

UNIVERSITY  
*Duplicate*  
OF  
PENNSYLVANIA.

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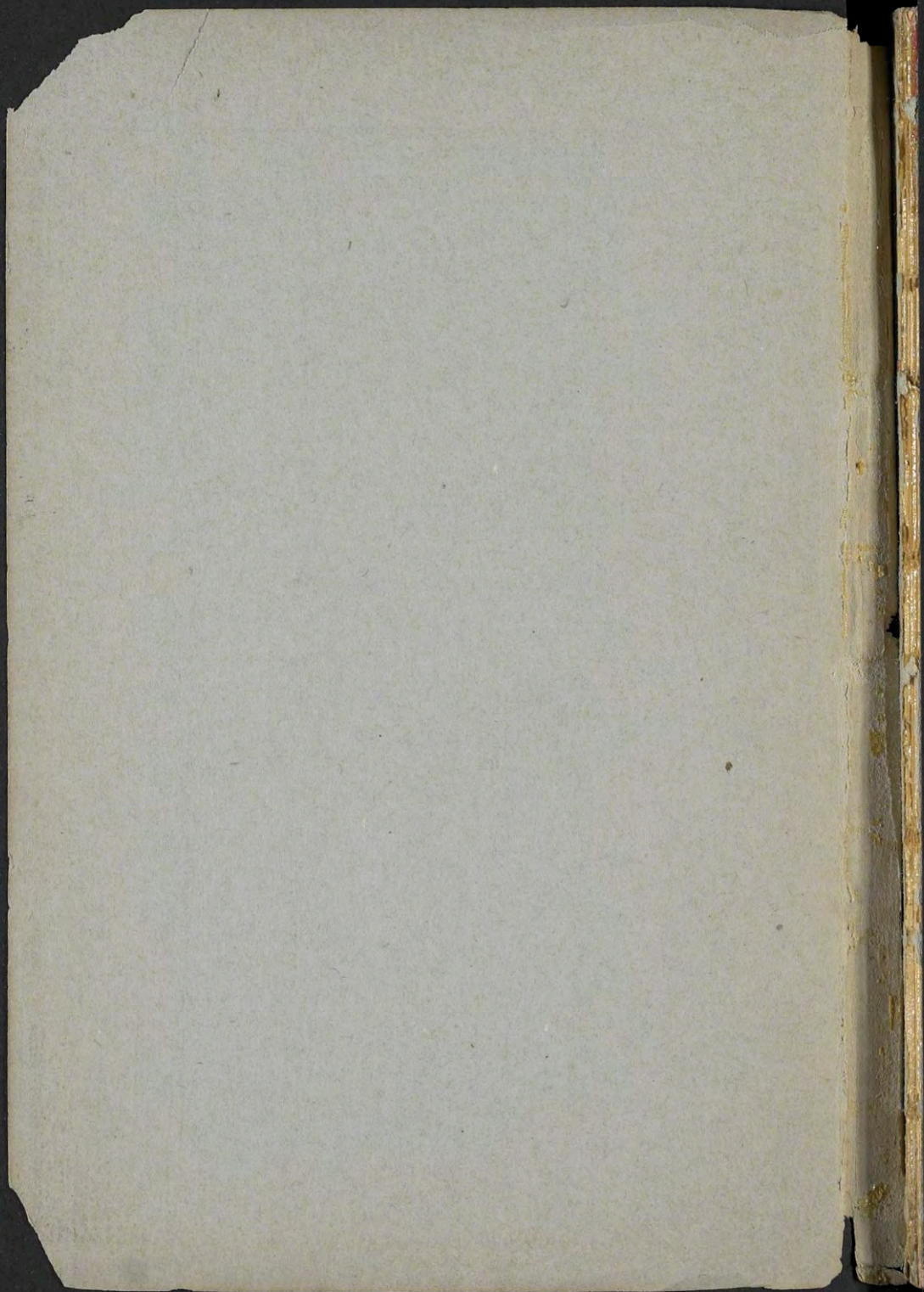
Catalogue and Announcements  
1892-93.

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PHILADELPHIA :  
PRINTED FOR THE UNIVERSITY.

1893.





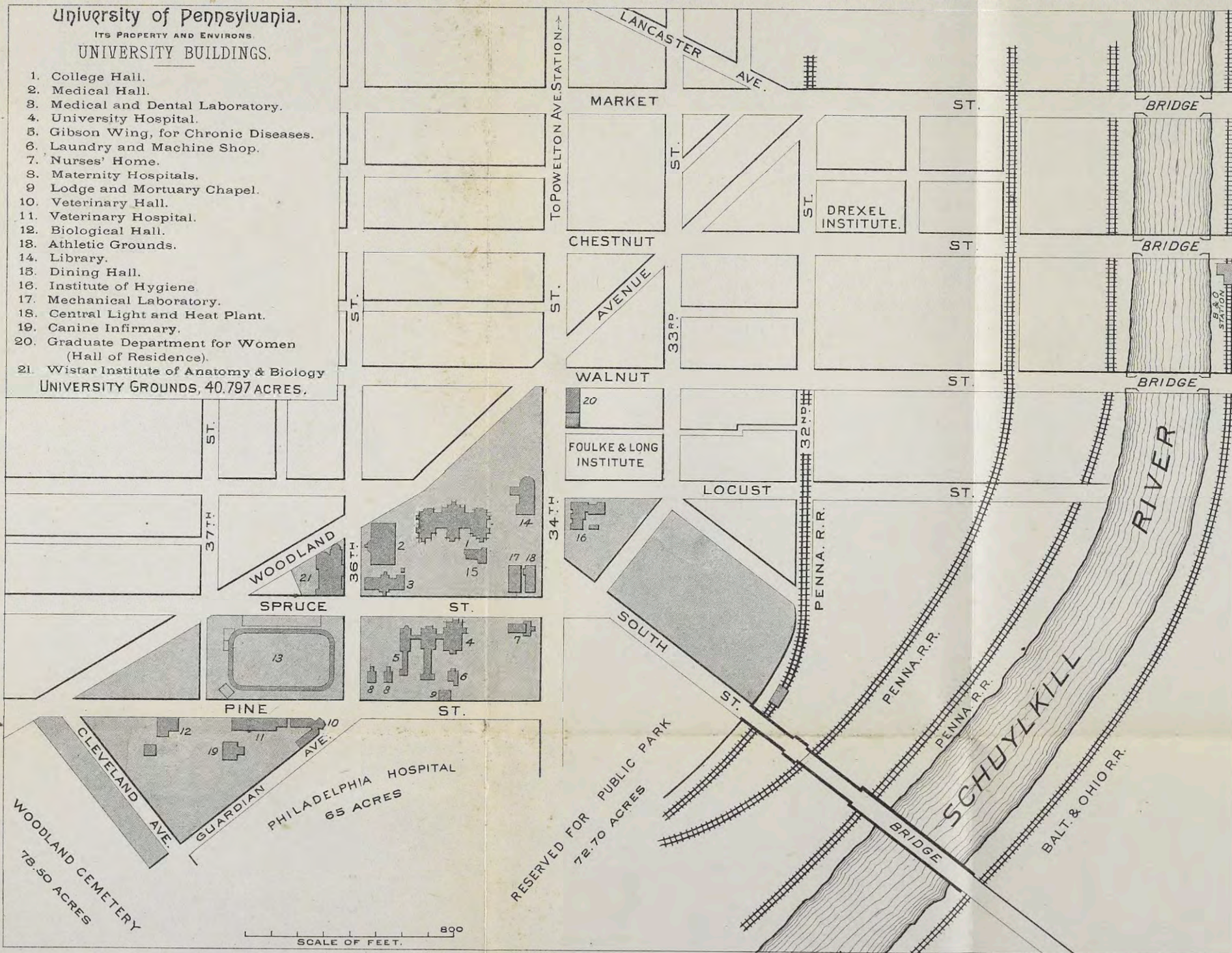


# University of Pennsylvania.

ITS PROPERTY AND ENVIRONS.

## UNIVERSITY BUILDINGS.

1. College Hall.
  2. Medical Hall.
  3. Medical and Dental Laboratory.
  4. University Hospital.
  5. Gibson Wing, for Chronic Diseases.
  6. Laundry and Machine Shop.
  7. Nurses' Home.
  8. Maternity Hospitals.
  9. Lodge and Mortuary Chapel.
  10. Veterinary Hall.
  11. Veterinary Hospital.
  12. Biological Hall.
  13. Athletic Grounds.
  14. Library.
  15. Dining Hall.
  16. Institute of Hygiene.
  17. Mechanical Laboratory.
  18. Central Light and Heat Plant.
  19. Canine Infirmary.
  20. Graduate Department for Women (Hall of Residence).
  21. Wistar Institute of Anatomy & Biology.
- UNIVERSITY GROUNDS, 40.797 ACRES.



SCALE OF FEET. 800

WOODLAND CEMETERY  
78.50 ACRES

PHILADELPHIA HOSPITAL  
65 ACRES

RESERVED FOR PUBLIC PARK  
72.70 ACRES



UNIVERSITY  
OF  
PENNSYLVANIA.

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Catalogue and Announcements  
1892-93.

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1893.



**1892.****JULY.**

S . 3 10 17 24 31  
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**AUGUST.**

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**SEPTEMBER.**

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**OCTOBER.**

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**NOVEMBER.**

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**DECEMBER.**

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**1893.****JANUARY.**

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**FEBRUARY.**

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**MARCH.**

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**APRIL.**

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**JUNE.**

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**1893.****JULY.**

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**AUGUST.**

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**SEPTEMBER.**

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**OCTOBER.**

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**NOVEMBER.**

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 S 4 11 18 25 .

**DECEMBER.**

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 T . 7 14 21 28 .  
 F 1 8 15 22 29 .  
 S 2 9 16 23 30 .



## UNIVERSITY CALENDAR FOR 1892-1893.

1892.

Sept. 26, Monday,	Entrance Examinations, College Department, begin, 9 A. M.
“ 30, Friday,	Announcement of Results of Entrance Examinations, 12 M.
Oct. 3, Monday,	First Term begins: College Department, 10 A.M.
“ 3, Monday,	Winter Session begins: Departments of Medicine, Dentistry, Veterinary Medicine and Auxiliary Medicine, 12 M.
“ 3, Monday,	First Term begins: Course in Music, 2 P.M.
“ 3, Monday,	First Term begins: Department of Law, 4 P.M.
Nov. 23, Wednesday,	Thanksgiving Holiday begins: College Department, 5 P.M. Departments of Medicine, Dentistry and Veterinary Medicine, 5.30 P.M.
“ 28, Monday,	Thanksgiving Holiday ends, 9 A.M.
Dec. 23, Friday,	Christmas Recess begins: College Department and Department of Law, 5 P.M. Departments of Medicine, Dentistry and Veterinary Medicine, 5.30 P.M.

1893.

Jan. 3, Tuesday,	Christmas Recess ends, 9 A.M., Medical, Dental, and Veterinary Departments.
“ 4, Wednesday,	Christmas Recess ends, 9 A.M., College Dep't.
“ 16, Monday,	Mid-Year Examinations begin: College Department, 9 A.M.
Feb. 1, Wednesday,	Second Term begins: College and Law Departments, 9 A.M.
“ 22, Wednesday,	Washington's Birthday. Holiday, all Departments; University Day, at the University.
Mar. 29, Wednesday,	Easter Holiday begins: College Department, 5 P.M.
April 5, Wednesday,	Easter Holiday ends, 9 A.M.
“ 28, Friday,	Last day for receipt of Theses and Prize Essays, College Department.
May 10, Wednesday,	Commencement: Departments of Medicine and Dentistry.



- June 14, Wednesday, Announcement of Results of Examinations : College Department, 10 A.M.
- “ 15, Thursday, Commencement : College Department, and Departments of Law, Veterinary Medicine, and Philosophy, 11 A.M.
- “ 19, Monday, Entrance Examinations begin : College Department, 9 A.M.
- “ 22, Thursday, Examinations for advanced Standing : College Department, 9 A.M.
- “ 23, Friday, Announcement of Results of Entrance Examinations : College Department, 12 M.

## SUMMER VACATION.

- Sept. 11, Monday, Entrance Examinations begin : College Department, 9 A.M.
- “ 16, Saturday, Announcement of Results of Entrance Examinations, 12 M.
- “ 27, Wednesday, Competitive Examination for Medical Scholarships, 12 Noon.
- “ 27, Wednesday, Registration of all Students, College Department.
- “ 28, Thursday, Examinations for Admission to Advanced Standing and Re-examinations of Undergraduates : Departments of Medicine and Dentistry, 12 Noon.
- “ 29, Friday, First Term begins : College Department and Department of Philosophy, 10 A.M.
- “ 29, Friday, First Term begins : Course in Music, 2 P.M.
- “ 29, Friday, Entrance Examination : Departments of Medicine and Veterinary Medicine, 12 Noon.
- Oct. 2, Monday, Winter Session begins : Departments of Medicine, Dentistry, Veterinary Medicine, Auxiliary Medicine, 12 M.
- “ 2, Monday, First Term begins : Department of Law, 9 P.M.
- Nov. 29, Wednesday, Thanksgiving Holiday begins : All Departments, 5 P. M.
- Dec. 22, Friday, Christmas Recess begins : College Department, Department for Women, and Department of Law, 5 P.M. Departments of Medicine, Dentistry, and Veterinary Medicine, 5.30 P.M.

1894.

- Jan. 3, Wednesday, Christmas Recess ends : All Departments, 9 A.M.
- “ 31, Wednesday, First Term ends : College Department and Department of Law.



## University of Pennsylvania.

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 founding a School on the lines suggested by that wise counsellor. Over two thousand pounds, equivalent to at least forty thousand dollars at the present time, were raised ; a building, which had been erected to accommodate the thronged congregations of the celebrated Whitfield, was purchased ; 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 Proprietaries 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



demand 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 for ever 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.

Thus established, the University has advanced with the times, and now comprises the following departments :

THE COLLEGE DEPARTMENT, Including

THE COURSE IN ARTS,

THE COURSES IN SCIENCE,

(The Towne Scientific School),

THE COURSE IN ARCHITECTURE.

THE COURSES IN NATURAL HISTORY,

(The School of Biology),

THE COURSE IN FINANCE AND ECONOMY,

(The Wharton School),

THE COURSE IN MUSIC.

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 ARCHÆOLOGY AND PALÆONTOLOGY.

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.

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THE GOVERNOR OF PENNSYLVANIA, *ex-officio* President of  
the Board.

FREDERICK 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.,  
HORACE HOWARD FURNESS, PH.D., LL. D.,  
WHARTON BARKER,  
SAMUEL DICKSON,  
HON. JOHN SCOTT,  
JAMES MACALISTER, LL.D.,  
JOHN C. SIMS,  
HENRY H. HOUSTON,  
JOSEPH D. POTTS,  
HON. HENRY REED,  
HON. SAMUEL W. PENNYPACKER, LL.D.,  
RT. REV. OZI WILLIAM WHITAKER, D.D.,  
JOHN BARNARD GEST,  
JOSEPH S. HARRIS,  
WALTER GEORGE SMITH,

---

REV. JESSE Y. BURK, Secretary, University.  
EDWARD W. MUMFORD, Assistant Secretary, Univer-  
sity.  
RICHARD WOOD, Treasurer *pro tem.*, 400 Chestnut St.



UNIVERSITY CHAPLAINS.

- THE REV. GEORGE DANA BOARDMAN, D.D., LL.D.  
 THE REV. J. A. M. CHAPMAN, D.D.  
 THE REV. CHARLES WOOD, D.D.  
 THE REV. ADOLPH SPAETH, D.D.  
 THE REV. LEVERETT BRADLEY.

CHAIRMEN OF STANDING COMMITTEES.

WAYS AND MEANS :

MR. HARRISON . . . . . 400 Chestnut Street.

BUILDINGS, ESTATES AND PROPERTY :

MR. WOOD . . . . . 400 Chestnut Street.

LIBRARY :

DR. FURNESS . . . . . 222 West Washington Square.

DEPARTMENT OF ARTS :

MR. FRALEY . . . . . 1000 Walnut Street.

DEPARTMENT OF MEDICINE :

DR. MITCHELL . . . . . 1524 Walnut Street.

DEPARTMENT OF LAW :

MR. SCOTT . . . . . 243 South Fourth Street.

DEPARTMENT OF SCIENCE :

MR. MERRICK . . . . . Roxborough.

DEPARTMENT OF FINANCE AND ECONOMY :

MR. BARKER . . . . . 429 Chestnut Street.

DEPARTMENT OF VETERINARY MEDICINE :

DR. HUNT . . . . . 1300 Spruce Street.

DEPARTMENT OF PHYSICAL EDUCATION :

MR. SIMS . . . . . 233 South Fourth Street.

DEPARTMENT OF BIOLOGY :

DR. MACALISTER . . . . . Drexel Institute.

DEPARTMENT OF PHILOSOPHY :

MR. FRALEY . . . . . 1000 Walnut Street.

DEPARTMENT OF DENTISTRY :

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## OFFICERS.\*

	Residence.
WILLIAM PEPPER, M.D., LL.D., PROVOST OF THE UNIVERSITY.	1811 Spruce St.
E. OTIS KENDALL, LL.D., VICE-PROVOST.	3826 Locust St.
<hr/>	
FRANCIS A. JACKSON, A.M., Professor of the Latin Language and Literature.	University.
E. OTIS KENDALL, LL.D., THOMAS A. SCOTT Professor of Mathematics, and Honorary Dean of the College Faculty.	3826 Locust St.
J. PETER LESLEY, LL.D., Emeritus Professor of Geology and Mining.	1008 Clinton St.
RICHARD A. F. PENROSE, M.D., LL.D., Emeritus Professor of Obstetrics and of the Dis- eases of Women and Children.	1331 Spruce St.
ALFRED STILLÉ, M.D., LL.D., Emeritus Professor of the Theory and Practice of Medicine and of Clinical Medicine.	3900 Spruce St.
HARRISON ALLEN, M.D., Professor of Zoölogy and Comparative Anatomy.	1933 Chestnut St.
HORATIO C. WOOD, M.D., LL.D., Professor of Materia Medica, Pharmacy and General Therapeutics, and Clinical Professor of Nervous Diseases.	1925 Chestnut St.
CHARLES J. STILLÉ, LL.D., Emeritus JOHN WELSH CENTENNIAL Professor of History and English Literature.	2201 St. James' Place.
OSWALD SEIDENSTICKER, Ph.D. (Göttingen), Litt.D., Professor of the German Language and Literature.	309 S. 40th St.
J. I. CLARK HARE, LL.D., Emeritus Professor of the Institutes of Law, including, inter alia, International, Constitu- tional, Commercial and Civil Law.	118 S. 22d St.
GEORGE F. BARKER, Ph.B., M.D., Professor of Physics.	3909 Locust St.

\* Arranged, except Provost and Vice-Provost, in order of accession to office.



- WILLIAM PEPPER, M.D., LL.D.,  
Professor of the Theory and Practice of Medicine  
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- JOHN HARSHBERGER, Assistant Instructor in Analytical Botany.
- WILSON EYRE, JR., Instructor in Pen and Ink Drawing.
- WALTER J. KEITH, PH.D., Instructor in Chemistry.
- J. J. MORRIS, Assistant Instructor in Mechanical Engineering.
- ALEXANDER C. ABBOTT, M.D., First Assistant in Hygiene.
- ALBERT A. GHRISKEY, M.D., Assistant in Hygiene.
- JULIAN MILLARD, Instructor in Architecture.
- JULIUS OHLY, Instructor in Chemistry.
- HOMER SMITH, A.M., 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.
- WALTER L. WEBB, C.E., Instructor in Civil Engineering.
- CHARLES WORTHINGTON, C.E., Instructor in Civil Engineering.
- A. WILLIAM SCHRAMM, B.S., M.E., Instructor in Electrical Engineering.
- H. W. HUFFINGTON, Instructor in Mechanical Engineering.
- LUCIEN E. PICOLET, Instructor in Mechanical Engineering.
- EDWARD WESSELHOEFT, Instructor in German.
- WILLIAM J. SHIELDS, A.M., Instructor in Physics.
- J. HARTLEY MERRICK, Assistant to the Dean.
- PHILIP P. CALVERT, Assistant Instructor in Zoölogy.
- ALBERT T. CLAY, Instructor in Hebrew.
- JAMES WARRINGTON, Instructor in Accounting.
- FREDERICK W. NEILSON, Instructor in Music, and Leader of College Choir.
- HENRY PLASSCHAERT, Instructor in Modeling.

## LECTURERS.

- THEOPHILUS P. CHANDLER, JR., Lecturer in Architecture.
- MILTON J. GREENMAN, Ph.B., M.D., Lecturer on Physiology.
- WILLIAM ROMAINE NEWBOLD, Ph.D., Lecturer on Philosophy.

- LIGHTNER WITMER, Ph.D., Lecturer on Experimental Psychology.  
 MAXWELL SOMMERVILLE, University Lecturer on Glyptology.  
 FRANK MILES DAY, B.S., Lecturer in Architecture.  
 BARR FERREE, Lecturer in Architecture.  
 JOHN STEWARDSON, Lecturer in Architecture.  
 WALTER COPE, Lecturer in Architecture.  
 HENRY W. ROLFE, Ph.D., Lecturer on the Latin Language and Literature.  
 LOUIS J. MATOS, M.E., Lecturer on Technical Chemistry.  
 HARRY W. JAYNE, Ph.D., Lecturer on Technical Chemistry.  
 CHARLES S. BOYER, B.S., Lecturer on Technical Chemistry.  
 ALBERT S. BOLLES, Ph.D., University Lecturer on Banking, Law and Practice.  
 JOSEPH ADNA HILL, Ph.D., Lecturer on Finance.  
 ABRAM H. WINTERSTEEN, LL.B., Lecturer on Business Law and Practice.  
 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.
- 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 FULLERTON, *Chairman*; Professor LAMBERTON, Professor JACKSON, Professor CHEYNEY, Professor MARBURG.
- LIBRARY.—Professor LAMBERTON, *Chairman*; Professor BARKER, Professor McMASTER, Professor SMITH, Professor SCHELLING.
- STUDENTS' RESIDENCES.—Professor SMITH, *Chairman*; Professor LAMBERTON, Professor PATTEN.



## DEPARTMENTS OF COLLEGE WORK.

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

ANCIENT LANGUAGES.—Professor LAMBERTON, *Chairman*; Professor JACKSON, Professor PETERS, Professor EASTON, Professor HILPRECHT, Professor JASTROW, Mr. BURKE and Mr. CLAY.

MODERN LANGUAGES.—Professor EASTON, *Chairman*; Professor SEIDENSTICKER, Professor SCHELLING, Professor BRINTON, Professor RENNERT, Mr. PENNIMAN, Mr. SMITH, Mr. WESSELHOEFT.

PHILOSOPHY.—Professor FULLERTON, *Chairman*; Dr. WITMER and Dr. NEWBOLD.

HISTORY.—Professor MCMASTER, *Chairman*; Professor THORPE, Professor CHEYNEY and Professor ROBINSON.

ECONOMICS.—Professor JAMES, *Chairman*; Professor PATTEN, Professor FALKNER, Dr. ADAMS, Dr. HILL, Mr. WINTERSTEEN and Mr. WARRINGTON.

MATHEMATICS.—Professor KENDALL, *Chairman*; Professor FISHER and Professor CRAWLEY.

PHYSICS.—Professor BARKER, *Chairman*; Professor GOODSPEED and Mr. SHIELDS.

CHEMISTRY AND MINERALOGY.—Professor SMITH, *Chairman*; Dr. FRANKEL, Dr. KEITH, Mr. BROWN and Dr. OHLY.

NATURAL HISTORY.—Professor JAYNE, *Chairman*; Professor ALLEN, Professor ROTHROCK, Professor RYDER, Professor WILSON, Professor MACFARLANE, Professor COPE, Dr. BURK, Dr. GREENMAN, Mr. MOORE, Mr. HARSHBERGER, and Mr. CALVERT.

ARCHITECTURE AND DRAWING.—Professor LAIRD, *Chairman*; Mr. DANA, Mr. EVERETT, Mr. MILLARD, Mr. STEWARDSON, Mr. COPE, Mr. FERREE, Mr. EYRE, Mr. DAY and Mr. PLASSCHAERT.

MECHANICAL AND ELECTRICAL ENGINEERING.—Professor SPANGLER, *Chairman*; Mr. HUFFINGTON, Mr. SCHRAMM, Mr. PICOLET, Mr. GRIFFITH and Mr. MORRIS.

CIVIL ENGINEERING.—Professor MARBURG, *Chairman*; Mr. WEBB, Mr. WORTHINGTON.

MINING ENGINEERING.—Mr. BROWN, *Chairman*; Professor SMITH and Professor MARBURG.

## FELLOWS IN THE COLLEGE DEPARTMENT.

Philip P. Calvert, FELLOW IN BIOLOGY, University.

Albert T. Clay, FELLOW IN ASSYRIAN, University.

Edward T. Devine, A.B., A.M., WHARTON SCHOOL FELLOW, 3727 Locust Street.

Edward A. Johnson, A.M., WHARTON SCHOOL FELLOW, University.

\*Samuel McCune Lindsay, Ph.D. (Halle), WHARTON SCHOOL FELLOW.

David Mandel, Jr., Ph.B., WHARTON SCHOOL FELLOW, 717 Walnut Street.

Josiah Harmar Penniman, A.B., 4322 Sansom Street.

\*Leo S. Rowe, Ph.D., WHARTON SCHOOL FELLOW.

Homer Smith, A.M., FELLOW IN ENGLISH, 3912 Pine Street.

John L. Stewart, Ph.B., WHARTON SCHOOL FELLOW, 1726 South Fifteenth Street.

Walter Edward Weyl, Ph.B., WHARTON SCHOOL FELLOW, 835 North Fifth Street.

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\* Absent on leave.



## UNDERGRADUATES.

The Courses are indicated as follows:—*Arts, A.; Natural History, N. H.; Finance and Economy, Wh.; General Science, Lower Years, Sc; Technical Divisions, Pure and Applied Chemistry, Sc. 1; Civil Engineering, Sc. 3. Mechanical Engineering, Sc. 4; Four Years Technical Courses, Chemistry, Ch.; Civil Engineering, C. E.; Mechanical Engineering, M. E.; Electrical Engineering, E. E.; Architecture, Arch.*

## POST-SENIORS.

	Course.	Residence.	City Address.
Wesley Bartine,	Sc. 4,	Philadelphia,	1839 N. 22d St.
Edward Taggart Child,	Sc. 4,	do.	837 N. 21st St.
Herman Louis Dieck, Jr.,	Sc. 1,	do.	1941 N. 11th St.
Percival Vaisey French,	Sc. 4,	do.	4226 Chester Ave.
William Francis Kelly,	Sc. 4,	do.	4016 Baring St.
George Edmunds Lawrence,	Sc. 4,	Salem, N. J.	
Joseph Hunter Lewis,	Sc. 4,	Philadelphia,	768 Florida St.
Clifford Lewis, Jr.,	Sc. 3,	do.	313 S. 12th St.
J. Bird Moyer,	Sc. 1,	do.	2227 Columbia Ave.
William M. Scott,	Sc. 4,	do.	1911 Mt. Vernon St.
Arthur Gregg Singer,	Sc. 3,	do.	4660 Penn St., Fkd.
James Alexander Stewart,	Sc. 4,	do.	2532 Brown St.
Herbert Eugene White,	Sc. 4,	do.	710 N. 40th St.
William MacIntire White,	Sc. 3,	do.	2145 N. 12th St.

## SENIORS.

	Course.	Residence.	City Address.
Wm. Young Campbell Anderson,	Wh.,	Philadelphia,	745 S. 9th St.
Elliston Perot Bissell,	Arch.,	do.	2047 Locust St.
Henry Paul Busch,	Sc. 1,	do.	1006 Spruce St.
Charles Philip Bower,	Sc. 3,	do.	2028 N. 29th St.
John Cadwalader, Jr.,	A.,	do.	1519 Locust St.
Charles Alfred Cassanova,	Sc. 4,	do.	939 Spruce St.
Edward Salisbury Clark,.	A.,	Bay City, Mich.,	219 S. 33d St.
Thomas Luther Coley,	A.,	Philadelphia,	704 Franklin St.
Edward Burton Colket,	Sc. 4,	do.	2037 Chestnut St.
Walter Isaac Cooper,	A.,	do.	1819 Spring Garden.
Andrew Wright Crawford,	A.,	Bryn Mawr.	
Francis Thibault Cross,	Sc. 4,	Philadelphia,	32 S. 21st St.
William Mortimore Crowther,	Wh.,	do.	739 Gray's Ferry Rd.
Joseph Robbins Curtis,	Sc. 4,	do.	3723 Spruce St.
James Henri Donnelly,	Wh.,	do.	909 N. 29th St.
Edward John Dooner,	Wh.,	do.	1734 Master St.
Frank Spencer Edmonds,	Wh.,	do.	1538 Centennial Ave.
Benjamin Evans,	Wh.,	Red Oak, Iowa,	3465 Sansom St.
Alfred Christian Fleckenstein,	Sc. 4,	Philadelphia,	321 N. 19th St.
Charles Schlessinger Friedman,	Sc. 1,	do.	1704 Lambert St.
Thomas Sovereign Gates,	Wh.,	do.	Main & Sch'l Sts., Gtn.
John Ervin Gensemer,	A.,	Marshallville, O.,	2124 N. 12th St.
Charles Allyn Gilchrist,	Sc. 1,	Philadelphia,	5014 Wayne Ave., Gtn.

UNDERGRADUATES.

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	Course.	Residence.	City Address.
James Harry Graham,	Wh.,	Philadelphia,	2115 N. 15th St.
Arthur Maurice Greene, Jr.,	Sc. 4,	do.	331 W. Chn. Ave., Gtn.
Jesse Moore Greenman,	N. H.,	Cleveland, O.,	3729 Locust St.
Jansen Haines,	Sc. 4,	Cheltenham.	
George Hervey Hallett,	A.,	Pottsville, Pa.	
Clinton Gardner Harris,	Arch.,	Philadelphia,	144 School Lane, Gtn.
Francis Chambers Harris,	N. H.,	do.	1826 Pine St.
William Charles Hays,	Arch.,	do.	508 S. 41st St.
Joseph J. Gillingham Hibbs,	Sc. 1,	do.	1514 N. 17th St.
John Githens Horner,	Wh.,	Palmyra, N. J.	
Arthur Wellesley Howes,	A.,	Philadelphia,	3725 Spruce St.
David Wendell Hulburd,	A.,	do.	2023 Wallace St.
Stephen Linnard Innes,	A.,	do.	3813 Walnut St.
George Johnson,	A.,	do.	833 N. 22d St.
Geo. Washington Kendrick, 3d,	Wh.,	do.	3507 Baring St.
James Lawton Kendrick,	Wh.,	do.	2024 N. 22d St.
Samuel Murdock Kendrick,	Wh.,	do.	3507 Baring St.
Harry Eugene Kohn,	Wh.,	do.	718 N. 6th St.
Frank Livingston Laird,	Wh.,	Hughesville,	3338 Walnut St.
Francis Herbert Lee,	A.,	Philadelphia,	4216 Walnut St.
Benjamin Wolf Loeb,	Wh.,	do.	929 N. 8th St.
Howard Adler Loeb,	Sc. 4,	do.	2124 Spg. Garden St.
Thomas Emmett McDermott,	Sc. 1,	do.	1262 Pt. Breeze Ave.
Clayton McElroy,	A.,	do.	115 S. 20th St.
George McFadden,	A.,	do.	1428 Walnut St.
Clarence Stanley McIntire,	Wh.,	do.	1204 Race St.
Clyde Milne,	A.,	do.	1714 Spruce St.
John Eyre Morgan,	Sc. 4,	Johnstown,	Wyncote P. O.
Robert Churchman Morgan,	Sc. 4,	do.	Wyncote P. O.
James Clark Moore, Jr.,	Wh.,	Philadelphia,	4201 Walnut St.
James Caverly Newlin,	Sc. 3,	do.	1018 Clinton St.
John Nolen,	Wh.,	do.	4802 Chester Ave.
Samuel Wilkins Norwood,	Wh.,	Greenville, S.C.	
Richard Thomas O'Malley,	A.,	Philadelphia,	2001 Race St.
Horace Hill Patterson,	Sc. 4,	do.	3720 Locust St.
Roderick G. Pearson,	Sc. 3,	do.	4666 Green St., Gtn.
William Henry Perry,	A.,	do.	2001 Race St.
Martin Port Rice,	Sc. 4,	do.	710 N. 40th St.
Marion Rinehart Rodgers,	Sc. 3,	do.	1403 N. 13th St.
Howard DeHaven Ross,	Wh.,	Wilmington, Del.,	(307 West St.)
Owen Louis Shinn,	Ch. 4,	Philadelphia,	1714 Willington St.
John Falconer Sinclair,	A.,	do.	3909 Walnut St.
Charles Sinkler, Jr.,	A.,	do.	1606 Walnut St.
George Albert Smyth,	A.,	do.	Penn & Chew Sts., Gtn.
Frederick Dawson Stone, Jr.,	Sc. 3,	do.	Fisher's Lane, Gtn.
Harry Eugene Spencer,	Sc. 1,	Wilmington, Del.,	205 E. 13th St.
Samuel Swift,	Sc. 4,	do.	1409 Delaware Ave.
Justin Ralph Sypher,	A.,	Philadelphia,	4025 Walnut St.
Seyichiro Terashima,	Wh.,	Tokio, Japan,	University.
Stoyan Vasil Tsanoff,	Wh.,	Sofia, Bulgaria,	University.
William Budd Warne, Jr.,	Sc. 4,	Philadelphia,	206 W. Logan Sq.



	Course.	Residence.	City Address.
Frank Forest Welsh,	Sc. 1,	Eaton, O.,	109 S. 34th St.
Jesse Starr White,	A.,	Camden, N. J.,	329 Cooper St.
Edward Burke Wilford,	Sc. 4,	Philadelphia,	1520 N. 18th St.
Charles Willing,	A.,	do.	2020 Spruce St.
Robert Newton Willson, Jr.,	A.,	do.	2226 Spruce St.
Frank Potts Witmer,	Sc. 3,	do.	724 N. 19th St.
Erskine Wright,	A.,	do.	1926 Wallace St.
James T. Young,	Wh.,	do.	1330 Spg. Garden St.

## STUDENTS OF THE FOURTH YEAR NOT CANDIDATES FOR A DEGREE.

	Course.	Residence.	City Address.
Joseph Maurice Haywood,	Wh.,	Ambler.	
William Clark McKnight,	A.,	Ridley Park.	
Samuel Kreamer Reeves,	Sc. 1,	Phoenixville.	
J. Anson Smith,	N. H.,	Gloucester, N. J.	
Harry Chapman Thayer,	Wh.,	Merion Station.	
Walter Edward Whitaker,	Sc. 4,	Philadelphia,	Adams and Sellers Sts.

## JUNIORS.

	Course.	Residence.	City Address.
Harvey Gottschall Allebach,	N. H.,	Green Lane,	3223 Sansom St.
John Brander Austin, Jr.,	Sc. 3,	Wallingford.	
Frederick Cook Beecher,	Wh.,	North East,	3729 Locust St.
Clarence E. Blackburn,	Wh.,	Philadelphia,	1938 N. 13th St.
William Earle Bradley,	Sc. 4,	do.	1323 Mt. Vernon St.
William P. Brines,	A.,	do.	1833 Fitzwater St.
Frederick Schermerhorn Brinton,	Sc. 4,	do.	143 Price St., Gtn.
Henry Cartright Burr,	Ch. 4,	do.	326 S. 24th St.
William Leberman Cauffman,	A.,	do.	School Lane, Gtn.
Paul Cheyney,	Sc. 1,	do.	4301 Haverford St.
Harry Orrick Johnson Childs,	A.,	do.	1110 S. 47th St.
George Morrison Coates, Jr.,	N. H.,	Berwyn.	
George Douglass Codman,	Wh.,	Philadelphia,	3733 Spruce St.
Henry Hill Collins, Jr.,	Wh.,	do.	103 S. 21st St.
Robert Graham Contrell,	Sc. 1,	do.	126 S. 34th St.
Robert Duncan Coombs, Jr.,	Sc. 3,	do.	429 S. 40th St.
Erskine Hazard Cox,	Sc. 4,	do.	2218 St. James Place.
Benjamin Franklin Cresson,	Sc. 3,	Conshohocken.	
John Mulchinock Cruice,	A.,	Philadelphia,	114 N. 18th St.
Paul Armon Davis, 3d,	Arch.,	do.	2009 Girard Ave.
William Chauncey Emhardt,	A.,	do.	1936 N. 13th St.
Edwin Henry Fetterolf,	Wh.,	do.	Girard College.
Warren Matthews Foote,	Sc. 1,	do.	1203 N. 41st St.
Albert Philip Francine,	N. H.,	do.	1404 Spruce St.
Howard Fuguet,	Sc. 4,	do.	110 S. 19th St.
Edwin Atlee Garrett, Jr.,	Sc. 4,	do.	114 N. 16th St.
John Henry Hackenberg,	A.,	Jenkintown,	
Robert Rockwell Hall,	Sc. 4,	do.	3909 Spruce St.
Francis Hawke,	Arch.,	Tunkhannock.	
D'Orsay Hecht,	N. H.,	Milwaukee, Wis.	3723 Spruce St.
Cheesman Abiah Herrick,	Wh.,	Redwood, N. Y.,	204 S. 36th St.

UNDERGRADUATES.

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	Course.	Residence.	City Address.
Paul Renno Heyl,	Sc. 1,	Philadelphia,	4050 Aspen St.
Theodore Heysham,	A.,	Norristown.	
George Cash Horter,	A.,	Philadelphia,	1032 Vine St.
Reginald Heber Innes,	Wh.,	do.	3813 Walnut St.
William Hamilton Jefferys,	N. H.,	do.	3928 Walnut St.
Evertson Crosby Kindleberger,	A.,	Washington, D. C.,	252 S. 17th St.
Charles Ferdinand Knight,	Sc. 4,	Philadelphia,	917 Franklin St.
Joseph Ragland Long,	C.E.4,	Chester.	
Kunpei Matsumoto,	Wh.,	Tokio, Japan,	3232 Locust St.
Masao Matsugata,	Wh.,	do.	
Emlen McConnell,	Sc. 3,	Haddonfield, N. J.	
Gilbert Stuart Moore, Jr.,	Sc. 4,	Philadelphia,	2259 Franklin St.
William Garrett Moore,	Sc. 4,	Haddonfield, N. J.	
Charles Thornton Murphy, Jr.,	A.,	Philadelphia,	2121 Arch St.
Tokumatsu Nakajima,	A.,	Tokio, Japan,	708 Locust St.
Winchester Dana Osgood,	C.E. 4,	Omaha, Neb.,	3917 Pine St.
Ernest Moorhead Paddock,	A.,	Philadelphia,	3911 Locust St.
Alfred Harrison Pancoast,	Arch.,	do.	3921 Brown St.
Charles Leo Partridge,	N. H.,	do.	Coulter & Knox, Gtn.
William Pepper, Jr.,	N. H.,	do.	1811 Spruce St.
Arthur Hobson Quinn,	A.,	do.	720 N. 16th St.
George Ulrich Rehfuß,	Arch.,	do.	1508 N. 5th St.
Henry Gwinner Riebenack,	Sc. 3,	do.	S. E. 34th & Powelton.
James Clifford Rosengarten,	A.,	do.	256 S. 15th St.
Benjamin Rowland,	A.,	Ogontz.	
Charles Alfred Sherlock,	A.,	Philadelphia,	1002 St. Bernard's Pl.
Robert Soutter Sinclair,	A.,	do.	3909 Walnut St.
Carroll B. Smith,	Sc. 4,	Norristown.	
Thomas Smith,	Sc. 4,	Oak Lane.	
Thomas Kilby Smith,	Wh.,	Torresdale.	
Frederic William Speakman,	Sc. 4,	Coatesville.	
Walter Smith Thomson,	Wh.,	Philadelphia,	1426 Walnut St.
Henry Worth Thornton,	Sc. 3,	Newton, Bucks Co.	
Francis John Tucker,	Sc. 4,	Thurlow.	
Samuel Pastorious Tull,	A.,	Philadelphia,	333 Richmond St.
Percy Hartshorne Wilson,	Sc. 3,	do.	3931 Walnut St.
James Henry Wagonhurst,	Sc. 3,	Clifton,	3607 Locust St.
Alan Wood, 3rd,	Sc. 4,	Conshohocken.	
Edward Stanton Young,	Sc. 4,	Philadelphia,	1330 Spg. Garden St.

STUDENTS OF THE THIRD YEAR NOT CANDIDATES FOR A DEGREE.

	Course.	Residence.	City Address.
George Shattuck Barrows,	Sc. 4,	Philadelphia,	1417 Walnut St.
Wesley Leshner Blythe,	Arch.,	do.	3227 Woodland Ave.
James Maxwell Bullock, Jr.,	A.,	do.	1826 Chestnut St.
Stephen Albert Cloud,	Arch.,	Chester,	28 W. Third St.
George James Fox,	A.,	Philadelphia,	1921 Walnut St.
Philip Fine Fulmer,	Wh.,	Dingman's Ferry,	3305 Walnut St.
George Bickley Houseman,	A.,	Philadelphia,	4915 Paul St., Fkd.
Victor Lenher,	Sc. 1,	Mechanicsburg.	
Julius William Leisel, Jr.	Sc. 1,	Philadelphia,	1703 N. 21st St.



## COLLEGE DEPARTMENT.

	Course.	Residence.	City Address.
Joseph Samuel Lovering,	Wh.,	Philadelphia,	School Lane, Gtn.
Alphonse Robert Nicholson,	Sc. 1,	Jenkintown.	
Vickers Oberholtzer,	Sc. 1,	Norristown,	Green and Airy Sts.
William Stephen Outerbridge, Jr.	Wh.,	Philadelphia,	825 Wharton St.
Joseph Coleman Saltar,	Sc. 1,	Chicago, Ill.,	Pemberton, N. J.
Lawrence Sydney Shermer,	A.	Philadelphia,	W. Walnut Lane, Gtn.
Powell Stackhouse, Jr.,	Sc. 4,	Wallingford.	
Catharine Rupert Stephens,	Sc. 1,	Philadelphia,	3350 Walnut St.
Roy Allen Thomas,	Wh.,	Norristown.	
James Henry Wood,	Wh.,	Philadelphia,	1835 Arch St.
Elizabeth N. Woolman,	Sc. 1,	Lansdowne.	

## IN MUSIC.

Bowness Briggs,	Wilmington, Del.		
T. Lester Carpenter,	do.		
Reuben S. Horman,	Philadelphia,	2351 E. Cumberl'd Ave.	
Harry Kuni,	do.	817 Buttonwood St.	
Harry Mack,	do.	2301 N. 6th St.	
Irwin J. Morgan,	do.	Lancaster Ave.	
F. P. Patterson,	do.	2217 Trinity Place.	
Carrie E. Turner,	do.	1703 Edwin St.	
William J. Winther,	do.	2606 Girard Ave.	

