wharton School of Finance and Economy</td>
<td>107</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Admission to</td>
<td>97</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fellowships in</td>
<td>112</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Publications of</td>
<td>113</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Wistar Institute of Anatomy and Biology</td>
<td>291</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Women, Graduate Department for</td>
<td>265</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>