## SOPHOMORES.

	Course.	Residence.	City Address.
Horace Woodhull Ash,	Sc.,	Philadelphia,	1512 Harrison St., Fk.
Roger Ashhurst,	A.,	do.	1830 Spruce St.
Craig Atmore,	Sc.,	do.	1641 N. Broad St.
George Bishop Bains, 3rd,	Sc.,	do.	519 S. 41st St.
George Meredith Ball, Jr.,	Sc.,	do.	4010 Pine St.
Henry Chauncey Barclay,	A.,	do.	1816 Pine St.
Daniel Morrell Bates,	Sc.,	Washington, D. C.	
John Blakeley,	Sc.,	Philadelphia,	Walnut Lane and Wayne.
Edgar Selden Bloom,	Sc.,	do.	2039 Columbia Ave.
William Draper Brinckle,	Arch.,	Highlands, Del.	
George Lewis Brinton,	A.,	Philadelphia,	145 Price St., Gtn.
Arthur Howell Brockie,	Arch.,	do.	30 W. Walnut Lane, Gtn
Peter Harry Brower,	A.,	Spring City.	
Theodore Bunker,	Sc.,	Philadelphia,	4007 Locust St.
Edmund James Burk,	A.,	do.	2110 Vine St.
John Nicholson Carlisle,	C.E.4,	do.	5444 Merion Ave.
George Phillips Chase,	N. H.,	Washington, D. C.	
Samuel Hart Chase,	N. H.,	Philadelphia,	2100 Pine St.
Richard Sanders Chew,	Sc.,	Washington, D. C.,	1116 Fitzwater.
James Hamilton Colket,	Sc.,	Philadelphia,	2037 Chestnut St.
James Harold Cornell,	N. H.,	do.	1605 N. 10th St.
George Crow,	Sc.,	do.	2129 Spring Garden.
Walter Rush Cuthbert,	A.,	do.	4000 Chestnut St.
Charles Frederick DaCosta,	Sc.,	do.	1700 Walnut St.
Edward Albert Darby,	Sc.,	do.	1725 Montgomery Av.
Frank Lucas DeArmond,	M.E.4,	Beverly, N. J.	

	Course.	Residence.	City Address.
Ricardo Arcadio Delgado,	C.E.4,	Matanzas, Cuba,	3236 Chestnut.
Spencer Cole Dickson,	A.,	Scranton,	212 S. 41st St.
Victor William Dippell,	A.,	Philadelphia,	1230 N. 6th St.
Groves Washington Drew,	A.,	do.	821 Wharton St.
Herman Louis Duhring, Jr.,	Arch.,	do.	Chestnut Hill.
George Eisner,	Sc.,	do.	Stratford Hotel.
John Horace Frank,	Arch.,	do.	2116 Mt. Vernon St.
Henry Conrad Fritz,	Sc.,	Wilmington, Del.,	1005 Jefferson.
Horace Pugh Fry,	M.E.4,	Philadelphia,	709 N. 16th St.
Samuel Genstein,	Sc.,	Russia,	625 Dickinson St.
John Francis Gorman	Sc.,	Philadelphia,	1720 N. 18th St.
William Stewart Greene,	Sc.,	do.	226 S. 39th St.
Francis Albert Gugert,	M.E.4,	Wayne,	
David Halstead, Jr.,	M.E.4,	Philadelphia,	1129 Cherry St.
Thomas Carson Hanna,	Arch.,	Pottsville,	3118 Dakota St.
William Meredith Hanna.	Ch. 4,	Philadelphia,	110 So. 38th St.
William Henry Hansell, Jr.,	M.E.4,	do.	2040 Arch St.
Joseph Francis Harold,	Ch. 4,	do.	917 Passyunk Ave.
Harry Burr Harris,	Ch. 4,	do.	1912 Federal St.
Joseph Linden Heacock,	Arch.,	Wyncote.	
Charles Christian Heyl,	M.E.4,	Philadelphia,	4050 Aspen St.
Samuel Ryerson Horn,	Sc.,	do.	3717 Frankford Ave.
Charles Michael Jacobs,	A.,	do.	Mt. Airy.
Fleming James, Jr.,	A.,	do.	4722 Springfield Ave.
Henry Duvall James,	Sc.,	do.	4722 Springfield Ave.
George Lewis Justice,	Sc.,	do.	1211 Walnut St.
William Fretz Kemble,	Arch.,	do.	1931 S. 5th St.
Edward Clarence King,	Sc.,	do.	4042 Chestnut St.
Bernard Kohn,	Sc.,	do.	1523 N. 8th St.
Harry Mahlon Land,	Sc.,	do.	2012 Madison Ave.
George Meade Large,	A.,	do.	2312 De Lancey Place.
Edgar Heisler Lawrence,	Sc.,	do.	1820 Fairmount Ave.
Albert Leslie Lewis,	A.,	Akron, N. Y.,	4119 Pine St.
Walter Gibbs Lewis,	Sc.,	Philadelphia,	1909 Green St.
Herman Livingston,	Sc.,	do.	1429 S. Broad St.
Reuben Frank Lowenstein,	Sc.,	do.	1420 N. 7th St.
Samuel McCullagh,	A.,	Worcester, Mass.,	2012 Race St.
Francis Salisbury McIlhenny,	A.,	Philadelphia,	Upsal St., Gtn.
William McKeever,	Sc.,	do.	2116 Vine St.
John Doughty McMullin,	A.,	do.	4816 Trinity Pl.
Charles Moore Magee,	A.,	Conshohocken.	
William Griscom Marot,	M.E.4,	Philadelphia,	315 N. 33d St.
Kenjiro Matsumoto,	Sc.,	Tokio, Japan.	
J. Merritt Matthews,	Ch. 4,	Philadelphia,	634 Spruce St.
Frederick Louis Meyer,	Ch. 4,	do.	1929 Park Ave.
William Hartshorne Miller,	Sc.,	do.	112 N. 19th St.
Percy Stiffler Mitchell,	Sc.,	Altoona,	Chester.
Howard Kaufman Mohr,	Sc.,	Philadelphia,	1611 N. 15th St.
Frazer Smith Monaghan,	Sc.,	West Chester.	
William White Montgomery,	A.,	do.	
Charles Lincoln Morris,	Sc.,	Philadelphia,	1515 Montgomery Ave.



## COLLEGE DEPARTMENT.

	Course.	Residence.	City Address.
Arthur Newlin,	Sc.,	Philadelphia,	1018 Clinton St.
Thomas Henry Nicholls,	N H,	Dutch Flat, Cal.,	3305 Walnut St.
George William Norris,	A.,	Philadelphia,	1530 Locust St.
James Jenkins Overn,	Sc.,	do.	2108 Diamond St.
Albert Pancoast,	M.E.4,	do.	1013 S. 4th St.
John Pemberton,	A.,	do.	403 S. 22d St.
George Howard Perkins,	Sc.,	do.	413 S. Broad St.
Alan Bigelow Perley,	M.E.4,	do.	Mt. Airy.
Otto Pflueger,	Sc.,	do.	2904 Poplar St.
John Sergeant Price, Jr.,	A.,	do.	1709 Walnut St.
Owen Josephus Roberts,	A.,	do.	Fisher's Lane, Gtn.
Nelson Lawrence Roray,	Sc.,	Cedarville, N.J.,	4818 Greenway Ave.
Charles Edward Roth,	A.,	Philadelphia,	2230 N. 17th St.
George William Sargent,	Ch. 4,	Bellwood.	
William Bishop Schuyler,	Sc.,	Pottstown.	
Alexander Sellers,	Sc.,	Philadelphia,	1819 Vine St.
Alfred Day Silliman,	Sc.,	do.	1315 N. Broad St.
Haseltine Smith,	A.,	Abington P. O.	
William Aymar Squire, Jr.,	Sc.,	Beverly, N. J.	
Francis Penn Steel, Jr.,	Ch. 4,	Philadelphia,	229 N. 18th St.
William Albert Steel,	Sc.,	do.	1726 N. 13th St.
Henry Gawthrop Swayne,	Sc.,	St. Augustine, Fla.,	3117 N. 16th St.
James Wilson Sylvester,	Sc.,	Philadelphia,	2035 Fitzwater St.
Gustav Hugo Tafel,	Sc.,	do.	1724 Green St.
George Herbert Taylor,	Arch.,	do.	403 N. 33d St.
Francis Hawthorne Thomson,	A.,	Wilmington, Del.,	211 West St.
Matthew Ambrose Tracy,	Sc.,	Conshohocken.	
Ralph Lambert Warren,	Sc.,	Philadelphia,	3218 Summer St.
Walter Burgess Warren,	Sc.,	do.	3218 Summer St.
Henry Miller Watts,	A.,	do.	2303 Walnut St.
John Howard Weatherby,	Sc.,	Camden, N. J.,	404 Pearl St.
Norman Norcross Wendell,	Sc.,	Philadelphia,	4205 Sansom St.
John Straton Wetherill,	Sc.,	Mt. Holly, N. J.	
James Wilson Wister,	A.,	Philadelphia,	4717 Green St.
William Sydney Young,	Sc.,	do.	Upsal St., Gtn.

## STUDENTS OF THE SECOND YEAR NOT CANDIDATES FOR A DEGREE.

	Course.	Residence.	City Address.
Folger Barker,	Wh.,	Wyncote P. O.	
Edwin Stephens Barnett,	Sc. 1,	Mt. Alverno.	
John Randolph Bertolett,	Sc. 4,	Philadelphia,	4312 Penngrove.
Edwin Littlefield Blabon,	Wh.,	do.	21st and Venango Sts.
John Edward Breen,	Sc. 3,	Cincinnati, O.,	3328 Walnut St.
Herbert Brown,	Sc. 1,	Philadelphia,	Stenton Ave., Gtn.
Vincent Bodine,	Sc. 1,	Camden, N. J.,	333 Vine St.
Andrew Webster Carey, Jr.,	Sc. 4,	Wenonah, N. J.	
William Elwood Caveny,	Sc.,	Philadelphia,	High St., Gtn.
Daniel George Coogan,	Ch. 4,	do.	3413 Walnut St.
Thomas Evans Dunn,	Sc.,	do.	5341 Main St., Gtn.
Frank Gardner,	C. E.4,	do.	456 Green Lane, Rox.
Mary Dechert Griffith,	Sc. 1,	do.	3914 Walnut St.

UNDERGRADUATES.

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	Course.	Residence.	City Address.
Frederick S. Gross,	Wh.,	Philadelphia,	879 N. 41st St.
Samuel Wilbur Grubb,	Sc. 3,	do.	539 N. 6th St.
Albert Deming Hatfield,	Sc. 1,	Janesville, Wis.,	Upland, Pa.
Harry Havelock Horrocks,	Arch.,	Philadelphia,	18 S. 34th St.
Joseph Kemper,	Sc. 3,	do.	2230 Ridge Ave.
Paul Aloysius Vincent Kirchner,	Sc. 3,	do.	930 N. 6th St.
Charles Lavine Lightenhome,	Sc. 1,	do.	1222 Columbia Ave.
Martin Luther Nicholas,	Wh.,	Richmond, Va.,	238 Quince St.
Thomas K. Ober, Jr.,	Sc.,	Philadelphia,	1617 N. 16th St.
Israel Eugene Rabinovitch,	M.E. 4,	Russia,	235 Catharine St.
Mitchell George Rosengarten, Jr.	Sc. 1,	Philadelphia,	1826 Spruce St.
John Thomas Rowland,	Arch.,	Jersey City, N. J.	
Oswin Weinberger Shelly,	Arch.,	Milford Square,	839 N. 5th St.
George Henry Stephenson,	Sc. 1,	Philadelphia,	1521 Locust St.
Robert Stewart Strader,	C.E. 4,	do.	Wissahickon.
Willis Terry,	Sc.,	do.	1936 Green St.
H. Daniel Troy,	Sc. 4,	Florida,	248 W. Logan Square.
Charles Normac Trump,	Arch.,	Philadelphia,	105 Maplewood, Gtn.
George Pennypacker Tustin,	Sc.,	do.	1812 N. 22d St.
Adrian Francois Wellens,	Wh.,	do.	2145 Howard St.
Elisha Kent Wetherill,	Sc. 1,	do.	1636 Walnut St.

IN BIOLOGY.

Edith Needles Brubaker,	Philadelphia,	40 N. 19th St.
Eckley Brinton Coxe, Jr.,	Drifton,	
George Macy Ekwurzel,	Philadelphia,	4531 Frankford Ave.
Mrs. Harriet Fletcher Cartwright Gould,	do.	119 S. 17th St.
Lucy C. Gendell,	do.	400 N. 40th St.
George Warrington Lamb,	Moorestown.	
Andrew Muller,	Philadelphia,	1144 N. 4th St.
Louise Nichols,	do.	1914 Vine St.
Ethel Austin Shrigley,	Lansdowne.	
Henry Field Smyth,	Philadelphia,	Penn and Chew Sts., Gtn.
Anna Woolman,	Lansdowne.	

IN MUSIC.

Josephine Bauman,	Philadelphia,	919 N. 5th St.
E. M. Cadmus,	do.	19 S. 37th St.
Ella Crowell,	Avondale.	
Margaret Crowell,	do.	
Lucy L. Haswell,	Wallingford.	
Emma H. Hogan,	Cramer Hill, N. J.	
Minnie Leubs,	Philadelphia,	463 N. 8th St.
Adeline MacIntosh,	do.	2021 DeLancey Place.
Laura E. Nolan,	do.	6437 Vine St.
Susanna Atlee Ridgway,	do.	4432 Chestnut St.
Edith Tyson,	do.	414 N. 33d St.
Mary Weston,	do.	3735 Locust St.
Clara N. Wilson,	Lansdowne.	



## COLLEGE DEPARTMENT.

## FRESHMEN.

	Course.	Residence.	City Address.
Robert Robinson Adams,	A.,	Philadelphia,	508 Worth St.
Cornelius Ambruster,	M.E.4,	do.	11 W. Coulter St., Gtn.
John McManus Archer,	Sc.,	Reading,	301 S. 5th St.
Astley Paston Cooper Ashhurst,	A.,	Philadelphia,	2000 Delancey Pl.
Harry Solomon Ashworth,	A.,	do.	2421 Sepviva St.
George Bishop Bains,	Sc.,	do.	122 S. 39th St.
Harry Bamberger,	Sc.,	do.	1438 N. Broad St.
Francis Willard Bancroft,	Arch.,	Bloomfield, N. J.	4205 Sansom St.
James Frazier Bard,	M. E.4,	Philadelphia,	4302 Walnut St.
Matthew Baird Barkley,	M. E.4,	Charleston, S. C.,	Merion Sta.
Henry Leander Bernardy,	Sc.,	Philadelphia,	221 S. 17th St.
Clifford Southgaet Beale,	A.,	do.	1323 N. 6th St.
Charles Alford Blatchley,	M. E.4,	Wayne.	
Gideon Boericke,	Sc.,	Hammondsport,	1707 Mt. Vernon St.
Frank Jerome Borie,	M. E.4,	New Castle, Del.	
Andrew Cottrell Boswell,	C. E. 4,	Mt. Holly, N. J.	
Frederick Brister,	C. E. 4,	Philadelphia,	621 N. 13th St.
Macy Brooks,	A.,	do.	117 N. 33d St.
Henry Tunis Bruen,	Sc.,	do.	1814 S. Rittenhouse.
Robert Coalter Bryan,	M. E. 4,	Richmond, Va.	3401 Walnut St.
Alexander Scott Buchanan,	C. E. 4,	Norristown.	
William Turner Buck,	M. E. 4,	Chester,	236 W. 4th St.
Addison Brown Burk, Jr.,	M. E. 4,	Philadelphia,	1121 Mt. Vernon St.
James Warner Butterworth,	M. E. 4,	do.	1432 Girard Ave.
Joseph Cauffman,	A.,	do.	School Lane, Gtn.
William Edwards Chapman,	A.,	do.	5308 Germantown Av.
Arthur Wayne Clark,	Ch. 4,	Conshohocken.	
Louis Joseph Clarke,	M. E. 4,	Philadelphia,	1309 S. Broad St.
Lewis Worthington Colfelt	Sc.,	do.	2348 Bridge St., Fkd.
Francis L. Cramp,	Sc.,	do.	1736 Spring Garden St
John Law Dallam,	A.,	do.	Clapier St., Gtn.
Ross DeArmond,	Sc.,	Beverly, N. J.	
Hyacinth Peraldi deComene,	M. E. 4,	Philadelphia,	50 N. 13th St.
Harold Donaldson Eberlein,	A.,	do.	4502 Kingsessing Ave.
Thomas Robert Elcock, Jr.,	Arch.,	Glenside.	
David Newlin Fell, Jr.,	Sc.,	Philadelphia,	1534 N. Broad St.
Charles Field, 3d,	Ch. 4,	do.	2013 Green St.
Edgar Simpson Fisher,	A.,	do.	209 N. 36th St.
Leighton Mensing Ford,	Sc.,	do.	1807 Arch St.
Frederick Fraley, Jr.,	A.,	do.	1833 Pine St.
Matthew Henry Gailey,	C. E. 4,	do.	1513 Franklin St.
Louis Joseph Gerson,	M. E. 4,	do.	4303 Walnut St.
Alfred Morton Githens,	Arch.,	do.	1512 Pine St.
James N. Paley Graham,	M. E. 4,	do.	2317 Oxford St.
George Alva Grevemeyer,	Sc.,	do.	1906 N. 12th St.
Charles Frederick Guhlman,	Sc.,	do.	3325 Walnut St.
Charles Baughman Habighurst,	M. E. 4,	do.	653 N. 44th St.
Clarence Arthur Hall,	Ch. 4,	do.	3220 Powelton Ave.
Joseph Harrison,	A.,	Rosemont.	
Charles Magarge Hassinger,	Sc.,	Philadelphia,	5145 Main St., Gtn.

	Course.	Residence.	City Address.
John Chambers Hinckley,	A.,	Philadelphia,	127 N. 19th St.
Carroll Hodge,	M.E.4,	do.	334 S. 13th St.
Harry Bastian Hughes,	A.,	do.	Boyer St., Mt. Airy.
William Janney,	Sc.,	do.	1535 N. Broad St.
Henry Norton June,	Arch.,	Towanda,	410 S. 43d St.
Harrison G. Kimball,	Arch.,	Philadelphia,	322 S. 42d St.
Morris Kind,	C.E. 4,	do.	1515 N. 10th St.
Francis Henry Knauff,	M.E.4,	do.	2211 St. Albans Pl.
Adolph Max Krakauer,	M.E.4,	El Paso, Texas,	204 S. 36th St.
James Heidel Langstroth,	A.,	Philadelphia,	4848 Germantown Av.
Benjamin LaPish,	A.,	do.	115 Pomona Ter., Gtn.
Michael James Larkin,	N. H.,	Mahanoy.	
Ralph Waldo Leach,	Sc.,	Philadelphia,	2219 Green St.
Walter John Leaman,	N. H.,	Leaman Pl.	3729 Locust St.
Theodore LeBoutillier,	Sc.,	Philadelphia,	E. Washington L.Gtn.
W. Irving Lex,	C.E. 4,	do.	2211 Jefferson St.
Walter Crispin Lippincott,	A.,	do.	110 N. 17th St.
Morton Githens Lloyd,	M.E.4,	do.	1606 Mt. Vernon St.
George Thomas Lukens,	A.,	Conshohocken.	
James Russell McClure, Jr.,	Sc.,	Philadelphia,	209 S. 42d St.
Charles Kriebel Meschter,	Sc.,	Worcester, Mont.	Co., 421 Preston St.
Granville Richard Micou,	Sc.,	Philadelphia,	4814 Regent Sq.
Clinton Hancock Miller,	Sc.,	do.	2032 Spring Garden.
Henry Polk Miller,	Sc.,	do.	1616 N. 13th St.
Davis Levis Moore, Jr.,	M.E.4,	do.	2018 Broad St.
Fisher Corlies Morgan,	A.,	do.	130 W. Cheltenham Av. Gtn.
Israel Wister Morris,	M.E.4,	do.	1514 Spruce St.
Benjamin F. Murphy, Jr.,	M.E.4,	do.	836 Corinthian Ave.
Harry Warren Nice,	A.,	do.	1904 Warnock St.
Oliver Randolph Parry,	Arch.,	N. Hope, Bucks Co.,	2005 Arch St.
Herman Speck Pettibone,	A.,	Greenville, Tenn.	
Frank Adler Pfaelzer,	M.E.4,	Philadelphia,	1318-Franklin St.
William Frances Hughes Reed,	A.,	do.	1601 Chestnut St.
Arthur Hart Remington,	N. H.,	do.	1832 Pine St.
Gilbert Haven Rettew,	M.E.4,	do.	3921 Locust St.
Thomas Roberts, Jr.,	A.,	do.	116 S. Front St.
William Dunton Schrack,	Sc.,	do.	127 Harvey St., Gtn.
George Lewis Schaffer, Jr.,	A.,	do.	1013 N. Front St.
Arthur Shrigley,	Arch.,	Lansdowne.	
C. Clarence Sichel,	A.,	Philadelphia,	1812 Mt. Vernon St.
J. Fenimore Cooper Sickel, Jr.,	Ch. 4,	do.	637 N. 40th St.
Edward Wanton Smith,	Sc.,	do.	4717 Germantown Av.
Harold Edward Smith,	A.,	Wallingford,	
Thomas Somerville Stewart, Jr.,	Sc.,	Philadelphia,	1031 Spruce St.
James Madison Stifter, Jr.,	A.,	Upland.	
William Moseley Swain,	Arch.,	Philadelphia,	1518 N. Broad St.
Robert Richard Tafel,	Sc.,	Wernersville.	
Walter Thomas Taggart,	Ch. 4,	Philadelphia,	2011 Fairmount Ave.
Walter Thayer,	Sc.,	Merion Station.	
George Edward Thomas,	Ch. 4,	Philadelphia,	1513 Centennial.
Paul Kirk Middlebrook Thomas,	Sc.,	do.	1807 Chestnut St.



	Course.	Residence.	City Address.
Stanley Jeffery Tonkin,	C. E. 4,	Wilkes-Barre,	87 South St.
Algernon Sidney Uhler,	M. E. 4,	Philadelphia,	1607 Chestnut St.
Otman Franklin Wagonhurst,	C. E. 4,	Clifton.	
Robert Burns Wallace,	A.,	Tyrone Co., Ireland,	1930 Federal St.
Arthur Edward Weil,	A.,	Philadelphia,	1720 Pine St.
J. Howard Weinberger,	C. E. 4,	Spinnerstown.	
Henry Hunter Welsh,	A.,	Philadelphia,	4104 Pine St.
Edward Morwitz West,	Sc.,	do.	1524 Swain St.
Samuel Adams Whitaker,	Sc.,	Phoenixville.	
John Odenheimer White,	Sc.,	Philadelphia,	2026 N. 12th St.
James Edgar Willing,	Sc.,	do.	1918 Spg. Garden St.
Henry Winsor, Jr.,	Sc.,	Haverford.	
Scott Leopold Wolff,	Ch. 4,	Philadelphia,	1219 Franklin St.
Henry Newbold Woolman,	Sc.,	do.	
David Thomas Young,	Sc.,	do.	2029 Arch St.
James Henderson Young,	A.,	do.	2224 Spruce St.
Robert Thompson Young,	C. E. 4,	do.	Chestnut Hill.

## STUDENTS OF THE FIRST YEAR NOT CANDIDATES FOR A DEGREE.

	Course.	Residence.	City Address.
Joseph Kahn Arnold,	A.,	Philadelphia,	637 Oxford St.
Francis Jordan Ashcom,	Sc. 1,	Everett,	4034 Baring St.
Francis Joseph Baldwin,	Arch.,	Baltimore, Md.,	3743 Spruce St.
Lewis Lafayette Bassett,	Sc. 1,	Philadelphia,	4013 Baring St.
William Sexton Bateman,	Sc. 4,	Camden, N. J.,	116 N. 4th St.
Richard W. Belfield,	Sc. 4,	Philadelphia,	435 N. Broad St.
Harry H. Belknap,	Wh.,	do.	3719 Spring Garden.
Leo Belmont,	Wh.,	do.	833 Marshall St.
James Lorenzo Bever, Jr.,	M. E. 4,	Cedar Rapids, Iowa.	
Frederick Buel Bonebrake,	Wh.,	Topeka, Kansas.	
John Windstandley Breyfogle,	Arch.,	New Albany, Ind.,	4124 Chester Ave.
Frank Asbury Collins, Jr.,	Sc.,	Philadelphia,	4509 Wayne Ave.
Harry Franklin Cook,	Wh.,	Chicago, Ill.,	3223 Sansom St.
William Penn Cresson,	Arch.,	Philadelphia,	224 S. Broad St.
Lewis Moore Crawford,	Ch. 4,	Merion Station.	
Walter David Dalsimer,	Wh.,	Philadelphia,	938 Franklin St.
Malcolm Macfarland Dickinson,	Wh.,	do.	1416 N. 17th St.
William Henry Evans,	Wh.,	do.	1309 Brown St.
Elias Gates,	Wh.,	Memphis, Tenn.,	3260 Chestnut St.
William Wheeler Hatch,	Arch.,	Hoosic Falls, N. Y.	
Harvey Thomas Hauer,	Arch.,	Lebanon,	530 Chatham St.
Charles Russell Hinchman,	Sc. 1,	Philadelphia,	3655 Chestnut St.
Walter Abraham Hirsh,	Wh.,	do.	1418 N. 16th St.
Edward T. Keyworth,	Arch.,	York, Pa.	
William J. Klein,	Sc. 3,	Philadelphia,	1527 N. 19th St.
Norman Van Pelt Levis,	A.,	Mt. Holly, N. J.	
Warren Gloninger Light,	N. H.,	Lebanon.	
Francis Joseph Lukens,	A.,	Philadelphia,	5083 Main St., Gtn.
Joseph Gazzam MacKenzie,	Wh.,	do.	6211 Seminole Ave.

	Course.	Residence.	City Address.
Frank Van MacMullin,	M E. 4,	Philadelphia,	1610 Page St.
Abdiel Read McClure,	Arch.,	Homestead,	3419 Walnut St.
Augustus McManus,	Sc. 4,	Thurlow.	
Frank Sees McManus	Arch.,	Philadelphia,	1404 N. 15th St.
John McManus,	Sc. 4,	Thurlow.	
Philip Maas,	Sc. 1,	Philadelphia,	1228 W. College Ave.
Luther Martin, 3d,	Sc. 1,	do.	Pulaski Ave., Gtn.
Edwin Williams Moore,	Wh.,	do.	4209 Chester Ave.
J. Edgar Morton,	Arch.,	Merchantville, N. J.	
James Charles Murtagh,	Wh.,	West Chester.	
Albert Woodcock Newton,	Arch.,	Montrose,	3714 Baring St.
Henry Dawes Oliver,	Sc. 3,	Easton,	3607 Locust St.
Robeson Lea Perot,	Arch.,	Philadelphia,	111 W. Walnut L., Gtn.
Charles Elliott Pickett,	Wh.,	Seymour, Conn.,	4108 Spruce St.
Charles Edwin Plumly,	Arch.,	Philadelphia,	2030 Race St.
Joseph Alvin Porter,	C.E. 4,	Reading,	8 N. 2d St.
James Lewis Reese,	Sc. 1,	Centralia,	3607 Locust St.
John Joseph Reilly,	Sc. 4,	Philadelphia,	1551 N. 13th St.
Thomas Seabrook Reilly,	Sc. 3,	do.	1551 N. 13th St.
Ernest Elijah Rockhold,	Wh.,	Bainbridge, O.	
George Lansing Rothrock,	Wh.,	Cedar Rapids, Iowa.	
Jacob Rubel,	Wh.,	Philadelphia,	1507 N. 10th St.
Frank Henry Smith,	A.,	Gloucester, N.J.,	1833 Carpenter St.
A. Lincoln Spencer,	Wh.,	Milford, Del.,	3208 Sansom St.
Frederick Transom,	M.E.4,	Philadelphia,	1413 Tasker St.
John Fessenden Truesdell,	Wh.,	do.	3409 Baring St.
Charles Arthur Warner,	Arch.,	Ardmore.	
Marshall Warren Way,	Wh.,	West Chester.	
Harrison B. Weil,	Wh.,	Philadelphia,	502 N. 6th St.
Brinton Wetherill,	Sc.,	do.	1723 Pine St.
John Lawrence Wetherill,	Sc.,	do.	1723 Pine St.
George Whitney Wood,	Sc.,	do.	5502 Germantown Av.
Henry Gillette Woodman,	Arch.,	do.	244 S. 21st St.
Edward Bell Wright,	Ch. 4,	Washington, D.C.,	3413 Walnut.

IN BIOLOGY.

Russell Armor,	Harrisburg,	3719 Spruce St.
Naomi Bitting,	Philadelphia,	1625 Diamond St.
Francis Head Brown,	do.	Stenton Ave., Gtn.
Sara Darlington Chambers,	do.	53d and Media Sts.
James Christian Chestnut,	do.	1757 Frankford Ave.
Edward Crathorne Dale,	do.	
Annie Farson,	do.	1011 St. Bernard's Pl.
Henry Flannery, Jr.,	Doulassville.	
George Thomas Forbes,	India,	417 S. 40th St.
George Randall Fox,	Lansdowne.	
Hart Fox,	Philadelphia,	1304 Hanover St.
Thomas Stotesbury Githens,	do.	1512 Pine St.



## COLLEGE DEPARTMENT.

	Residence.	City Address.
Mrs. Harriett Herring,	Philadelphia,	3816 Spg. Garden St.
Charles Edwin Hite,	Walnut, Kan.,	Burlington, N. J.
Sarah Edith Ives,	Philadelphia,	1455 N. 29th St.
Walter Clark Lauderdale,	do.	4605 Springfield Ave.
Elmira Lodor,	do.	1313 N. 12th St.
Leon Franklin Luburg,	do.	321 N. 8th St.
Cahn Sampson Lenox,	North Adams, Mass.	
James M. Phillips,	New Haven.	
Laura May Pyle,	Philadelphia,	3260 Chancellor Pl.
Moncure Robinson Raynor,	do.	Chestnut Hill.
Edith Adeline Reed,	do.	268 S. 38th St.
George Washington Reese,	Centralia,	3413 Walnut St.
Amelia M. Ringe,	Three Tuns, Mont.	
	Co.,	612 N. 12th St.
Howard M. Shriner,	Philadelphia,	2176 E. York St.
Ross Skillern,	do.	3509 Baring St.
Anna Parvin Smith,	Parkesburg.	
Louise Hortense Snowden,	Philadelphia,	2205 Walnut St.
Ralph P. Stubbs,	Wilmington, Del.,	907 Tatnall St.
George Alphonse Sweeney,	Chester,	609 Welsh St.
David Torrens Taylor,	Philadelphia,	2110 Mt. Vernon St.
Bertha Elizabeth Corson Yocoin,	do.	747 S. Broad St.

## IN MUSIC.

Lithi J. Capps,	Philadelphia,	1911 Carpenter St.
Harry Orrick Johnson Childs,	do.	1110 S. 47th St.
C. S. Devine,	do.	3729 Locust St.
Albert Jordan,	do.	5218 Master St.
Elizabeth Lucas,	do.	1913 Arch St.
Mary F. Mitcheson,	do.	1608 Locust St.
Mary E. Robinson,	do.	1410 Christian St.

## PARTIAL STUDENTS IN ARCHITECTURE.

Elizabeth J. Abel,	Philadelphia,	1134 Jackson St.
Miriam V. Cooke,	Narberth, Pa.	
Charles Augustus Davis,	Philadelphia,	238 S. 3d St.
Mary B. Eyre,	do.	3237 Chestnut St.
Christina H. Garrett,	Media, Pa.	
Mattie E. Hetherington,	Philadelphia,	3645 Locust St.
Mary Grace Laird,	do.	3256 Walnut St.
Margaret S. McIntire,	do.	212 S. 43rd St.
Winifred Hester MacIntosh,	do.	2021 DeLancey Place.
Abbie S. Montelius,	do.	210 S. 43rd St.
Cora T. Nelson,	do.	1844 Taylor St.
Mary Sheerer Parker,	do.	4108 Spruce St.
Jean B. Skidmore,	do.	1603 Wallace St.
Emily S. Weeks,	do.	313 N. 37th St.
Alfred Whelen,	do.	123 S. 20th St.

UNDERGRADUATES.

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SUMMARY.

	Arts.	Science.	Finance.	Nat. Hist.	Arch.	Biology.	Music.	Total.
Fellows . . . .	3	—	7	—	—	1	—	11
Post-Seniors . .	—	14	—	—	—	—	—	14
Seniors . . . .	25	29	23	2	3	—	—	82
Juniors . . . .	17	30	11	8	4	—	—	70
Sophomores . .	27	73	—	4	8	—	—	112
Freshmen . . .	31	76	—	3	8	—	—	118
Fourth Year . .	1	2	2	1	—	—	—	6
Third Year . . .	4	9	5	—	2	—	9	29
Second Year . .	—	25	5	—	4	11	13	58
First Year . . .	4	24	20	1	29	33	7	118
Totals . . . .	112	282	73	19	58	45	29	618



# SUBJECTS OF INSTRUCTION

OFFERED BY

## THE COLLEGE FACULTY.

In the following pages all the subjects in which the College Faculty offers instruction are enumerated, and the Courses offered in each subject are described. Special students, not candidates for degrees, may select from these the subjects they wish to take, under the conditions explained on pages 88 and 89.

The numbers prefixed to the Courses are merely for purposes of reference, and do not necessarily refer to the order in which they are usually taken. Except where otherwise stated, Courses extend through the whole 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 postgraduate 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. *Tuesday and Friday, at 2.*

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 prophetic books. This course is offered as an elective in Senior year. Two hours a week. *Monday and Friday, at 3.*

Mr. CLAY :—

3. Review of Grammar. Reading at sight. Exercises in translating from English into Hebrew. Elective for Seniors in Arts. One hour. *Thursday, at 12.*

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, that 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 than previously 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 farther 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.

In the postgraduate work these things are aimed at: Facility in



rapid reading ; close exegetical work ; a clear and comprehensive view of the natural modes of thought as exemplified in the syntax.

Sophocles' *Edipus Coloneus* is this year the basis of the close exegetical work ; along with this will go, however, a full reading of all Sophocles' plays, with analysis of them by the student, and a study of the history and antiquities relating to Greek tragedy.

Professor LAMBERTON :—

4. Æschylus' *Agamemnon*, Sophocles' *Edipus Tyrannus*, Jevon's *Greek Literature*. Private reading, Homer. Two hours. *Thursday and Friday at 10.*
3. Euripides' *Iphigenia in Taures* ; Plato's *Protagoras* ; Greek Antiquities. Private reading, Aristophanes' *Acharnians and Clouds*. Three hours. *Monday and Wednesday, at 11 ; Friday, at 12.*
2. (Conjointly with Mr. Burke, see below). Plato's *Laches*, Euripides' *Medea*, Greek Composition, Private reading, Xenophon's *Symposium* ; Andocides' *de Mysteriis*. One hour. *Tuesday, at 10.*
1. (Half course). Xenophon's *Æconomicus*, Greek Composition. One hour. *Section I., Wednesday, at 10 ; Section II., Thursday, at 9.*
- A. Demosthenes' *Oration on the Crown*. One hour. *Tuesday, at 3.*
- B. Political History of Athens, with reading of Aristotle's *Ἀθηναίων Πολιτεία*. One hour. *Thursday, at 1.*

Courses A and B are voluntary work, not counting for degree in Junior and Senior years.

Mr. BURKE :—

2. (Conjointly with Professor Lambertson, see above). Plato's *Laches*, Euripides' *Medea*, Greek Composition. Two hours. *Wednesday, at 10 ; Thursday, at 9.*
1. (Half course). Given simultaneously with 7, and with it making up one course. Lysias. Plato's *Apology*. Greek Composition. Two hours. *Section I., Monday, at 12 ; Tuesday, at 9. Section II., Monday, at 12 ; Tuesday, at 12.*

#### LATIN.

Professor JACKSON :—

1. SELECTIONS FROM LIVY AND HORACE (*Satires*).—Prescribed for Freshmen in Arts. Four hours. *Tuesday, at 11 ; Thursday, at 10 ; Friday, at 10. Section I., Wednesday, at 9. Section II., Wednesday, at 10.*
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. Four hours. *Monday, at 12 ; Tuesday, at 9 ; Wednesday, at 12 ; Thursday, at 12.*
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. *Tuesday, at 12 ; Thursday, at 9 ; Friday, at 11.*

6. CÍCERO (*Tusculanae*) or LUCRETÍUS (*Selections*). HORACE (*Ars Poetica*).—Reading at sight. Three hours. *Wednesday, at 11; Thursday, at 11; Friday, at 9.*

MR. BURKE:—

7. LATIN GRAMMAR. LATIN PROSE COMPOSITION. CÆSAR (*Commentaries*).—Three hours. *Monday, at 10; Wednesday, at 9; Thursday, at 10.*
8. CÆSAR, VIRGIL (*Æneid*). LATIN PROSE COMPOSITION.—Three hours.

Course 8 is not given in 1892-'93.

Courses 7 and 8 are designed for students in the Natural History Course who do not present Latin at the entrance examination, and for special students in the Course Preparatory to Medicine. Students who have failed in Latin in the entrance examination may not take Courses 1, 7 or 8 to prepare for re-examination in that subject.

#### ENGLISH.

Four objects are contemplated in the arrangement of 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) study of the 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 of the College Department during the earlier years.

The endeavor to interest the student in good writers begins in Freshman year, and although there subordinate to composition, becomes a main feature of the Sophomore's work in the courses in composition and literature which are prescribed for all students of this class. Courses in the history of English literature follow in Junior year, and are also prescribed for students in both Arts and Science; and the seminars, the various electives, together with lectures on such subjects as the Drama, Poetics and Æsthetics are reserved for Juniors and Seniors in Arts. The courses in English language and Philology are pursued as electives by students of the two upper classes, and involve 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.) COMPOSITIONS AND DECLAMATIONS.

English composition is prescribed as the study of all students of the College Department during Freshman and Sophomore years. It is continued as a requirement for Juniors in Arts and Science, 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



in Arts. 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.—Study of American Prose Authors (Franklin, Irving, Hawthorne, Poe), with rhetorical criticism and compositions on subjects suggested by the reading. These compositions, after correction by the instructor, must, if necessary, be rewritten by the student. Course 1 is prescribed for all Freshmen. Two hours. *Arts, Monday at 11, Wednesday at 12. Science 1, Tuesday and Thursday at 11. Science 2, Tuesday at 9, Thursday at 12. Science 3, Tuesday at 12, Friday at 11.*

ENGLISH 4.—Four formal essays during the year, criticised by the instructor with reference to rhetorical form and logical arrangement of ideas. Course 4 is prescribed for Seniors in Arts and Science. Course 6 may be substituted for this course. Appointments to be made with the instructor.

ENGLISH 6.—Weekly Exercises in Composition, corrected and criticized by the instructor with special view to developing a clear and ready English style. This course is elective for Seniors in Arts and is received in lieu of Course 4. One hour. *Wednesday, at 2.*

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. As an aid to this work, selections from good writers are read and discussed from a rhetorical point of view. 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. Course 2 is prescribed for all Sophomores.

ENGLISH 3.—Weekly exercises in popular and literary subjects assigned by the instructor, special attention being given to logical discussions and the writing of orations. The compositions of this course are read and corrected as in Course 2. Course 3 is prescribed for Juniors in Arts and Science. One hour. *Arts, Tuesday, at 2 and 3; Science, Friday, at 3.*

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.

ENGLISH 9, DECLAMATION.—This course affords opportunity for special training in the writing of orations, in debating and in original speaking, extemporaneous and prepared. Course 9 is elective to Juniors and Seniors in Arts in Class B, and is optional to Juniors and Seniors of the other courses of the College Department.

The attention of students pursuing these courses is called to the Prize for Declamation and Oration mentioned on a later page. 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 Freshman 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 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 æsthetic point of view. The seminaries of these two years and the requirements of collateral reading keep the student in constant touch with the actual works which form the subjects of the lectures.

English Literature is prescribed as the study of all Sophomores, and becomes elective in certain of the technical courses in Junior year. Students in Arts are required to pursue the subject during three years; and in addition to the prescribed courses, electives are offered to Juniors and Seniors and two seminaries to 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.*) *Wednesday, at 11; Thursday, at 2; Friday, at 10 and 11.*
2. MODERN NOVELISTS.—Lectures in the development of the novel through Scott, Dickens, Thackeray, George Elliot 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. Two hours. (*Second Term.*) *Hours as in Course 1.* (Given conjointly with Mr. PENNIMAN.)
3. PERIOD OF FRENCH INFLUENCE.—Lectures in 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. Two hours. (*First Term.*) *Monday and Wednesday, at 9.*
7. THE AGE OF ELIZABETH.—Lectures in the History of English Literature from the Revival of Learning to Milton, exclusive of the Drama, Recitations and Examinations in collateral reading. Two hours. (*Second Term.*) *Monday and Wednesday, at 9.*

Courses 3 and 7 are prescribed for all Juniors in Arts, and for Juniors in the Towne Scientific School pursuing courses in Mining and Chemistry. Juniors in Civil Engineering may elect these courses, or the courses for Juniors in Philosophy or History.



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 in Arts, candidates for honors in English. Two hours. (*Every other week.*) *Wednesdays, from 3 to 5.*
- Course 4 is open to Juniors in Arts, candidates for honors in English, and to other members of the Junior Class under certain restrictions.
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. Elective for Juniors in Arts in Class B. Two hours.
- Course 13 is omitted in 1892-'93.
10. PRINCIPLES OF ENGLISH VERSIFICATION. (Half course).—Lectures on Poetics, the nature of English Verse from an æsthetic as well as structural point of view, with practical exercises in the scansion of English metres. Two hours. (*First 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. *Monday and Tuesday, at 10.*
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.*) *Monday, at 9; Tuesday, at 10.*
- Courses 8, 10 and 14 are prescribed for Seniors in Arts.
- 9 SEMINARY.—Readings, discussions and criticisms of papers prepared by the students on subjects selected from the works of authors treated in Courses 11 and 8. Two hours. (*Every other week throughout the year.*) *Wednesday, 3 to 5.*
- Course 9 is open to Seniors in Arts, candidates for honors in English, and to other members of the Senior Class under certain restrictions.
11. ELIZABETHAN DRAMATISTS.—Readings and critical study of selected plays of Marlowe, Shakespeare, Jonson, Beaumont and Fletcher, Webster and Marston. Preparation of papers involving the principles of dramatic construction. Two hours. (*First Term.*) *Monday and Wednesday, at 2.*
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.*) *Monday and Wednesday, at 2.*
- Courses 11 and 12 are elective in Group B for Seniors in Arts.

(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 all 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 exhaustively.

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 Freshmen in Science, and in the various technical courses. Three hours (*Second Term*.)
2. ANGLO-SAXON, ELEMENTARY COURSE. — Sweet's Anglo-Saxon Primer, Sweet's Anglo-Saxon Reader, lectures on phonetics, followed by a comparative study of Anglo-Saxon, Middle English and Modern English forms and orthography. Course 2 is elective to Juniors and Seniors in Arts. Two hours. *Tuesday and Thursday, at 1.*
3. ANGLO-SAXON POETRY. — *Bēowulf, Judith, Sievers' Anglo-Saxon Grammar; March.* Comparison of Anglo-Saxon forms with those of the later periods continued. Course 3 must be preceded by the Elementary Course in Anglo-Saxon. Two hours.
4. ENGLISH PHILOLOGY. — *Minor Course.* Readings in Chaucer. Course 4 is open to those only who have pursued the Elementary Course in Anglo-Saxon for one term. Two hours. (*Second Term*).
5. ENGLISH PHILOLOGY. — *Major Course.* Morris' *Specimens of Early English.* Readings in Chaucer. The Anglo-Norman is studied chiefly in connection with Chaucer. Course 5 is open to those only who have taken Course 1 in Anglo-Saxon. Two hours.



## GERMAN.

Professor SEIDENSTICKER :—

2. Cohn's *Bakterien*; Virchow's *Nahrungs und Genussmittel*; Goethe's *Hermann und Dorothea*; Benedix's *Doctor Wespe*; Harris' *German Composition*. Three hours a week. *Section 1*, Tuesday, at 11; Wednesday, at 12; Friday, at 12. *Section 2*, Monday, at 9; Tuesday, at 12; Thursday, at 9.
3. German Grammar. *Select German Reader*. Schiller's *Maria Stuart*; Lessing's *Minna von Barnhelm*. Three hours a week. Monday, at 10; Tuesday, at 10; Thursday, at 10.
4. Helmholtz's *Goethe's Wissenschaftliche Arbeiten*; Pinner's *Gesetze der Naturerscheinungen*; Müller's *Elektrische Maschinen*. Two hours. Monday, at 11; Wednesday, at 11.
5. Goethe's *Meisterwerke*; Lessing's *Nathan der Weise*; Schiller's *Gedichte*; Jagemann's *Materials for German Composition*. Three hours. Tuesday, at 9; Wednesday, at 9; Friday, at 11.

Mr. WESSELHOEFT :—

1. Brandt's *German Reader*; Storm's *Immensee*; Schiller's *Neffe als Onkel*. Review of German grammar, with Stein's German Exercises. Five hours.
6. *Elementary Grammar*. Joyne's *German Reader*; Joynes-Meissner *Grammar*. Three hours. Wednesday, at 10; Thursday, at 12; Friday, at 11.
7. German Composition. German Science Reader. Goethe's *Prose*. Two hours.

Not given in 1892-'93.

## FRENCH.

Professor EASTON :—

5. Victor Hugo's *Ruy Blas* or *Hernani*. Molière. The language of daily life in some such text book as Fasquelle. History of the Literature. Principal laws governing the changes in the forms of the Latin in the transition into French. Two hours. Prescribed for Seniors in Arts. Monday, at 11; Thursday, at 12.
6. Translation of French prose beginning with Super's *Reader*. Prescribed for Freshmen in Science. Two hours. *Section 1*, Tuesday and Thursday, at 9. *Section 2*, Monday and Thursday, at 10.

Assistant Professor RENNERT :—

1. Victor Hugo, *Hernani*; Molière, *Les Precieuses Ridicules*, and de Musset, *Poésies Nouvelles*. This Course is prescribed for Juniors in Science. Two hours. Monday, Tuesday and Thursday, at 9.
2. In this, which is a Course for beginners, after the study of some elementary French grammar, with exercises in translation from English into French, easy prose is read, beginning with Super's French Reader. In addition, the class will read De Vigny, *La Canne de Jonc*; and Claretie, *Pierille*. This Course is prescribed for Juniors in Arts. Three hours.

3. Saudeau, *Mademoiselle de la Seiglière*; Enault, *Le Chien du Capitaine*; Dumas, *Les Demoiselles de St. Cyr*; and Ohnet, *Le Chant du Cygne*. This course is prescribed for Sophomores in Science. Three hours. *Monday and Wednesday, at 11; Friday, at 9.*
4. Review of French Grammar, with translation from English into French. The class reads George Sand, *La Mare au Diable*; Souvestre, *Un Philosophe Sous les Toits*; and Daudet, *La Belle Nivernaise*. Prescribed for Freshmen in Science. Two hours. *Monday, at 11.*

## OLD FRENCH.

Assistant Professor RENNERT:—

1. Gaston Paris, *Extraits de la Chanson de Roland*. Two hours. *Wednesday and Friday, at 4.*
  2. Toynbee; Specimens of Old French. Two hours.
- Courses 1 and 2 are elective in Junior year. Course 2 is omitted in 1892-'93.

## ITALIAN.

Assistant Professor RENNERT:—

1. Grandgent's Italian Grammar. Carcano, *Il Capellano della Rovella*. *Memorie d'un Fanciullo*. Goldoni, *Il vero Amico*; de Amicis, *Cuore*. Two hours. *Wednesday, at 2; Thursday, at 10.*
  2. Dante, Selections from the *Inferno*; Tasso, *La Gerusalemme Liberata*. Cantos 1 and 2.
- Course 2 is omitted in 1892-'93.

## SPANISH.

Assistant Professor RENNERT:—

1. Knapp's Spanish grammar and readings. Breton de los Herberos; *A Madrid me vuelvo*. Two hours. (*Both Terms.*)
2. Montemayor, *La Diana*. Lazarillo de Tormes. Calderon, *El Principe Constante*. Two hours. (*Both Terms.*)

## PHILOSOPHY.

Professor FULLERTON:—

1. LOGIC.—Lectures and recitations, covering in outline the Inductive and Deductive Logic. Jevons' *Lessons in Logic* is the text-book used. This course is prescribed for Juniors in Arts and in the Wharton School, and is elective for Juniors in Science, excepting those in Chemistry. Two hours. (*First Term.*) *Tuesday, at 11; Friday, at 10.*
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 in the Wharton School, and is elective for Juniors in Science, excepting those in Chemistry. Two hours. (*Second Term.*) *Tuesday, at 11; Friday, at 10.*



3. HISTORY OF PHILOSOPHY. — Lectures, with use of Schwegler's Manual. This course is prescribed for Seniors in Arts, and is elective for Seniors in the Wharton School. Two hours. (*First Term.*) *Tuesday, at 12; Wednesday, at 12.*
4. THE DEVELOPMENT OF IDEALISM.—Lectures and recitations. This course is open only to those who have taken a course in Psychology. It is prescribed for Seniors in Arts. Two hours. (*Second Term.*) *Tuesday, at 12; Wednesday, at 12.*
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 Mediæval).— Elective for Juniors in Arts, and open as voluntary work to Juniors in all departments. The text-book used is Sidgwick's "Outlines." One hour. (*First Term.*) *Friday, at 1.*
7. HISTORY OF ETHICAL THEORIES. (Modern).— Elective for Juniors in Arts, and open as voluntary work to Juniors in all departments. One hour. (*Second Term.*) *Friday, at 1.*

#### PSYCHOLOGY.

Dr. NEWBOLD :—

1. GENERAL PSYCHOLOGY.—The Senses and the Intellect. Prescribed for Seniors in Arts. The text-book used is James' *Outlines of Psychology*. One hour. (*First Term.*) *Monday, at 12.*
2. GENERAL PSYCHOLOGY.—The Emotions and the Will. Prescribed for Seniors in Arts. This course is a continuation of Course 1. One hour. (*Second Term.*) *Monday, at 12.*

Dr. WITMER :—

3. EXPERIMENTAL PSYCHOLOGY.—The Physiology of the Nervous System, and Sensation. Elective for Seniors and Juniors in Arts, and in the Wharton School. Given in the Biological Building. Two hours. (*First Term.*) *Monday, at 9, and Friday, at 2.*
4. EXPERIMENTAL PSYCHOLOGY.—The Psychology of Perception. A continuation of Course 3, and open to the same students. Two hours. (*Second Term.*) *Monday, at 9; Friday, at 2.*

#### 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, and is elective for Juniors in Arts. Two hours. *Monday, at 11; Tuesday, at 12.*

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, and in the Wharton School. Two hours. *Monday, at 12; Tuesday, at 11.*
3. **AMERICAN STATE PAPERS (Half Course).**—A short course of lectures on six great State papers: 1.—The Declaration of Independence. 2.—The Articles of Confederation. 3.—The Constitution of the United States. 4.—The Ordinance of 1787. 5.—The Virginia and Kentucky Resolutions. 6.—The Proclamation to the Nullifiers. 7.—The Emancipation Proclamation. Prescribed for Seniors in the School of American History and Institutions, and in the Wharton School. Two hours.
4. **VETO MESSAGES (Half Course).**—A short course of lectures on important vetoes. Prescribed for Seniors in School of American History and Institutions, and in the Wharton School. Two hours. (See note under Course 6)
5. **AMERICAN POLITICAL ORATIONS.**—A course of required reading for Juniors in the School of American History and Institutions, and in the Wharton School.
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. Two hours.  
 Course 6 alternates with Half Courses 3 and 4. During 1892-'93 Course 6 is given, and Half Courses 3 and 4 are omitted.
- II. **POLITICAL AND ECONOMIC HISTORY OF THE UNITED STATES.**—The course follows an outline prepared specially for the purpose. Maps are drawn, papers prepared by students are discussed, and the methods of historical study are made an important element in the Course. Special Class. Two hours. *Saturday, at 10 (every other week).*

Professor THORPE:

7. **GOVERNMENT IN THE UNITED STATES, (a) the States, (b) the Nation (1776-1892).**—These lectures are delivered twice 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 in Science. Two hours. *Monday, at 12; Friday, at 2.*
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. *Tuesday and Thursday, at 10.*



9. CONSTITUTIONAL HISTORY.—(a.) *The Government of Pennsylvania*, 1682–1892. Charter, Constitutions 1776, 1790, 1834, 1873. (b.) *The Government of Massachusetts*, 1620–1892. Charter Constitution, 1780. (c.) *The Government of Virginia*, 1606–1892. Charters, Constitutions 1776, 1830, 1850, 1864, 1868–1870. (d.) *The Constitution of the States of the Northwest*. (e.) *The Government of American Cities*. Prescribed for Seniors in American History. Two hours.
10. 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.
12. DEVELOPMENT OF GOVERNMENT IN AMERICA.—Local Government, State Government, National Government. Discussion of questions involved in the growth of American civil institutions. Preparation and discussion of papers by the students. An outline is printed for convenience in study. Special Class. Two hours. *Saturday, at 10 (every other week)*.

## EUROPEAN HISTORY.

Assistant Professor CHEYNEY :—

1. ENGLISH HISTORY.—The Tudor and Stuart Periods, 1500–1700. 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*, Vol. II., is used as a text-book, with prepared papers and required readings. Prescribed for Freshmen in Arts. Two hours. (*First Term.*) *Monday, at 9; Thursday, at 12.*
2. ENGLISH HISTORY.—The Political and Constitutional History of England since 1792. This course includes a study of the aristocratic organization of the English government and society at the close of last century, the effects of the French Revolution, the influence of liberal ideas, and the growth of democracy. A series of lectures on the relations of England and Ireland will also be given. Prescribed for Juniors in the Wharton School. Three hours. (*Second Term.*) *Monday, at 9; Thursday, at 12.*
3. MODERN ECONOMIC HISTORY.—Including (1) a comparative study of the changes in land holding in the principal European countries during the last 150 years, (2) a study of the development of English society as based on industrial conditions, the guild system, the industrial revolution, and recent economic institutions, and (3) an account of the principal modern socialistic proposals and experiments. Prescribed for Juniors in the Wharton School. Three hours. (*First Term.*) *Monday, Tuesday and Thursday at 11.*
4. MEDIÆVAL HISTORY OF EUROPE.—The institutions of the later Roman Empire, the settlements of the Teutonic races, ecclesiastical organization and monasticism, Mohammedanism, the rise of the Frankish monarchy, the mediæval Empire, feudalism and the Crusades. Elective for Juniors and Seniors in Arts. Two hours. *Tuesday and Thursday, at 9.*

Associate 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. Three hours. (*First Term.*) *Monday, at 10; Tuesday, at 2, and Friday, at 9.*
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. Three hours. (*Second Term.*) *Monday, at 10; Tuesday, at 2, and Friday, at 9.*
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.*) *Monday and Friday, at 11.*

PUBLIC LAW AND POLITICS.

Professor JAMES and Dr. ADAMS :—

1. CONSTITUTION OF THE UNITED STATES.—A study of the text of the Constitution, using as a text-book Cooley's *Elements of Constitutional Law*. Prescribed for Juniors in the Wharton School. Two hours. (*First Term.*) *Thursday and Friday, at 12.*
  3. HISTORY AND THEORY OF THE STATE.—A study of the elements of Political Science, as presented in such works as that of Crane and Moses, on *Comparative Politics*. Prescribed for Juniors in the Wharton School. Two hours.
  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. One hour. (*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.*) *Wednesday and Thursday, at 11.*
  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.*)
- Course 6 is not offered in 1892-'93.
7. ESSAY COURSE IN MUNICIPAL ADMINISTRATION.—An examination into details of municipal administration of leading American cities, especially Philadelphia. Two hours. *Wednesday and Friday, at 11.*



8. STUDY OF MUNICIPAL PROBLEMS.—Wharton School City Councils. Committee Work on Gas, Water, Railroads, Education, Tax Rate, Finance, Rapid Transit, etc. One hour.
9. CITY GOVERNMENT.—Report on the Municipal Government of New York Commission. Report on Municipal Government of the Pennsylvania Commission. Lectures on Municipal Government, and Essays on the Administrative Departments of leading cities, especially Philadelphia. One hour. *Thursday, at 12.*
10. PUBLIC LECTURES.—By well-known men, on practical subjects, dealing especially with Municipal Administration.
11. CONSTITUTIONAL LAW.—Study of the Constitution of the United States, using Pomeroy's *Treatise* as a text book. Two hours. *Tuesday, at 12; Friday, at 12.*

## BUSINESS LAW AND PRACTICE.

Associate Professor FALKNER :—

2. MERCANTILE LAW.—Parsons' *Laws of Business*. Prescribed for Seniors in the Wharton School. Two hours. (*First Term.*)
3. MERCANTILE PRACTICE.—Lectures. Prescribed for Seniors in the Wharton School. Two hours. (*Second Term.*)

Mr. WARRINGTON :—

1. METHODS OF ACCOUNTING.—Prescribed for Juniors in the Wharton School. Two hours.

Mr. WINTERSTEEN :—

4. BUSINESS LAW AND CONTRACTS, with especial reference to Engineering Contracts. Prescribed for Post-Seniors in Civil Engineering and Mechanical and Electrical Engineering, and for Seniors in the Four Year Engineering Courses. One hour.

## 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. Three hours. *Wednesday, at 10; Thursday, at 11; Friday, at 12.*
5. POLITICAL ECONOMY.—Mill's *Political Economy*. Prescribed for Seniors in the Wharton School. Three hours. (*First Term.*) *Monday, at 10; Thursday and Friday, at 12.*
6. POLITICAL ECONOMY.—Ingram's *History of Political Economy*. Prescribed for Seniors in the Wharton School. Three hours. (*Second Term.*) *Monday, at 10; Thursday and Friday, at 12.*

Professor JAMES :—

8. HISTORY AND THEORIES OF TAXATION.—Adam Smith's *Wealth of Nations*. Prescribed for Seniors in the Wharton School. One hour. *Wednesday, at 12.*

Dr. HILL :—

9. FINANCE.—Ten Lectures on the Income Tax. One hour. (*First Term.*)
2. CURRENCY AND BANKING.—Jevons' *Money and the Mechanism of Exchange*. Prescribed for Juniors in the Wharton School. Two hours. *Wednesday, at 10.*

Dr. ADAMS :—

7. FINANCE.—Bastable's work on *Public Finance*, supplemented by lectures. Prescribed for Seniors in the Wharton School. Two hours. *Thursday, at 11, and at other hours to be assigned.*
10. LIBRARY WORK.—Topical Work to acquaint students with the use of reference books. One hour. *Monday, at 12.*

Mr. CHANDLER :—

11. LECTURES ON FINANCE.—The Money Market, Bonds, Mortgages, Investments, Panics, Corporations, etc. One hour. (*First Term.*) *Monday, at 9.*

Dr. BOLLES :—

12. LECTURES ON FINANCE.—Banks of the United States. Prescribed for Juniors in the Wharton School. One hour. (*Second Term.*) *Monday, at 9.*

#### MATHEMATICS.

Professor KENDALL :—

3. SOLID GEOMETRY.—Chauvenet's *Geometry* (Byerly Edition). Course 3 is prescribed for Freshmen in Arts, Architecture and Chemistry. Three hours. *Freshmen in Arts; Tuesday, at 10; Wednesday and Friday, at 11. Freshmen in Arch. and Chem.; Tuesday and Thursday, at 2; Friday, at 12.*  
Freshmen in Natural History take either Course 3 or Course 6.
5. TRIGONOMETRY.—Crawley's *Elements of Trigonometry*. Course 5 is prescribed for Freshmen in Arts, Architecture and Chemistry. Three hours. (*Second part of First Term, and Second Term.*) *Freshmen in Arts; Tuesday, at 10, Wednesday and Friday, at 11. Freshmen in Arch. and Chem.; Tuesday and Thursday, at 2; Friday, at 12.*  
Freshmen in Natural History take either Course 5 or Course 9.
10. ANALYTIC GEOMETRY.—Hardy's *Analytic Geometry*. Course 10 is prescribed for Sophomores in Arts and Architecture. Three hours. *Monday, at 11; Wednesday, at 9; Thursday, at 10.*
19. ASTRONOMY.—Young's *Astronomy*. Prescribed for Juniors in Arts and Seniors in Science (except those in Mechanical Engineering). Two hours. *Juniors; Monday and Wednesday, at 12. Seniors; Tuesday and Thursday, at 11.*

Assistant Professor CRAWLEY :—

- I a. ALGEBRA.—Well's *College Algebra*. The topics taken up are: Theory of Quadratic Equations and Quadratic Expressions; Inde-



terminate Equations of the first degree; Theory of Logarithms, Permutations and Combinations, Probabilities, Series, Continued Fractions and the Elements of the General Theory of Equations. Freshmen in Natural History take either Course 1, Course 1 a or Course 2. Two hours. *Monday, at 9; Wednesday, at 11.*

Prescribed for Freshmen in Chemistry and Architecture.

6. PLANE AND SPHERICAL TRIGONOMETRY.—Crawley's *Elements of Trigonometry* and Newcomb's *Tables of Logarithms*. This course covers the usual methods for the solution of Plane and Spherical Triangles, together with some introduction to Trigonometric Analysis. Prescribed for Freshmen in Science, Mechanical and Electrical Engineering, and Civil Engineering. Four hours. (*First Term.*) *Section I., Tuesday, at 10; Wednesday, at 2; Thursday, at 10; Friday, at 12; Section II., Tuesday, at 11; Wednesday, at 12; Thursday, at 11; Friday, at 10.*
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. This year the work will be in Algebra during the First Term, and in Trigonometry during the Second Term. The text books used are Smith's *Treatise on Algebra* and Lock's *Higher Trigonometry*. One hour. *Monday, at 1.*
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, Mechanical and Electrical Engineering, and Civil Engineering. Four hours. (*Second Term.*) Same hours as for Course 11.
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. *Monday, at 10; Thursday, at 12; Friday at 11.*
21. DETERMINANTS.—Muir's *Theory of Determinants*. This course deals mainly with the theory of the subject. Some knowledge of Elementary Calculus (such as is given by Course 5) is a prerequisite. One hour. (*First Term.*) *Wednesday, at 10.*
12. ANALYTIC GEOMETRY OF THREE DIMENSIONS.—Smith's *Solid Geometry*. This course takes the subject up at the beginning and goes through surfaces of the second degree, with such additional matter in systems of conicoids as the time may permit. Some knowledge of Calculus and of Determinants is a prerequisite. Open as an elective course. One hour. *Wednesday, at 3.*
25. HIGHER PLANE CURVES.—This course is open only to those students who have had advanced work in Analytic Geometry

Omitted in 1892-'93.

Assistant Professor FISHER :—

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. Two hours. *Monday, at 10; Thursday, at 12.*
2. ALGEBRA.—C. Smith's *Treatise on Algebra*. Third edition. This course differs from the preceding, chiefly in the amount and nature of the work in the same topics. Prescribed for Freshmen in Science and Engineering. Four hours. (*Second Term.*)
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 Science and Engineering. Four hours. (*First Term.*) *Sec. I., Tuesday, Wednesday, Thursday, Friday, at 10. Sec. II., Tuesday, at 11; Wednesday, at 12; Thursday, at 11; Friday, at 12.*
- 15 a. CALCULUS.—Taylor's *Elements of Calculus*. The Elements of the Differential and Integral Calculus. This course is offered in 1892-'93 as a voluntary to Sophomores in Arts as a preparation for Courses 17 and 18, and to other students in whose courses Calculus is not included. One hour. *Tuesday, at 1.*
20. QUATERNIONS.—Lectures. For the Faculty prize in Mathematics, to members of the Junior Class. The lectures are based upon Tait'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. *Tuesday, at 12.*
22. THEORY OF EQUATIONS.—Burnside and Panton, with references to Salmon's *Modern Higher Algebra*. The theory of the Cubic and Bi-quadratic, and of the general equation of the  $n$ th degree, Determinants and some work in Invariants and Covariants. Elective to Juniors and Seniors. Two hours. *Tuesday, at 9; Friday, at 11.*
24. PROJECTIVE GEOMETRY.—Cremona's *Elements of Projective Geometry*, with supplementary lectures. Elective to Juniors and Seniors. Two hours.  
Omitted in 1892-'93.
13. ADVANCED ANALYTIC GEOMETRY of two and three Dimensions. The study of lines and surfaces of the first and second orders, based upon the works of Salmon. Two hours. Elective to Juniors and Seniors who have taken Courses 10 or 11, 15 or 15 a, and 21 or 22.  
Omitted in 1892-'93.
17. CALCULUS.—Advanced work in Differential Calculus. Williamson and lectures, with references to Bertrand. Elective for Juniors and Seniors who have taken Course 15 or 15 a. Two hours.  
Omitted in 1892-'93.
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. *Monday, at 9; Thursday, at 9.*
23. DIFFERENTIAL EQUATIONS.—Forsyth, and lectures. Elective to Seniors who have taken Courses 17 and 18. Two hours. *Tuesday, at 2; Wednesday, at 9.*
26. SEMINAR.—For special inquiries in particular lines of work, and for the reading and discussion of articles in current mathematical journals. Two consecutive hours, alternate weeks.  
Omitted in 1892-'93.

## CHEMISTRY.

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

Professor SMITH, assisted by Dr. KEITH, Dr. FRANKEL, and Dr. OHLY:—

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 Freshmen Class of the Four Year Course in Chemistry devote six hours per week to the experimental portion of this Course. They recite twice per week.
- The Freshmen in Mechanical Engineering, Civil Engineering and Architecture, as well as the Sophomores in Science, and the Juniors in Arts, devote three hours per week to this Course. They all recite one hour per week. Hours of recitation are as follows: *Monday, at 11 and 2; Tuesday, at 11 and 2; Wednesday, at 10 and 2; Thursday, at 2, and Friday, at 2.*
2. ANALYTICAL CHEMISTRY.—Qualitative Analysis. Laboratory practice with recitations. Preparation of a series of inorganic salts. The (Science) Juniors in Chemistry are required to take twelve hours in this subject; the Sophomores of the Four-year Course in Chemistry, from eighteen to twenty 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. Recitations on *Monday, at 2; Wednesday, at 2, and Friday, at 12.*
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; and Sophomores in Four Year Mechanical Engineering, three hours (for *Second*

- Term*). Lectures and recitations every *Thursday, at 9*, and at such additional hours as may be appointed by instructors.
4. ORGANIC CHEMISTRY.—The instruction is by recitation and lectures. Prescribed for (Science) Juniors in Chemistry, and Juniors in the Four Year Course in Chemistry. Two hours. *Monday, at 10; Friday, at 11.*
  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, 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 (Science) Seniors in Chemistry, 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 of the Department.
  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. *Friday, at 4.*
  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. *Monday, at 9.*
  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), and Seniors in the Four Year Course. The lecture hour is appointed after consultation with those who take the Course.

## PHYSICS.

The undergraduate courses in Physics are classified under the three heads of Elementary Physics (Courses 1 and 2), General Physics (Courses 3, 4, 5 and 6), and Practical Physics (Courses 7, 8 and 9). The Courses in Practical Physics must be preceded by the Courses in General Physics.

Professor BARKER :—

7. PHYSICAL MEASUREMENTS.—Methods. Prescribed for Seniors in Science, and Third-year students in Civil Engineering and Mechanical Engineering. Three hours. *Tuesday and Thursday, 3 to 5.*



Professor BARKER and Assistant Professor GOODSPEED :—

5. HEAT AND LIGHT.—Lectures, two hours, Professor Barker ; and Recitation, one hour, Assistant Professor Goodspeed. Prescribed for Juniors in Science, and for Second-year students in Civil and Mechanical Engineering. This Course must be preceded by 3 and 4. Three hours in all. (*First Term.*) *Tuesday and Thursday, at 10 ; Wednesday, at 10 and 12.*
6. ELECTRICITY AND MAGNETISM. — Lectures, two hours, Professor Barker ; and Recitation, one hour, Assistant Professor Goodspeed. Prescribed for Juniors in Science, and for Second-year students in Civil and Mechanical Engineering. This Course must be preceded by 3, 4 and 5. Three hours in all. (*Second Term.*) *Tuesday and Thursday, at 10 ; Wednesday, at 10 and 12.*
9. ELECTRICAL MEASUREMENTS.—Prescribed for Seniors in Science, and Third-year students in Mechanical and Electrical Engineering. Three hours. *Wednesday, from 2 to 5.*

Professor BARKER, Assistant Professor GOODSPEED and Mr. SHIELDS :—

8. PHYSICAL MEASUREMENTS.—Laboratory. Three hours.

Assistant Professor GOODSPEED :—

1. ELEMENTARY PHYSICS.—Prescribed for Sophomores in Arts. Two hours. *Tuesday, at 12 ; Friday, at 10.*

Assistant Professor GOODSPEED and Mr. SHIELDS :—

2. ELEMENTARY PHYSICS. — Practical Course. Prescribed for First-year students in Chemistry and Natural History. Methods, one hour, Assistant Professor Goodspeed. Laboratory, three hours. Four hours in all. *Wednesday, from 9 to 10, and 2 to 5.*
3. MASS-PHYSICS.—This Course must be preceded by Mathematics 1, 3 and 5, or their equivalent. Prescribed for Sophomores in Science and First-year students in Civil and Mechanical Engineering. Two hours. (*First Term.*) *Monday and Thursday, at 11 and 12 ; Friday, at 9.*
4. ENERGY AND SOUND.—This Course must be preceded by Course 3. Prescribed for Sophomores in Science and First-year students in Civil and Mechanical Engineering. Two hours. (*Second Term.*) *Monday and Thursday, at 11 and 12 ; Friday, at 9.*

#### BIOLOGY.

##### *General Biology.*

Professor MACFARLANE, assisted by Mr. MOORE, Mr. CALVERT and Mr. DOUGHERTY :—

1. GENERAL BIOLOGY.—Lectures and Laboratory work. Six hours. *Monday, at 4 ; Tuesday and Thursday, 2 to 4.30.*

*Zoölogy.*

Professor JAYNE :—

12. VERTEBRATE MORPHOLOGY.—Advanced Course. Lectures and Laboratory work. Course 12 is open to those only who have taken Course 5. Seven 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. *Wednesday at 3 (and at other hours appointed by the instructor).*

Professor JAYNE and Dr. BURK :—

8. MAMMALIAN ANATOMY.—Lectures and Laboratory work. Six hours. (*First Term.*) *Monday, from 2 to 4; Wednesday and Friday, from 11 to 1.*
24. HUMAN ANATOMY.—Six hours.

Professor JAYNE and Mr. MOORE :—

5. SYSTEMATIC STUDY OF THE VERTEBRATES.—Laboratory work, with explanatory lectures. Six hours. (*Second Term.*) *Monday and Tuesday, from 2 to 5.*

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.*) *Thursday and Friday, from 9 to 12.*
7. ANIMAL EMBRYOLOGY.—Lectures and Laboratory work. Course 7 is open only to those who have taken Course 6. Six hours. (*Second Term.*) *Thursday and Friday, from 9 to 12.*
9. ANIMAL HISTOLOGY.—Advanced Course. Lectures and Laboratory work. Course 9 is open to those only who have taken Course 6. Seven hours. (*First Term.*)
10. ANIMAL EMBRYOLOGY.—Advanced Course. Lectures and Laboratory work. Course 10 is open to those only who have taken Course 7. Seven hours. (*Second Term.*)

Professor ALLEN :—

22. THE MECHANISM OF LOCOMOTION.—Course 22 is open only to advanced students. Two hours. *Tuesday afternoon.*
23. MAMMALIAN NEUROLOGY AND CRANIOLOGY.—Course 23 is open only to advanced students. Two hours. *Tuesday afternoon.*

Professor HORN :—

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

Mr. MOORE :—

2. GENERAL ZOÖLOGY.—Lectures. One hour. *Wednesday at 2.*



Mr. CALVERT :—

3. SYSTEMATIC STUDY OF THE INVERTEBRATES.—Laboratory work, with explanatory lectures. Six hours. (*First Term.*) *Monday, 9 to 12. Other hours fixed by the instructor.*

*Botany.*

Professor WILSON, Professor MACFARLANE and Mr. HARSHBERGER :—

14. GENERAL STRUCTURAL BOTANY.—Lectures and Laboratory work. Six hours. (*First Term.*) *Monday, at 4; Wednesday, at 3; Friday, from 2 to 5.*

Professor WILSON and Mr. HARSHBERGER :—

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

Professor MACFARLANE :—

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.*) *Tuesday and Wednesday, from 9 to 12.*

Courses 15 and 17 may be taken together.

Professor MACFARLANE, Mr. 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. *Hours same as in Course 14.* Six hours. (*Second Term.*)

Courses 15 and 17 may be taken together.

Professor MACFARLANE and Mr. HARSHBERGER :—

16. PLANT HISTOLOGY.—Lectures and Laboratory work. Course 16 is open only to those who have taken Course 14. Six hours. (*First Term.*) *Tuesday and Wednesday, from 9 to 12.*

Professor ROTHROCK :—

19. ECONOMIC BOTANY.—Lectures and Laboratory work. Course 19 is open to those only who have taken Courses 14 and 15. (*Second Term.*)

Omitted in 1892-'93.

*Physiology.*

Dr. GREENMAN :—

20. ANIMAL PHYSIOLOGY.—Course 20 is open only to those who have taken Course 1. Three hours. *Tuesday, from 2 to 5.*

The Laboratory is open to advanced students.

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.

Mr. BROWN :—

1. THEORY of Metallurgical processes, and of the dressing and mechanical treatment of ores. This Course is prescribed for all Seniors in Science. One hour. *Tuesday, at 12.*
2. ASSAYING.—This Course is prescribed for Seniors in Metallurgy and Mining. Four hours. *Monday and Friday, after 2. (Two Sections.)*
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

Mr. BROWN :—

1. CRYSTALLOGRAPHY.—Native elements, sulphides, chlorides and fluorides. This Course is prescribed for Juniors in Chemistry, in Metallurgy and Mining, and in Civil Engineering. Two hours. *Monday and Wednesday, at 12.*
2. MINERALOGY.—Oxides, sulphates, phosphates, etc. Carbonates and silicates. This Course is prescribed for all Seniors in Science, except those in Mechanical Engineering. Two hours. *Monday, at 9 ; Thursday, at 10.*
3. DETERMINATIVE MINERALOGY.—Prescribed for Seniors in Chemistry, Metallurgy, and Mining, and in Civil Engineering. Two hours. *Thursday, from 2 to 4.*

## MINING.

Mr. 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. *Monday, from 2 to 5 ; Wednesday, from 3 to 5.*
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. *Thursday, at 11 ; Friday, at 10.*



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. *Tuesday, at 10.*
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. *Tuesday and Wednesday, at 9.*

## GEOLOGY.

Professor COPE :—

5. PRINCIPLES OF GEOLOGY.—Outline of Vertebrate Paleontology. Two hours. *Thursday, at 12 ; Friday, at 12.*

Mr. BROWN :—

1. LITHOLOGY.—Prescribed for Juniors in Metallurgy and Mining. One hour.
3. STRATIGRAPHY of the rock systems in connection with Paleontology, 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. *Monday, at 11, and Friday, at 9.*

## 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.*)
- B. 5. THE ORDERS OF ARCHITECTURE.—The Five Orders of Classic Architecture, analyzed in lectures and blackboard dictations; memorized and reproduced in finished drawings. Text book, Vignola. Sophomores in Architecture. Six hours. (*First term.*) First-year Specials in Architecture. Nine hours. (*Major part of 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. 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. Eight hours. (*Second Term.*) *Monday, from 2 to 5 ; Wednesday, at 12, and 2 to 5 ; Friday, at 12.*

- C. 6. SKETCH DESIGN.—Three and six-hour programmes in advanced design, to be rendered in pencil and color in sketch form. Alternating with the regular monthly problems in design. Juniors and First-year Specials in Architecture.
- C. 7. DESIGN.—Monthly problems in design developing the principles of planning and composition, and employing academic methods of rendering. Accompanied by lectures and criticisms. Juniors in Architecture. Ten hours. (*First and Second terms.*) First-year Specials in Architecture. Twelve hours. (*Second Term.*) Juniors, Monday, 2 to 5; Tuesday, at 11, and 2 to 5; Thursday, 2 to 5. *Special Students, Monday, at 12, and 2 to 5; Tuesday, 11 to 1; Wednesday, at 12, and 2 to 5; Friday, at 9 and 12.*
- C. 8. THEORY OF DESIGN.—Lectures on the theory of architectural composition. Sophomores, Juniors and First-year Specials in Architecture. One hour. (*Part of Second Term.*) Friday, at 12.
- C. 9. MEASURED DRAWING.—Drawing to scale of executed works from measurements and sketches taken on the spot. Juniors in Architecture. Three hours. (*Part of First and Second Terms.*) Wednesday, 2 to 5.
- C. 10 a. HISTORY OF ANCIENT ARCHITECTURE.—Egyptian, Assyrian, Persian and Hindu Architecture. Lectures and recitations. Text book, T. Roger Smith's *Classic Architecture*. Sophomores, Juniors and Special Students in Architecture. One hour. (*Part of one Term alternate years.*) Friday, at 4.30.
- D. 5. DESIGN.—Advanced Problems in design completing the studies in planning and composition prescribed for Junior year. Seniors in Architecture. Twelve hours. (*First term.*) Fifteen hours. (*Minor part of Second Term.*) Second-year Specials. Fifteen hours. (*First and Second Terms.*) Seniors and Second-year Students, Monday, at 12 and 2 to 5; Tuesday, 2 to 5; Wednesday, 2 to 5; Friday, 11 to 1.
- D. 6. THEORY OF DESIGN.—Lectures on the theory of architectural composition. Juniors and First-year Specials in Architecture. One hour. (*Part of First Term.*)
- D. 7. THESIS.—A problem in Architectural Composition requiring plans, sections, elevations and a descriptive essay. Seniors in Architecture. Fifteen hours. (*Major part of Second Term.*)
- D. 8. 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. *Monday and Wednesday, at 12.*
- D. 9. ACOUSTICS.—The Acoustics of buildings. Application of known principles to practice. Lectures. Seniors and Second-year Specials in Architecture. One hour. (*Part of First Term.*) Thursday, at 9.
- I. 6. HISTORY OF ARCHITECTURE.—History of Ancient, Classic, Mediæval, Renaissance and Modern Architecture. Lectures and Recitations. Seniors in Civil Engineering. One hour. Friday, at 9.



Professor DANA :—

- C. 5. WATER COLOR DRAWING.—Drawing in water color from still life and from nature. Three-hour studies during two years under personal direction and criticism. Juniors, Seniors and Special Students in Architecture. Three hours. *Thursday, 10 to 1.*
- J. 4. WATER COLOR DRAWING.—Water color drawing from still life and nature, with special reference to individual needs of partial students taking Course J. Three hours. *Thursday, 10 to 1.*

Mr. EYRE :—

- C. 3. PEN AND INK RENDERING.—Rendering of architectural drawings in pen and ink; theory of the composition of line drawings. Exercises in two-hour periods during two years under personal direction and criticism. Text book, Gregg's *Architectural Rendering in Pen and Ink*. Juniors, Seniors and Special Students in Architecture. Two hours. *Tuesday, 9 to 11.*
- J. 3. PEN AND INK DRAWING.—Theory of rendering in pen and ink, and the composition of line drawings, with special reference to the individual needs of partial students taking Course J. Exercises under personal direction and criticism. Two hours. *Tuesday, 9 to 11.*

Mr. MILLARD :—

- 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.*) *Monday, at 11; Thursday, 11 to 1.*
- A. 3. ELEMENTS OF ARCHITECTURE.—Typical Greek, Roman and Gothic Moldings. Architectural features rendered in India ink. Freshmen in Architecture. Three hours. (*First Term.*) *Tuesday, at 3; Wednesday, 9 to 11.*
- A. 4. ELEMENTARY DESIGN.—Drawing and rendering simple projects from dictation and blackboard. A continuation of A. 3. Freshmen in Architecture. Three hours. (*Second Term.*) *Tuesday, at 3; Wednesday, 9 to 11.*
- A. 5. PERSPECTIVE.—Principles and practical exercises. (A. 5 follows directly on A. 2.) Freshmen and First-year Specials in Architecture, and First-year Class in Interior Decoration. Three hours. (*Second Term.*) *Monday, at 11; Thursday, 11 to 1.*
- B. 2. SHADES AND SHADOWS.—Lectures on theory and practical exercises. Sophomores and First-year Specials in Architecture. Three hours. (*First Term.*) *Tuesday, 2 to 4; Friday, at 9.*
- B. 3. WORKING DRAWINGS.—Making of architects' working drawings; plans, sections, elevations and details. Drawn from notes and dictations and under personal direction. Sophomores in Architecture. Three hours. (*First Term.*) Two hours. (*Second Term.*) *Monday, at 12; Thursday, 11 to 1.*

- C. 11. LECTURE DRAWING.— Exercises in drawing and tracing to accompany lectures on the History of Architecture. Tracings blue-printed to form a continuous illustration of the history of Architecture. Sophomores and Juniors (and Seniors 1892-93.) One hour. *Friday, at 9.*
- C. 13. MECHANICS OF MATERIALS.— Principles of Mechanics and their practical application in the use of building materials. Juniors and First-year Specials. Two hours. *Monday, at 12; Wednesday, at 12.*
- I. 2. MECHANICAL DRAWING.— Geometrical problems in pencil; geometrical drawing in ink, projections, developments, intersections and isometric drawing. Text book, Faunce's *Mechanical Drawing*. Freshmen in Towne Scientific School. Two hours. *Sec. I., Monday, 2 to 4; Sec. II., Thursday, 2 to 4.*
- I. 4. MECHANICAL DRAWING.— Shades and shadows, brush work, machine drawing. Text book. Faunce's *Mechanical Drawing*. Sophomores in Towne Scientific School. Two hours. *Sec. I., Monday, 2 to 4; Sec. II., Wednesday, 2 to 4.*

Mr. EVERETT:—

- 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. Four hours. *Wednesday, 2 to 4; Thursday, 3 to 5.*
- B. 1. FREEHAND DRAWING.— Drawing from casts of architectural ornament in charcoal and pencil. Sophomores in Architecture. Four hours. *Tuesday, 10 to 12; Thursday, 2 to 4.*
- 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. Five hours. (*First and Second terms.*) First-year Specials in Architecture. Six hours. *Juniors, Monday, 9 to 12; Wednesday, 9 to 11. Special Students, Monday, 9 to 12; Wednesday, 9 to 11.*
- 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.*) *Friday, 2 to 5.*
- C. 12. HISTORY OF ORNAMENT.— Lectures on the historical development of ornamental forms. Juniors, First-year Specials in Architecture and First-year class in Interior Decoration. One hour. (*Part of First and Second Terms.*) *Tuesday, at 11.*
- 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 Science and 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. *Monday, 9 to 12; Wednesday, 9 to 11; Thursday, 2 to 4.*



- 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.*) *Friday, 2 to 5.*
- 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 Decoration. First-year Students in Interior Decoration. Four hours. *Monday and Wednesday, 2 to 4.*
- G. 2. BRUSH DRAWING.—Drawing in outline, with the brush, of decorative patterns and designs. First-year Students in Interior Decoration. One hour. (*Part of First Year.*) *Friday, at 11.*
- G. 3. 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 Decoration. Three hours. (*Part of First and Second Terms.*) *Friday, 2 to 5.*
- 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 Decoration. One hour. *Monday, at 12.*
- 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 Decoration. 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 Decoration. Four hours. *Monday and Wednesday, 2 to 4.*
- 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 Decoration. Three hours. (*Part of First and Second Terms.*) *Monday, 9 to 12.*
- H. 3. THEORY OF DESIGN.—Lectures on the principles of the design and composition of interior decorations, with application to Second-year problems. Second-year Students in Interior Decoration. One hour. *Wednesday, at 12.*
- H. 4. 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 Decoration. Eight hours. *Hours as assigned.*

- I. 1. FREEHAND DRAWING.—Drawing elementary forms in outline from the flat. Text book, Prang's *Nos. 1, 2 and 3*. Freshmen in Towne Scientific School. One hour. *Sec. I., Monday, at 11; Sec. II., Thursday, at 11.*
- I. 3. FREEHAND DRAWING.—Drawing ornamental forms in outline in pencil from the flat. Text book, Prang's *Nos. 4, 5 and 6*. Sophomores in Towne Scientific School. One hour. *Sec. I., Monday, at 4; Sec. II., Wednesday, at 4.*
- I. 5. FREEHAND DRAWING.—(a) Drawing elementary forms in outline from the flat in pencil. Text book, Prang's *Nos. 1, 2, 3, 4, 5 and 6*. (b) Drawing Biological Specimens from the object in pencil. Freshmen in Biology. Three hours. *Wednesday, 11 to 1.*
- J. 1. FREEHAND DRAWING.—Drawing in pencil and charcoal from the flat, the round and the cast. Adapted to the individual requirements of Partial Students taking Course J, with a view to giving a general training in freehand drawing. Four hours. *Monday and Wednesday, 2 to 4.*

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. Three hours. (*Major part of First and Second Terms.*) *Thursday, 2 to 5.*
- J. 2. MODELING.—Modeling in clay in conventionalized plant forms, and the human figure from the cast and the flat. Course arranged with reference to individual needs of Partial Students taking Course J. Three Hours. (*Major part of First and Second Terms.*) *Thursday, 2 to 5.*

Professor ROTHROCK :—

- G. 6. Plant form applied to decorative art. Lectures. First-year Class in Interior Decoration. One hour. (*Part of Second Term.*) *As assigned.*

Dr. JAYNE :—

- H. 5. ARTISTIC ANATOMY.—Lectures. Second-year Class in Interior Decoration. One hour. (*Part of Second Term.*) *As assigned.*

Mr. DAY :—

- C. 10. (b.) HISTORY OF GREEK AND ROMAN ARCHITECTURE.\*—Lectures illustrated by stereopticon views. Text book, T. Roger Smith's *Architecture; Classic and Early Christian*. Sophomores, Juniors, Seniors and Special Students in Architecture. One hour. (*Part of one term in alternate Years.*) *Friday, 4.30 to 5.30.*
- C. 10. (e.) HISTORY OF RENAISSANCE ARCHITECTURE.†—Lectures illustrated by stereopticon views. Text book, T. Roger Smith's *Architecture; Gothic and Renaissance*. Sophomores, Juniors, Seniors and Special Students in Architecture. One hour. (*Part of one term in alternate Years.*) *Friday, 4.30 to 5.30.*

\* Assigned to Mr. Day for 1891-92.

† Assigned to Mr. Day for 1892-93.



Mr. COPE :\*—

- C. 10. (d.) HISTORY OF GOTHIC ARCHITECTURE.—Lectures illustrated by stereopticon views. Text book, T. Roger Smith's *Architecture; Gothic and Renaissance*. Sophomores, Juniors, Seniors and Special Students in Architecture. One hour. (*Part of one term in alternate Years.*) *Friday, 4.30 to 5.30.*

Mr. MASON : \*—

- C. 10. (c.) HISTORY OF EARLY CHRISTIAN, ROMANESQUE AND BYZANTINE ARCHITECTURE.—Lectures illustrated by stereopticon views. Text book, T. Roger Smith's *Architecture; Classic and Early Christian*. Sophomores, Juniors, Seniors and Second-year Specials in Architecture. One hour. (*Part of one term in alternate Years.*) *Friday, 4.30 to 5.30.*

Mr. STEWARDSON :—

- C. 12. HISTORY OF ORNAMENT.†—Lectures on the historical development of historical forms; illustrated by stereopticon views. Recitations. Prescribed in 1891-92 for Juniors and Seniors in Architecture. Two hours. (*Part of one Term.*) *Thursday, at 9.*

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.*) *Thursday, at 9.*

#### CIVIL ENGINEERING.

Mr. WORTHINGTON :—

1. PROJECTIONS.—Elementary plane problems. Orthographic projections in one quadrant. Isometric and oblique projections. Elementary problems in shades and shadows and linear perspective. Course 1 is prescribed for Freshmen in the four-year course. Two hours. (*First Term.*)
2. DESCRIPTIVE GEOMETRY.—Problems of the point, line and plane; single-curved, double-curved and warped surfaces; intersections, tangencies and developments. Course 2 is prescribed for Sophomores in Science, and Sophomores in the four-year course. Two hours. (*First Term.*)
3. 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 3 is prescribed for Sophomores in Science, and for Sophomores in the four-year course. Two hours. (*Second Term.*)
4. STEREOTOMY. — Stone cutting. Determination of the forms and sizes of stones in the construction of groined, trumpet and cloistered

\* Appointed to deliver this course in 1891-92.

† Assigned to Mr. Stewardson prior to appointment of Mr. Everett, whose courses see.

- arches, compound and conoidal wing-walls, arched gateways, etc. Construction of templets and use of directing instruments. Theory and preparation of models. Course 4 is prescribed for Post-Seniors in Civil Engineering and for Juniors in the four-year course. One hour. (*First Term.*)
6. SURVEYING.—Theory and field practice in the use and adjustment of the transit and level. Course 6 is prescribed for Juniors in Architecture. Three hours. (*First Term.*)
  15. PEN TOPOGRAPHY.—Conventional signs. Elementary exercises. Course 15 is prescribed for Juniors in Civil Engineering (*First Term.*), and for Freshmen in the four-year course (*Second Term.*) Two hours. (*One Term.*)
  16. COLORED TOPOGRAPHY.—Conventional methods of representation and general exercises. Course 16 is prescribed for Sophomores in the four-year course. Two hours. (*First Term.*)
  17. TOPOGRAPHICAL DRAWING.—Map drawing, based on survey of previous year. Course 17 is prescribed for Seniors in Civil Engineering and for Sophomores in the four-year course. Two hours. (*First Term.*)
  19. MECHANICAL DRAWING. — Drafting instruments and operations, lettering, graphic constructions relating to plane problems and elementary projections; dot, line and brush shading, coloring, graining, representation of earthwork and masonry. Course 19 is prescribed for Freshmen in the four-year course. Four hours.
  20. MECHANICAL DRAWING.—Graphic construction of problems relating to shades and shadows and perspective. Course 20 is prescribed for Sophomores in the four-year course. Two hours. (*Second Term.*)
  21. MECHANICAL DRAWING.—Graphic construction of arches, gateways, wing-walls, etc. Course 21 is prescribed for Post-Seniors in Civil Engineering and for Juniors in the four-year course. Two hours. (*First Term.*)

Mr. WEBB :—

5. SURVEYING.—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 U. S. Government land surveys. Course 5 is prescribed for Juniors in Civil Engineering and for Freshmen in the four-year course. One hour.
7. SURVEYING. — Theory of hydrographical, mining and city surveying. Course 7 is prescribed for Seniors in Civil Engineering, and for Sophomores in the four-year course. One hour. (*First Term.*)
8. SURVEYING.—Theory relating to railroad surveying. Simple, compound and transition curves; turnouts, etc. Course 8 is prescribed for Juniors in Civil Engineering and for Sophomores in the four-year course. Three hours. (*Second Term.*)



9. GEODESY.—Figure of the earth. Method of least squares; adjustment and weight of observations; theory of probable error; computations relating to triangulations. Course 9 is prescribed for Post-Seniors in Civil Engineering and for Seniors in the four-year course. Four hours. (*First Term.*)
10. SURVEYING.—Field practice in land, topographical and plane table surveying. Course 10 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.
11. SURVEYING.—Field practice in city, topographical and hydrographical surveying. Course 11 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.
12. SURVEYING.—Field practice in staking out simple, compound and transition curves. Course 12 is prescribed for Juniors in Civil Engineering, and for Sophomores in the four-year course. Two hours. (*Second Term.*)
13. RAILROAD LOCATION.—Field practice in laying out a short line of railroad, including reconnoissance, preliminary survey, location, determination of grades, cross-sectioning, setting of slope stakes, etc. Course 13 is prescribed for Seniors in Civil Engineering and for Juniors in the four-year course. Equivalent of four hours per week. (*First Term.*)
14. GEODETIC OPERATIONS.—Field practice in precise triangulation in connection with secondary geodetic work. Use of instruments, base-line measurements, etc. Course 14 is prescribed for Post-Seniors in Civil Engineering and for Seniors in the four-year course. At hours to be assigned. (*First Term.*)
18. MAP DRAWING.—Map of hydrographical survey; map of city survey. Course 18 is prescribed for Seniors in Civil Engineering and for Sophomores in the four-year course. One hour.
22. RAILROAD OFFICE WORK, based on the data of survey during the preceding term; drawing of final map and profile; amount, haul and cost of earth work; estimates of masonry; designs of culverts; detail drawings. Course 22 is prescribed for Seniors in Civil Engineering and for Juniors in the four-year course. Three hours. (*Second Term.*)
35. 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 latest methods of railway management. Course 35 is prescribed for Post-Seniors in Civil Engineering and for Seniors in the four-year course. Four hours. (*Second Term.*)

Acting Professor MARBURG:—

23. MECHANICS OF MATERIALS.—The resistance and elasticity of materials. Theory of flexure. Stresses in simple and continuous

- beams and long columns. Determination of moments of inertia and radii of gyration. Analysis of combined stresses. Effect of suddenly applied and oft-repeated loading. Torsional stresses. Designing of riveted joints. Course 23 is prescribed for Juniors in Civil Engineering and for Juniors in the four-year course. Two hours.
24. 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 24 is prescribed for Seniors in Civil Engineering and for Juniors in the four-year course. One hour. (*Second Term*).
  25. MATERIALS OF CONSTRUCTION.—Manufacture and physical characteristics of Iron and Steel. Strength, elasticity and resilience and conditions by which these properties are affected. Crystallization and granulation. Inspection and specifications. Properties of timber, and methods of preservation. Course 25 is prescribed for Post-Seniors in Civil Engineering and for Seniors in the four-year course. Two hours.
  26. 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 26 is prescribed for Juniors in Civil Engineering and Architecture and for Seniors in the four-year course. Two hours. (*Second Term*).
  27. 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 27 is prescribed for Seniors in Civil Engineering, and for Seniors in the four-year course. Four hours. (*Second Term*.)
  28. SUSPENSION, CANTILEVER AND SWING BRIDGES.—Determination of stresses in bridges of these types by analytical methods. Course 28 is prescribed for Post-Seniors in Civil Engineering, and for Seniors in the four-year course. One hour. (*First Term*.)
  29. BRIDGE DESIGNING.—Complete design of a plate girder bridge. Computations and detail drawings. Course 29 is prescribed for Seniors in Civil Engineering, and for Juniors in the four-year course. Two hours. (*Second Term*.)
  30. BRIDGE DESIGNING.—Complete design of a railway bridge. Pratt truss. Computations and detail drawings. Course 30 is prescribed for Post-Seniors in Civil Engineering, and for Seniors in the four-year course. Four hours.
  31. HYDROMECHANICS, embracing hydrostatics and hydraulics.—Pressure and energy of fluids. Determination of centre of pressure flow by orifices, tubes and weirs. Flow in pipes, conduits, canals, and natural streams. Current meters. Hydraulic motors and relative merits of standard types. Measurement and cost of water power. Course 31 is prescribed for Seniors in Civil Engineering, and for Juniors in the four-year course. Four hours. (*First Term*.)



32. SANITARY ENGINEERING SYSTEMS.—Sewers and Drains. Methods of preparing sewerage plans. Foundations, construction and ventilation. House drainage. Disposal of sewage. Course 32 is prescribed for Seniors in Civil Engineering, and for Juniors in the four-year course. One hour. (*Second Term.*)
33. FOUNDATIONS, DAMS, PIERS AND ABUTMENTS.—Ordinary foundations, pile and I beam foundations, subaqueous foundations. Theory of masonry dams and retaining walls, bridge piers and abutments. Course 33 is prescribed for Post-Seniors in Civil Engineering and for Seniors in the four-year course. Two hours. (*First Term.*)
34. STONE ARCHES AND CULVERTS.—Theory and methods of construction. Course 34 is prescribed for Post-Seniors in Civil Engineering and for Seniors in the four-year course. One hour. (*Second Term.*)
36. ENGINEERING SPECIFICATIONS.—Study of selected specifications relating to iron and steel, masonry, bridge construction, etc. Course 36 is prescribed for Post-Seniors in Civil Engineering and for Seniors in the four-year course. One hour. (*Second Term.*)
37. SPECIAL LECTURES.—Lectures on River and Harbor Improvements, Municipal Engineering, Water Supply, Materials of Engineering, etc. Course 37 is prescribed for Post-Seniors in Civil Engineering and for Seniors in the four-year course. At hours to be assigned. (*Second Term.*)
38. INSPECTION TOURS. — Visits to engineering works and manufacturing establishments. Course 38 is prescribed for Post-Seniors in Civil Engineering, and for Seniors in the four-year course. At hours to be assigned.
39. THESIS.—Thesis on professional subject. Required of the Post-Seniors in Civil Engineering, and of the Seniors in the four-year course.

#### 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, 4, 5, 10 and 14, or 2, 4, 6, 9, 11 and 15, Physics 1, and the equivalent of Mechanical Engineering 4.

Professor SPANGLER :—

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. Two hours. *Monday, at 12; Wednesday, at 11.*

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 must be preceded by 1 and 2. Two hours. *Monday and Tuesday, at 10.*
7. KINEMATICS.—Laws of motion. Combinations of pure mechanism. Pulleys and belts. Trains of gearing and forms of teeth of wheels. Link work. Required for Post-Seniors in Mechanical Engineering. MacCord's *Kinematics*. Two hours. *Tuesday, at 12; Thursday, at 11.*
16. MARINE ENGINEERING AND NAVAL ARCHITECTURE.—Naval Architecture. Sennett's *Marine Engines*. Course 16 is required for Post-Seniors in Mechanical Engineering, and voluntary for others having the necessary preparation. One hour. *Thursday, at 10.*
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 plant, arrangement of power, tools, etc., in shops, descriptions of particular machines and processes. Course 18 is prescribed for Post-Seniors in Mechanical Engineering. Sixteen weeks, one visit per week. *Fridays.*
19. SPECIFICATIONS.—Methods of drawing specifications and contracts for engines, boilers, foundations, etc. Making estimates as to cost, weight, etc. Course 19 is prescribed for Post-Seniors in Mechanical Engineering. One hour. (*Second Term.*)
23. STEAM ENGINES AND BOILERS.—Short Course. For students in Civil Engineering only. Two hours.

Professor SPANGLER and Mr. HUFFINGTON :—

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 slide-valve. Prescribed for Juniors and Sophomores in Four-year Course in Mechanical Engineering. Two hours. (*Second Term.*)
22. GRAPHICAL STATICS.—Principles of graphical statics, and their application to bridges, cranes, and other framed structures. Prescribed for Juniors and Sophomores in Mechanical Engineering. Two hours. *Tuesdays and Thursdays, at 9.*

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. Course 17 is prescribed for Post-Seniors in Mechanical Engineering. Two hours, and one afternoon. (*When visits to manufacturing establishments are discontinued.*) *Wednesday and Friday, 9 to 11.*
- 4 b. DESCRIPTIVE GEOMETRY.—Principle and application to mechanical drawing. Course 4 b is prescribed for Freshmen in the Four-year Course. One hour. *Monday, at 12 and 2.*



## Mr. SCHRAMM :—

11. ELECTRICITY.—Measurements and discussion of electrical quantities, and their application to the construction and use of galvanometers, batteries and accumulators, etc. Jenkins' *Electricity and Magnetism*. Ayrton's *Practical Electricity*. One hour. *Wednesday, at 10.*
20. 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*. Salomon's *Accumulations*. This Course is prescribed for Post-Seniors in Mechanical Engineering, and must be preceded by Course 10. Two hours.
21. ELECTRODYNAMICS.—Laboratory work. Wiring, testing dynamos, motors and storage batteries, calorimetry, measurement of currents, insulation, etc. Course 21 is prescribed for Post-Seniors in Mechanical Engineering. Six hours. *Monday and Wednesday, from 2 to 5.*

## Mr. SCHRAMM and Mr. HUFFINGTON :—

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.) Course 5 is prescribed for Juniors and for Freshmen in the Four-year Course, and covers elementary work in the details of engines and boilers. Two hours.

## Mr. GRIFFITH and Mr. MORRIS :—

12. SHOP WORK.—Manual training in wood and iron work. Course 12 is prescribed for Juniors in Mechanical Engineering. Nine hours. *Tuesday and Friday, 2 to 5; Saturday, 9 to 12.*
- 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. *Wednesday, 9 to 12.*
- 12 b. SHOP WORK.—Continuation of 12 a. Prescribed for Sophomores in the Four-year Course. Three hours. *Monday, 10 to 1.*
13. SHOP WORK.—Making patterns from working drawings, finishing castings, and making, finishing and fitting parts of machinery. Pipe-fitting. Course 13 is prescribed for Seniors in Mechanical Engineering, and must be preceded by Course 12. Nine hours.

## Mr. HUFFINGTON :—

1. STATICS.—Application of the principles of statics to rigid bodies. Elasticity and strength of materials. Forms of uniform strength. 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. Course 1 is prescribed for Juniors in Mechanical Engineering. 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*). *Monday, at 12; Thursday, at 11.*

- 7 a. KINEMATICS.—Elementary Combinations. Pulleys and belts, link work, gearing, etc. Prescribed for Freshmen in the Four-year Course. Three hours. (*Second Term.*)
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.) Course 8 is prescribed for Seniors in Mechanical Engineering, and must be preceded by 1, first part of 2, 4, 5 and 6. Two hours. *Tuesday and Friday, at 11.*
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. Thurston's *Manual of Steam Boilers*. 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 is prescribed for Seniors in Mechanical Engineering, and must be preceded by 1, 4, 5, 6, and first part of 2. Two hours. *Monday, at 11; Friday, at 10.*

Mr. PICOLET :—

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. Course 4 is prescribed for Juniors 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. *Monday, 2 to 5.*
- 4 a. SKETCHING AND DRAWING.—Making working sketches, finished drawings, tracings and blue prints for the tools and machines in the laboratories. Course 4 a is prescribed for Seniors in Mechanical Engineering, and must be preceded by Course 4. Two hours. *Tuesday, 2 to 5.*
- 4 c.—DRAWING.—Geometric drawing. Description geometry problems, and elementary mechanical drawing. Use of instruments. Prescribed for Freshmen in Four-year Course in Mechanical Engineering. Three hours.

MUSIC.

Professor CLARKE :—

- I. 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 I



- includes all that is embraced in the study of harmony or thorough-bass. Two hours. *Monday, at 1; Thursday, at 3.*
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. *Monday and Thursday, at 2.*
  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. *Monday, at 4; Thursday, at 4.*

## COURSES OF STUDY.

The College Faculty conducts the following Courses of Study :

- I. The Course in Arts.
- II. The General Course in Science.
- III. The Course in Mechanical Engineering.
- IV. The Course in Electrical Engineering.
- V. The Course in Civil Engineering.
- VI. The Course in Chemistry.
- VII. The Course in Chemical Engineering.
- VIII. The Course in Architecture.
- IX. The Course in Natural History.
- X. The Course in Finance and Economy.
- XI. The Course in American History.
- XII. The Course in Biology Preparatory to Medicine.
- XIII. The Course in Music.

### THE COURSE IN ARTS.

In the Freshman and Sophomore years of the Course in Arts, the studies are all prescribed, and embrace English, Greek, Latin, History, Mathematics, Physics and Hygiene. In the Junior and Senior years, English, Philosophy, Social Science, Chemistry and Astronomy only are required, and the student is permitted, under certain restrictions, to choose the other studies of his course from a wide range of elective subjects. Students in full standing, who have taken the Freshman and Sophomore years in Arts, may enter at the beginning of Junior year the course in Finance and Economy, the course in American History, the course in Natural History, or the course Preparatory to Medicine, and still remain candidates for the degree of Bachelor of Arts. Students who are permitted to change at the beginning of Sophomore year from the Arts course to the course in Natural History become candidates for 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 COURSES IN SCIENCE AND TECHNOLOGY.

#### (a) THE GENERAL COURSE IN SCIENCE.

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 which 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, in Natural 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 who desire to continue their literary and historical studies are permitted to enter the Arts course 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, except that in Sophomore year; students who do not propose to enter the technical scientific courses are permitted to substitute History, Pure Mathematics or Biology for Descriptive Geometry and Drawing. 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.

(b) TECHNICAL COURSES OF FOUR YEARS.

These courses lead to the degrees of Bachelor of Science in Mechanical Engineering, in Electrical Engineering, in Civil Engineering, in Chemical Engineering and in Chemistry, 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 COURSE 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, History, Mathematics, Chemistry, Physics, Geology 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 Decoration 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 Decoration. An examination in drawing is required for admission.

#### THE COURSE IN NATURAL HISTORY.

The course in Natural History covers four years and leads to the degree of Bachelor of Science. It is planned more especially for those who desire to devote a large share of their time in college to studies in Biology and the related sciences with a view to becoming teachers, or as a preparation for more extended graduate study. To enable young men, whose preparation has not been in the line of the usual college requirements for entrance, to take advantage of this course, a special group of elective requirements has been offered, which embraces the subjects effectively taught in the best high schools of the country. In this course, after the Freshman year, few of the studies are prescribed, but the student is required, at the beginning of the Sophomore year, to submit to the Faculty for approval a carefully considered plan for his entire course. If approved, this plan may be changed only by special permission.



If the student elects his studies according to the requirements of the Medical Faculty as set forth on a later page under that department, and passes the examination and receives the Bachelor's Degree, he will be admitted to the Second year of the 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.

#### 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, Science or Natural History, or to other candidates for a degree who have had equivalent training elsewhere. Special students, not candidates for a degree, are also admitted.

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 Freshman and Sophomore years. Students from other institutions who are 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 Archæology, 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. Baccalaureate graduates of this course will be admitted to the second year of the required Four-year course in Medicine. Special students are admitted to this course.

#### SPECIAL AND PARTIAL COURSES.

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

In the Course in Arts, 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 instruction 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 presenting 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.

In the Wharton School, special students, properly qualified, are admitted to the work in any subject or subjects taught in the School.

PARTIAL COURSES, also, may be taken, consisting of such groups of studies (not constituting special courses) as the Faculty may sanction; but admission to a partial course is to be considered an exceptional 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 46 to 84 inclusive.

#### THE COURSE IN MUSIC.

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

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 46 to 84.



## ADMISSION TO COLLEGE.

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

Blank certificates are issued every year to such principals of recognized preparatory schools as may be named for the privilege. The Faculty reserves the right, however, to withdraw from any school the privilege of sending pupils into college on certificate.

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 will be held on June 14 and 15, 1893, in Washington, D. C.; in Cleveland, Ohio, and in a number of other centres 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 Freshman Class. These will be found in detail under the head of Prizes.

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, announced at the time of the examination, and taken this year from Addison's *Sir Roger de Coverley Papers*. The required reading for the year is as follows: Scott's *Kenilworth*, Goldsmith's *Vicar of Wakefield*, Shakespeare's *Twelfth Night*, and Addison's *Sir Roger de Coverley Papers*, all of which, or equivalents for the first three, must have been read by the candidate.
- In 1894 the books to be read by each candidate will be 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*.

For 1895 : Shakespeare's *Merchant of Venice* and *Twelfth Night*, Milton's *L'Allegro, Il Penseroso, Comus*, and *Lycidas*, Longfellow's *Evangeline*, the *Sir Roger de Coverley Papers* in the *Spectator*, Macaulay's *Essays on Milton and Addison*, Webster's first *Bunker Hill Oration*, Irving's *Sketch Book*, Scott's *Abbot*.

For 1896 : Shakespeare's *Merchant of Venice* and *Midsummer Night's Dream*, Milton's *L'Allegro, Il Penseroso, Comus* and *Lycidas*, Longfellow's *Evangeline*, Macaulay's *Essay on Milton*, Webster's first *Bunker Hill Oration*, DeFoe's *History of the Plague in London*, Irving's *Tales of a Traveller*, Scott's *Woodstock*, George Eliot's *Silas Marner*.

#### HISTORY.

- A.—History of the United States. (Scudder or Johnson is suggested.)
- B.—Ancient History (Freeman's *General Sketch of History*, Chapters I.—VI., is suggested).

#### 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 SEVERAL COURSES.

##### FOR THE COURSE IN ARTS.

#### 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 *Gaulic War*).
- D.—Virgil (first six books of the *Æneid*, with the scanning).
- F.—Cicero (Six Orations, including the four against Catiline).



## FOR THE COURSE IN SCIENCE.

## 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).  
 C.—Cæsar (four books of the *Gallic War*).  
 E.—Virgil (first three books of the *Æneid* 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*).  
 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.*

## FOR THE COURSE IN CHEMISTRY.

FRENCH A and B, or German A and B (as above).

## 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.—Elementary Physics, as in Stewart, Avery or Gage.

FRENCH A and B, or German A and B.

## FOR THE COURSE IN ARCHITECTURE.

FRENCH.—A and B (as above).

Candidates must show ability to sketch some ordinary object in a satisfactory manner. They must also produce drawings indicating familiarity with the use of mathematical instruments.

## FOR THE COURSE IN NATURAL HISTORY.

Candidates for the Freshman Class of the course in Natural History may pass in the subjects required for either the course in Arts or that in Science, or they may present, in addition to the English, History and Mathematics required of all candidates, the following subjects:—

ENGLISH.—C.—Rhetoric (as in McElroy's *Structure of English Prose*). English readings and compositions, exercises in reading and speaking.

*This subject is the equivalent of the English 1 of the College course, prescribed for all Freshmen, and must represent at least a year's study in addition to English A and B.*

PHYSICAL GEOGRAPHY.

*Any four of the following ten studies :*

1. LATIN.—A, B, C, and E (as for Science).
2. HISTORY.—C.—English History.
3. MATHEMATICS.—The equivalent of the work done by the Freshmen in either Arts or Science.
4. ASTRONOMY.—(As in Lockyer's *Elementary Lessons*.) A knowledge of the principal constellations will be required.
5. PHYSICS.—(As in Avery's *Elements of Natural Philosophy* or Gage's *Elements of Physics*.)
6. GEOLOGY.—Candidates who offer Geology must show a satisfactory field knowledge of the formations found in the locality of their previous residence. They must be able to identify the rocks occurring at such locality from specimens shown them, and recognize the fossil animal forms of such as are found in the rocks, and to give their general zoölogical characters.
7. CHEMISTRY.—(As in Sheppard's *General Chemistry* or Remsen's *Elementary Chemistry*.)
8. PHYSIOLOGY.—(As in Martin's *Human Body*.)
9. BOTANY.—Bessey's *Briefer Course in Botany* covers the amount required.
10. ZOÖLOGY.—Claus and Sedgwick's *Zoölogy* is suggested.

*FOR THE COURSES IN FINANCE AND ECONOMY, AND AMERICAN HISTORY.*

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, Science, or Natural History courses.

Graduates of the Four Year course in the Central High School of Philadelphia are admitted to full standing in these courses without examination.

ADMISSION TO SPECIAL AND PARTIAL COURSES.

The requirements for admission to special and partial courses are given on pages 88-89.

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 may be examined in Latin C and D, and those for the course in Science 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 COURSE IN ARTS.

## FRESHMAN CLASS.

- ENGLISH 1.\*—Rhetoric. *Two hours.* Mr. PENNIMAN.  
 GREEK 4.—*Three hours.* Professor LAMBERTON and Mr. BURKE.  
 LATIN 1.—*Four hours.* Professor JACKSON.  
 EUROPEAN HISTORY 1.—English History. *Two hours (First Term).*  
 Assistant Professor CHEYNEY.  
 AMERICAN HISTORY 7.—Government in the United States. *Two hours (Second Term).* Professor THORPE.  
 MATHEMATICS 1.—Algebra. *Two hours.* Assistant Professor FISHER.  
 MATHEMATICS 3.—Solid Geometry. *Three hours (First Part of Term).* Professor KENDALL.  
 MATHEMATICS 5.—Trigonometry. *Three hours (Second Part of First Term and Second Term).* Professor KENDALL.  
 PHYSICAL EDUCATION.—Hygiene. Lectures, examinations and work in gymnasium. *Three hours.* Dr. FARIES.

## SOPHOMORE CLASS.

- ENGLISH 2.—Weekly Compositions read and discussed in small sections of the class at hours appointed by the instructor. 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.  
 ENGLISH LITERATURE 2.—Lectures on Modern Novelists. Themes. *Two hours (Second Term).* Professor SCHELLING and Mr. PENNIMAN.  
 GREEK 2.—*Three hours.* Professor LAMBERTON and Mr. BURKE.  
 LATIN 3.—*Four hours.* Professor JACKSON.  
 EUROPEAN HISTORY 5.—French Revolution. *Three hours (First Term).* Associate Professor ROBINSON.  
 EUROPEAN HISTORY 6.—Europe since 1815. *Three hours (Second Term).* Associate Professor ROBINSON.  
 MATHEMATICS 10.—Analytic Geometry. *Three hours.* Professor KENDALL.  
 PHYSICS 1.—Elementary Physics. *Two hours.* Assistant Professor GOODSPEED.  
 PHYSICAL EDUCATION.—Examinations and exercises in gymnasium. Dr. FARIES.

## JUNIOR CLASS.

## REQUIRED STUDIES,—

- ENGLISH 3.—Weekly exercises in popular and literary subjects. *One hour.* Mr. SMITH.

\* For more complete description of this study and the other studies named below, see pp. 46-84.



- ENGLISH LITERATURE 3.—Lectures on the Period of French Influence. (Waller to Cowper). *Two hours (First Term)*. Professor SCHELLING.
- ENGLISH LITERATURE 7.—Lectures on the Age of Elizabeth, exclusive of the Drama. *Two hours (Second Term)*. Professor SCHELLING.
- ENGLISH LITERATURE 4.—Seminary. Discussion and Criticism of papers prepared on subjects selected from authors treated in lectures of courses 7 and 4. *Two hours*. Professor SCHELLING.  
(Hereafter required of candidates for honors in English.)
- PHILOSOPHY 1.—Logic. *Two hours (First Term)*. Professor FULLERTON.
- PHILOSOPHY 2.—Ethics. *Two hours (Second Term)*. Professor FULLERTON.
- MATHEMATICS 19.—Astronomy. *Two hours*. Professor KENDALL.
- CHEMISTRY 1.—General Inorganic Chemistry. *Three hours*. Professor SMITH, Dr. FRANKEL and Dr. OHLY.
- ELECTIVE STUDIES.—

Of group A each Junior must take at least two studies, and of group B at least one, making his total number of hours per week, including required work, not less than fifteen nor, unless the consent of the Dean has first been had, more than eighteen.

## A.

- GREEK 3.—*Three hours*. Professor LAMBERTON.
- LATIN 5.—*Three hours*. Professor JACKSON.
- HEBREW 1.—*Two hours*. Professor JASTROW.
- SANSKRIT 1.—*Two hours*. Professor EASTON.
- ANGLO-SAXON 1.—*Two hours*. Professor EASTON.
- GERMAN 3.—*Three hours*. Professor SEIDENSTICKER.
- FRENCH 1.—*Three hours*. Professor EASTON.
- ITALIAN 1.—*Two hours*. Assistant Professor RENNERT.

## B.

- ENGLISH LITERATURE 13.—English Prose Authors. Readings from Cowley to Johnson, with reference to English prose style. *Two hours*. Professor SCHELLING.
- ENGLISH 9.—Declamation. Debating and Original Speaking, extemporaneous and prepared. Mr. SMITH.
- ENGLISH 10.—English Philology. Lectures on Old and Early English, with practical exercises. *Two hours*. Professor EASTON.
- EUROPEAN HISTORY 4.—Mediæval History of Europe. *Two hours*. Assistant Professor CHEYNEY.
- MATHEMATICS 12.—Analytic Geometry of Three Dimensions. *One hour*. Assistant Professor CRAWLEY.

MATHEMATICS 13.—Advanced Analytic Geometry of Two and Three Dimensions (Salmon). *Two hours.* Assistant Professor FISHER.

(Omitted in 1892-93.)

MATHEMATICS 17.—Advanced Differential Calculus. *Two hours.* Assistant Professor FISHER.

(Omitted in 1892-93.)

MATHEMATICS 20.—Quaternions. First Course. Lectures. For Faculty Prize to members of the Junior Class. *One hour.* Assistant Professor FISHER.

MATHEMATICS 21.—Determinants. (Lectures.) *One hour.* Assistant Professor CRAWLEY.

MATHEMATICS 22.—Theory of Equations. (Burnside and Panton.) *Two hours.* Assistant Professor FISHER.

MATHEMATICS 24.—Projective Geometry. (Cremona.) *Two hours.* Assistant Professor FISHER.

MATHEMATICS 25.—Seminar. *One hour.* Assistant Professor FISHER.

PHYSICS 3.—Mass-Physics. *Two hours (First Term).* Assistant Professor GOODSPEED.

PHYSICS 4.—Energy and Sound. *Two hours (Second Term).* Assistant Professor GOODSPEED.

CHEMISTRY 2.—Analytical Chemistry. Laboratory practice and recitations in Qualitative Analysis. Making of Inorganic Preparations. *The Laboratory is open every day from 9 until 5, except on Saturday afternoon.* Professor SMITH and Dr. KEITH.

CHEMISTRY 3.—Organic Chemistry. Lectures. *Two hours.* Professor SMITH.

MINERALOGY 1.—Crystallography. Native elements and Sulphides. *Two hours.* Mr. BROWN.

GEOLOGY 5.—Principles of Geology. Outline of Vertebrate Palæontology. *Two hours.* Professor COPE.

BIOLOGY 1.—General Biology. *Six hours.* Professor MACFARLANE.

BIOLOGY 2.—Zoölogy. Lectures. *One hour.* Mr. MOORE.

BIOLOGY 8.—Mammalian Anatomy. *Six hours.* Professor JAYNE.

BIOLOGY 14.—General Structural Botany. *Six hours (First Term).* Professor WILSON.

BIOLOGY 15.—Systematic Study of the Phænogams. *Six hours (Second Term).* Professor MACFARLANE.

PSYCHOLOGY 3.—Experimental Psychology. Lectures with Laboratory work. *Two or three hours.* Dr. WITMER.

#### SENIOR CLASS.

REQUIRED STUDIES,—

ENGLISH 4.—Rhetoric. Four formal essays during the year, as in Junior year.

English 6 of the elective studies may be substituted for this course.



- ENGLISH LITERATURE 10.—Lectures on the Principles of English Versification. (Half course.) *Two hours (First Term)*. Professor SCHELLING.
- ENGLISH LITERATURE 14.—Lectures on the English Drama. *Two hours*. Professor SCHELLING.
- ENGLISH LITERATURE 8.—Lectures on Modern and Contemporary Poets. *Two hours (Second Term)*. Professor SCHELLING.
- ENGLISH LITERATURE 9.—Seminary. *Once in two weeks*. Professor SCHELLING.
- PHILOSOPHY 3.—History of Philosophy. *Two hours (First Term)*. Professor FULLERTON.
- PHILOSOPHY 4.—Philosophy. The Development of Idealism. *Two hours (Second Term)*. Professor FULLERTON.
- PHILOSOPHY 5.—Ethics (Advanced Course). *One hour (Second Term)*. Professor FULLERTON.
- Equivalent Courses in Psychology may be substituted for these Courses in Philosophy.
- PSYCHOLOGY 1.—Elementary Psychology. *One hour (First Term)*. Dr. NEWBOLD.
- PUBLIC LAW AND POLITICS 11.—Constitutional Law. *Two hours*. Professor JAMES.

## ELECTIVE STUDIES,—

Of group A each Senior must take at least two studies, and of group B at least one, making his total number of hours per week, including required work, not less than fifteen nor, unless the consent of the Dean has first been had, more than eighteen.

## A.

- GREEK 4.—*Two hours*. Professor LAMBERTON.
- LATIN 6.—*Three hours*. Professor JACKSON.
- HEBREW 1.—*Two hours*. Professor JASTROW.
- HEBREW 2.—*Two hours*. Professor HILPRECHT.
- Course 2 is open to those only who have taken Course 1.
- SANSKRIT 1.—*Two hours*. Professor EASTON.
- SANSKRIT 2.—*Two hours*. Professor EASTON.
- Course 2 is open to those only who have taken Course 1.
- GERMAN 5.—*Three hours*. Professor SEIDENSTICKER.
- FRENCH 4.—*Two hours*. Professor EASTON.
- OLD FRENCH 1.—*Two hours*. Assistant Professor RENNERT.
- ITALIAN 1.—*Two hours*. Assistant Professor RENNERT.
- ITALIAN 2.—*Two hours*. Assistant Professor RENNERT.
- Course 2 is omitted in 1892-93.

## B.

- ENGLISH 6.—Advanced Composition. Weekly or daily exercises, to be criticised by the instructor at the weekly meetings. *One hour*. Mr. PENNIMAN.

- ENGLISH 9.—Declamation. Debating and Original Speaking, extemporaneous and prepared. Mr. SMITH.
- ENGLISH LANGUAGE 2.—Elementary Anglo-Saxon. Lectures on Phonetics. *Two hours.* Professor EASTON.
- ENGLISH LANGUAGE 3.—Anglo-Saxon Poetry. Comparison with Later Periods. *Two hours.* Professor EASTON.
- ENGLISH LANGUAGE 4.—English Philology. *Two hours.* Professor EASTON.
- ENGLISH LANGUAGE 5.—English Philology. *Two hours.* Professor EASTON.
- EUROPEAN HISTORY 4.—Mediæval History of Europe. *Two hours.* Assistant Professor CHEYNEY.
- MATHEMATICS 22.—Theory of Equations. (Burnside and Panton.) *Two hours.* Assistant Professor FISHER.
- MATHEMATICS 23.—Differential Equations. (Forsyth.) *Two hours.* Assistant Professor FISHER.
- MATHEMATICS 24.—Projective Geometry. (Cremona.) *Two hours.* Assistant Professor FISHER.
- MATHEMATICS 25.—Higher Plane Curves. *Two hours.* Assistant Professor CRAWLEY.  
Omitted in 1892-93.
- MATHEMATICS 26.—Seminar. *One hour.* Assistant Professor FISHER.  
Omitted in 1892-93.
- CHEMISTRY 4.—Analytical Chemistry. Laboratory Practice, Lectures and Recitations in Gravimetric and Volumetric Analysis. *The Laboratory is open every day from 9 to 5, except on Saturday afternoon.* Professor SMITH and Dr. KEITH.
- MINERALOGY 1.—Crystallography. Native Elements and Sulphides. *Two hours.* Mr. BROWN.
- GEOLOGY 1.—Lithology. *One hour.* Mr. BROWN.
- BIOLOGY 2.—General Zoölogy. Lectures. *One hour.* Mr. MOORE.
- BIOLOGY 8.—Mammalian Anatomy. *Six hours.* Professor JAYNE.
- BIOLOGY 3.—Systematic Study of the Invertebrates. *Six hours (First Term).* Mr. CALVERT.
- BIOLOGY 5.—Systematic Study of the Vertebrates. *Six hours (Second Term).* Professor JAYNE.
- BIOLOGY 6.—Animal Histology. *Six hours (First Term).* Professor RYDER.
- BIOLOGY 7.—Animal Embryology. *Six hours (Second Term).* Professor RYDER.
- BIOLOGY 14.—General Structural Botany. *Six hours (First Term).* Professor WILSON.
- BIOLOGY 15.—Systematic Study of the Phænogams. *Six hours (Second Term).* Professor MACFARLANE.



- BIOLOGY 20.—Animal Physiology. *Three hours.* Dr. GREENMAN.
- PSYCHOLOGY 3.—Experimental Psychology. Lectures with Laboratory work. *Two hours (First Term).* Dr. WITMER.
- PSYCHOLOGY 4.—Experimental Psychology. *Two hours.* Dr. WITMER.
- PHYSICS 5.—Heat and Light. *Three hours (First Term).* Professor BARKER.
- PHYSICS 6.—Electricity and Magnetism. *Three hours (Second Term).* Professor BARKER.
- PHYSICS 8.—Practical work in the Physical Laboratory. *Three hours.* Professor BARKER and Assistant Professor GOODSPEED.

## THE GENERAL COURSE IN SCIENCE.

## FRESHMAN CLASS.

- ENGLISH 1.\*—Study of American Prose Authors, with Rhetorical Criticism and Composition. *Three hours.* Mr. PENNIMAN.
- MATHEMATICS 2.—Algebra. *Four hours (Second Term).* Assistant Professor FISHER.
- MATHEMATICS 6.—Trigonometry. *Four hours (First Term).* Assistant Professor CRAWLEY.
- ARCHITECTURE I 1.—Freehand Drawing. *One hour.* Mr. EVERETT.
- ARCHITECTURE I 2.—Geometrical and Isometrical Drawing. *Two hours.* Mr. MILLARD.
- EUROPEAN HISTORY 1.—English History. *Two hours (Second Term).* Assistant Professor CHEVNEY.
- AMERICAN HISTORY 7.—Government in the United States. *Two hours (First Term).* Professor THORPE.
- GERMAN 1.—*Five hours.* Mr. WESSELHOEFT.
- FRENCH 2.—*Five hours.* Professor EASTON.
- 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. PENNIMAN.
- 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.
- EUROPEAN HISTORY 6.—Europe since 1815. *Three hours (Second Term).* Associate Professor ROBINSON.
- These courses are elective with Drawing and Descriptive Geometry.
- ARCHITECTURE I 4.—Mechanical Drawing. *Two hours.* Mr. MILLARD.  
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.—Analytic Geometry. *Four hours (First Term).* Assistant Professor FISHER.
- MATHEMATICS 15.—Differential and Integral Calculus. *Four hours (Second Term).* Assistant Professor CRAWLEY.

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\* For a description of this and other studies below, see pp. 46-84.



CIVIL ENGINEERING 2.—Descriptive Geometry. *Two hours (First Term)*. Mr. WORTHINGTON.

CIVIL ENGINEERING 3.—Shades and shadows and perspective. *Two hours (Second Term)*. Mr. WORTHINGTON.

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

PHYSICS 4.—Energy and Sound. *Two hours (Second Term)*. Assistant Professor GOODSPEED.

CHEMISTRY 1.—General Inorganic Chemistry. *Three hours*. Professor SMITH, Dr. FRANKEL and Dr. OHLY.

GERMAN 2.—*Three hours*. Professor SEIDENSTICKER.

FRENCH 3.—*Three hours*. Professor EASTON.

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 IN THE TOWNE SCIENTIFIC SCHOOL.

The courses in this School (named from its largest benefactor, John Henry Towne) are divided into two groups. In the one are included the courses which are regarded as the continuation of the general courses in Science; in the other the courses of technical instruction of four years. The technical divisions of the general course in Science 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.

### JUNIOR CLASS.

#### STUDIES PURSUED BY THE WHOLE CLASS.

ENGLISH 3.—Weekly exercises in Composition, read and discussed in small sections of the class. *One hour*. Mr. PENNIMAN.

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.

GERMAN 4.—*Two hours*. Professor SEIDENSTICKER.

- FRENCH 1.—*Two hours.* Assistant Professor RENNERT.  
Of these two languages each Junior elects one—that already taken in Freshman and Sophomore years.
- PHILOSOPHY 1.—Logic. *Two hours (First Term).* Professor FULLERTON.  
This Course is not required of students in Chemistry or in Metallurgy and Mining.
- PHILOSOPHY 2.—Ethics. *Two hours (Second Term).* Professor FULLERTON.  
This Course is not required of students in Chemistry or in Metallurgy and Mining.
- EUROPEAN HISTORY 4.—Mediæval History of Europe. *Two hours.* Assistant Professor CHEYNEY.  
This Course is not required of students in Metallurgy and Mining.
- MATHEMATICS 16.—Differential and Integral Calculus. *Three hours.* Assistant Professor CRAWLEY.
- PHYSICS 5.—Heat and Light. *Three hours (First Term).* Professor BARKER and Assistant Professor GOODSPEED.
- PHYSICS 6.—Electricity and Magnetism. *Three hours (Second Term).* Professor BARKER and Assistant Professor GOODSPEED.
- 1. Additional Studies pursued by the Chemical Section.*
- CHEMISTRY 1.—Qualitative Analysis. Making of Inorganic Preparations. *Twelve hours.* Professor SMITH and Dr. KEITH.
- CHEMISTRY 3.—Organic Chemistry. *Two hours.* Professor SMITH.
- MINERALOGY 1.—Crystallography. Native Elements and Sulphides. *Two hours.* Mr. BROWN.
- 2. Additional Studies pursued by the Metallurgical and Mining Section.*
- MINING 1.—Mining Engineering. Construction of parts of Mines and of Mining Machinery, from notes and sketches. *Five hours.* Mr. BROWN.
- MINING 2.—Mining Engineering. Lectures on the methods used in prospecting for and developing ore and coal deposits. *Two hours.* Mr. BROWN.
- MINERALOGY 1.—Crystallography. Native Elements and Sulphides. *Two hours.* Mr. BROWN.
- GEOLOGY 1.—Lithology. *One hour.* Mr. BROWN.
- CHEMISTRY 2.—Qualitative Analysis. Making of Inorganic Preparations. *Six hours.* Professor SMITH and Dr. KEITH.
- CIVIL ENGINEERING 5.—Surveying. Theory. *One hour.* Mr. WEBB.
- CIVIL ENGINEERING 8.—Railroad Surveying. Theory. *Three hours (Second Term).* Mr. WEBB.
- CIVIL ENGINEERING 10.—Surveying. Field Practice. *Three hours.* Mr. WEBB.
- CIVIL ENGINEERING 7.—Surveying. *One hour (First Term).* Mr. WEBB.



CIVIL ENGINEERING 12.—Railroad Surveying. Field Practice. *Two hours (Second Term)*. Mr. WEBB.

CIVIL ENGINEERING 15.—Pen Topography. *Two hours (First Term)*. Mr. WORTHINGTON.

CIVIL ENGINEERING 16.—Colored Topography. *Two hours (Second Term)*. Mr. WORTHINGTON.

3. *Additional Studies pursued by the Civil Engineering Section.*

CIVIL ENGINEERING 15.—Pen Topography. *Two hours (First Term)*. Mr. WORTHINGTON.

CIVIL ENGINEERING 16.—Colored Topography. *Two hours (Second Term)*. Mr. WORTHINGTON.

CIVIL ENGINEERING 23.—Mechanics of Materials. *Four hours (First Term)*. Professor MARBURG.

CIVIL ENGINEERING 26.—Graphical Statics. *Two hours (Second Term)*. Professor MARBURG.

CIVIL ENGINEERING 5.—Surveying. Theory. *One hour*. Mr. WEBB.

CIVIL ENGINEERING 10.—Surveying. Field Practice. *Three hours*. Mr. WEBB.

In addition to the hours above mentioned, one entire week during the Second Term is devoted to a farm survey.

CIVIL ENGINEERING 8.—Railroad Surveying. Theory. *Three hours (Second Term)*. Mr. WEBB.

CIVIL ENGINEERING 12.—Railroad Surveying. Field Practice. *Two hours (Second Term)*. Mr. WEBB.

CHEMISTRY 2.—Qualitative Analysis. *Four hours*. Professor SMITH and Dr. KEITH.

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.

4. *Additional Studies pursued by the Mechanical Engineering Section.*

MECHANICAL ENGINEERING 1.—Statics. *Two hours*. Mr. HUFFINGTON.

MECHANICAL ENGINEERING 2.—Hydrostatics and Hydraulics. *Two hours*. Mr. HUFFINGTON.

MECHANICAL ENGINEERING 4.—Drawing. *Three hours*. Mr. PICOLET.

MECHANICAL ENGINEERING 5.—The Steam Engine. *Two hours (First Term)*. Mr. HUFFINGTON.

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. GRIFFITH.

MECHANICAL ENGINEERING 23.—Graphic Statics. *Two hours.* Professor SPANGLER.

### SENIOR CLASS.

#### STUDIES PURSUED BY THE WHOLE CLASS.

- ENGLISH 4.—Four formal essays during the year. Mr. PENNIMAN.  
English 6 may be substituted for this Course.
- ENGLISH 9.—Declamation. (Optional.) Mr. SMITH.
- PUBLIC LAW AND POLITICS 11.—Constitutional Law. *Two hours.* Professor JAMES.
- MATHEMATICS 19.—Astronomy. *Two hours.* Professor KENDALL.  
Course 19 is not required of students in Mechanical Engineering.
- PHYSICS 7.—Physical measurements. Methods. *Three hours.* Professor BARKER.
- PHYSICS 8.—Practical work in the Physical Laboratory. *Three hours.* Professor BARKER and Assistant Professor GOODSPEED.
- METALLURGY 1.—Theory of Metallurgical Processes. *One hour.* Mr. BROWN.

#### 1. *Additional Studies pursued by the Chemical Section.*

- CHEMISTRY 4.—Gravimetric and Volumetric Analysis. *Six hours.* Professor SMITH and Dr. KEITH.
- CHEMISTRY 5.—Applied Inorganic and Organic Chemistry. *Two hours.* Excursions to chemical works. Dr. KEITH.
- CHEMISTRY 7.—Organic Chemistry. Laboratory work in making Organic Preparations. Proximate and Ultimate Organic Analysis. *Six hours.* Professor SMITH and Dr. KEITH.
- CHEMISTRY 8.—Seminary. *One hour.* Professor SMITH, Dr. KEITH, Dr. FRANKEL, and Dr. OHLY.
- MINERALOGY 2.—Mineralogy. *Two hours.* Mr. BROWN.
- MINERALOGY 3.—Determinative Mineralogy. *Two hours.* Mr. BROWN.

#### 2. *Additional Studies pursued by the Metallurgical and Mining Section.*

- METALLURGY 2.—Assaying. *Four hours.* Mr. BROWN.
- MINING 1.—Mining Engineering. Construction of parts of Mines and of Mining Machinery from notes and sketches. *Five hours.* Mr. BROWN.
- MINING 4.—Mining Engineering. Lectures on the principles involved and the machinery employed in haulage, hoisting and pumping in mines. *Two hours.* Mr. BROWN.
- MINERALOGY 2.—Mineralogy. *Two hours.* Mr. BROWN.
- MINERALOGY 3.—Determinative Mineralogy. *Two hours.* Mr. BROWN.
- CHEMISTRY 4.—Gravimetric and Volumetric Analysis. *Four hours.* Professor SMITH and Dr. KEITH.
- CIVIL ENGINEERING.—7-11-13-22-18.



3. *Additional Studies pursued by the Civil Engineering Section.*

- CIVIL ENGINEERING 17.—Topographical Drawing. *Two hours (First Term).* Mr. WORTHINGTON.
- CIVIL ENGINEERING 31.—Hydromechanics. *Four hours (First Term).* Professor MARBURG.
- CIVIL ENGINEERING 32.—Sanitary Engineering Systems. *One hour (Second Term).* Professor MARBURG.
- CIVIL ENGINEERING 27.—Structures. *Four hours (Second Term).* Professor MARBURG.
- CIVIL ENGINEERING 29.—Bridge Designing. *Two hours (Second Term).* Professor MARBURG.
- CIVIL ENGINEERING 24.—Materials of Engineering. *One hour (Second Term).* Professor MARBURG.
- CIVIL ENGINEERING 7.—Surveying. Theory. *One hour (First Term).* Mr. WEBB.
- CIVIL ENGINEERING 11.—Surveying. Field Practice. *Three hours (First Term).* Mr. WEBB.

In addition to the hours above mentioned, one entire week during the first term is devoted to a connected hydrographical survey.

- CIVIL ENGINEERING 13.—Railroad Location. Field Practice. *Four hours (First Term).* Mr. WEBB.
- CIVIL ENGINEERING 22.—Railroad Office Work. *Three hours (Second Term).* Mr. WEBB.
- CIVIL ENGINEERING 18.—Map drawing. *One hour.* Mr. 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.

4. *Additional Studies pursued by the Mechanical Engineering Section.*

- MECHANICAL ENGINEERING 2.—Hydrostatics and Hydraulics. *Two hours.* Professor SPANGLER.
- MECHANICAL ENGINEERING 4 a.—Sketching and Drawing. *Two hours.* Mr. PICOLET.
- MECHANICAL ENGINEERING 8.—Steam Engine. *Two hours.* Mr. HUFFINGTON.
- MECHANICAL ENGINEERING 9.—Steam Boilers. *Two hours.* Mr. HUFFINGTON.
- MECHANICAL ENGINEERING 11.—Electricity. *One hour.* Mr. SCHRAMM.
- MECHANICAL ENGINEERING 13.—Shop work. *Nine hours.* Mr. MORRIS and Mr. GRIFFITH.

## POST-SENIOR CLASS.

*1. Studies pursued by the Chemical Section.*

- CHEMISTRY 12.—Industrial Chemistry. Experimental Studies in Applied Inorganic and Organic Chemistry. *Ten hours.* Professor SMITH and Dr. KEITH.
- CHEMISTRY 15.—Advanced Chemical Theory. Lectures. *One hour.* Professor SMITH.
- CHEMISTRY 10.—Analytical Chemistry (Advanced Course). Electrolysis and Electrolytic Methods. Lectures. *One hour.* Dr. FRANKEL.
- CHEMISTRY 17.—Special Topics in Pure Inorganic and Analytical Chemistry. Lectures. Professor SMITH.
- GEOLOGY 3.—*Two hours.* Mr. BROWN.
- METALLURGY 3.—Demonstrations of the principal metallurgical processes by furnace. *Two hours.* Mr. 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. Mr. BROWN.

*2. Studies pursued by the Metallurgical and Mining Section.*

- METALLURGY 3.—Demonstrations of the principal metallurgical processes by furnace. *Two hours.* Mr. 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. Mr. BROWN.
- MINING 3.—Mining Engineering. *Two hours.* Mr. 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.* Mr. BROWN.
- GEOLOGY 4.—The topographical, structural and genetic relations of the principal ore deposits in America and Mexico. *One hour.* Mr. BROWN.
- CHEMISTRY 10.—Lectures. Analytical Chemistry (Advanced Course). Electrolysis and Electrolytic methods. *One hour, and others to be assigned by the instructor.* Dr. FRANKEL.

*3. Studies pursued by the Civil Engineering Section.*

- CIVIL ENGINEERING 4.—Stereotomy. Theory. *One hour (First Term).* Mr. WORTHINGTON.
- CIVIL ENGINEERING 21.—Mechanical Drawing. *Two hours (First Term).* Mr. WORTHINGTON.
- CIVIL ENGINEERING 25.—Materials of Construction. *Two hours.* Professor MARBURG.
- CIVIL ENGINEERING 28.—Suspension, Cantilever, and Swing Bridges. *One hour (First Term).* Professor MARBURG.



- CIVIL ENGINEERING 30.—Bridge Designing. *Four hours.* Professor MARBURG.
- CIVIL ENGINEERING 36.—Engineering Specifications. *One hour (Second Term).* Professor MARBURG.
- CIVIL ENGINEERING 33.—Foundations, Dams, Piers, and Abutments. *Two hours (First Term).* Professor MARBURG.
- CIVIL ENGINEERING 34.—Stone Arches and Culverts. *One hour (Second Term).* Professor MARBURG.
- CIVIL ENGINEERING 35.—Railway Economics. *Four hours (Second Term).* Mr. WEBB.
- CIVIL ENGINEERING 9.—Geodesy. *Four hours (First Term).* Mr. WEBB.
- CIVIL ENGINEERING 14.—Geodetic Operations *Hours to be assigned. (First Term.)* Mr. WEBB.
- CIVIL ENGINEERING 37.—Lectures on Engineering subjects. *Hours to be assigned. (Second Term.)* Professor MARBURG.
- CIVIL ENGINEERING 38.—Inspection Tours to Engineering Works. Professor MARBURG.
- CIVIL ENGINEERING 39.—Thesis on Professional Subject.
- MECHANICAL ENGINEERING 14.—Thermodynamics. *Three hours.* Professor SPANGLER.
- ARCHITECTURE J 6.—History of Architecture. *One hour.* Professor LAIRD.
- MINERALOGY 2.—*Two hours.* Mr. BROWN.
- MINERALOGY 3.—Determinative Mineralogy. *Two hours.* Mr. BROWN.
- GEOLOGY 3.—*Two hours.* Mr. BROWN.
- BUSINESS LAW 3.—Law of Contracts. *One hour.* Mr. WINTERSTEEN.

4. *Studies pursued by the Mechanical Engineering Section.*

- MECHANICAL ENGINEERING 3.—Hydrodynamics. *Two hours.* Professor SPANGLER.
- MECHANICAL ENGINEERING 7.—Kinematics. *Two hours.* Professor SPANGLER.
- MECHANICAL ENGINEERING 14.—Thermodynamics. *Three hours.* Professor SPANGLER.
- MECHANICAL ENGINEERING 15.—Thermodynamics. (In Laboratory.) *Six hours.* Professor SPANGLER.
- MECHANICAL ENGINEERING 16.—Marine Engineering and Naval Architecture. *One hour.* Professor SPANGLER and Mr. PICOLET.
- MECHANICAL ENGINEERING 17.—Designing Machinery. *Four hours.* Professor SPANGLER and Mr. PICOLET.
- MECHANICAL ENGINEERING 18.—Visits to manufacturing establishments. *Sixteen weeks, one visit per week.* Professor SPANGLER.
- MECHANICAL ENGINEERING 19.—Contracts and Specifications. *One hour (Second Term).* Professor SPANGLER.

BUSINESS LAW I.—Contracts and Specifications. *One hour (Second Term)*. Mr. WINTERSTEEN.

MECHANICAL ENGINEERING 20.—Electrodynamics. *Five hours*. Mr. SCHRAMM.

MECHANICAL ENGINEERING 21.—Electrodynamics. Laboratory work. *Six hours*. Mr. SCHRAMM.



## FOUR YEAR COURSES IN MECHANICAL AND ELECTRICAL ENGINEERING.

### FRESHMAN CLASS.

- ENGLISH 1\*.—Rhetoric. *Three hours.* Mr. PENNIMAN.
- MATHEMATICS 6.—Trigonometry. *Four hours (First Term).* Assistant Professor CRAWLEY.
- MATHEMATICS 2.—Algebra. *Four hours (Second Term).* Assistant Professor FISHER.
- PHYSICS 3.—Barker's *Physics.* *Two hours (First Term).* Assistant Professor GOODSPEED.
- PHYSICS 4.—General Physics. Energy and Sound. *Two hours (Second Term).* Assistant Professor GOODSPEED.
- CHEMISTRY 1.—General Inorganic Chemistry. Laboratory work with recitations. *Three hours.* Professor SMITH, Dr. FRANKEL and Dr. OHLY.
- MECHANICAL ENGINEERING 7a.—Kinematics. Elementary combinations, pulleys and belts, link work, gearing. *Three hours (Second Term).* Mr. HUFFINGTON.
- MECHANICAL ENGINEERING 5.—Steam Engine. *Two hours (First Term).* Mr. SCHRAMM.
- MECHANICAL ENGINEERING 12a.—Shop work. Manual Training in wood and iron. *Three hours (First Term).* *Six hours (Second Term).* Mr. GRIFFITH and Mr. MORRIS.
- MECHANICAL ENGINEERING 4.—Drawing. Geometrical construction and projection. *Three hours.* Mr. PICOLET.
- MECHANICAL ENGINEERING 4b.—Descriptive Geometry. Principles and applications to mechanical drawing. *One hour.* Mr. PICOLET and Professor SPANGLER.
- FRENCH 2.—*Three hours.* Assistant Professor RENNERT.
- GERMAN 1.—*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.
- ENGLISH 1.—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.—Heat and Light. *Three hours (First Term).* Professor BARKER and Assistant Professor GOODSPEED.
- PHYSICS 6.—Electricity and Magnetism. *Three hours (Second Term).* Professor BARKER and Assistant Professor GOODSPEED.

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\* For full description of this and other studies named below, see pp. 46-84.

- CHEMISTRY 2.—Analytic Chemistry. (Laboratory work.) *Three hours.* Professor SMITH and Dr. KEITH.
- MECHANICAL ENGINEERING 23.—Graphics. *Two hours (First Term).* Mr. HUFFINGTON.
- MECHANICAL ENGINEERING 1.—Statics. *Two hours (Second Term).* Mr. HUFFINGTON.
- MECHANICAL ENGINEERING 6.—Kinematics. *Two hours.* Mr. HUFFINGTON.
- MECHANICAL ENGINEERING 12*b*.—Shop work. *Six hours.* Mr. GRIFFITH and Mr. MORRIS.
- MECHANICAL ENGINEERING 4*c*.—Drawing. The preparation of working drawings from sketches. *Three hours.* Mr. PICOLET.
- FRENCH 3.—*Three hours.* Assistant Professor RENNERT.
- GERMAN 2.—*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.—Experimental Physics. *Three hours.* Professor BARKER.
- PHYSICS 8.—Laboratory work. *Three hours.* Professor BARKER.
- METALLURGY 1.—Metallurgical processes. *One hour.* Mr. BROWN.
- MECHANICAL ENGINEERING 1.—Statics. *Two hours (First Term).*
- MECHANICAL ENGINEERING 2.—Hydrostatics and Hydraulics. *Two hours.* Professor SPANGLER.
- MECHANICAL ENGINEERING 9.—Steam boilers. *Two hours.*
- MECHANICAL ENGINEERING 11.—Electricity. *Two hours.*
- MECHANICAL ENGINEERING 15*a*, 21*a*.—Mechanical and Electrical Laboratory. *Six hours.*

Electrical Engineering Students only.

- MATHEMATICS 16.—Calculus. *Three hours.* Assistant Professor CRAWLEY.
- PHYSICS 7.—Experimental Physics. *Three hours.* Professor BARKER.
- PHYSICS 8.—Laboratory work. *Six hours.* Professor BARKER.
- MECHANICAL ENGINEERING 1.—Statics. *Two hours (First Term).*
- MECHANICAL ENGINEERING 2.—Hydrostatics and Hydraulics. *Two hours.* Professor SPANGLER.
- MECHANICAL ENGINEERING 9*a*.—Steam boilers. *Two hours.* Mr. HUFFINGTON.
- MECHANICAL ENGINEERING 11.—Electrical measurements. *One hour.* Mr. SCHRAMM.

\* As the Junior Class of the four year courses will be first formed in 1893-'94, and the Senior Class in 1894-'95, the work for these years is as yet unassigned.



- MECHANICAL ENGINEERING 11a.—Practical electricity. *Two hours.*  
 MECHANICAL ENGINEERING 11b.—Telegraphy. *Two hours (Second Term).* Mr. SCHRAMM.  
 MECHANICAL ENGINEERING 15a, 21a.—(Laboratory work.) *Six hours.* Mr. SCHRAMM.

### SENIOR CLASS.

Mechanical Engineering Students only.

- MECHANICAL ENGINEERING 8.—Steam engine. *Two hours.* Mr. HUFFINGTON.  
 MECHANICAL ENGINEERING 14.—Thermodynamics. *Three hours.*  
 MECHANICAL ENGINEERING 15.—Thermodynamics. *Six hours.*  
 MECHANICAL ENGINEERING 3.—Hydrodynamics. *Two hours.* Professor SPANGLER.  
 MECHANICAL ENGINEERING 20.—Electrodynamics. *Two hours.*  
 MECHANICAL ENGINEERING 21b.—Electrodynamics. (Laboratory work.) *Three hours.* Mr. SCHRAMM.  
 MECHANICAL ENGINEERING 17.—Designing Machinery. *Three hours.*  
 MECHANICAL ENGINEERING 16.—Marine engines. *Two hours.*

Electrical Engineering Students only.

- MECHANICAL ENGINEERING 8.—Steam engine. *Two hours.* Mr. HUFFINGTON.  
 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.* Professor SPANGLER.  
 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).* Mr. SCHRAMM.  
 MECHANICAL ENGINEERING 21c.—Electric lights. Photometry. Accumulators. *Five hours (second half of First Term).*  
 MECHANICAL ENGINEERING 21b.—Dynamo Electric Machinery. *Four hours (Second Term).* Mr. SCHRAMM.  
 MECHANICAL ENGINEERING 21.—Electrodynamics. (Laboratory work.) *Six hours.* Mr. SCHRAMM.  
 BUSINESS LAW AND PRACTICE 4.—*One hour.* Mr. WINTERSTEEN.

### 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. Whenever these are not available the instruction

takes the form of lectures, with use of the books of reference in the Rogers Engineering Library and in the private collections of the professors. To render the work of the student regular from day to day, and to assure self-reliance in study and certainty that the principles of the subjects are thoroughly understood, practical problems, whenever possible, are given to the class for solution.

The instruction in MATHEMATICS extends through three years. 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 these 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 the elementary geometrical drawing precedes this work.



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.



**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

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, motor, 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 is now being equipped with examples of the best modern types of steam boilers. The plant will contain 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 to be used for lighting purposes will 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 45 horse-power Porter-Allen and a 30 horse-power Corliss engine, and several plain slide valve engines of 15 horse-power each, used for running blast and ventilating fans, will place the facilities of this Department far in advance of any plant used for instruction purposes in this country. The plan at present followed of giving each student charge of all the machinery and



apparatus in the Department for a portion of his time, under proper supervision, will be followed in the new plant.

There are now being installed a 30 kilo-watt Edison machine, a 400 light Brush incandescent machine, a 500 light United States machine and a 300 ampere Thomson-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 being connected up with their own apparatus, and the students will be required to study and test each of the machines in use.

The remainder of the first floor will be used for the Department of Mechanical Engineering.

The work of boiler testing will hereafter be 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 to be set up and used by the students.

The instruction in the principles of engine testing will be 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 the 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 will also be 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 will be used for pumps and injector testing, and a large cistern under the floor and two large tanks on the fourth floor will 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 machines for testing materials, iron and steel, oils, cement, steam gauges, indicators, chimney gases, etc., are being placed, and will in a short time be in running order. The machinery in this room will be 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, together with the absorbing and transmitting dynamometer now in the possession of the Department.

On the third floor of this building is located the drawing room, with 2500 square feet of floor space, well lighted and amply supplied with the necessary furniture to carry out the work of the Department. An additional class room, the Instructors' room and the Electrical Laboratory are also on this floor, the latter having 1600 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 buildings 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.

#### 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.

The library is open from 9 A. M. to 5 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.\*

### FRESHMAN CLASS.

(*Civil Engineering Studies.*)

- CIVIL ENGINEERING 19 †.—Mechanical Drawing. *Four hours.* Mr. WORTHINGTON.
- CIVIL ENGINEERING 1.—Projections. *Two hours (First Term).* Mr. WORTHINGTON.
- CIVIL ENGINEERING 15.—Pen Topography. *Two hours (Second Term).* Mr. WORTHINGTON.
- CIVIL ENGINEERING 5.—Surveying. Theory. *One hour.* Mr. WEBB.
- CIVIL ENGINEERING 10.—Surveying. Field practice. *Three hours.* Mr. WEBB.

In addition to the hours above mentioned, one entire week during the second term is devoted to a farm survey.

(*Other Studies Required.*)

- ENGLISH 1.—Compositions. *Two hours.* Mr. PENNIMAN.
- ENGLISH LANGUAGE 2.—*One hour.* Professor EASTON.
- GERMAN 1.—*Three hours.* Professor SEIDENSTICKER.
- FRENCH 2.—*Three hours.* Assistant Professor RENNERT.
- MATHEMATICS 1.—Trigonometry. *Four hours (First Term.)* Assistant Professor CRAWLEY.
- MATHEMATICS 2.—Algebra. *Four hours (Second Term).* Assistant Professor FISHER.
- PHYSICS 2.—Mass Physics. *Two hours (First Term).* Assistant Professor GOODSPEED.
- PHYSICS 3.—Energy and Sound. *Two hours (Second Term).* Professor BARKER.
- CHEMISTRY 1.—General Inorganic Chemistry. *Three hours.* Professor SMITH, Dr. FRANKEL, and Dr. OHLY.
- ARCHITECTURE A 5.—Freehand Drawing. *One hour.* Mr. EVERETT.

### SOPHOMORE CLASS.

(*Civil Engineering Studies.*)

- CIVIL ENGINEERING 2.—Descriptive Geometry. *Two hours (First Term).* Mr. WORTHINGTON.
- CIVIL ENGINEERING 3.—Shades and Shadows, and Perspective. *Two hours (Second Term).* Mr. WORTHINGTON.
- CIVIL ENGINEERING 20.—Mechanical Drawing. *Two hours (Second Term).* Mr. WORTHINGTON.
- CIVIL ENGINEERING 17.—Topographical Drawing. *Two hours (First Term).* Mr. WORTHINGTON.

\* For the Five-year Course in Civil Engineering, see pages 101 to 109.

† For a full description of this study and the other studies named below, see pages 46 to 84.



- CIVIL ENGINEERING 16.—Colored Topography. *Two hours (Second Term)*. Mr. WORTHINGTON.
- CIVIL ENGINEERING 7.—Surveying. Theory. *One hour (First Term)*. Mr. WEBB.
- CIVIL ENGINEERING 11.—Surveying. Field Practice. *Three hours (First Term)*. Mr. WEBB.
- CIVIL ENGINEERING 18.—Map Drawing. *One hour*. Mr. WEBB.
- CIVIL ENGINEERING 8.—Railroad Surveying. Theory. *Three hours (Second Term)*. Mr. WEBB.
- CIVIL ENGINEERING 12.—Railroad Surveying. Field Practice. *Two hours (Second Term)*. Mr. WEBB.

In addition to the hours above mentioned, one entire week during the first term is devoted to a connected 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.

*(Additional Studies Required.)*

- ENGLISH 2.—Compositions. *Two hours (Second Term)*. Mr. SMITH.
- ENGLISH LITERATURE 1.—Modern Essayists. Themes. *Two hours (First Term)*. Professor SCHELLING and Mr. PENNIMAN.
- GERMAN 2.—*Three hours*. Professor SEIDENSTICKER.
- FRENCH 3.—*Three hours*. Professor EASTON.
- Each student is required to take one of these two languages.
- 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 4.—Heat and Light. *Three hours (First Term)*. Professor BARKER.
- PHYSICS 5.—Electricity and Magnetism. *Three hours (Second Term)*. Professor BARKER.
- CHEMISTRY 2.—Qualitative Analysis. *Four hours*. Professor SMITH and Dr. KEITH.

**JUNIOR CLASS.**

*(Civil Engineering Studies.)*

- CIVIL ENGINEERING 4.—Stone Cutting. Theory. *One hour (First Term)*. Mr. WORTHINGTON.
- CIVIL ENGINEERING 21.—Mechanical Drawing. *Two hours (First Term)*. Mr. WORTHINGTON.
- CIVIL ENGINEERING 23.—Mechanics of Materials. *Four hours (First Term)*. Professor MARBURG.
- CIVIL ENGINEERING 26.—Graphical Statics. *Two hours (Second Term)*. Professor MARBURG.

- CIVIL ENGINEERING 27.—Structures. *Four hours (Second Term).*  
Professor MARBURG.
- CIVIL ENGINEERING 29.—Bridge Designing. *Two hours (Second Term).* Professor MARBURG.
- CIVIL ENGINEERING 31.—Hydromechanics. *Four hours (First Term).* Professor MARBURG.
- CIVIL ENGINEERING 32.—Sanitary Engineering Systems. *One hour (Second Term).* Professor MARBURG.
- CIVIL ENGINEERING 24.—Materials of Engineering. *One hour (Second Term).* Professor MARBURG.
- CIVIL ENGINEERING 13.—Railroad Location. Field Practice. *Four hours (First Term).* Mr. WEBB.
- CIVIL ENGINEERING 22.—Railroad Office Work. *Three hours (Second Term)* Mr. 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.

(*Other Studies Required.*)

- MATHEMATICS 16.—Differential and Integral Calculus. *Three hours.*  
Assistant Professor CRAWLEY.
- PHYSICS 6.—Experimental Physics. *Three hours.* Professor BARKER.
- PHYSICS 7.—Laboratory Work. *Three hours.* Professor BARKER  
and Assistant Professor GOODSPEED.
- MINERALOGY 2.—*Two hours.* Mr. BROWN.
- MINERALOGY 3.—Determinative Mineralogy. *Two hours.* Mr. BROWN.

#### SENIOR CLASS.

- CIVIL ENGINEERING 25.—Materials of Construction. *Two hours.*  
Professor MARBURG.
- CIVIL ENGINEERING 28.—Suspension, Cantilever, and Swing Bridges.  
Theory. *One hour (First Term).* Professor MARBURG.
- CIVIL ENGINEERING 30.—Bridge Designing. *Four hours.* Professor  
MARBURG.
- CIVIL ENGINEERING 36.—Engineering Specifications. *One hour (Second Term).* Professor MARBURG.
- CIVIL ENGINEERING 33.—Foundations, Dams, Piers, and Abutments.  
*Two hours (First Term).* Professor MARBURG.
- CIVIL ENGINEERING 34.—Stone Arches and Culverts. *One hour (Second Term).* Professor MARBURG.
- CIVIL ENGINEERING 35.—Railway Economics. *Four hours (Second Term).* Mr. WEBB.
- CIVIL ENGINEERING 9.—Geodesy. Theory. *Four hours (First Term).*  
Mr. WEBB.



CIVIL ENGINEERING 14.—Geodesy. Field practice. *Hours to be assigned (First Term.)* Mr. WEBB.

CIVIL ENGINEERING 37.—Special Lectures on Engineering subjects. *Hours to be assigned (Second Term.)* Professor MARBURG.

CIVIL ENGINEERING 38.—Inspection Tours to Engineering Works. Professor MARBURG.

CIVIL ENGINEERING 39.—Thesis on a Professional Subject.

*(Other Studies Required.)*

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 11.—*Two hours.* Professor JAMES.

MATHEMATICS 19.—Astronomy. *Two hours.* Professor KENDALL.

METALLURGY I.—Theory. *One hour.* Mr. BROWN.

GEOLOGY I.—*One hour.* Mr. BROWN.

BUSINESS LAW I.—Law of Contracts. *One hour.* Mr. WINTERSTEEN.

#### COURSES IN CIVIL ENGINEERING.

Two distinct courses are offered to students in CIVIL ENGINEERING.

The first is open to those who have completed the studies of the Freshman and Sophomore years of the General Course in Science. In this course 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 Second, or 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 prac-

tice. 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 course in Chemistry is 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 course in Mineralogy familiarizes 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. 46 to 84). 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, 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 the 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 approved 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 the 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 reconnoissance to final location are taken up in their regular sequence, precisely as is done 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 and weights 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 survey.

**GRAPHICAL STATICS.**—This subject is presented chiefly with a view to making 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 conditions of head. Special facilities will be provided in the new Mechanical 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 following 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 conducting duty tests of pumping engines.

**ARCHITECTURE.**—A brief course is given in the History of Architecture, 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** will be 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 Preservation of Timber, etc.

**VISITS OF INSPECTION.**—A limited number of inspection tours are made yearly to manufacturing plants and to engineering works completed 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 and of the Senior Class in the Four-year course, as a necessary condition for graduation. These theses must embody 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 at the University.



## LIBRARY.

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 Departments and are constantly accessible to the students.

## FOUR YEAR COURSE IN CHEMISTRY.

## FRESHMAN CLASS.

MATHEMATICS 3.\*—Solid Geometry. *Three hours, (Major part of First Term).* Professor KENDALL.

MATHEMATICS 5.—Trigonometry. *Three hours, (Second part of First Term).* Professor KENDALL.

MATHEMATICS 1a.—Algebra. *Two hours.* Assistant Professor CRAWLEY.

GERMAN 1.—*Five hours.* Mr. WESSELHOEFT.

FRENCH 4.—French Grammar. *Two hours.* Assistant Professor RENNERT.

FRENCH 6.—Translation of French Prose. *Two hours.* Professor EASTON.

Freshmen are required to take either German or French.

ENGLISH 1.—Rhetoric. *Two hours.* Mr. PENNIMAN.

MECHANICAL DRAWING I 2.—*Two hours.* Mr. MILLARD.

FREEHAND DRAWING I 1.—*One hour.* Mr. EVERETT.

PHYSICS 2.—*Four hours.* (Three hours devoted to practical work in the physical laboratory and one hour to lecture or recitation.) Assistant Professor GOODSPEED and Mr. SHIELDS.

CHEMISTRY 1.—*Eight hours.* (Six hours devoted to laboratory work and two to lectures or recitations.) Professor SMITH, with Dr. FRANKEL and Dr. OHLY.

## SOPHOMORE CLASS.

ENGLISH 2.—Weekly Composition. *Two hours.* Mr. SMITH.

ENGLISH 8.—Declamation. Mr. SMITH.

ENGLISH LITERATURE 1 and 2—*Two hours.* Professor SCHELLING.

GERMAN 2 OR FRENCH 3.—*Three hours.* Professor SEIDENSTICKER or Assistant Professor RENNERT.

MINERALOGY 1.—Mineralogy (begun). *Two hours.* Mr. BROWN.

CHEMISTRY 2.—Qualitative Analysis. Preparation of Inorganic Compounds. Quantitative Analysis begun. *Eighteen to twenty hours.* Professor SMITH and Dr. KEITH.

OPTIONAL STUDIES.—MATHEMATICS, BOTANY AND PHYSICS.

## JUNIOR CLASS.

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

GERMAN 3 OR FRENCH 5.—*Three hours.* Professor SEIDENSTICKER or Professor EASTON.

\*For a full description of this study and the other studies named below see pages 46 to 84.



- ENGLISH LITERATURE 3 AND 7.—*Two hours.* Professor SCHELLING.  
 MINERALOGY 3.—*Two hours.* Mr. BROWN.  
 MINERALOGY 2.—Assaying. *Three hours.* Mr. BROWN.  
 METALLURGY I.—*Two hours.* Mr. BROWN.  
 GEOLOGY I.—*One hour.* Mr. 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.* Pro-  
 fessor SMITH and Dr. KEITH.  
 OPTIONAL STUDIES—PHYSICS. MICROSCOPIC BOTANY. BIOLOGY.

### SENIOR CLASS.

- FRENCH 5 OR GERMAN 5.—*Three hours.* Professor EASTON or Pro-  
 fessor SEIDENSTICKER.  
 PUBLIC LAW AND POLITICS II.—*Two hours (First Term).* Professor  
 JAMES.  
 BUSINESS LAW AND PRACTICE 4.—*One hour (Second Term).* Mr.  
 WINTERSTEEN.  
 CHEMISTRY 5 AND 6.—Organic and Applied Chemistry. *Twenty-five  
 or more hours.* Professor SMITH.  
 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 only omits 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.

The degree conferred upon all who have successfully completed the above 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.



## COURSE IN CHEMICAL ENGINEERING.

### FRESHMAN CLASS.

- ENGLISH 1.\*—Rhetoric. *Three hours.* Mr. PENNIMAN.
- MATHEMATICS 6.—Trigonometry. *Four hours (First Term).* Assistant Professor CRAWLEY.
- MATHEMATICS 2.—Algebra. *Four hours (Second Term).* Assistant Professor FISHER.
- PHYSICS 1.—Barker's Physics. *Two hours (First Term).* Assistant Professor GOODSPEED.
- PHYSICS 4.—General Physics. Energy and sound. *Two hours (Second Term).* Assistant Professor GOODSPEED and Mr. SHIELDS.
- CHEMISTRY 1.—General Inorganic Chemistry. Laboratory work with recitations. *Six hours.* Professor SMITH, Dr. FRANKEL, and Dr. OHLY.
- MECHANICAL ENGINEERING 7a.—Kinematics. Elementary combinations, pulleys and belts, link work, gearing. *Three hours (Second Term).* Mr. HUFFINGTON.
- MECHANICAL ENGINEERING 12a.—Shop work. Manual training in wood and iron. Two hours throughout the year. Mr. GRIFFITH and Mr. MORRIS.
- MECHANICAL ENGINEERING 4.—Drawing. Geometrical construction and projection. *Three hours.* Mr. PICOLET.
- MECHANICAL ENGINEERING 5.—The Steam Engine. *Two hours (First Term).* Mr. HUFFINGTON.
- FRENCH 2.—*Three hours.* Assistant Professor RENNERT.
- GERMAN 1.—*Three hours.* Mr. WESSELHOEFT.
- Each student is required to take one of these two languages.

### SOPHOMORE CLASS.

- ENGLISH LITERATURE 1.—Lecture on Modern Essayists. Themes. *Two hours (First Term).* Professor SCHELLING.
- ENGLISH 1.—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.—Heat and Light. *Three hours (First Term).* Professor BARKER.
- PHYSICS 6.—Electricity and Magnetism. *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 Dr. KEITH.

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\* For a description of this and other studies named below see pp. 46-84.

MECHANICAL ENGINEERING 23.—Graphics. *Two hours (First Term).* Mr. HUFFINGTON.

MECHANICAL ENGINEERING I.—Statics. *Two hours (Second Term).* Mr. HUFFINGTON.

MECHANICAL ENGINEERING 12*b*.—Shop work. *Two hours.* Mr. GRIFFITH and Mr. MORRIS.

FRENCH 3.—*Three hours.* Assistant Professor RENNERT.

GERMAN 2.—*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 Dr. KEITH.

CHEMISTRY 6.—Organic Chemistry. Lectures. Laboratory work in making Organic Preparations. *Ten hours (One Term).* Professor SMITH and Dr. KEITH.

PHYSICS 9.—Experimental Physics. *Three hours.* Professor BARKER, and Assistant Professor GOODSPEED.

PHYSICS 8.—Laboratory work. *Three hours.* Professor BARKER.

METALLURGY I.—Metallurgical processes. *One hour.* Mr. BROWN.

MECHANICAL ENGINEERING I.—Statics. *Two hours.* Mr. HUFFINGTON.

MECHANICAL ENGINEERING 2.—Hydrostatics and Hydraulics. *Two hours.* Professor SPANGLER.

MECHANICAL ENGINEERING 9*a*.—Steam boilers. *Two hours (One Term).* Mr. HUFFINGTON.

MECHANICAL ENGINEERING II.—Electricity. *Two hours.*

MECHANICAL ENGINEERING 15*a*, 21*a*.—Mechanical and Electrical Laboratory. *Three hours.*

MATHEMATICS 16.—Calculus. *Three hours.* Assistant Professor CRAWLEY.

### SENIOR CLASS.

CHEMISTRY 5.—Applied Chemistry. Lectures with Reviews. *Two hours.* Excursions to chemical works. Dr. KEITH.

CHEMISTRY 9.—Selected Methods of Industrial Chemistry. Experimental Studies in Applied Inorganic and Organic Chemistry. *Ten hours.* Professor SMITH and Dr. KEITH.

MECHANICAL ENGINEERING 8.—Steam engine. *Two hours.*

MECHANICAL ENGINEERING 14.—Thermodynamics. *Three hours.*

MECHANICAL ENGINEERING 20.—Electrodynamics. *Three hours.*

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

MECHANICAL ENGINEERING 17.—Designing Machinery. *Three hours.*



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)*.

## COURSES IN ARCHITECTURE.

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, granting a Certificate of Proficiency. To these is added an auxiliary Course of two years in Interior Decoration, granting a diploma. The Department also gives all instruction in Freehand and Mechanical Drawing to Freshmen and Sophomores in the General Science Courses of the Towne Scientific School; Freehand Drawing to Freshmen in Biology and Architectural History to Seniors in Civil Engineering.

## FOUR YEAR COURSE.

## FRESHMAN YEAR (A).

*(Architectural Studies.)*

ARCHITECTURE, A. 1.\*—Freehand Drawing. *Four hours.* Mr. EVERETT.

ARCHITECTURE, A. 2.—Mechanical Drawing. *Three hours (First Term).* Mr. MILLARD.

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.—Perspective. *Three hours (Second Term).* Mr. MILLARD.

*(Other Studies Required.)*

ENGLISH 1.—Rhetoric. *Two hours.* Mr. PENNIMAN.

GERMAN 1.—Mr. WESSELHOEFT.

FRENCH 4.—*Five hours.* Assistant Professor RENNERT.

Each student elects one of these two languages.

MATHEMATICS 1.—Algebra.

MATHEMATICS 3.—Solid Geometry. Professor KENDALL.

CHEMISTRY 1.—*Three hours.* Professor SMITH, Dr. FRANKEL and Dr. OHLY.

SANITARY SCIENCE 1.—Hygiene.

PHYSICAL EDUCATION.—Lectures, examinations, and exercise in gymnasium. *Three hours.* Dr. FARIES.

\*For a full description of this and other studies named below, see pages 86 to 84.



## SOPHOMORE YEAR (B).

*(Architectural Studies.)*

- ARCHITECTURE, B. 1.—Freehand Drawing. *Four hours.* Mr. EVERETT.
- ARCHITECTURE, B. 2.—Shades and Shadows. *Three hours (First Term).* Mr. MILLARD.
- 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.—The Orders of Architecture. *Six hours (First Term).* Professor LAIRD.
- ARCHITECTURE, B. 6.—Sketch Design. Professor LAIRD.
- ARCHITECTURE, B. 7.—Design. *Eight hours (Second Term).* Professor LAIRD.
- ARCHITECTURE, C. 8.—Theory of Design. *One hour.* Professor LAIRD.
- ARCHITECTURE, C. 10.—\*History of Architecture. *One hour (throughout two years).*
- ARCHITECTURE, C. 11.—\*Lecture Drawing. *One hour.* Mr. MILLARD.

*(Other Studies Required.)*

- ENGLISH LITERATURE 1.—Modern Essayists. *Two hours (First Term.)* Professor SCHELLING.
- ENGLISH LITERATURE 2.—Modern Novelists. *Two hours (Second Term).* Professor SCHELLING.
- FRENCH 3.—*Three hours.* Assistant Professor RENNERT.
- GERMAN 2.—*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 Physics. *Two hours.* Assistant Professor GOODSPEED.
- PHYSICAL EDUCATION.—Examinations and exercises in gymnasium. 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.

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\* See Junior year.

- ARCHITECTURE, C. 3.—Pen and Ink Rendering. *Two hours.* MR. EYRE.
- ARCHITECTURE, C. 4.—Modeling. *Three hours (Major Part of First and Second Terms).* MR. PLASSCHAERT.
- ARCHITECTURE, C. 5.—Water Color Drawing. *Three hours.* PROFESSOR DANA.
- ARCHITECTURE, C. 6.—Sketch Design. PROFESSOR LAIRD.
- ARCHITECTURE, C. 7.—Design. *Ten hours.* PROFESSOR LAIRD.
- ARCHITECTURE, C. 8.—Theory of Design. *One hour (Part of Second Term).* PROFESSOR LAIRD.
- ARCHITECTURE, C. 9.—Measured Drawing. *Three hours (Part of First and Second Terms).* PROFESSOR LAIRD.
- ARCHITECTURE, C. 10.—History of Architecture. Corps of Lecturers. *One hour (Throughout Two Years).*
- (a) Ancient. PROFESSOR LAIRD.\*
  - (b) Greek and Roman. FRANK MILES DAY, B.S.\*
  - (c) Early Christian Romanesque and Byzantine. GEORGE C. MASON, JR.\*
  - (d) Gothic. WALTER COPE.\*
  - (e) Renaissance. FRANK MILES DAY, B.S.†
  - (f) Modern. Lecturer as announced.†
- ARCHITECTURE, C. 11.—Lecture Drawing. *One hour.* MR. MILLARD.
- ARCHITECTURE, C. 12.—History of Ornament.\* *One hour (Part of First and Second Terms).* MR. EVERETT.
- ARCHITECTURE, C. 13.—Mechanics of Materials. *Two hours.* MR. MILLARD.
- CIVIL ENGINEERING 6.—Theory of Surveying. *Three hours (First Term).* MR. WORTHINGTON.
- ARCHITECTURE, C. 14.—Advanced Building Construction. *One hour (Part of First and Second Terms).* MR. BOYDEN.
- SANITARY SCIENCE 1.—Hygiene. *Two hours.* DR. ABBOTT.
- SANITARY SCIENCE 2.—Hygiene. *Two hours.* DR. ABBOTT.
- GEOLOGY 1.\*—*One hour.* MR. BROWN.
- 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.

\* 1891-92.

† 1892-93.

Course C. 10 continues through two years; see Sophomore and Senior years.

\* Given by Mr. Stewardson in 1891-92.

\* Postponed to 1893-94. (*For Students in Architecture.*)



- ARCHITECTURE, D. 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. 5.—Water Color Drawing. *Three hours*. Professor DANA.
- ARCHITECTURE, D. 5.—Design. *Twelve hours (First Term), Fifteen hours (Minor Part of Second Term)*. Professor LAIRD.
- ARCHITECTURE, D. 6.—Theory of Design. *One hour (Part of First Term)*. Professor LAIRD.
- ARCHITECTURE, D. 7.—Thesis. *Fifteen hours (Part of Second Term)*. Professor LAIRD.
- ARCHITECTURE, C. 10.—History of Architecture. *One Hour (1892-93)*. CORPS OF LECTURERS.
- ARCHITECTURE, C. 11.—Lecture Drawing. *One hour*. Mr. MILLARD.
- ARCHITECTURE, D. 8.—Graphical Statics. *Two hours (First and Second Terms)*. Professor LAIRD.
- ARCHITECTURE, D. 9.—Acoustics. *One hour (Part of, First Term)*. Professor LAIRD.
- ARCHITECTURE, D. 10.—Specifications and Estimates.† *One hour (Part of One Term)*.
- ARCHITECTURE, D. 11.—Professional Practice.† *One hour (Part of One Term)*.

## SPECIAL COURSE OF TWO YEARS.

### FIRST YEAR.

- ARCHITECTURE, A. 5.—Perspective. *Three hours (Second Term)*. Mr. MILLARD.
- ARCHITECTURE, B. 2.—Shades and Shadows. *Three hours (First Term)*. Mr. MILLARD.
- ARCHITECTURE, B. 5.—The Orders of Architecture. *Nine 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. Professor LAIRD.

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\* See Sophomore and Junior years.

† Appointment to be made from the Corps of Lecturers on Architecture.

- ARCHITECTURE, C. 7.—Design. *Twelve hours (Second Term)*. Professor LAIRD.
- ARCHITECTURE, C. 8.—Theory of Design. *One hour (Part of Second Term)*. Professor LAIRD.
- ARCHITECTURE, C. 10.—History of Architecture. *One hour (Throughout Two Years)*. CORPS OF LECTURERS.
- ARCHITECTURE, C. 11.—Lecture Drawing. *One hour*. Mr. MILLARD.
- ARCHITECTURE, C. 12.—History of Ornament. *One hour (Part of First and Second Terms)*. Mr. EVERETT.
- ARCHITECTURE, C. 13.—Mechanics of Materials. *Two hours*. Mr. MILLARD.
- ARCHITECTURE, C. 14.—Advanced Building Construction. *One hour (Part of First and Second Terms)*. Mr. BOYDEN.
- SANITARY SCIENCE 1.—*One hour (Second Term)*. Dr. ABBOTT.
- SANITARY SCIENCE 2.—*One hour (First Term)*. Dr. ABBOTT.

#### SECOND YEAR.

- ARCHITECTURE, D. 1.—Freehand Drawing. Mr. EVERETT.
- ARCHITECTURE, D. 2.—Sketching. *(Part of First and Second Terms)*. Mr. EVERETT.
- ARCHITECTURE, C. 3.—Pen and Ink Rendering. *Two hours*. Mr. EYRE.
- ARCHITECTURE, C. 5.—Water Color Drawing. *Three hours*. Professor DANA.
- ARCHITECTURE, D. 5.—Design. *Fifteen hours (First and Second Terms)*. Professor LAIRD.
- ARCHITECTURE, D. 6.—Theory of Design. *One hour (Part of First Term)*. Professor LAIRD.
- ARCHITECTURE, C. 10.—History of Architecture. *One hour*. CORPS OF LECTURERS.
- ARCHITECTURE, C. 11.—Lecture Drawing. *One hour*. Mr. MILLARD.
- ARCHITECTURE, D. 8.—Graphical Statics. *Two hours*. Professor LAIRD.
- ARCHITECTURE, D. 9.—Acoustics. *(Part of First Term)*. Professor LAIRD.
- CIVIL ENGINEERING 6.—Theory of Surveying. *Three hours (First Term)*. Mr. WORTHINGTON.

#### COURSE IN INTERIOR DECORATION.

##### FIRST YEAR (G).

- ARCHITECTURE, G. 1.—Freehand Drawing. *Four hours*. Mr. EVERETT.
- ARCHITECTURE, G. 2.—Brush Drawing. *One hour (Part of First Year)*. Mr. EVERETT.
- ARCHITECTURE, G. 3.—Water Color Drawing. *Three hours (Part of First and Second Terms)*. Mr. EVERETT.



- ARCHITECTURE, C. 5.\*—Water Color Drawing. *Three hours.* Professor DANA.
- ARCHITECTURE, C. 12.—\*History of Ornament. *One hour (Part of First and Second Terms).* Mr. EVERETT.
- ARCHITECTURE, G. 4.—Theory of Design. *One hour.* Mr. EVERETT.
- ARCHITECTURE, G. 5.—Problems and Criticisms. *Eight hours.* Mr. EVERETT.
- ARCHITECTURE, G. 6.—Plant form applied to Decorative Art. *One hour (Part of Second Term).* Professor ROTHROCK.

## SECOND YEAR (H).

- ARCHITECTURE, H. 1.—Freehand Drawing. *Four hours.* Mr. EVERETT.
- ARCHITECTURE, A. 5.†—Perspective. *Three hours (Second Term).* Mr. MILLARD.
- ARCHITECTURE, H. 2.—Water Color Drawing. *Three hours (Part of First and Second Terms).* Mr. EVERETT.
- ARCHITECTURE, C. 5.\*—Water Color. *Three hours.* Professor DANA.
- ARCHITECTURE, H. 3.—Theory of Design. *One hour.* Mr. EVERETT.
- ARCHITECTURE, H. 4.—Problems and Criticisms. *Eight hours.* Mr. EVERETT.
- ARCHITECTURE, H. 5.—Artistic Anatomy. *One hour (Part of Second Term).* Dr. JAYNE.

COURSES OF STUDY OPENED TO THE PUBLIC AND TAKEN BY  
PARTIAL STUDENTS.

## (J).

- ARCHITECTURE, J. 1.—Freehand Drawing. *Four hours.* Mr. EVERETT.
- ARCHITECTURE, J. 2.—Modeling. *Three hours (Major Part of First and Second Terms).* Mr. PLASSCHAERT.
- ARCHITECTURE, J. 3.—Pen and Ink Drawing. *Two hours.* Mr. EYRE.
- ARCHITECTURE, J. 4.—Water Color Drawing. *Three hours.* Professor DANA.

## 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

\*See Four-year Course for C.

† See Four-year Course for A.

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 readiness and skill.

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 men fitted for it by experience as draftsmen the best of 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 Decoration 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 Decoration 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 Professors of Architecture and Art, Instructors in Architecture, Freehand Drawing, Modeling and Pen and Ink, and Lecturers on the History of Architecture, Ornament, Theory of Design and Construction.

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, æsthetic 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 æsthetics 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, 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 form the additional work of the First Term, whilst in the Second are introduced Design and Working Drawings. 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 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 and Descriptive 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, only those studies which bear directly upon the subject in hand being pursued in other departments.



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 Junior year 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 criticism and oversight of the professor in charge and by lectures on the Theory of Design and methods of rendering the finished drawings. "Measured drawing" requires that the class shall measure and afterwards draw to scale buildings already executed.

The history of Architecture is now pursued with increasing attention to the evolution of national types, such as the Egyptian, Assyrian, Greek and Roman, the Early Christian, Romanesque, Byzantine, Gothic and Renaissance. The lectures are illustrated by lantern slides and otherwise and supplemented by readings and recitations. 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. In Geology the qualities and locations of building stones are taught, while surveying is carried to the point of using transit and level, as required in ordinary architectural practice.



## THE COURSE IN NATURAL HISTORY

IN THE

### SCHOOL OF BIOLOGY.

#### FRESHMAN CLASS.

ENGLISH 1.\*—Rhetoric. *Three hours.* Mr. PENNIMAN.

LATIN, GERMAN OR FRENCH.

Before completing the course in Natural History each student must have taken of one or more of these languages an equivalent of twelve hours a week for one year. The languages selected, and the order in which they can be taken, will depend on the language or languages offered at the entrance examinations. Students who offer no foreign languages for admission must take of Latin the equivalent of six hours a week for one year.

AMERICAN HISTORY 7.—Government in the United States. *Two hours (First Term).* Professor THORPE.

EUROPEAN HISTORY 1.—English History. *Two hours (Second Term).* Assistant Professor CHEYNEY.

MATHEMATICS 1.—Algebra. *Two hours.* Assistant Professor FISHER.

MATHEMATICS 3.—Solid Geometry. *Three hours (first part of First Term).* Professor KENDALL.

MATHEMATICS 5.—Trigonometry. *Three hours (second part of First Term and Second Term).* Professor KENDALL.

MATHEMATICS 2.—Algebra. *Four hours (Second Term).* Assistant Professor FISHER.

MATHEMATICS 6.—Trigonometry. *Crawley's Trigonometry and Jones' Table of Logarithms. Three hours (First Term).* Assistant Professor Crawley.

Courses 1, 3 and 5, or 2 and 6 are required.

ARCHITECTURE I 1.—Freehand Drawing. *One hour.* Mr. EVERETT.

ARCHITECTURE I 2.—Geometrical and Isometrical Drawing. *Two hours.* Mr. MILLARD.

BIOLOGY.—General Biology. Lectures and laboratory work. *Six hours.* Professor MACFARLANE.

Students presenting advanced English, History and Mathematics for admission to College are permitted to substitute other courses for those prescribed for Freshmen.

#### SOPHOMORE CLASS.

##### PRESCRIBED STUDIES—

ENGLISH 2.—Compositions. Mr. SMITH.

ENGLISH 8.—Declamation. Two or more Declamations during the year by each student. Mr. SMITH.

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\* For a full description of this study and the other studies named below see pages 46 to 84.

## LATIN, GERMAN OR FRENCH.

## ELECTIVE STUDIES—

Of the elective studies each student must take each year enough courses to make his total number of hours per week, including required work, not less than twenty.

The course thus chosen is subject to the approval of the faculty. The restrictions attached to the different courses must be observed. (For a description of the courses see pp. 46 to 84.)

- ENGLISH LITERATURE 1.—Modern Essayists. Themes. *Two hours (First Term)*. Professor SCHELLING.
- ENGLISH LITERATURE 2.—Modern Novelists. Themes. *Two hours (Second Term)*. Professor SCHELLING.
- EUROPEAN HISTORY 5.—French Revolution. *Three hours (First Term)*. Associate Professor ROBINSON.
- EUROPEAN HISTORY 6.—Europe since 1815. *Three hours (Second Term)*. Associate Professor ROBINSON.
- MATHEMATICS 10.—Analytic Geometry. *Three hours*. Professor KENDALL.
- MATHEMATICS 11.—Analytical Geometry. *Four hours (First Term)*. Assistant Professor FISHER.
- MATHEMATICS 15.—Differential and Integral Calculus. *Four hours (Second Term)*. Assistant Professor CRAWLEY.
- CHEMISTRY 1.—General Inorganic Chemistry. *Three hours*. Professor SMITH, Mr. FRANKEL, and Dr. OHLY.
- PHYSICS 1.—Elementary Physics. *Two hours*. Assistant Professor GOODSPEED.
- PHYSICS 3.—Mass-Physics. *Two hours (First Term)*. Assistant Professor GOODSPEED.
- PHYSICS 4.—General Physics. Energy, Sound. *Two hours (Second Term)*. Assistant Professor GOODSPEED.
- Course 4 must be preceded by Course 3.
- BIOLOGY 2.—General Zoölogy. Lectures. *One hour*. Mr. MOORE.
- BIOLOGY 3.—Systematic Study of the Invertebrates. Laboratory work with explanatory lectures. *Six hours (First Term)*. Mr. CALVERT.
- BIOLOGY 8.—Mammalian Anatomy. *Six hours*. Professor JAYNE.
- BIOLOGY 14.—General Structural Botany. *Six hours (First Term)*. Professor WILSON.
- BIOLOGY 15.—Systematic Study of the Phænogams. *Six hours (Second Term)*. Professor WILSON.

## JUNIOR CLASS.

## PRESCRIBED STUDIES—

- ENGLISH 3.—Weekly exercises in popular and literary subjects. *One hour*. Mr. SMITH.

English 6 of the elective studies may be substituted for this course.



LATIN, GERMAN OR FRENCH.

ELECTIVE STUDIES—

The electives offered for Sophomore year, and in addition :—

- ENGLISH 6.—Advanced Composition. *One hour.* Mr. PENNIMAN.
- ENGLISH 9.—Declamation. Mr. SMITH.
- ENGLISH LITERATURE 3.—The Period of French Influence. (Waller to Cowper. *Two hours (First Term).* Professor SCHELLING.
- ENGLISH LITERATURE 10.—English Versification. *Two hours (First Term).* Professor SCHELLING.
- ENGLISH LITERATURE 4.—Seminary. *Two hours, alternate weeks.* Professor SCHELLING.
- ENGLISH LITERATURE 13.—Reading in English Prose. *Two hours.* Professor SCHELLING.
- ENGLISH LITERATURE 7.—The Age of Elizabeth. *Two hours (Second Term).* Professor SCHELLING.
- PHILOSOPHY 1.—Logic. *Two hours (First Term).* Professor FULLERTON.
- PHILOSOPHY 2.—Ethics. *Two hours (Second Term).* Professor FULLERTON.
- PSYCHOLOGY 3.—Experimental Psychology. Lectures with laboratory work. *Two hours (Second Term).* Mr. WITMER.
- PHYSICS 5.—Heat and Light. *Three hours.* Professor BARKER.
- PHYSICS 6.—Electricity and Magnetism. *Three hours (Second Term).* Professor BARKER.
- MINERALOGY 1.—Crystallography. Native elements and sulphides. *Two hours.* Mr. BROWN.
- GEOLOGY 5.—Principles of Geology. Outline of Vertebrate Palæontology. *Two hours.* Professor COPE.
- CHEMISTRY 2.—Analytical Chemistry. Qualitative Analysis. Making of Inorganic Preparations. *The Laboratory is open every day from 9 until 5, except on Saturday afternoon.* Professor SMITH and Dr. KEITH.
- CHEMISTRY 3.—Organic Chemistry. Lectures. *Two hours.* Professor SMITH.
- BIOLOGY 5.—Systematic Study of the Vertebrates. *Six hours (Second Term).* Professor JAYNE.
- BIOLOGY 6.—Animal Histology. *Six hours (First Term).* Professor RYDER.
- BIOLOGY 7.—Animal Embryology. *Six hours (Second Term).* Professor RYDER.
- BIOLOGY 11.—Invertebrate Morphology. (Advanced Course.) *Six hours (First Term).* Professor DOLLEY.
- BIOLOGY 16.—Plant Histology. *Six hours (First Term).* Professor MACFARLANE.
- BIOLOGY 17.—Systematic Study of Cryptogams. *Six hours (Second Term).* Professor MACFARLANE.
- BIOLOGY 24.—Human Anatomy. *Six hours.* Professor JAYNE.

## SENIOR CLASS.

## PRESCRIBED STUDIES—

- ENGLISH 4.—Rhetoric. Four Essays. Mr. PENNIMAN.  
 LATIN, GERMAN OR FRENCH.  
 PUBLIC LAW AND POLITICS II.—*Two hours.* Professor JAMES.  
 PUBLIC LAW AND POLITICS II.—Constitutional Law. *Two hours.*  
 Professor JAMES.

## ELECTIVE STUDIES—

All the electives offered for Junior year, and in addition :—

- GEOLOGY 1.—Lithology. *One hour.* Mr. BROWN.  
 BIOLOGY 20.—Animal Physiology. *Two hours.* Dr. GREENMAN.  
 CHEMISTRY 4. Analytical Chemistry. Laboratory practice, lectures in Gravimetric and Volumetric Analysis. *The laboratory is open every day from 9 to 5, except on Saturday afternoon.* Professor SMITH and Dr. KEITH.  
 MINERALOGY 2.—Mineralogy. *Two hours.* Mr. BROWN.  
 MINERALOGY 3.—Determinative Mineralogy. *Two hours.* Mr. BROWN.

And the following Advanced Courses :—

- EUROPEAN HISTORY 4.—Mediæval History of Europe. *Two hours.*  
 Assistant Professor CHEYNEY.  
 ENGLISH LITERATURE 8.—Lectures on Modern and Contemporary Poets. *Two hours (Second Term).* Professor SCHELLING.  
 ENGLISH LITERATURE 9.—Seminary. *Two hours (alternate weeks).*  
 Professor SCHELLING.  
 ENGLISH LITERATURE 11.—Elizabethan Dramatists. *Two hours (First Term).* Professor SCHELLING.  
 ENGLISH LITERATURE 12.—Elizabethan Prose and Criticism. *Two hours (Second Term).* Professor SCHELLING.  
 PHILOSOPHY 3.—History of Philosophy. *Two hours (First Term).*  
 Professor FULLERTON.  
 PSYCHOLOGY 1.—Elementary Psychology. *One hour (First Term).*  
 Dr. NEWBOLD.  
 PSYCHOLOGY 3.—Mental measurements, lectures, reports and advanced work on the laboratory. *Two hours (First Term).* Dr. WITMER.  
 PHYSICS 8.—Physical Measurements. *Three hours.* Professor BARKER.  
 BIOLOGY 9.—Animal Histology (Advanced Course). *Seven hours (First Term).* Professor RYDER.  
 BIOLOGY 10.—Animal Embryology (Advanced Course). *Seven hours (Second Term).* Professor RYDER.  
 BIOLOGY 12.—Vertebrate Morphology (Advanced Course). *Seven hours (First Term).* Professor JAYNE.



- BIOLOGY 13.—Osteology of the Mammalia. Lectures and laboratory work. *Six hours*. Professor JAYNE.
- BIOLOGY 18.—Plant Physiology. Lectures and laboratory work. *Seven hours*. Professor WILSON.
- BIOLOGY 19.—Economic Botany. Lectures and laboratory work. *Seven hours (Second Term)*. Professor ROTHROCK.

Omitted in 1892-93.

A complete description of the laboratories, courses and methods of work in Natural History is contained in the Handbook of Information concerning the School of Biology, copies of which may be obtained on application to the Dean.

## THE COURSE IN FINANCE AND ECONOMY

### IN THE

## WHARTON SCHOOL.

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.

### JUNIOR CLASS.

#### FIRST TERM.

PUBLIC LAW AND POLITICS I.\*—Constitution of the United States.  
*Two hours.* Professor JAMES and Dr. ADAMS.

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\*For a full description of this and all other studies below, see pages 46 to 84.



- PUBLIC LAW AND POLITICS 8.—Study of Municipal Problems. Wharton School Common Council. *One hour.* Dr. ADAMS.
- PUBLIC LAW AND POLITICS 10.—Public Lectures. The Pennsylvania Tax Conference. By JOSEPH D. WEEKS.  
The Select Council of Philadelphia. By JAMES R. GATES, President of Select Council.  
The Sinking Fund of the City of Philadelphia. By GENERAL LOUIS WAGNER, Chairman of the Sinking Fund Commission.  
Newspaper Work. By COLONEL A. K. MCCLURE.  
The Department of Public Safety, City of Philadelphia. By ABRAM M. BEITLER, Director of the Department.
- PUBLIC LAW AND POLITICS 3.—History and Theory of the States. *Two hours.* Professor JAMES and Dr. ADAMS.
- ECONOMICS AND SOCIAL SCIENCE 1.—Political Economy. Walker's *Political Economy*, and Adam Smith's *Wealth of Nations*. *Three hours.* Professor PATTEN.
- ECONOMICS AND SOCIAL SCIENCE 11.—Lectures on Finance. *One hour.* Mr. CHANDLER.
- ECONOMICS AND SOCIAL SCIENCE 10.—Library Work. *One hour.* Dr. ADAMS.
- BUSINESS LAW AND PRACTICE 1.—Methods of Accounting. *One hour.* Mr. WARRINGTON.
- EUROPEAN HISTORY 3.—Modern Economic History. *Three hours.* Assistant Professor CHEYNEY.
- AMERICAN HISTORY 1.—Political History of the United States. *Two hours.* Professor MCMASTER.
- PHILOSOPHY 1.—Logic. *Two hours.* Professor FULLERTON

## SECOND TERM.

- PUBLIC LAW AND POLITICS 4.—Comparative Study of the Constitutions of Germany and Switzerland. *One hour.* Professor JAMES.
- PUBLIC LAW AND POLITICS 3.—Politics. Comparative Constitutional Law. *Two hours.* Dr. ADAMS.
- PUBLIC LAW AND POLITICS 8.—Study of Municipal Problems. *One hour.* 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 2.—Currency and Banking. *Two hours.* DR. HILL.
- ECONOMICS AND SOCIAL SCIENCE 12.—Lectures on Finance. Banks of the United States. *One hour.* Dr. BOLLES.
- BUSINESS LAW AND PRACTICE 1.—Methods of Accounting. *One hour.* Mr. WARRINGTON.
- EUROPEAN HISTORY 2.—History of England. *Three hours.* Assistant Professor CHEYNEY.

- EUROPEAN HISTORY 5.—Period of the French Revolution. *Three hours.* Associate Professor ROBINSON.
- AMERICAN HISTORY 1.—Political History of the United States. *Three hours.* Professor McMASTER.
- PHILOSOPHY 2.—Ethics. *Two hours.* Professor FULLERTON.

## SENIOR CLASS.

## FIRST TERM.

- PUBLIC LAW AND POLITICS 7.—Study of City Government. *Two hours.* Professor JAMES.
- PUBLIC LAW AND POLITICS 9.—Municipal Government. *One hour.* Professor JAMES.
- PUBLIC LAW AND POLITICS 8.—Study of Municipal Problems. Wharton School Councils. *One hour.* Dr. ADAMS.
- PUBLIC LAW AND POLITICS 10.—Public Lectures. Same as to the Junior Class.
- ECONOMICS AND SOCIAL SCIENCE 7.—Finance. Bastable's *Public Finance.* Lectures. *One hour.* Dr. ADAMS.
- ECONOMICS AND SOCIAL SCIENCE 8.—Finance. Theories of Taxation. *One hour.* Professor JAMES.
- ECONOMICS AND SOCIAL SCIENCE 9.—Finance. Lectures on Income Tax. *One hour.* Dr. HILL.
- BUSINESS LAW AND PRACTICE 1.—Theory of Accounting. *One hour.* Mr. WARRINGTON.
- EUROPEAN HISTORY 7.—The Renaissance and Reformation. *Two hours.* Associate Professor ROBINSON.
- EUROPEAN HISTORY 3.—History of Land Tenures. *Three hours.* Assistant Professor CHEYNEY.
- AMERICAN HISTORY 8, 9 AND 10.—History of State Constitutional Law. *Two hours.* Professor THORPE.
- AMERICAN HISTORY 6.—Political History of the United States. *Two hours.* Professor McMASTER.
- AMERICAN HISTORY 2.—Economic and Financial History of the United States. *Two hours.* Professor McMASTER.

## SECOND TERM.

- PUBLIC LAW AND POLITICS 9.—Municipal Government. *One hour.* Professor JAMES.
- PUBLIC LAW AND POLITICS 7.—Study of City Government. *Two hours.* Professor JAMES.
- PUBLIC LAW AND POLITICS 8.—Study of Municipal Problems. *One hour.* Dr. ADAMS.
- PUBLIC LAW AND POLITICS 10.—Public Lectures. Continued. Same as to Junior Class.
- ECONOMICS AND SOCIAL SCIENCE 7.—Finance. Bastable's *Public Finance.* Lectures. *Two hours.* Dr. ADAMS.



- ECONOMICS AND SOCIAL SCIENCE 6.—Political Economy. Ingram's *History of Political Economy*. *Three hours*. Professor PATTEN.
- BUSINESS LAW AND PRACTICE I.—Theory of Accounting. *One hour*. Mr. WARRINGTON.
- AMERICAN HISTORY 8, 9 AND 10.—History of State Constitutional Law. *Two hours*. Professor THORPE.
- AMERICAN HISTORY 3.—American State Papers. *Two hours*. Professor MCMASTER.
- AMERICAN HISTORY 6.—Political History of the United States. *Two hours*. Professor MCMASTER.

#### METHODS OF WORK.

The plan of instruction embraces recitations, lectures, and seminars. 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 seminars, 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 Governments.

#### 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.
2. Constitutional Law of the United States.
3. International Law.
4. History of the Common 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.

A series of occasional publications on Political Economy and Public Law and on History will be issued by the University, representing a portion of the work done in the seminaries by the professors and students. The following numbers have already appeared:—1. Wharton School Annals of Political Science. 2. The Anti-Rent Agitation in New York. 3. Ground Rents in Philadelphia. 4. Consumption of Wealth. 5. Prison Statistics in 1888. 6. Rational Principles of Taxation. 7. German Constitution. 8. Swiss Constitution. 9. Our Sheep and the Tariff. 10. The German Bundesrath. 11. The Theory of Dynamic Economics.

## 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 the 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 SCHOOL OF AMERICAN HISTORY AND INSTITUTIONS.

This school, organized in 1891, offers undergraduate instruction in American History as part of a definite course leading to the degrees of Bachelors 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, Science, or Natural History, or to bring a preparation equivalent to that to be gained in such a course. 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.

### 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.
- 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. *Three hours (First 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 MCMASTER.
- AMERICAN HISTORY 3 AND 4.—American State Papers, and Veto Messages of the Presidents. (These two together make one Course.) *Two hours.* Professor MCMASTER.

Omitted in 1892-93.



- AMERICAN HISTORY 6.—Political History Since the Civil War. *Two hours.* Professor MCMASTER.
- 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.—Mill's *Political Economy*. *Three hours (First Term).* Professor PATTEN.
- ECONOMICS AND SOCIAL SCIENCE 6.—Ingram's *History of Political Economy*. *Three 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 McMaster 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 11.—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.

#### THE 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.

#### THE UNIVERSITY CONGRESS.

Another feature of the School is The University 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 University 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.

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\*For a fuller description of the Library see circular of Information No. 1, of the School.



THE COURSE PREPARATORY TO MEDICINE  
IN THE  
SCHOOL OF BIOLOGY.

This course extends through two years, and may be elected by students at the beginning of Junior year. It 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. The course is open to earnest students who cannot present the requirements for admission to the regular college courses, or 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.

## FIRST YEAR.

- BIOLOGY 1.—General Biology. Lectures and Laboratory work. *Six hours.* Professor MACFARLANE and assistants.
- BIOLOGY 2.—General Zoölogy. Lectures. *One hour.* Mr. MOORE.
- 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 Phænogams. Lectures and Laboratory work. *Six hours (Second Term).* Professor MACFARLANE and assistants.
- DRAWING 2.—Freehand Drawing from Models. *Three hours.* Mr. MILLARD.
- CHEMISTRY 1.—General Inorganic Chemistry. Laboratory work with recitations. *Three hours.* Professor SMITH, Dr. FRANKEL and Dr. OHLY.
- LATIN, GERMAN, OR FRENCH. *Three hours.*

## SECOND YEAR.

- BIOLOGY 3.—Systematic Study of the Invertebrates. Laboratory work with explanatory lectures. *Six hours (First Term).* Mr. CALVERT.
- BIOLOGY 5.—Systematic Study of the Vertebrates. Laboratory work with explanatory lectures. *Six hours (Second Term).* Professor JAYNE.
- BIOLOGY 6.—Animal Histology. *Six hours (First Term).* Professor RYDER.

- BIOLOGY 7.—Animal Embryology. *Six hours (Second Term)*. Professor RYDER.
- BIOLOGY 16.—Plant Histology. *Six hours (First Term)*. Professor MACFARLANE and Mr. HARSHBERGER.
- BIOLOGY 17.—Systematic Study of Cryptogams. *Six hours (Second Term)*. Professor MACFARLANE.
- BIOLOGY 20.—Animal Physiology. Lectures and demonstrations. *Three hours*. Dr. GREENMAN.
- BIOLOGY 24.—Human Anatomy. *Six hours*. Professor JAYNE and Dr. BURK.
- CHEMISTRY 2.—Analytical Chemistry. Qualitative Analysis. Making of Inorganic Preparations. The Laboratory is open every day *from 9 until 5*, except on Saturday afternoon. *Six hours*. Professor SMITH and Dr. KEITH.

Of the following three courses only one is required :

- LANGUAGE (Latin, German or French). *Three hours*.
- MINERALOGY 1.—Crystallography. Native Elements and Sulphides. *Two hours*. Mr. BROWN.
- GEOLOGY 5. Principles of Geology. Outline of Vertebrate Palæontology. *Two hours*. Professor COPE.

The special student who has completed this course, and has passed satisfactory examinations, is granted a certificate which admits him to the Medical School without examination, and enables him 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.

Baccalaureate graduates of this course will be admitted to the second year of the required Four Year Medical course.

For detailed description of the facilities and methods of work in Natural History, consult the Handbook of Information concerning the School of Biology.



## 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.

## ARRANGEMENT OF SESSIONS.

The College year is divided into two terms of about eighteen weeks each. The first term began in 1892 on October 3, at 10 o'clock, A.M., and ends on February 1, 1893, at 5 o'clock, P.M. The second term begins on February 1, at 10 o'clock, and ends with commencement on June 15. The examinations for entrance will begin on June 19 and September 11. The next College year will begin on September 29, 1893, 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 Department. 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 BAIRD 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 25, 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.
4. A prize of twenty-five dollars for the second 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 1893, 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 1893, 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 this Department.

*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 twenty dollars for the best Essay in Intellectual and

Moral Philosophy by a member of the Senior Class. Subject: *The Ethics of Aristotle.*

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 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.

5. A prize of thirty dollars for the best Essay in History and English Literature by a member of the Senior Class. Subject: *The Elizabethan Literature of Voyage and Discovery.*

6. A prize of twenty dollars for the best Essay by a member of the Junior Class. Subject: *Henry Crabbe Robinson.*

7. A prize of fifteen dollars for the best Declamation by a member of the Sophomore Class, the contest being open to the public.

8. A prize of twenty dollars to a member of the Scientific Classes for improvement in Drawing, and for general good conduct and application.

9. 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.

10. A prize of twenty-five dollars for the best series of mounted preparations of plant histology. 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: *William Blake, Poet and Artist.*

### 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 LA BARRE 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: *Whittier*.

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: *The Fall in Prices since 1870*.

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 department of Metallurgy and Mining and the other in the department of Pure and Applied Chemistry. The prizes will be awarded by the Gangue with the advice of the Professors in charge of these departments.

#### 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 University. All undergraduates of the College Department 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 re-founded in 1892, holds bi-weekly meetings at its rooms in the University during the College year. All students in the University are eligible to membership. 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 carrying on actual field work, holds bi-weekly meetings at the Biological School 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.

THE CAMERA CLUB, to active membership in which all undergraduates of the University are eligible, holds stated meetings and lantern exhibitions monthly, in the 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 exhibition 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 (A.B.)* is given on graduation (1) to students in Arts who have completed the full course; (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 Arts.

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 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 who complete the Four Year course in Natural History; (3) 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; (4) to students who take Junior and Senior year in the Course in Arts after having completed the first two years in the Course in Science.

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.

#### THESES.

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 Department is one hundred and sixty dollars a year, except that for the last three years in the Towne Scientific School and the Four Year Technical Courses in Chemistry, Civil, Mechanical, Electrical and Chemical Engineering, it is two hundred dollars a year, and for the Course in Music thirty 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 Technical Courses in Science, 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 Department, address Professor Horace Jayne, Dean of the Faculty.

ACCOMMODATIONS.

Good board can be had near the University 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.

	Min.	Max.
Board, thirty-seven weeks . . . . .	\$175 00	\$250 00
Tuition (according to Department and Year of the Course) . . . . .	150 00	200 00
Text-books . . . . .	10 00	50 00
	\$335 00	\$500 00

THE SOCIETY OF THE ALUMNI.

For a description of the aims of the Society, a list of officers, and other information, see ALUMNI ORGANIZATIONS, on a later page.



## DEPARTMENT OF PHILOSOPHY.

### FACULTY.

- WILLIAM PEPPER, M.D., LL.D., PROVOST, and *ex-officio* President.  
HORACE JAYNE, M.D., Professor of Biology, and DEAN.  
E. OTIS KENDALL, LL.D., Professor of Mathematics.  
HARRISON ALLEN, M.D., Professor of Comparative Anatomy and Zoölogy.  
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 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. JOHN P. PETERS, Ph.D., Professor of Hebrew.  
REV. HERMANN V. HILPRECHT, Ph.D., Professor of Assyrian.  
DANIEL G. BRINTON, M.D., Professor of American Archæology 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.  
HUGH A. CLARKE, Mus. Doc., Professor of the Science of Music.  
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 F. 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.  
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.

## OTHER INSTRUCTORS.

- EDWARD P. CHEYNEY, A.M., Assistant Professor of European History.
- HUGO A. RENNERT, Ph.D., Assistant Professor of Romance Philology and Literature.
- GEORGE E. FISHER, A.B., Assistant Professor of Mathematics.
- EDWIN S. CRAWLEY, Ph.D., Assistant Professor of Mathematics.
- AMOS P. BROWN, B.S., E.M., Instructor in Mining and Metallurgy.
- HENRY W. ROLFE, Lecturer in the Latin Language and Literature.
- LIGHTNER WITMER, Ph.D., Lecturer in Experimental Psychology.
- WILLIAM ROMAIN NEWBOLD, Ph.D., Lecturer in Philosophy.
- ARTHUR W. GOODSPEED, Ph.D., Assistant Professor of Physics.
- WALTER J. KEITH, Ph.D., Instructor in Chemistry.
- LEE K. FRANKEL, Ph.D., Instructor in Chemistry.
- REV. ALBERT TOBIAS CLAY, A.B., Fellow in Assyriology.

## MATRICULATES.

Josephine Feger Ancona,	Reading,	3350 Walnut St.
Alice Minerva Atkinson, A.B. (Swarthmore),	Holicong,	3350 Walnut St.
William L. Balentine,	Philadelphia,	2140 N. 28th St.
Loring Woart Batten, A.B. (Harvard),	do.	4805 Regent St.
Rev. John Grant Baun, A.M. (Pennsylvania),	do.	1733 Vine St.
Leon Schwartz Bowers, Ph.B. (Pennsylvania),	do.	1606 N. 15th St.
Charles S. Boyer, A.M. (Brown),	do.	3223 Clifford St.
Robert Hart Bradbury, A.M. (C. H. S.),	do.	45 Otter St.
Charles Henry Brelsford,	do.	2434 N. Broad St.
Amos Peaslee Brown, B.S., E.M. (Pennsylvania),	do.	Fisher's Lane, Germantown.
Martin Grove Brumbaugh, M.S. (Brethren's College),	Huntingdon,	3715 Spruce St.
George Stanley Burnfield, A.M. (Toronto),	Philadelphia,	495 N. 4th St.
Rev. Albert Tobias Clay, A.B. (Franklin and Marshall),	Lancaster,	301 S. 40th St.
George Howard Cliff,	Philadelphia,	1507 N. 17th St.
Laura Belle Cross, A.B. (Hampton College),	Louisville, Ky.,	3350 Walnut St.
Rev. Abraham Emil Dahlman, A.M. (Ursinus),	Philadelphia,	413 N. 38th St.
Edward Thomas Devine, A.M. (Cornell College),	do.	214 S. 37th St.



Rev. Max Felix Dumstrey, A.B. (Franklin and Marshall),	Philadelphia,	921 N. 26th St.
Kent Rolla Dunlap, A.B. (Wellesley),	do.	3350 Walnut St.
Augustus Clemens Ehrenfeld, A.M. (Wittenberg College),	Springfield, O.,	3430 Sansom St.
Joseph Edmund Enich, Ph. B. (Pennsylvania),	Philadelphia,	3346 Walnut St.
George Egbert Fisher, A.B. (Cornell University),	do.	Cresheim R'd., Chestnut Hill.
George W. Flounders, Herbert Friedenwald, A.B. (Johns Hopkins),	Ashbourne. Philadelphia,	915 N. 16th St.
Vivian Frank Gable, Ph.B. (Pennsylvania),	do.	506 Erie Ave.
John Palmer Garber, Emily Ray Gregory, A.B. (Wellesley),	Ridley Park. Philadelphia,	3350 Walnut St.
Lewis Reifsneider Harley, Ph.B. (Illinois Wesleyan University),	North Wales.	
John William Harshberger, B.S. (Pennsylvania),	Philadelphia,	737 Corinthian Ave.
Fanny Rysan Mulford Hitchcock, William Clayton Jacobs,	New York, Philadelphia,	3628 Chestnut St. 706 N. 44th St.
Emory Richard Johnson, M.L. (University of Wisconsin),	Madison, Wis.,	3731 Spruce St.
Samuel E. B. Kinsloe, Frank Warren Klingensmith, A.B. (Thiel),	Philadelphia, do.	Bustleton. Mt. Airy.
Thomas Montgomery Lightfoot, M.S. (Swarthmore),	do.	5025 Green St., Germantown.
Archibald McCullagh, Jr., A.B. (Pennsylvania),	Worcester, Mass.,	2012 Race St.
Clifton Maloney, A.B. (Pennsylvania),	Philadelphia,	625 N. 15th St.
David Mandel, Jr., Ph.B. (Pennsylvania),	do.	717 Walnut St.
Louis Joseph Matos, M.E. (University of Missouri),	do.	3943 Fairmount Ave.
Jesse Hamor Michener, Caspar Wistar Miller, Ph.B. (Pennsylvania),	do. Media,	Wissinoming. 26 S. 38th St.
John Percy Moore, B.S. (Pennsylvania),	Philadelphia,	3740 Powelton Ave.
Kathleen Carter Moore,	do.	3740 Powelton Ave.
Lewis Baxter Moore, A.B. (Fisk University),	do.	1509 Pine St.
William Joseph Moran, A.B. (Villanova),	do.	Wissinoming.
Andrew Jackson Morrison,	do.	1430 N. 7th St.

Samuel Walker Morton, M.D. (Pennsylvania),	Philadelphia,	1509 Pine St.
Dana Carleton Munro, A.M. (Brown),	do.	4504 Chester Ave.
Lois Macy Otis, B.S. (Cornell University),	do.	1532 Arch St.
Francis Clifford Phillips, A.M. (Pennsylvania),	Allegheny,	344 Ridge Ave.
Josiah Harmar Penniman, A.B. (Pennsylvania),	Philadelphia,	4322 Sansom St.
Mary Engle Pennington, Lyman Pierson Powell, A.B. (Johns Hopkins),	do.	3908 Walnut St.
Rev. John Richelsen, A.B. (Bloomfield Seminary),	Madison, Wisc.,	3740 Spruce St.
William Hershey Righter, Ph.B. (Pennsylvania),	Philadelphia	867 Corinthian Ave.
William Benjamin Roskam, Ph.B. (Pennsylvania),	do.	3801 Spruce St.
William Henry Samuel, A.M. (C. H. S.),	do.	1423 N. 15th St.
Frank Earle Schermerhorn, Ph.B. (Pennsylvania),	do.	2505 N. 12th St.
Richard Conrad Schiedt, A.M. (Calvin College),	Philadelphia,	824 N. Broad St.
Adeline Frances Schively, Sam'l Christian Schmucker, A.B. (Muhlenberg),	Lancaster.	
Ellis Anstett Schnabel, A.M. (Lehigh),	Philadelphia,	1503 Centen. Ave.
Isaac Joachim Schwatt, Edgar Arthur Singer,	Indiana.	
Edgar Arthur Singer, Jr., B.S. - (Pennsylvania),	Philadelphia,	615 N. 11th St.
Homer Smith, A.B., (Amherst),	Mitau, Russia,	504 Spruce St.
John Lammey Stewart, Ph.B. (Pennsylvania),	Philadelphia,	4662 Penn St.
David Heist Stout, George H. Stout,	do.	4662 Penn St.
Eleanor Tibbetts, A.B., (Antioch College),	do.	3912 Pine St.
Rev. Philip Vollmer, A.M. (Bloomfield Seminary),	do.	1726 S. 15th St.
Richard Ware, D.C., (Johns Hopkins),	do.	2114 Uber St.
William Franklin Watson, A.M., (Colby),	do.	3746 Powelton Ave.
Henry Jacob Weber, Walter Edward Weyl, Ph.B. (Pennsylvania),	do.	3350 Walnut St.
	do.	1814 Wharton St.
	Washington, D. C.,	4124 Chester Ave.
	Greenville, S. C.	3917 Pine St.
	Philadelphia,	1824 S. 10th St.
	do	836 N. 5th St.



James Monroe Willard,	Bethayres.	
Lucy Langdon Williams,	Philadelphia,	220 St. Mark's Sq
Thomas Worcester Worrell,	do.	Tacony St., Fk'd.
		Total, 78.

## SPECIAL STUDENTS.

Mary Ann Albertson,	Philadelphia,	3940 Brown St.
Peter Altpeter, A.B. (Thiel),	Rochester, N.Y.,	Episc. Div. Sch.
Elizabeth Allen Atkinson,	Three Tuns,	5146 Gt'n Ave.
Harriet Stark Chase Atwater,	Philadelphia,	3816 Spruce St.
Jessie Sarah Bagg,	do.	1637 S. Broad St.
Benjamin Franklin Battin, A.B. (Swarthmore),	Swarthmore.	
David Hendricks Bergey, B.S., M.D. (Pennsylvania),	North Wales.	
Rev. George Sherman Burrows, A.B. (Kenyon),	Brockport, N.Y.,	Episc. Div. Sch.
George Bosworth Churchill, A.M. (Amherst),	Philadelphia,	8 S. 12th St.
Alexander Renshaw DeWitt, LL.M. (Pennsylvania),	do.	44th and Osage Ave.
Lindee Walton Crawford,	do.	1335 Marshall St.
Elizabeth Drinker Storer, A.B. (Vassar),	Cincinnati, O.,	3350 Walnut St.
Maurice Fels, A.B., (Johns Hopkins),	Philadelphia,	1312 Franklin St.
Charles Abram Field, A.B. (Roanoke College),	Fishersville, Va.,	Lutheran Theol. Seminary.
Dallett Fuguet, A.B. (Pennsylvania),	Philadelphia,	1128 Spruce St.
William Marshall Harrison, A.M. (Kenyon),	do.	Episc. Hospital.
Joseph Head, D.D.S., M.D. (P.D.C.), (Pennsylvania),	do.	1626 Chestnut St.
Charles Hoffman, A.M. (Pennsylvania),	do.	729 Walnut St.
Wilhelmina Rachel Jastrow,	do.	925 N. 8th St.
John Jacob Kline, A.M. (Muhlenberg),	New Hanover.	
Ernest Theo. Kretschmann, Ph.D. (Pennsylvania),	Philadelphia,	Trappe, Pa.
Theodore Wm. Kretschmann, Ph.D. (Pennsylvania),	do.	Chestnut Hill.
Minerva McChain, A.B., (Cornell University),	do.	107 W. Walnut Lane, Gt'n.
Joseph MacGregor Mitcheson, A.B. (Pennsylvania),	do.	1608 Locust St.
William Stuart Morris, A.B., (Pennsylvania),	do.	1514 Spruce St.
Joseph Sakernoshin Motoda, A.B. (Kenyon),	Kurume, Japan,	Episc. Div. Sch.

Edward Warloch Mumford, Ph.B. (Pennsylvania),	Philadelphia,	1401 N. 17th St.
Adam Laubenstein Ramer, A.B. (Muhlenberg),	do.	Mt. Airy.
William Frederick Rick, A.B. (Thiel),	Utica, N. Y.,	Luth. Div. Sch.
James Irwin Robb, A.B.	Bryn Mawr.	
John Franklin Shields, B.S. (Penna. State Coll.),	Chester, Pa.,	229 E. 5th St.
George Hughes Smith, Ph.D. (Pennsylvania),	Philadelphia,	1530 Diamond St.
Luther Jonas Smith, A.B., (Thiel),	Wadsworth, O.,	Episc. Div. Sch.
Abraham Lincoln Spencer, Florence Elizabeth Stryker,	Philadelphia,	3208 Sansom St.
John Bellis Van Fleet, A.B., (St. Stephen's Coll.),	Burlington, N. J.	
Walter Loring Webb, C.E., (Cornell University),	Philadelphia,	Episc. Div. Sch.
Julia Elma Wilcox,	do.	3913 Pine St.
Lee Huntington Young, A.B. (Kenyon),	do.	1702 Arch St.
	Gambier, O.,	Episc. Div. Sch.
		Total, 39.

## 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 1892-93 instruction in the various subjects is offered as follows:

## AMERICAN ARCHÆOLOGY AND LINGUISTICS.

Professor DANIEL G. BRINTON.

I. *Archæology*:

	Hours per Week.
(a) Methods of Archæological Explorations . . . . .	
(b) Characteristic Remains in the leading Archæological Provinces of North and South America . . . . .	
(c) Relations of Archæology to Ethnography . . . . .	



II. *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 FRANCIS N. THORPE.

- (1) The Growth of Constitutional Government in the United States . . . . . 2
- (2) The Comparative Study of Government in the States of the Union . . . . . 2

Professor JOHN BACH MCMASTER.

- (1) Economic and Political History of the United States . . . . . 4
- "Saturday Class" in the above, for Graduates and Special Students . . . . . 1

BOTANY.

Professor JOHN M. MACFARLANE.

- (1) Comparative Morphology of the leading Natural Orders of Plants . . . . . 3
- Laboratory Work on the above . . . . . 9

Professor JOSEPH T. ROTHROCK.

- (1) Systematic Botany
  - (2) Economic Botany
  - (3) Medical Botany
- } at least . . . . . 15

These courses are omitted for 1892-93.

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 . . . . . I
- (2) Synthetic Organic Chemistry . . . . . I
- (3) Analytical Chemistry . . . . . I
- Seminar . . . . . I
- Laboratory Work . . . . . I

Hours  
per Week.

- Instructor WALTER J. KEITH.  
 (a) Organic Chemistry . . . . . I  
 Instructor LEE K. FRANKEL.  
 (b) History of Chemistry . . . . . I

COMPARATIVE PHILOLOGY AND SANSKRIT.

Professor MORTON W. EASTON.

- (1) Sanskrit Grammar and Readings . . . . . 2  
 (2) Çakuntâla and the Veda . . . . . 2  
 (3) Linguistics and Comparative Philology of the Indo-European Languages, with especial reference to Phonetics . . . . . 2  
 (4) Old Iranian Grammar and Selections from the Avesta... 2  
 (5) Special instruction, not connected with any of the above courses, in the Old Persian text of the Behistûn Inscription is offered to students of Assyriology . . . . . I

ENGLISH.

Professor MORTON W. EASTON.

I. *English Language* :

- (1) English Philology. Lectures on Phonetics, with special reference to English Sounds . . . . . 2  
 (2) Anglo-Saxon—Sweet's Reader, Sievers' and March's Grammars, Bëowulf . . . . . 2

Professor FELIX E. SCHELLING.

II. *English Literature* :

- (1) Modes of Modern Poetic Thought and Expression . . . . . 2  
 (2) The Theory and History of English Versification . . . . . 2  
 (3) Origin and History of the English Drama . . . . . 2  
 (4) Principles of Dramatic Structure in their Application to the English Drama . . . . . 2

Lectures in all four divisions of Course II are supplemented by Seminary Work.

Courses 1 and 2 under II are omitted in 1892-93.

EUROPEAN HISTORY.

Associate Professor JAMES H. ROBINSON.

- I. France in the latter half of the Eighteenth Century, with especial reference to the Development of Political Speculation . . . . . 2

Assistant Professor EDWARD P. CHEYNEY.

- II. English Social and Economic History from the Fourteenth to the Eighteenth Century . . . . . 1½



## EXPERIMENTAL PSYCHOLOGY.

Lecturer LIGHTNER WITMER.

- |  |   |
|--|---|
| (1) Experimental Psychology. Lectures and Laboratory Work . . . . .                  | 3 |
| (2) Psychological Æsthetics. Lectures, with Demonstrations and Experiments . . . . . | 2 |

## GERMANIC LANGUAGE AND LITERATURE.

Professor OSWALD SEIDENSTICKER.

- |   |   |
|---|---|
| (1) Gothic Grammar and Readings in Ulfilas . . . . .                    | 2 |
| (2) Middle High German Grammar and Readings in the Nibelungen . . . . . | 2 |

## GREEK LANGUAGE AND LITERATURE.

Professor WILLIAM A. LAMBERTON.

- |   |   |
|---|---|
| (1) Critical Study of the Greek Drama . . . . .                         | 2 |
| (2) Lectures on Greek Syntax . . . . .                                  | 1 |
| (3) Plato's Republic; chiefly as an exercise in rapid reading . . . . . | 2 |

## LATIN LANGUAGE AND LITERATURE.

Lecturer HENRY W. ROLFE.

- |  |   |
|--|---|
| (1) Selections from the Letters and Orations of Cicero, with especial reference to the Fall of the Roman Republic and the causes thereof . . . . . | 2 |
|--|---|

## LEGAL INSTITUTIONS—HISTORY AND DEVELOPMENT.

Professor JAMES PARSONS.

- |   |   |
|---|---|
| (1) Roman Law and Jurisprudence . . . . . | 1 |
|---|---|

## MATHEMATICS.

Assistant Professor EDWIN S. CRAWLEY.

- |                                  |   |
|----------------------------------|---|
| (1) Higher Plane Curve . . . . . | 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) Projective Geometry . . . . .  | 2 |
| (4) Quaternions . . . . .  | 2 |
| (5) Modern Higher Algebra . . . . .  | 2 |
| (6) Differential Equations . . . . .   | 2 |
| (7) Theory of Functions . . . . .  | 2 |
| (8) Seminar . . . . .  | 1 |

MINERALOGY AND GEOLOGY.

Instructor AMOS P. BROWN.

- |   |   |
|---|---|
| (1) Mineralogy and Crystallography . . . . .  | 3 |
| (2) 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 |
| (3) Geology Practicum . . . . .   | 3 |

POLITICAL ECONOMY.

Professor SIMON N. PATTEN.

- |   |   |
|---|---|
| (1) History of Political Economy . . . . .                            | 2 |
| (2) Recent Development of Political Economy . . . . .                 | 2 |
| (3) Seminary of Political Economy (every other week) . . . . .        | 2 |
| (4) Advanced Course for the Investigation of Special Topics . . . . . | 3 |

POLITICAL SCIENCE.

Professor EDMUND J. JAMES.

- |  |   |
|--|---|
| (1) Finance . . . . .  | 1 |
| (2) General Political Science . . . . .                                      | 1 |
| (3) Educational Administration . . . . .                                     | 2 |
| (4) Railroad Transportation (Seminary work only, every other week) . . . . . | 2 |

NOTE.—The course in Constitutional Law of the United States given to Arts and Science Seniors in the College Department, is also open to Department of Philosophy students, as is also the course in Municipal Government given to the Seniors in the Wharton School. Time per week devoted to each course . . . . . 2

PHILOSOPHY.

Professor GEORGE S. FULLERTON.

- |  |   |
|--|---|
| (1) History of Philosophy . . . . .        | 2 |
| (2) General Psychology . . . . .           | 2 |
| (3) Discussion of Special Topics . . . . . | 2 |

Lecturer WM. ROMAINE NEWBOLD.

- |                                  |   |
|----------------------------------|---|
| (1) Philosophy of Kant . . . . . | 2 |
| (2) Ethics . . . . .             | 2 |

PHYSICS.

Professor GEORGE F. BARKER.

- |  |   |
|--|---|
| (1) Theory and Practice of Spectroscopy (First Term) . . . . . | 2 |
|--|---|



	Hours per Week.
(2) Sound and Light . . . . . (First Term) . . . . .	2
(3) Electricity and Magnetism (Second Term) . . . . .	2
(4) Theory of Potentials . . . . .	1
(5) Physical Investigations . . . . .	1

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
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#### ROMANCE PHILOLOGY AND LITERATURE.

Assistant Professor HUGO A. RENNERT.

(1) Old French . . . . .	2
(2) History of French Literature . . . . .	1
(3) Old Provençal . . . . .	1
(4) Old Spanish . . . . .	1

#### SEMITIC LANGUAGES AND LITERATURE.

Professor MORRIS JASTROW, JR.

##### *General Semitic Grammar:*

(1) Critical Study of the Semitic Noun, with especial refer- ence to the theories of Lagarde and Barth (Second Term) . . . . .	1
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Professor MORRIS JASTROW, JR.

##### I. *Arabic:*

(1) Elements of Arabic Grammar, with Selected Readings. Selected Suras from the Koran. . . . .	2
(2) Prose and Poetical Selections from the Beirut Chres- tomathy . . . . .	1
(3) Abd el Malik Ibn Hischam's Life of Mohammed (Second Term) . . . . .	1

Professor HERMANN V. HILPRECHT.

##### II. *Ethiopic:*

(1) Interpretation of Dillman's <i>Chrestomathia Æthiopica</i> . . . . .	1
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Professor HERMANN V. HILPRECHT.

##### III. *Assyriology:*

(1) Assyrian Grammar and Historical Development of Cune- iform Writing. . . . .	2
(2) Interpretation of Selected Assyrian Texts. . . . .	1

	Hours per Week.
(3) Interpretation of Winckler's <i>Allbabylonische Keilschrift- texte</i> . . . . .	1
(4) Interpretation of Evett's <i>Inscriptions of the Reigns of Evil—Merodach, Neriglissar, and Laborosoarchod</i> . . . . .	1
(5) The Public and Domestic Life of Ancient Babylonia, with interpretations of objects in the Museum (First Term) . . . . .	1
(6) Assyrian Seminar: Exercises in deciphering Original Clay Tablets. <i>Privatissime sed gratis</i> . . . . .	1

REV. ALBERT TOBIAS CLAY (Fellow in Assyriology).

(1) Review of Grammar, and Practical Exercises in Read- ing Cuneiform Inscriptions . . . . .	2
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Professor JOHN P. PETERS.

IV. *Hebrew* :

(1) Hebrew Grammar, comparatively studied ; for advanced students only . . . . .	1
(2) Lyric Poetry of the Hebrews . . . . .	2
(3) Geography and Archæology of the Old Testament . . . . .	1
(4) Questions in the Religion and History of the Hebrews . . . . .	1
(5) Seminar for Pentateuchal Study . . . . .	

PROFESSOR MORRIS JASTROW, JR.

(1) Elementary Course in Hebrew. Selections from Genesis and the Book of Kings . . . . .	2
(2) Philological Study of the Book of Lamentations . . . . .	1

Professor MORRIS JASTROW, JR.

V. *Post-Biblical Literature* :

(1) The Treatise Pirkê Aboth (Sayings of the Fathers), ed. Strack . . . . .	1
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Professor MORRIS JASTROW, JR.

VI. *Phœnician* :

(1) Semitic Epigraphy: Selected Phœnician Inscriptions from the Corpus Inscriptionum Semiticarum . . . . .	1
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Professor MORRIS JASTROW, JR.

VII. *Syriac* :

(1) Elements of Syriac Grammar, with Selected Readings . . . . .	1
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ZOÖLOGY.

Professor HARRISON ALLEN.

I. *Comparative Anatomy and Zoölogy* :

(1) The Mechanism of Locomotion . . . . .	2
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## DEPARTMENT OF PHILOSOPHY.

	Hours per Week.
(2) Mammalian Neurology and Craniology . . . . .	2
Professor JOHN A. RYDER.	
II. <i>Comparative Embryology</i> :	
(1) Comparative Histology; supervision and laboratory work . . . . .	12
(2) Comparative Embryology; supervision and laboratory work . . . . .	12
Professor HORACE JAYNE.	
III. <i>Vertebrate Morphology</i> :	
(1) The Osteology of the Mammalia . . . . .	4

## 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 :
  1. American Archæology and Linguistics.
  2. American History—Political and Constitutional.
  3. Botany.
  4. Chemistry.
  5. Comparative Philology and Sanskrit.
  6. English Language and Literature.
  7. European History.
  8. Experimental Psychology.
  9. Germanic Philology and Literature.
  10. Greek Language and Literature.
  11. Latin Language and Literature.
  12. Legal Institutions—History and Development.

13. Mathematics.
14. Mineralogy and Geology.
15. Political Economy.
16. Political Science.
17. Philosophy.
18. Physics.
19. Romance Philology and Literature.
20. Semitic Languages and Literature.\*
21. Zoölogy.

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.

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.

#### 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.

A detailed account of the courses offered in this department is given in the February number of the University of Pennsylvania *Bulletin*, which will be sent on receipt of twenty cents.

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\* 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.



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Starbuck, J. Clinton,	Philadelphia,	Walter D. Green.
Steelman, Philip S.,	Bakersville, N. J.,	University.
Stein, William N.,	Shenandoah,	James Stein.
Steiner, J. Goodwin, A.M. (Leb. Val. Coll.),	Brookville,	University.
Stewart, William T.,	Philadelphia,	University.
Sudler, Foster, Ph.B. (Dick- inson),	Sudlersville, Md.,	A. E. Sudler.
Swartzlander, Frank B.,	Doylestown,	F. Swartzlander.
Taggart, Howard M., Ph.G.,	Philadelphia,	W. S. Stewart.
Taylor, Alonzo Englebert,	Alden, Iowa,	University.
Taylor, T. Clarkson, Ph.G.,	Wilmington, Del.,	University.
Taylor, J. Gurney,	Burlington, N. J.,	R. H. Harte.
Thomas, W. Hersey, A. B. (C.H.S.),	Philadelphia,	W. M. McIntosh.
Tinker, Guert M., A.B. (Thiel Col.),	Sharon,	Griswold and Heil- man.
Todd, George M.,	Columbiana, Ohio	University.
Trimbath, Walter P.,	Everett,	Drs. Schooley, Stewart and Ca- rothers.
Upham, John H. J.,	Philadelphia,	University.
Urtecho, Rafael,	Rivas, Nicaragua,	University.
Veith, Charles A.,	Pottsville,	D. W. Bland.
Venn, J. Harry, Ph.G.,	Memphis, Tenn.,	University.
Voss, William,	Gloucester, Mass.,	University.
Warren, Stanley S.,	Shelbyville, Tenn.,	University.
Weber, Charles H.,	Philadelphia,	J. Weber.
Weil, Samuel D.,	Calhoun, Ky.,	D. D. Robertson.
Welker, Franklin, A.B. (U. of Rochester),	Attica, N. Y.,	E. B. Angell.
Wendell, W. Guthrie,	Philadelphia,	University.
Wenrich, George G.,	Wernersville,	Wenrich & Deppen.
White, Charles E.,	Wilmington, Del.,	University.
Wilson, Andrew J., B.S. (Bethany),	Wheeling, W. Va.	L. D. Wilson.
Wilson, James F., A. B. (C. H. S.),	Philadelphia,	S. M. Wilson.
Woolley, Scudder J., Ph.G.,	Long Branch, N. J.,	University.
Wray, William S.,	Germantown,	University.

Name.	Post Office.	Preceptor.
Wright, Barton L., Zerfing, Charles E.,	Philadelphia, Ashland,	University. J. L. Hoffman.

Students of the Second Year, 264.

## FIRST YEAR.

Name.	Post Office.	Preceptor.
Allison, Edwin E., Alvey, Thomas G., Anthony, Isham H., A. B. (Fiske), Armstrong, Alexander, Armstrong, John P., B.S., Auten, Frank E., B.S., Bailey, William J., Balderstone, Stephen V.	Washington, Ocean Grove, N. J., Brownsville, Tenn., Trenton, N. J., Newark, Del., Monticello, Ill., New Glasgow, N. S., North Wiltshire, P. E. I., Point Pleasant, W. Va., New Bloomfield, Youngstown, Wilmington, Del., Telford, Lebanon, Wilkes-Barre,	University. University. University. Charles B. Leavitt. C. Henry. George A. Hall. University. University. University. A. R. Barbee. University. W. N. Smith. P. W. Tomlinson. J. E. Bauman. A. B. Gloninger. D. B. Birney and C. S. Beck. William Skinner.
Barbee, Hugh A., Barnett, Robert T., Barrett, Thomas J., Barrett, Walter K., Bauman, J. Warren, Beattie, John, Beck, Horace P., Bellot, Claude H. L., Betton, George W., Bishop, John S., Blair, J. Edward, Blanchard, George A., A.B. (Williams), Bostic, John, Breath, Walter P., Bradley, D. Cameron, Braucht, Harvey S., B.S., Brown, Harry H., Brown, Harry M., Brunn, Harold,	Roseau, Dominica, W. I., Tallahassee, Fla., Snow Hill, Md., Latrobe, Hudson, N. H., Kahoka, Mo., Galveston, Texas, Philadelphia, Coburn, Philadelphia, Philadelphia, San Bernardino, Cal., Waymart, Columbia, Port Gibson, Miss., Crown Point, N. Y., Pottstown, Philadelphia, Trinidad, Col.,	G. Betton Massey. Charles P. Jones. Geo. B. Anderson. University. J. R. Bridges. University. University. C. S. Musser. University. University. University of Cali- fornia. University. University. University. Dr. McCurry. F. W. Van Buskirk. D. B. Birney. Henry Palmer and Geo. W. Robinson.



Name.	Post Office.	Preceptor.
Burt, N. Howard,	Bridgeton, N. J.,	University.
Butler, Rodman,	Augusta, Ga.,	University.
Campbell, George R., A.B. (Colby.),	Waterville, Me.,	H. H. Campbell.
Carlisle, Henry L.,	Phillipsburg,	S. F. Lytle.
Carroll, Martin L.,	Tower City,	C. M. Rickert.
Chain, George A.,	Philadelphia,	University.
Chakaloff, George N.,	Samokov, Bulgaria,	S. W. Morton.
Child, Scott P., Ph.B. (Oberlin),	Grand Rapids, Mich.,	University.
Cisler, Louis H., Ph.B. (Marietta),	Marietta, Ohio,	B. F. Hart.
Clark, Colin R.,	Mandan, N. Dak.,	David B. Birney.
Coley, Thomas L.,	Philadelphia,	James Collins.
Coll, Hugh J.,	Connellsville,	University.
Connell, E. Dewitt,	Hillsboro', Ore.,	University.
Contrell, Robert Graham,	Newark, N. J.,	University.
Cooper, Francis L.,	Philadelphia,	University.
Cooper, Hamilton W.,	Wisacky, S. C.,	Drs. Bossard and Baker.
Corson, Elton S., A.B.,	Marmora, N. J.,	University.
Craig, Henry D.,	Mauch Chunk,	University.
Crowley, Joseph W.,	Philadelphia,	University.
Davies, William T., Jr.,	Towanda,	University.
Davis, Richard, M.A.,	Salem, N. J.,	B. A. Waddington.
Davis, William T.,	Camden, N. J.,	W. A. Davis.
Dechert, Harry W.,	Schuylkill Haven,	Daniel Dechert.
Dennis, J. Benjamin, A.B. (C. H. S.),	Philadelphia,	C. Wirgman.
Denslow, Walter B.	Wellsville, Ohio,	University.
Diaz, Charles P., A.B.,	Matanzas, Cuba,	University.
Dill, George M.,	York Springs,	University.
Dingee, William H.,	Philadelphia,	University.
Donaldson, Harry J.,	Williamsport,	J. A. Klump.
Downing, Thomas F.,	Moundsville, W. Va.,	J. H. Hartigan.
Downs, Robert Norton, Jr.,	Germantown,	University.
Drake, Ellwood L.,	Philadelphia,	University.
Draper, Alexis Lumb,	Boston, Mass.,	University.
Dunn, Paul,	Mahanoy City,	Louis Weber.
Eaton, Clark D.,	Berwick,	University.
Eccles, John,	Battle Creek, Mich.,	University.
Ellis George W.,	Philadelphia,	A. W. Miller.
Ellis, Guilherme, Jr.,	Sao Paula, Brazil,	Guilherme Ellis.
Ellis, Henrique,	Sao Paula, Brazil,	Guilherme Ellis.
Emery, William H.,	Hickory,	Drs. McElroy and Campbell.
Engeman, Edward J.,	Brooklyn, N. Y.,	University.
Fargo, Joseph C.,	Augusta, Ga.,	University.
Filbert, Charles E., A.B. (Pennsylvania),	Pine Grove,	Dr. Conrad.
Fischer, Stephen,	Mt. Oliver,	L. F. Flick.

Name.	Post Office.	Preceptor.
Fisler, Harry Cattell, A. B. (Lafayette),	Easton,	J. D. Updegrave.
Fleming, Anthony,	Dundas, Ont.,	University.
Flexer, George A.,	Allentown,	Daniel Hiestand.
Fleckenstine, Horace,	Glenolden,	M. A. Wood.
Fretz, Alfred E.,	Sellersville,	C. D. Fretz.
Frew, George W. H.,	Paradise,	University.
Fritz, Clarence Henry,	Philadelphia,	J. H. Musser.
Fuller, Frank J.,	Potsdam, N. Y.,	J. S. McKay.
Fuller, George H., A. B. (Allegheny),	Garrettsville, Ohio,	University.
Gallagher, Gerald P., B.S. (Fordham),	Williamsport,	T. S. Rich.
Galloway, Charles A., A. B. (C. H. S.),	Philadelphia,	University.
Gans, Sigmund L.,	Philadelphia,	Thos. G. Morton.
Gardner, E. Roy,	Easton,	Thomas Zulick.
Garrett, Harry W.,	Orwigsburg,	University.
Gay, Alexander S.,	Village Green,	W. S. S. Gay.
Gerlach, Richard F.,	Trenton, N. J.,	University.
Gibby, Herbert B., A. B. (Princeton),	Princeton, N. J.,	University.
Gilbride, John J.,	Hawley,	Richard Gibbons.
Gillespie, Martin S.,	Edinboro',	S. B. Hotchkiss.
Gilligan, John H.,	Wilkes-Barre,	University.
*Gittings, J. Claxton,	Philadelphia,	J. B. H. Gittings.
Glasgow, S. McPheeter,	Lexington, Va.,	University.
Goldensky, Henry,	Philadelphia,	University.
Gomberg, Max B.,	Providence, R. I.,	Dr. Anthony.
Graves, Charles T., M.E. (S. W. S., N. S.),	Washington,	J. Y. Scott.
Greenleaf, Henry Simpson,	Washington, D. C.,	Johns Hopkins University.
Griggs, Joseph F., A. B. (West. Univ., Penna.),	Pittsburgh,	University.
Hamilton, John,	Los Angeles, Cal.,	University.
Hamilton, William A.,	Philadelphia,	Robert McCreight.
Hannum, William R.,	Wake Forest, N. C.,	J. B. Powers.
Harrington, Timothy L., B.S. (Univ. Wis.),	Oshkosh, Wis.	University.
Harris, Frank D.,	Philadelphia,	University.
Harris, Irving E., Ph.B. (Rochester),	Rochester,	University.
Hartman, Irvin H.,	Leinbach's,	University.
Harvey, Edwin H., M.E.,	Leesport,	University.
Hawke, Edward S.,	Hopewell, N. J.,	E. P. Hawke.
Hayes, William J.,	Worcester, Mass.,	University.
Hays, George L.,	Ashton, Mo.,	University.
Heller, Edwin A.,	Philadelphia,	L. W. Steinbach.
Hemphill, Joseph, Jr.,	West Chester,	Isaac Massey.

\*Pursuing the Four-year Course of study.



Name.	Post Office.	Preceptor.
Henry, John Norman,	Philadelphia,	University.
Hickman, W. Atlee,	Philadelphia,	N. Hickman.
Higgins, Aubrey F.,	Germanstown,	University.
Higgins, Frank J.,	Pittston,	University.
High, Frank G., B.S. (Amherst),	Pittsburgh,	James and Thomas McCann.
Hoffman, Miles A.,	Rosemont,	Thos. Stellwagon.
Hollister, Charles M., A.B. (Williams),	Cambridge, N. Y.,	University.
Hopkins, Frank,	Warm Springs, Va.,	University.
Hopkins, Samuel W.,	Bloomington, Ill.,	LeRoy S. Hopkins.
Hornbeck, James L.,	Catasauqua,	M. E. Hornbeck.
Horsky, Rudolph,	Helena, Mont.,	Henry Beates, Jr.
Howe, Harry D., B.S.,	Hampton, Va.,	Cornell University.
Hurd, Albert G., A.B. (Colby),	Westminster, Mass.,	University.
Huston, David T.,	Philadelphia,	University.
Irwin, George R.,	Clearfield,	University.
Irwin, James W.,	Philadelphia,	University.
Irwin, Robert A.,	Knoxville, Tenn.,	University.
Irwin, Robert S.,	Newtown,	C. B. Smith.
Jamison, Hugh D.,	Greensburg,	University.
Jones, R. S. Preston,	Collingswood, N. J.,	University.
Judd, Charles H.,	Buffalo, N. Y.,	University.
Kalloch, H. Knapp, A.B.,	New Whatcom, Wash.,	University.
Kalteyer, Fred J.,	San Antonio, Texas,	University.
Keiter, Ira A.,	Williamstown,	University.
Kennedy, Louis T.,	Pottsville,	J. Harry Swaving.
Kercher, Delno E., A.B. (Iowa),	Leona, Kans.,	University.
Kerlin, Isaac A., Jr., A.B.,	Elwyn,	J. Kerlin.
Kern, William Weber,	Philadelphia,	William M. Kern.
Keylor, Walter N., B.E.,	Nine Points,	Ingram E. Burt.
King, Willis E.,	Ithaca, N. Y.,	J. W. Winslow.
Kinner, George M.,	Towanda,	University.
Kistler, Clinton J., M.E.,	Germansville,	W. K. Kistler.
Klinck, George S.,	Utica, N. Y.,	J. G. Kilbourn and H. S. Quin.
Knapp, Lewis P.,	Armonk, N. Y.,	University.
Koch, James L.,	Leetonia, Ohio,	O. A. Rhodes.
Koch, Otto Andrew, A.B.,	Philadelphia,	James Simpson.
Koons, Harry S., B.S. (Audenreid),	Audenreid,	D. W. Mears.
Koonz, William,	Philadelphia,	University.
Kopf, J. Benjamin,	Wilmington, Del.,	University.
Laidley, John C.,	Carmichael's,	J. B. Laidley.
Lallou, James H.,	Philadelphia,	University.
Lamborn, Cary Lee, A.B. (Lincoln),	Avondale,	University.
Laughlin, John P.,	Indiana,	University.

## MATRICULATES.

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Name.	Post Office.	Preceptor.
Leamy, Le Barre Jayne,	Philadelphia,	J. Wm. White.
Leary, Montgomery E., B.A.	Rochester, N. Y.,	Fred. Pennington and J. L. Hatch.
(Rochester),		Stephen R. Jen-
Ledwell, Richard J.,	Charlottetown,	kins.
	P. E. I.,	University.
Leeke, Harry L., Ph.G.,	Baltimore, Md.,	Joseph Leidy, Jr.,
Leidy, C. Maury,	Philadelphia,	Charles S. Dolley
Levi, Joseph N.,	Rochester, N. Y.,	and M. J. Green-
		man.
Lewis, Charles, A.B.	Frostburg,	University.
(Wash. and Jefferson),		
Lichty, Milt. J., Ph.B.	Glade,	M. B. Gault.
(Mt. Union),		
Lindsay, Roland S., A.B.	Philadelphia,	University.
(C.H.S.),		
Livingood, Louis E., A.B.	Reading,	W. F. Muhlenberg.
(Princeton),		
Logue, William P.,	Williamsport,	B. H. Detwiler.
Loucks, Meade M., A.B.	Scottdale,	University.
(Wash. and Jefferson),		
Lyon, Leslie Clyde,	Williamsport,	Edward Lyon.
Marvel, Emery, Jr.,	Dover, Del.,	Philip Marvel.
Maitland, D. Lewis,	Middletown, Conn.,	Robert M. Clark.
Malaun, Murvington E., B.E.,	Hampton,	R. N. Meisenhelder.
Mann, Enos S.,	Columbia,	M. L. Herr.
Maris, Willard L., B.S.	Philadelphia,	Isaac Massey.
(Univ. Mich.), and		
M.S. (Swarthmore),		
Mattern, William K., Jr.,	Philadelphia,	Wm. K. Mattern.
Meanor, William C.,	Greensburg,	University.
Meck, Charles F.,	Muncy,	James R. Rankin.
Medrick, Raphael F., B.A.	Port Jervis, N. Y.,	H. B. Swartwout.
(Williams),		
Miller, Frank B., B.S.	Philadelphia,	University.
(Ursinus),		
Mintzer, Leonidas C.,	Philadelphia,	University.
Mowery, Samuel E.,	Newburg,	F. B. Lebernicht.
Murphy, James,	Middletown, Conn.,	A. J. Campbell.
Mutschler, Louis H.,	Canandaigua, N. Y.,	University.
Myer, Will W.,	Towanda,	C. K. Ladd.
McCarthy, Daniel J., A.B.	Philadelphia,	John B. Deaver.
(C. H. S.),		
* McConnell, Guthrie,	Philadelphia,	H. R. Wharton.
McCoy, George L.,	Wheeling, W. Va.,	J. W. Hartigan.
McCrory, Harry N.,	Connellsville,	University.
McDowell, Norris S.,	Philadelphia,	John Gillespie, Jr.
McGowan, John A.,	Philadelphia,	H. D. McLean.
McGrath, John T.,	Scranton,	Wm. Hagerty.
McKay, James G.,	Pittsburgh,	I. W. Riggs.

\*Pursuing the Four-year Course of study.



Name.	Post Office.	Preceptor.
McNamee, Bernard A.,	Germantown,	J. Edw. Moore.
McReynolds, Robert P., B.S.	Elkton, Ky.,	J. O. McReynolds.
(Vanderbilt),		
McWhorter, Thomas H.,	Millington, Md.,	University.
Newlove, George,	Philadelphia,	University.
Newton, Le Roy Allen,	Greenfield, Mass.,	M. F. McGrath.
* Norris, Henry, Jr.,	Seal P. O.,	University.
O'Brien, Michael,	Wilkes-Barre,	W. J. O'Brien.
Off, William Louis,	Philadelphia,	University.
Ohnesorg, Karl,	Bridgeport, Conn.,	D. R. Beaver.
Parker, Herman B.,	Bryn Mawr,	University.
Partridge, Herbert G., A.B.	West Dedham, Mass.,	University.
(Brown),		
* Patterson, Francis D.,	Chestnut Hill,	J. William White.
Pendleton, Arthur S.,	Warrenton, N. C.,	P. J. Macon.
Perry, George B.,	Scranton,	W. G. Fulton.
Petersen, Alfred C. N.,	Worcester, Mass.,	University.
Phillips, Lorenzo B.,	Bridgeton, N. J.,	M. K. Elmer.
Porter, William S.,	Oakland, Cal.,	University.
Prall, Samuel O.,	Belvidere, N. J.,	Wm. C. Albertson.
Purves, Geo. Morehouse, A.B.,	Philadelphia,	University.
Quetil, Charles E.,	Chestnut Hill,	University.
Ramsdell, Ernest S.,	Germantown,	University.
Randall, Arthur G., A.B.	N. Attleboro', Mass.,	University.
(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,	University.
Reed, J. Ross,	Lockport,	University.
Reese, George W.,	Centralia,	University.
Rice, T. Harper,	Pottstown,	William J. Davis.
Richards, William L.,	Wilkes-Barre,	University.
Richmond, George N., A.B.,	Greenville, Vt.,	University.
Rigg, Walter A.,	Reading,	S. L. Kurtz.
Riley, John D.,	Shenandoah,	University.
Robinson, George Willis,	Bayou La Chute, La.,	J. L. Kimball and H. C. Deaver.
Robinson, Z. Webster,	Pottsville,	W. H. Robinson.
Roderick, Edward,	Hazleton,	J. C. Heisler.
Rosell, David H.,	Philadelphia,	University.
Rothrock, Harry A.,	West Chester,	University.
Russell, Andrew L., A.B.	Bulger,	J. M. Moore.
(Westminster),		
Savidge, Edgar,	Ridley Park,	University.
Schreiner, Edward R.,	Philadelphia,	University.
Scott, William L., A.B.,	Venice,	University.

\* Pursuing the Four-year Course of study.

MATRICULATES.

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Name.	Post Office.	Preceptor.
Settle, W. Clarence,	Lewistown,	University.
Shaffer, S. Albert,	Lock Haven,	University.
Sharp, Leedom,	St. Paul, Minn.,	Wm. E. Hughes.
Shearer, Christian B.,	Harrisburg,	University.
Sheehan, Thomas P.,	Philadelphia,	University.
Shimer, Sterling D., A.B. (Lafayette),	Freemansburg,	University.
Shoomkoff, Stanislaw, J. Jr., A.B. (U. of Pa.), B.D. (Univ. Chicago),	Sophia, Bulgaria,	L. W. Morton.
* Shope, Samuel Z., B.E.D.,	Harrisburg,	F. Hinkle.
Sickel, Horatio G.,	Philadelphia,	James Collins.
Silva, José Maria,	Managua, Nic.,	University.
Simons, Irving N.,	Waterbury, Conn.,	University.
Simmons, Ernest Romaine D.D.S.,	Philadelphia,	University.
Simonton, Thomas Grier, A.B. (Washington and Jefferson),	Emmitsburg, Md.,	C. H. Jessop.
Simpson, William Albert,	Indiana,	University.
Singley, John D., A.B., (Wash. and Jefferson),	Uniontown,	J. D. Sturgeon.
Slaughter, Charles H. P.,	Philadelphia,	John A. Boger.
Smith, Dennis Kelly, A.B. (Waynesburg),	Elkin,	R. E. Brock.
Snively, A. Barr, A.B. (Johns Hopkins),	Waynesboro',	University.
Snively, Robley D.,	Waynesboro',	I. N. Snively.
Somers, Lucian B. C.,	Linwood, N. J.,	University.
Spear, Raymond,	Norristown,	John C. Spear.
Stacey, Harley James, A.B. (Cornell),	Belleville, N. Y.,	University.
Stadelman, Eugene,	Bala,	University.
Stehley, Paul Haldeman,	Falling Waters, W. Va.,	A. J. Semaster.
Stewart, George W.,	Missoula, Mont.	J. J. Buckley.
Stokes, Thomas P.,	Philadelphia,	University.
Stone, Harry B.,	Galveston, Texas,	University.
Stuart, Hugh C.,	Harrisburg,	H. McGowan.
Stump, William, A.B. (Princeton),	Bell Air, Md.,	University.
Sturgiss, Alfred G., Ph.B. (Marietta),	Marietta, Ohio,	C. W. Eddy.
Sullivan, John E. L., A.B.,	Fall River, Mass.,	University.
Taggart, George M.,	Norristown,	University.
Taylor, Arthur Grant, Ph.B. (Colgate),	Norwich, N. Y.,	L. J. Brooks and T. C. Ely.
Taylor, Alfred H.,	Salt Lake City, Utah,	University.
Thomas, Thomas Turner,	Scranton,	M. J. Williams.
* Trimble, Joseph E.,	Lima,	Samuel Trimble.
Turner, William T.,	Philadelphia,	M. Howard Fussell.

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Name.	Post Office.	Preceptor.
Turpin, Charles J., Ph.B. (Dickinson),	Gloucester, N. J.,	University.
Tyndall, Ira C.,	Georgetown, Del.,	John Hammond
Urtecho, Isidro,	Rivas, Nic.,	University.
Van Horne, Byron G.,	Englewood, N. J.,	University.
Vankirk, Frank S.,	Washington,	J. H. Little.
Wadsworth, William S.,	Philadelphia,	University.
Walker, Thomas Holmes,	Pittsburgh,	University.
Walker, William P.,	Topeka, Kans.,	University.
Walsh, Joseph, A.B.,	Parsons,	University.
Ward, James Melvin, A.M.,	Dempseytown,	University.
Weil, Harry,	Wilkes-Barre,	University.
Weill, Nathan J.,	Titusville,	W. G. Johnston.
Wentz, B. Frank,	New Providence,	W. J. Wentz.
Weyant, Harry,	Philadelphia,	G. Oram Ring.
White, Courtland Y., Jr.	Philadelphia,	Robert McCreight.
White, Frederick A.,	Paterson, N. J.,	University.
Wiborn, John A.,	Rochester, N. Y.,	University.
Wilhelm, Julius M.,	Traverse City, Mich.,	University.
Wilkinson, Charles E.,	Argenta, Ill.,	E. H. Thomas.
Williams, Henry L., A.B. (Yale),	Hartford, Conn.,	University.
Williams, Jos. John Gurney,	Germantown,	University.
Williamson, James.,	Philadelphia,	University.
Williamson, W. Hamilton,	Philadelphia,	University.
Wills, T. Edmund,	Pottstown,	W. J. Davis.
Willson, Harry G.,	Warrensville,	University.
Wilt, William M.,	York,	University.
Wingenbach, Julius F.,	Utica, N. Y.,	C. R. Weed.
* Wood, Horatio C., Jr.,	Philadelphia,	H. C. Wood.
Woods, Harvey W.,	Blain,	F. A. Gutshall.
Woods, Richard F., A.B.,	Philadelphia,	D. F. Woods.
Woodward, Edward B.,	Philadelphia,	H. W. Cattell.
Xander, William O., B.S., (Palatinate),	New Mahoning,	University.
Yaeger, Christian G., A.B. (C. H. S.),	Philadelphia,	John A. Boger.
Zemp, Sidney C.,	Camden, S. C.,	Francis L. Zemp.
Zugsmith, Edwin,	Allegheny,	University.
	Students of the First Year, 310.	

## SPECIAL STUDENTS.

Bertolet, John M.,	Reading,	James W. Keiser.
Coogan, Daniel,	Philadelphia,	University.
Elfers, Henry, D.D.S.,	Hamburg, Ger.,	University.
Hart, Austin S.,	Buffalo, N. Y.,	University.
Rosenthal, David A., D.D.S.,	Philadelphia,	University.
Schaeffer, Otto,	Baltimore, Md.,	J. T. Herbert.

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MATRICULATES.

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Name.	Post Office.	Preceptor.
Seem, Charles J.,	Bangor,	A. A. Seem.
Taylor, Gove S., Ph.G.,	Philadelphia,	M. B. Dwight.
Van Pelt, Harry,	Salem, N. J.,	C. M. Sherron.
Williams, George H.,	Berwyn,	James Aiken.
Witmer, Peter B.,	Palmyra,	University.
		Total, 11.

SUMMARY.

Students of the Fourth Year . . . . .	13
Students of the Third Year . . . . .	252
Students of the Second Year . . . . .	260
Students of the First Year . . . . .	311
Special Students . . . . .	11

Total . . . . . 847

The total number of new matriculates the present session, including those admitted to advanced standing, is 366.

SUMMARY BY STATES.

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Austria . . . . . 1	Japan . . . . . 1	Nova Scotia . . . . . 1
Brazil . . . . . 2	Kansas . . . . . 4	Ohio . . . . . 22
Bulgaria . . . . . 1	Kentucky . . . . . 4	Ontario . . . . . 1
California . . . . . 7	Louisiana . . . . . 2	Oregon . . . . . 1
Canada . . . . . 1	Maine . . . . . 6	Pennsylvania . . . . . 481
Central America . . . . . 1	Maryland . . . . . 16	Prince Edward Island . . . . . 6
Colorado . . . . . 1	Massachusetts . . . . . 19	Rhode Island . . . . . 4
Connecticut . . . . . 6	Mexico . . . . . 4	South Carolina . . . . . 3
Costa Rica . . . . . 1	Michigan . . . . . 8	Tennessee . . . . . 6
Cuba . . . . . 2	Minnesota . . . . . 4	Texas . . . . . 9
Delaware . . . . . 27	Mississippi . . . . . 1	Utah . . . . . 1
District Columbia . . . . . 7	Missouri . . . . . 5	Vermont . . . . . 2
Florida . . . . . 1	Montana . . . . . 4	Virginia . . . . . 7
France . . . . . 1	Nebraska . . . . . 2	Washington . . . . . 2
Georgia . . . . . 5	Nevada . . . . . 2	West Indies . . . . . 2
Germany . . . . . 2	New Hampshire . . . . . 2	West Virginia . . . . . 7
Hayti . . . . . 1	New Jersey . . . . . 58	Wisconsin . . . . . 4
Illinois . . . . . 9	New York . . . . . 40	
Indiana . . . . . 2	Nicaragua . . . . . 6	Total . . . . . 847



## 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 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 six hundred and twelve.

## 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, May 15, and Friday, September 29; 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.

General Biology . . . . .	96	hours.	Histology . . . . .	72	hours.
Mammalian Anatomy . . . . .	144	"	Human Anatomy . . . . .	144	"
Botany . . . . .	288	"	Physiology . . . . .	48	"
Chemistry . . . . .	216	"	Zoölogy . . . . .	96	"
Physics . . . . .	72	"	Embryology . . . . .	72	"

Students who have attended one course in a medical school (not Homœopathic 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 the elements of *General Pathology*. Students who have attended two courses in a regular medical school are admitted to the third year, 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

*Students are earnestly requested to be in attendance at the beginning of the Session, as later entrance is attended with great disadvantage.*

\* 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., Detroit, Mich., St. Louis, Mo., St. Paul, Minn., San Francisco, Cal., Galveston, Texas, Auburn, N. Y., Danville, Va., Knoxville, Tenn., Charlottetown, Prince Edward Island. The names of the examiners will be found on page 28.



*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.

The diplomas of graduates from other schools are not indorsed by the faculty of this school for registration, except after an examination of their holders, similar in all respects to that required of its own students. The fee for such examination is thirty dollars.

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.

Examinations for admission to advanced standing for the session 1893-94 will be held Thursday, September 28, at noon.†

#### COURSE OF STUDY.

The Trustees and Medical Faculty of the University, recognizing that the field of medical study is constantly enlarging, so that it is no longer practicable to give an adequate course of instruction in the limited space of three years, have adopted a *Four-year course, beginning with the session of 1893-94*. It is expected that through this change the student may not only receive more thorough and systematic instruction, but at the same time will be enabled with less burden to himself to assimilate the information imparted.

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 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 as well.

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 Gynæcology, 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, Orthopædic Surgery, Advanced Ophthalmology, Dermatology, Otology, Advanced Hygiene including Bacteriology, Advanced Anatomy, Advanced Physiology, Advanced Pathology, Advanced Medical Chemistry including Toxicology, Pædiatrics, 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 University may attend, without additional charge, the lectures and recitations in any other department, provided that the consent of the Dean of the 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.

*Medical History, Terminology, Ethics, etc.*—One lecture per week.

*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 especial 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, Gynæcology, Diseases of Skin, Eye, Ear, alternating with Physical Diagnosis and Pathological Histology).

Final examinations at the end of the course: Medical Chemistry, Anatomy including Embryology, Physiology and Physical Diagnosis.

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\* 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.  
*Gynæcology.*—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 January 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 January 1, one hour per week clinical lecture.  
*Laryngology.*—One didactic lecture per week after January 1.  
*Genito-Urinary Diseases.*—One hour per week practical instruction, after January 1.  
*General Clinics, Medical and Surgical,* including Philadelphia and Pennsylvania Hospital clinics.  
*Special Clinics* (Nervous Diseases, Pædiatrics, Gynæcology, 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 January 1.
- Operative Obstetrics.*—One hour practice per week until January 1.
- Nervous Diseases and Electro-Therapeutics.*—One clinical lecture per week, one hour per week practical instruction.
- Hygiene.*—One lecture per week.
- Gynæcology.*—One didactic lecture per week, one clinical lecture per week, one hour per week practical instruction.
- Pædiatrics.*—One clinical lecture per week until January 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 January 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.
- Orthopædic Surgery.*—One clinical and didactic lecture per week, one hour per week practical instruction until January 1.
- Genito-Urinary Diseases.*—One hour per week practical instruction after January 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, Gynæcology 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, Orthopædic Surgery, Advanced Ophthalmology, Dermatology, Otology, Advanced Hygiene including Bacteriology, Advanced Anatomy, Advanced Physiology, Advanced Pathology, Advanced Medical Chemistry including Toxicology, Pædiatrics, Genito-Urinary Surgery and Experimental Psychology.

#### TEXT-BOOKS.

##### FIRST YEAR.

##### TEXT-BOOKS.

*Chemistry:* Marshall's First-year Notes; Fownes' Chemistry; Medicus' Qualitative Analysis.

##### COLLATERAL READING.

Wurtz's Elements of Modern Chemistry; Richter's Chemistry.

- Anatomy*: Leidy; Piersol's Text-Book of Histology. Gray; Stirling's Practical Histology; Tyson's Cell Doctrine.
- Physiology*: Waller or Foster. Foster.
- Pathology*: Abbott's Principles of Bacteriology; Leidy's Anatomy; Foster's Physiology.
- Physical Diagnosis*: Tyson.
- Materia Medica*: H. C. Wood; Mann on Prescription Writing. Wood and Bache's Dispensatory.
- Dictionary of Medicine*: Gould.

## SECOND AND THIRD YEARS.

- Medical Chemistry*: Marshall's Second-year Notes; Greene; Tyson's Practical Examination of Urine; Marshall & Smith's Analysis of Urine. Wormley's Micro-chemistry of Poisons, 2d edition; Remsen's Organic Chemistry.
- Anatomy*: Leidy. Gray; Quain; Allen; Foster and Balfour's Elements of Embryology.
- Physiology*: Foster.
- General Pathology and Morbid Anatomy*: Ziegler; Woodhead's Practical Pathology; Abbott's Principles of Bacteriology. Cohnheim's Lectures on General Pathology; Pepper's System of Practical Medicine by American Authors; Sternberg's Manual of Bacteriology; Halliburton's Chemical Physiology and Pathology.
- Therapeutics*: H. C. Wood. Wood and Bache's Dispensatory.
- Surgery*: Ashhurst's Principles and Practice of Surgery; Agnew's Surgery. Ashhurst's International Encyclopædia of Surgery; Wharton's Minor Surgery and Bandaging.
- Clinical Surgery*: An American Text-Book of Surgery; Agnew's Surgery. Treves' Operative Surgery; Martin's Essentials of Surgery and Bandaging.
- Obstetrics*: Lusk's Midwifery. Hirst's System of Obstetrics; Barnes' Obstetrics.
- Gynæcology*: Goodell's Lessons in Gynæcology. Thomas on Diseases of Women; Emmet's Gynæcology.
- Physical Diagnosis*: Tyson.
- Ophthalmology*: Norris and Oliver's Text-Book of Diseases of the Eye.
- Skin Diseases*: Duhring.

## THIRD AND FOURTH YEARS.

- Surgery*: Ashhurst's Principles and Practice of Surgery; Agnew's Surgery. Ashhurst's International Encyclopædia of Surgery; Wharton's Minor Surgery and Bandaging.



- Clinical Surgery*: An American Text-Book of Surgery; Agnew's Surgery. Treves' Operative Surgery; Martin's Essentials of Surgery and Bandaging.
- Obstetrics*: Lusk's Midwifery. Hirst's System of Obstetrics; Barnes' Obstetrics.
- Gynæcology*: Goodell's Lessons in Gynæcology. Thomas on Diseases of Women; Emmet's Gynæcology.
- Diseases of Children*: Starr; Ashby and Wright. Meigs and Pepper; Keating's Cyclopædia of Diseases of Children; J. Lewis Smith's Diseases of Children.
- Medical Jurisprudence*: Taylor's Medical Jurisprudence, by Reese.
- Skin Diseases*: Duhring.
- Practice of Medicine*: A Text-Book of Medicine, edited by Pepper; Osler; Strümpel. Pepper's System of Practical Medicine; Stillé's & Maisch's Dispensatory; Tyson on Bright's Disease and Diabetes; Seiler's Diseases of Throat and Nose.
- Ophthalmology*: Norris and Oliver's Text-Book of Diseases of the Eye.
- Hygiene*: Parks' Practical Hygiene (last edition by Natter). Billings' Ventilation and Heating; Abbott's Principles of Bacteriology.

ORDER OF LECTURES,\* DAILY.—FIRST YEAR.—1893-4.

Hour.	Monday.	Tuesday.	Wednesday.	Thursday.	Friday.	Saturday.
9 A.M.						
10 A.M.	<b>Wormley.</b> Gen. Chem.	<b>Wormley.</b> Gen. Chem.	Chem. Laboratory, 3 hours.	<b>Mitchell.</b> Genl. Symp. and Diag.	Med. History Ethics, etc.	Dissection, or Phila. or Penna. Hospital, Clinics.
11 A.M.	<b>Miller.</b> Materia Medica.	<b>Daland.</b> Phys. Diagnosis. U. H.†		<b>Guiteras.</b> Gen. Pathol.	<b>Harte.</b> Osteol. and Syndesmol.	
12 M.	Prac. Normal Histol. 1 sec. 2 hrs. Others Osteology, or Dissection.	Prac. Normal Histol. 1 sec. 2 hrs. Others Osteology, or Dissection.	Prac. Normal Histol. 1 sec. 2 hrs. Others Dissect.	Prac. Normal Histol. 1 sec. 2 hrs. Others Osteology, or Dissection.	Prac. Normal Histol. 1 sec. 2 hrs. Others Osteology, or Dissection.	Dissection, or Medical and Surgical Clinics, U. H.
1 P.M.						
3½ P.M.	<b>Piersol.</b> Anatomy.	Histol. Demonstrations.	<b>Piersol.</b> Anatomy.	.	<b>Piersol.</b> Anatomy.	
4½ P.M.	<b>Reichert.</b> Physiology.	Bandaging Sections, until Dec. 15.	<b>Reichert.</b> Physiology.	<b>Wharton.</b> Band'g., Lec. until Dec. 15.	<b>Reichert.</b> Physiology.	
5½ P.M.				Bandaging Sections until Dec. 15.	Bandaging Sections until Dec. 15.	
7½ P.M.	Pharmacy Lab. Half the class.				Pharmacy, Lab. Half the class.	

For the study of Histology, Osteology and Syndesmolology, 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.

\*Subject to modification.

†U. H. University Hospital.

ORDER OF LECTURES,\* DAILY.—SECOND YEAR.—1893-4.

Hour.	Monday.	Tuesday.	Wednesday.	Thursday.	Friday.	Saturday.
9 A.M.			Phila. Hosp. Gynecolog. Clinic.			
10 A.M.			Phila. or Penna. Hos. Med. & Surg. Clinics.	<b>Wormley.</b> Med. Chem.	<b>Guiteras.</b> Morb. Anat.	Med. Chem-istry, Labo-ratory, 3 hours.
11 A.M.		<b>Guiteras</b> Morbid Anatomy.		<b>Ashhurst.</b> Surgery.	<b>Deaver.</b> Appl. Anat.	
12 M.	<b>Deaver.</b> Appl. Anat.	<b>Ashhurst.</b> Surgery.	Prac. Pathol. Histology, 1 sec. 2 hours. Others attend Gynae-colog. and Gen. Surg. Clinic, U.H.†	<b>Tyson.</b> Med Clinic.	<b>Ashhurst.</b> Surgery.	Prac. Pathol. Histology, 1 sec. 2 hours. Others at-tend Gen. Med. & Surg. Clinic U.H.
1 P.M.	Prac. Pathol. Histol. Phys. Diagnosis. Sections.	Prac. Pathol. Histol. Phys. Diagnosis. Sections.		Prac. Pathol. Histol. Phys. Diagnosis. Sections.	Prac. Pathol. Histol. Phys. Diagnosis. Sections.	
3½ P.M.	<b>Piersol.</b> Anatomy.	<b>Hirst.</b> Obstetrics.	<b>Piersol.</b> Anatomy.	<b>Hirst.</b> Obstetrics.	<b>Piersol.</b> Anatomy.	
4½ P.M.	<b>Reichert.</b> Physiology.	<b>Wood.</b> Therapeut.	<b>Reichert.</b> Physiology.	<b>Wood.</b> Therapeut.	<b>Reichert.</b> Physiology.	
7½ to 10 P.M.	Dissection.	Dissection.	Dissection.	Dissection.	Dissection.	

For the study of Pathological Histology and Physical Diagnosis, the Class is divided into sections, one of which is occupied at a time; those of the Second-year students not thus en-gaged attend Clinics. \*Subject to modification. †U. H. University Hospital.

ORDER OF LECTURES,\* DAILY. THIRD YEAR. 1893-4.

Hour.	Monday.	Tuesday.	Wednesday.	Thursday.	Friday.	Saturday.
9 A.M.			Phila. Hosp. Gynecolog. Clinic.	Dem. in Morb. Anat., Section.		Phila. Hosp. Gynecolog. Clinic.
10 A.M.	Dem. in Morb. Anat., Section.	Dem. in Morb. Anat., Section.	Phila. or Penna. Hos., Med. & Surg. Clinics.	Autopsies.	<b>Guiteras.</b> Morbid Anatomy.	Phila. or Penna. Hos., Med. & Surg. Clinics.
11 A.M.	<b>Guiteras.</b> Bacteriol.	<b>Guiteras.</b> Morb. Anat.		<b>Ashhurst.</b> Surgery.	<b>Deaver.</b> Appl. Anat.	
12 M.	<b>Deaver.</b> Appl. Anat.	<b>Ashhurst.</b> Surgery.	<b>Goodell.</b> Gynecolog. Clinic, U.H.†	<b>Tyson.</b> Med. Clinic, U. H.	<b>Ashhurst.</b> Surgery.	<b>Pepper.</b> Med. Clinic. U. H.
1 P.M.	<b>Randall.</b> Clinic Dis. of the Ear, U. H. Ward Classes Med. & Surg., U. H.†	<b>Duhring.</b> Clinic Dis. of the Skin, U. H. Ward Classes Med. & Surg., U. H.	<b>White.</b> Surg. Clinic, U. H.†	<b>Norris.</b> Clinic Dis-eases of the Eye, U. H. Ward Class-es, Surg., U. H.†	<b>Wood.</b> Clinic, Nerv. Dis., U. H. Ward Class-es, Med. U. H.	<b>Ashhurst.</b> Surg. Clinics, U. H.
3½ P.M.	<b>Wharton.</b> Minor Sur-gery, Lect. until Jan. 1.	<b>Hirst.</b> Obstetrics.	<b>Hirst.</b> Didactic Gynecology, U. H.†	<b>Hirst.</b> Obstetrics.	<b>Duhring.</b> Didac. Skin Dis. until Jan. 1. <b>Seiler.</b> Didac. Lary. after Jan. 1.	<b>Hirst.</b> Obstetrics.
4½ P.M.	<b>Wharton.</b> Frac. Dress-ing, 2 Secs., Practice until Jan. 1.	<b>Wood.</b> Therapeu-tics.	<b>Randall.</b> Didactic Otol., until Jan. 1. <b>Martin.</b> Genito-Uri-nary Dis. after Jan. 1, U. H.†	<b>Wood.</b> Therapeu-tics.	<b>Norris.</b> Didac. Oph-thalmology, U. H.†	<b>Wharton.</b> Frac. Dress., 2 Sections, Practice.
5½ P.M.	<b>Pepper</b> Practice.	<b>Pepper.</b> Practice.		<b>Pepper.</b> Practice.	Operat. Ob-stetric. Sec., after Jan. 1.	

For WARD CLASS instruction and Obstetrical Demonstrations the Third-year Class is di-vided into sections. SEE SPECIAL ROSTER.

\*Subject to modification. † U. H. University Hospital.



## ORDER OF LECTURES,\* DAILY.—FOURTH YEAR.—1893-4.

Hour.	Monday.	Tuesday.	Wednesday.	Thursday.	Friday.	Saturday.
10 A.M.			Phila. Hosp., Gynecolog. Clinic.	Autopsies.	<b>Billings or Abbott.</b> Hygiene.	Phila. Hosp. Gynecolog. Clinic.
11 A.M.	Prac. Ortho. Surg. U. H., until Jan. 1. <b>Ashhurst.</b> Oper. Surg., after Jan. 1.		Phila. or Penna. Hos., Med. & Surg., Clinics.	<b>Griffith.</b> Clinic, Dis- eases of Children. U. H. † until Jan. 1.	<b>Hirst.</b> Operative and Clinical Obstetrics.	Phila. or Penna. Hos., Med. Surg. and Gynec- ological Clinics.
12 M.	Pract. Gynec- col. Pract. Throat and Nose, U. H. †	Pract. Gynec- col. Pract. Throat and Nose, U. H. †	<b>Goodell.</b> Gynecolog., Clinic, U. H.	<b>Tyson.</b> Med. Clinic, U. H. †	Pract. Gynec- col. Pract. Throat and Nose, U. H. †	<b>Pepper.</b> Med. Clinic, U. H. †
1 P.M.	<b>Randall.</b> Ear Clin., U. H. Ward Classes in Surg., Der- matol., Otol., U. H. †	<b>Duhring.</b> Skin Clinic, U. H. Ward Classes in Surg.	<b>White.</b> Surg. Clinic, U. H. †	<b>Norris.</b> Eye Clin., U. H. Ward Classes, in Surg., Der- matol., Otol., U. H. †	<b>Wood.</b> Clinic, Nerv. Diseases, U. H. Ward Classes in Surgery.	<b>Ashhurst.</b> Surg. Clinic, U. H. †
3½ P.M.	Prac. Nerv., Dis., Oph- thal., U. H., Ward Classes in Med., U. H. †	<b>Willard.</b> Orthopaedic. Surg. Clinic, and Didac. Ward Classes in Med., U. H. †	Ward Classes in Med., U. H.	Prac. Nerv., Dis., Oph- thal., U. H. Ward Classes in Med., U. H. †	Ward Classes in Medicine, U. H. †	Ward Classes in Med., U. H. Prac. Nerv. Dis. Ophthal. Dermatol. Otol. U. H. †
4½ P.M.	<b>Wharton.</b> Oper. Surg., after Jan. 1.	<b>R. C. Norris.</b> Oper. Obstet. Sections.	<b>Randall.</b> Didac. Otol., until Jan. 1, U. H. <b>Martin.</b> Genito-Urin. Dis., after Jan. 1, U. H.	<b>Wharton.</b> Operative Surgery, after Jan. 1.	<b>R. C. Norris.</b> Operative Obstetrics, Sections.	Clinical Conference in Medicine U. H. †
5½ P.M.	<b>Pepper.</b> Practice.	<b>Pepper.</b> Practice.		<b>Pepper.</b> Practice.		

\*Subject to modification. The Bedside instruction in Medicine will be arranged to furnish two hours weekly to each member of the Fourth-year Class.

† Dermatology and Otolaryngology half the session.

‡ U. H. University Hospital.

## 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. 10, to Friday, November 18, inclusive.*

	Monday.	Tuesday.	Thursday.	Friday.
Prof. Goodell . . . .	D	—	A	B
" Tyson . . . .	B	D	—	A
" White . . . .	A	B	C	—
Special Clinics . . . .	C	A & C	B & D	C & D

*Second period, from Monday, Nov. 27, to Friday, Jan. 6, inclusive.*

	Monday.	Tuesday.	Thursday.	Friday.
Prof. Goodell . . . .	A	—	B	C
" Tyson . . . .	C	B	—	D
" White . . . .	B	C	D	—
Special Clinics . . . .	D	A & D	A & C	A & B

*Third period, from Monday, Jan. 9, to Friday, Feb. 17, inclusive.*

Prof. Goodell . . . .	B	—	C	D
" Tyson . . . .	D	A	—	C
" White . . . .	C	D	A	—
Special Clinics . . . .	A	B & C	B & D	A & B

*Fourth period, from Monday, Feb. 20, to Friday, March 31, inclusive.*

Prof. Goodell . . . .	C	—	D	A
" Tyson . . . .	A	C	—	B
" White . . . .	D	A	B	—
Special Clinics . . . .	B	B & D	A & C	C & D

The instruction is given at the University Hospital at 1 o'clock. Professor Tyson will meet the sections of the Third-year Class in the Wards and Medical Dispensary; Professor Goodell 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 portion of the term, the Clinical lectures on special subjects as follows:

I P. M.

<i>Monday</i>	<i>Tuesday</i>	<i>Thursday</i>	<i>Friday</i>
Prof. RANDALL <i>Otology.</i>	Prof. DUHRING <i>Dermatology.</i>	Prof. NORRIS <i>Ophthalmology.</i>	Prof. WOOD <i>Nerv. Dis.</i>

The entire Third and Fourth-year Classes attend the General Medical, Surgical, and Gynæcological Clinics, held on Wednesday and Saturday, from 12 to 2 o'clock, in the Upper Lecture Room of the University Hospital; also the Medical Clinic on Thursday, at 12 o'clock, and the Third-year Class attends the Demonstrations in Morbid Anatomy by Professor Guitéras and Dr. Cattell.

SPECIAL ROSTER OF LABORATORY INSTRUCTION IN HISTOLOGY, OSTEOLOGY AND SYNDESMOLOGY, FOR STUDENTS OF THE FIRST-YEAR. SESSION 1893-1894.

For instruction in these laboratories, the First-year Class is divided into five sections, A, B, C, D, and E, which attend throughout the entire session as follows:

	Monday.	Tuesday.	Wednesday.	Thursday.	Friday.	Saturday.
Histology,	A	B	C	D	E	—
Osteology,	B C D	—	—	E & A	Entire Class, 9 o'clock.	—

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 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. (A Thesis is no longer required, but students are recommended to prepare Theses in competition for the various Prizes).\*
- 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, 1893-4, begins on Monday, October 2d, and ends at Commencement, June 5th, 1894.

## EXPENSES.

## WINTER TERM.

*First Year.*

Matriculation Fee . . . . .	\$5 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.

\*The Thesis must be handed in by March 1, and should be appropriately bound. It becomes the property of the Library, and under no circumstances can it be removed. Candidates desiring copies must, therefore, make them in advance.

*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
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*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 Gynæcology 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 four free scholarships is held annually. (In 1893, on Wednesday, September 27, 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 Cæsar, 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. During the spring months a special course in Practical Embryology will be given, embracing those refinements and minutæ which, of necessity, are omitted in the regular winter's work. Especial facilities are afforded for original research; 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, during the regular winter session, 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 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, and an extensive collection of models, 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 Department, in which the collections of the Museum are to be placed. 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 is on Sprute 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 1891, there were treated 12,002 cases, representing almost all of the known medical, surgical, and gynæcological 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, Gynæcology 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 4, 1893, at 5 P. M. The Faculty has provided a Course in Clinical Bacteriology in the Laboratory of Hygiene for the resident physicians selected in May, 1893, thus adding materially to the advantages of the position.

## 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 con-

finement 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 anti-sepsis, 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 spring and summer, *private* classes are also 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 STILLÉ, H. C. WOOD, WILLIAM PEPPER, D. HAYES AGNEW, JOHN ASHHURST, JR., AND JOHN GUITÉRAS MEDICAL SOCIETIES

are composed of Third- and Fourth-year students. Their meetings are held bi-weekly during the winter session, for the reading and discussing of papers relating to the practice of medicine and surgery, and to pathology.

## PRIZES TO BE AWARDED MAY, 1893.

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 \$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 Hæmometer for the best report of his clinic during session of 1892-93.

The Professor of Clinical Surgery offers a Prize of a Surgical Pocket-case for the best report of his clinics during the session 1892-93; 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 Orthopædic Surgery offers a Prize of an Antiseptic Minor Operating Case for the best practical work in Orthopædic Surgery, or for an acceptable original design in Apparatus.

The Dr. LOUIS J. C. KIMMELL Prize of an Antiseptic Minor Operating Case is offered to the student who shall present 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 shall present 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; 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 passing the best examination in Osteology.

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 ZENTMAVER 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.

THE SOCIETY OF THE ALUMNI OF THE MEDICAL  
DEPARTMENT.

For a list of officers, and other information, see ALUMNI ORGANIZATIONS, on a later page.



# HOSPITAL OF THE UNIVERSITY OF PENNSYLVANIA.

JOHN S. BILLINGS, M.D., LL.D., DIRECTOR.

## BOARD OF MANAGERS.

RICHARD WOOD, PRESIDENT.

WM. F. NORRIS, M.D., VICE-PRESIDENT.

GEORGE FALES BAKER, M.D., SECRETARY.

RICHARD WOOD, TREASURER, *pro tem.*

WILLIAM PEPPER, M.D., LL.D., PROVOST.

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HORACE Y. EVANS, M.D.,

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SAMUEL S. STRYKER, M.D.

## ON THE PART OF THE BOARD OF WOMEN VISITORS.

MRS. W. A. LAMBERTON,

MRS. CHAS. C. HARRISON,

MRS. WAYNE MACVEAGH,

MRS. CHARLEMAGNE TOWER, JR.

## 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 *Medical Staff* and *Officers* of the Hospital are given 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 for 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 orthopædics and for venereal diseases, for out-door patients. In connection with the Orthopædic 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 them, 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 Davis, and not to the Dean of the Medical Faculty.*

## AUXILIARY DEPARTMENT OF MEDICINE.

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### FACULTY.

WILLIAM PEPPER, M.D., LL.D., PROVOST, and *ex-officio* President.

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

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

EDWARD D. COPE, PH.D., Professor of Mineralogy and Geology.

WILLIAM POWELL WILSON, Sc.D., Professor of the Anatomy and Physiology of Plants.

JOHN S. BILLINGS, M.D., Professor of Hygiene.

HARRISON ALLEN, M.D., *Dean*.

### MATRICULATES.

Charles Meredith Burk, M.D.,	Philadelphia.
John Eldridge Dubell,	Mt. Holly, N. J.
Herman W. Gross,	Boston, Mass.
John Hemsath,	Zehner, Pa.
Irving W. Hollingshead,	Pemberton, N. J.
Augustus Otto Koenig,	Philadelphia.
William S. May,	do
Charles F. Nassau, M.D.,	do.
John H. Remig, M.D.,	do.
J. Clifford Scott,	New Britain, Pa.
John Howell Janeway Upham,	Philadelphia.
F. P. Vale,	Washington, D. C.
Albert Ferree Witmer,	Philadelphia.

The Auxiliary Faculty of Medicine supplements the customary winter 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 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.

The session for 1892-93 will begin on Monday, October 3, and continue until the early part of May.

The matriculation book will be closed after November 1, except to such students as show the Dean good reasons for longer indulgence.



## COURSE OF STUDY.

**MEDICAL JURISPRUDENCE AND TOXICOLOGY.**—Subjects of legal medicine on which the physician may be called upon to give evidence in a court of justice :—

Signs of Death ; Personal identity (*identification of the living and the dead*) ; Feigned Diseases ; Violent Deaths (*homicidal and suicidal*) from (a) *wounds*, (b) *hanging*, (c) *strangling*, (d) *suffocation*, (e) *drowning*, (f) *heat*, (g) *cold*, (h) *starvation*, (i) *lightning*, (k) *poisoning*.

Infanticide and criminal abortion ; Signs of Pregnancy and of Delivery ; Legitimacy ; Rape ; Survivorship.

The Jurisprudence of Insanity (*civil and criminal responsibility ; feigned insanity ; rights of the insane ; plea of insanity as a bar to judicial punishment*).

The Legal Rights and Liabilities of Physicians ; Medical Experts—their rights and compensations.

Life Insurance in its medico-legal relations.

Medical Malpractice.

Poisoning, with special reference to *testing* ; modes of procedure in order to determine the presence of poisons in cases of homicide and suicide.

**HYGIENE.**—Sanitary science, especially in the direction of Preventive Medicine, has advanced so rapidly during the past few years that in this brief course only the more important subjects can be treated of in detail. Particular attention is directed to the practical application of sanitary knowledge, in accordance with the standard of efficient requirement in this branch justly demanded by the Illinois and other State Boards of Health.

1. Nature, causes, mode of propagation, and prophylaxis of preventable diseases—heredity and other modifying influences which affect their development—avoidance or control of maladies by quarantine, disinfection, isolation, etc. 2. Special prophylactic measures and hygienic management of cholera, typhoid fever, smallpox, glanders, trichiniasis, and the disturbances of health produced by parasites. 3. Analysis of air ; sanitary meteorology ; heating and ventilation ; examination of drinking water ; drainage and sewerage. 4. Food and drink as conditioning *all* physical and mental manifestations of vitality ; impurities, deteriorations and adulterations of food—their effects upon the human organism—means of detecting their existence and obviating their injurious action. 5. Chemistry of cooking. 6. Principles of hospital construction ; military, naval, school, industrial and personal hygiene.

**MINERALOGY, GEOLOGY, ZOÖLOGY AND BOTANY.**—Students in this Department take the lectures and laboratory work on these subjects in the College Department. For particulars see pp. 46-84.

## FEES.

The lectures are free to the medical students, and medical graduates, of this University. Other matriculates pay a matriculation fee of five dollars and a tuition fee of fifteen dollars for each professor's course, or thirty-five dollars for all the courses. The graduation fee is ten dollars.

## DEGREES.

Graduates in medicine, of not less than one year's standing, of this University, or of other medical schools on its *ad eundem* list, who have taken the lectures and done the laboratory work in Botany required for the first year in the Biological School of this University, and passed the examinations in the same; who have attended two full courses and passed the examinations in Comparative Anatomy and Zoölogy, in Medical Jurisprudence and Toxicology, and in Mineralogy and Geology; who have attended the course and passed the examination in Hygiene required in the Medical Department; presented to the Dean one month before the final examinations an original Thesis acceptable to the Faculty upon some subject connected with these studies, and paid their dues to the University, will be recommended to the Board of Trustees for the degree of Bachelor of Sciences Auxiliary to Medicine (B.S.).

When applying for examination the candidate must exhibit his medical diploma to the Dean, and show that he has paid all University dues.

Candidates must be present at Commencement, unless excused by the Faculty.

## SPECIAL STUDENTS.

The lectures and laboratories of this 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 lectures on a single branch. Such special students receive no degrees, but the Faculty may give certificates of attendance.

## MUSEUM.

The Museum of the Auxiliary Department of Medicine contains three thousand mineral specimens systematically arranged; a collection of rocks, fossils and casts, arranged according to their geological succession; a valuable philosophical apparatus, a growing collection of specimens of Comparative Anatomy and Zoölogy; chemical preparations and apparatus illustrative of Toxicology and Hygiene; diagrams, etc. These collections are arranged in the rooms of the Faculty.



The principal text-books used are :

- Taylor's *Medical Jurisprudence* (American edition by Reese).  
 Reese's *Manual of Toxicology*.  
 Reese's *Medical Jurisprudence and Toxicology*.  
 Dana's *System of Mineralogy*.  
 Elderhorst's *Manual of Qualitative Blowpipe Analysis*.  
 Dana's *Manual of Geology*.  
 Ganot's *Éléments de Physique*, translated by Atkinson.  
 Gray's *Text-Book of Botany*, Vols. I and 2.  
 Gray's *Manual of Botany*.  
 Parkes' *Manual of Hygiene*.  
 Schiedt's *Principles of Zoölogy*.

Works of reference :

- Wharton and Stillé's *Medical Jurisprudence*.  
 Taylor's *Medical Jurisprudence*.  
 Tidy's *Legal Medicine*.  
 Sach's *Text-Book of Botany*.  
 Le Maout and Decaisne's *General System of Botany, Descriptive and Analytical*.  
 Cooke and Berkely on *Fungi*.  
 Wilson's *Manual of Hygiene*.  
 Buck's *Hygiene and Public Health*.  
 Pavy or Chambers on *Diet*.  
 Mivart's *Elements of Anatomy*.  
 Nicholson's *Manual of Zoölogy*.  
 Gegenbaur's *Elements of Comparative Anatomy*.  
 Balfour's *Comparative Embryology*.  
 Williams on *Chemistry of Cooking*.  
 Parkes (Louis C.) on *Hygiene and Public Health*.  
 Rohé's *Text-Book of Hygiene*.

## THE WISTAR INSTITUTE OF ANATOMY AND BIOLOGY.

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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, of whom one holds office *ex relatione* to the founder, two *ex officio* in the Academy of Natural Sciences, and the remainder by election by the Board of Trustees of the University. Before the beginning of the college year 1893-94, announcements will be made of the special





## DEPARTMENT OF DENTISTRY.

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### FACULTY.

- WILLIAM PEPPER, M.D., LL.D., Provost, and *ex-officio* President.  
CHARLES J. ESSIG, M.D., D.D.S., Professor of Mechanical Dentistry and Metallurgy.  
EDWIN T. DARBY, M.D., D.D.S., Professor of Operative Dentistry and Dental Histology.  
JAMES TRUMAN, D.D.S., Professor of Dental Pathology, Therapeutics and Materia Medica.  
THEODORE G. WORMLEY, M.D., LL.D., Professor of Chemistry.  
EDWARD T. REICHERT, M.D., Professor of Physiology.  
GEORGE A. PIERSOL, M.D., Professor of Anatomy.  
JOHN MARSHALL, M.D., Nat.Sc.D., Assistant Professor of Chemistry.

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- ROBERT HUEY, D.D.S., Lecturer on Operative Dentistry.  
EDWARD C. KIRK, D.D.S., Lecturer on Operative Dentistry.  
JOHN D. THOMAS, D.D.S., Lecturer on Nitrous Oxide.

### CLINICAL INSTRUCTORS.

- |                       |                     |
|-----------------------|---------------------|
| DR. C. S. BECK,       | DR. E. H. NEALL,    |
| DR. GEO. W. KLUMP,    | DR. H. C. REGISTER, |
| DR. W. G. A. BONWILL, | DR. I. F. WARDWELL, |
| DR. W. R. MILLARD,    | DR. J. A. WOODWARD  |
| DR. R. R. UNDERWOOD,  |                     |

### DEMONSTRATORS.

- WILLIAM DIEHL, D.D.S., Demonstrator of Operative Dentistry.  
HARRY B. McFADDEN, D.D.S., Demonstrator of Mechanical Dentistry.  
JAMES E. LODER, D.D.S., Assistant Demonstrator of Operative Dentistry.  
JOSEPH W. WHITE, D.D.S., Assistant Demonstrator of Operative Dentistry.  
AMBLER TEES, JR., D.D.S., Assistant Demonstrator of Mechanical Dentistry, and Demonstrator of Continuous Gum Work.  
R. HAMILL D. SWING, D.D.S., Assistant Demonstrator of Operative Dentistry, and Demonstrator of Anæsthetics.



- FREDERICK W. AMEND, JR., D.D.S., Assistant Demonstrator of Mechanical Dentistry.
- MILTON N. KEIM, JR., D.D.S., Assistant Demonstrator of Mechanical Dentistry.
- J. EDWARD DUNWOODY, D.D.S., Assistant Demonstrator of Operative Dentistry.
- CHARLES A. E. CODMAN, D.D.S., Assistant Demonstrator of Operative Dentistry.
- FREDERIC A. PEESO, D.D.S., Demonstrator of Crown and Bridge Work.
- JAMES G. LANE, D.D.S., Assistant Demonstrator of Crown and Bridge Work.
- C. HERBERT WILSON, D.D.S., Assistant Demonstrator of Mechanical Dentistry.
- CHARLES H. BARNES, D.D.S., Assistant Demonstrator of Operative Dentistry.
- LOUIS E. RAUCH, D.D.S., Assistant Demonstrator of Operative Dentistry.
- EDMUND W. HOLMES, M.D., Demonstrator of Anatomy.
- ROBERT FORMAD, V.M.D., Demonstrator of Normal Histology.

### MATRICULATES.

#### THIRD YEAR.

Name.	Residence.	Preceptor.
Adams, Walter B.,	Germantown,	Wistar P. Brown.
Betts, Edward P.,	Towanda,	University.
Blanchard, George R., Jr.,	Philadelphia,	University.
Cahill, Frank J.,	Trenton, N. J.,	University.
Griffith, R. Philip,	Kingston,	University.
* Hecht, Hans,	Braunschweig, Ger- many,	University of Berlin.
Heiges, T. Tyrrell,	York,	J. D. Heiges.
Henneberg, Antony,	Geneva, Switzer- land,	University of Geneva.
Henneberg, Samuel,	Geneva, Switzer- land,	University of Geneva.
Herrera, Domingo C.,	Havana, Cuba,	University.
Lower, John P.,	Philadelphia,	University.
McDowell, Joseph M.,	Media,	H. L. Smedley.
Neebe, Charles W.,	Orange Free State, South Africa,	University of Halle and Berlin.
Regardis, Guillermo,	Maturin, Venez- uela,	University of Berlin and Halle.
Ricker, John R.,	Galveston, Texas,	University.

\* Not in attendance.

Name.	Residence.	Preceptor.
Rosen, Jaky,	Memphis, Tenn.,	University of Breslau and Berlin.
Vergel de Dios, Antonino,	Manilla, Philippine Islands,	École et Hopital Dentaire, Paris.
		Total, 17.

## SECOND YEAR.

Name.	Residence.	Preceptor.
Avila, Antonio d'	S. Paulo, Brazil,	Horace M. Lane.
Barral, Marcel,	Bordeaux, France,	Henri Leys.
Bogue, Frederick L.,	Montclair, N. J.,	E. A. Bogue.
Bosworth, Madison,	Omaha, Neb.,	University.
Bowers, Frederic H.,	Freeport, Ill ,	Kingsley, Allen & Sunderland.
Butler, Harry B.,	Fulton, N. Y.,	I. C. Curtis.
Cush, John J.,	Scranton,	W. P. DeLacy.
Delabarre, Frank A.,	Conway, Mass.,	Boston Dental College
DeLong, Wilson D., M.D.,	Pikesville,	Univ. of Vermont.
Erler, Rudolph,	Rochester, N. Y.,	B. F. La Salle.
Finch, George H.,	Boydton, Va.,	R. H. Finch.
*Floyd, Andrew G., Jr.,	Spartanb'gh, S.C.,	A. O. Thomas.
Fowler, Harley B.,	Whitewater, Wis.,	American College of Dental Surgery.
Garretson, Walter R.,	Knoxville, Iowa,	C. F. Garretson.
Gauntt, Le Clerc,	Lumberton, N. J.,	W. L. Winner.
Gilman, Lewis H.,	Philadelphia,	University.
*Hanson, Arthur E., M.D.,	Rio de Janeiro Brazil,	J. S. Dilk.
Hatch, J. Irvin,	Altoona,	J. A. Hatch.
Hill, Joseph M.,	Philadelphia,	University.
Horgan, John E.,	Philadelphia,	C. F. Horgan.
Hunter, John D.,	Phoenixville,	University.
Hunter, Raymond W.,	Greenfield, Mass.,	F. W. Williams.
Keffer, Franklin M.,	Philadelphia,	Edw. I. Keffer.
Keim, Charles F.,	Omaha, Neb.,	H. H. Keim.
Kenney, Arthur T.,	St Kilda, Australia,	D. McGregor.
Kuehn, Emil W.,	Wabasha, Minn.,	University.
Littig, Marquis D.,	Davenport, Iowa,	H. A. Littig.
Longeway, George E.	Dunham, Canada,	R. H. Berwick.
Lopez, L. Juan A.,	Guayaquil, Ecuador,	Eduardo Lopez.
McKinney, W. Ray,	Ithaca, N. Y.,	University.
Maize, Harry G.,	Mt. Carmel,	M. J. Hess.
Marfung, Edward J.,	Scranton,	University.
Marlow, Walter S.,	Wantage, England,	G. Pedley.
Matteossian, Herant B., A.B.,	Constantinople, Turkey,	University.
Mosberg, Carl,	Berlin, Germany,	University.
Newgarden, Albert,	Philadelphia,	Chas. Newgarden.

\* Not in attendance.



## DEPARTMENT OF DENTISTRY.

Name.	Residence.	Preceptor.
Odell, Charles F.,	Toledo, Ohio,	E. M. Cook.
O'Donnell, Peter,	Sugar Notch,	University.
Patterson, Thurlow G.,	Syracuse, N. Y.,	University.
Phipps, Otey H.,	Paris, Texas,	University.
Portz, Charles F.,	White Haven,	H. J. Laird.
Robb, Guy C.,	Huntingdon,	G. L. Robb.
Robeson, John A.,	Westbrook, N. C.,	Watkins & Conrad.
Robinson, Thomas W.,	Brooklyn, N. Y.,	Geo. F. Emerson.
Seibel, Philip H., M.D.,	San Francisco, Cal.,	Cooper Med. College.
Sherman, William T.,	Hazleton,	W. H. Hertz.
Stein, D. Ambrose,	Reading,	University.
Stevens, Frank K.,	Clear Ridge,	A. K. Davis.
Stine, Charles E.,	Hanover,	H. C. Ruth.
Storer, John W.,	Wheeling, W. Va.,	John H. McClure.
Sturtevant, Harry C.,	Philadelphia,	Louis E. Rauch.
Taggart, Campbell C.,	Philadelphia,	D. D. Smith.
Taylor, Howard S.,	Dover, Del.,	University.
Tyndale, Harold,	Media,	University.
Trey, Victor de,	Basel, Switzerland,	Emile de Trey.
Watters, T. Frederick,	Akron, Ohio,	J. H. Laney.
Weakly, Arthur D.,	Shelbyville, Ill.,	J. A. Bowman.
Witmer, B. Frank,	Lancaster,	M. H. Musser.
Wray, William J.,	Philadelphia,	University.
Zerfing, Wilson,	Ashland,	University.
		Total, 60.

## FIRST YEAR.

Name.	Residence.	Preceptor.
*Abbott, Paul W.,	Syracuse, N. Y.,	S. C. Dayan.
Aitken, William L.,	Melbourne, Aus- tralia,	University.
Angle, William P.,	Danville,	University.
Arosemena, Harmodio,	Panama, U. S. of Col.,	University.
Barrios, Carlos A.,	Rivas, Nicaragua,	University.
Bayne, Clarence S.,	Philadelphia,	University.
Best, Hass D.,	Knox,	University.
*Bowman, Harry L.,	Lancaster,	University.
Bradley, J. Lucius,	New Haven, Conn.,	W. V. Bradley.
Bradner, A. Mark,	Wissinoming,	Edw. I. Keffer.
Bushong, Charles A.,	Philadelphia,	O. P. Rex.
Carballo, Victor,	Montevideo, Uru- guay,	University.
Cleaver, Harry L.,	Manatawny,	University.
Decker, Walter E.,	Towanda,	Smith & Wardell.
Dobbyn, W. E. Stanhope,	Beechworth, Aus- tralia.	University.
Donnegan, Edmond J.,	Scranton,	Charles C. Laubach.

\* Not in attendance.

Name.	Residence.	Preceptor.
Dudderidge, William,	Lachute, Canada,	University.
Dudley, Jonas G.,	Worcester, Mass.,	University.
Dunbar, Adolph W.,	Brooklyn, N. Y.,	University.
Ellen, Alfred B.,	North East,	L. G. Wilder.
Elssler, John A.,	Pottsville,	J. E. Freeston.
Evans, Charles S.,	Tidioute,	University.
Faulk, Joseph E.,	Shamburg,	W. M. Coombs.
Ferris, Francis S.,	Philadelphia,	W. H. Trueman.
Freeston, J. William,	Pottsville,	J. E. Freeston.
Hagerty, Sheward,	West Chester,	J. E. Harlan.
Harris, William E.,	Lynchburg, Va.,	University.
Hassell, Newton C.,	Philadelphia,	University.
Hoening, Edward A.,	Titusville,	J. A. Todd.
Horcasitas, J. Pedro,	Chihuahua, Mex.,	University.
Houston, Joseph M.,	Carlisle,	University.
Hurlbut, Cornelius S., Jr.,	Springfield, Mass.,	C. S. Hurlbut.
Kemple, Fred C.,	Bellaire, Ohio,	H. C. Kemple.
Kilmore, John A.,	Fairfield,	D. Stuart Watson.
Lang, Oscar,	Milwaukee, Wis.,	F. H. Emmerling.
*Low, Thomas A.,	Renfern, Canada,	University.
McCullough, L. Leal,	Urbana, Ill.,	A. L. Sanderson.
McElligott, Thomas F.,	Lancaster,	R. D. McCaskey.
Maitland, Arthur G.,	Invercargill, New Zealand,	University.
Moorhead, William J.,	Brockwayville,	R. O. Moorhead.
Morris, Wade A.,	Austin, Texas,	F. S. Casper.
Myers, Charles S.,	Lancaster,	University.
Nabers, Samuel F.,	Birmingham, Ala.,	University.
Navarro, Bernardo M.,	Matanzas, Cuba,	University.
Noble, William B.,	Millersville,	University.
Potter, Frank J.,	Wells Bridge, N. Y.,	Morgan & Le Suer.
Redway, Richard B.,	Ilion, N. Y.	F. A. Olmstead.
Ribeiro, Manuel M.,	S. Paulo, Brazil,	University.
Richards, Newton B.,	South Easton,	University.
Riley, Walter R.,	East Greenwich, R. I.,	W. R. Lamb.
Roach, Ernest W. B.,	Bridgetown, Barba- dos, W. I.,	University.
Robinson, William T.,	Philadelphia,	University.
Rous, Armand,	Vevay, Indiana,	University.
Sandusky, Frederick R.,	Shelbyville, Tenn.,	G. C. Sandusky.
Saxenmeyer, George B.,	Philadelphia,	University.
Shaver, J. Harry,	Marathon, N. Y.,	University.
Sorg, Daniel E.,	Pittsburgh,	J. A. J. Haupt.
Spangler, Adam C.,	Middleburg,	University.
Stanley, Roloffe B.,	Philadelphia,	University.
Stilson, Ira B.,	Glenbrook, Conn.,	T. V. Ketchum.
Tann, Isaac R.,	Pittsburgh,	University.
Taylor, Fred G.,	Elkhorn, Wis.,	S. C. Goff.

\*Not in attendance.



Name.	Residence.	Preceptor.
Van Valin, Clyde A.	Fleming,	J. W. Rhone.
Walker, Albert,	Philadelphia,	University.
Watson, David S.,	Freeport, Ill.,	Kingsley, Allen & Sunderland.
Wells, Frederick M.,	Acton Vale, Can- ada,	Hyndman & Hynd- man.
Wells, William C.,	Geneva, N. Y.,	W. Lynn Adamy.
Whitlock, Charles H.,	Ithaca, N. Y.,	A. H. Fowler.
Wilson, Colin F.,	Dundas, Canada,	University.
Wishart, Edward R.,	Waterford,	University.
Woods, James B.,	Connellsville,	S. D. Woods.
Yale, William H.,	San Francisco, Cal.,	University.
		Total, 72.

## SPECIAL STUDENTS.

Name.	Residence.	Preceptor.
Eldredge, J. Smallwood, D.D.S.,	Cape May, N. J.,	University.
Gearhart, J. Beaver, D.D.S.,	Danville,	University.
Lopez, José Lúcio, D.D.S.,	Guatemala, C. A.,	University.
Ligondé Louis G., D.D.S.,	Jean-Rabel, Hayti,	University.

Students of the Third Year . . . . .	17
Students of the Second Year . . . . .	60
Students of the First Year . . . . .	72
Special Students . . . . .	4

Total . . . . . 153

The total number of new matriculates the present session, including those admitted to advanced standing, is 86.

Since the foundation of the Department the total number of graduates has been 699.

## SUMMARY.

Alabama . . . . .	1	Guatemala, C. A. . . . .	1
Australia . . . . .	3	Hayti . . . . .	1
Barbados, W. I. . . . .	1	Illinois . . . . .	4
Brazil . . . . .	3	Indiana . . . . .	1
California . . . . .	2	Iowa . . . . .	2
Canada . . . . .	5	Massachusetts . . . . .	4
Connecticut . . . . .	2	Mexico . . . . .	1
Cuba . . . . .	2	Minnesota . . . . .	1
Delaware . . . . .	1	Nebraska . . . . .	2
Ecuador . . . . .	1	New Jersey . . . . .	4
England . . . . .	1	New York . . . . .	12
France . . . . .	1	New Zealand . . . . .	1
Germany . . . . .	2	Nicaragua . . . . .	1

SUMMARY.—(Continued.)

North Carolina . . . . .	1	Texas . . . . .	3
Ohio . . . . .	3	Turkey . . . . .	1
Orange Free State . . . . .	1	Uruguay . . . . .	1
Pennsylvania . . . . .	67	U. S. of Colombia . . . . .	1
Philippine Islands . . . . .	1	Venezuela . . . . .	1
Rhode Island . . . . .	1	Virginia . . . . .	2
South Carolina . . . . .	1	West Virginia . . . . .	1
Switzerland . . . . .	3	Wisconsin . . . . .	3
Tennessee . . . . .	2	Total . . . . .	153

COURSE OF STUDY.

The course extends over three years, and in each year there are two sessions; the first, or regular Winter Session, extending from October to May—seven months. This is followed by a short Spring Session, which is of a practical character, and confined entirely to the Operating and Mechanical rooms. This course closes the last of June.

During the Winter Session the following is the arrangement of studies:

ORDER OF LECTURES AND PRACTICAL WORK.

FIRST YEAR.

Hour.	Monday.	Tuesday.	Wednesday.	Thursday.	Friday.	Saturday.
9 A. M.	Chemistry.	Chemistry.	Laboratory of Mechanical Dentistry.		Osteology.	
10 A. M.	Laboratory of Mechanical Dentistry.	Laboratory of Mechanical Dentistry.		Chemical. Laboratory Three H'rs.	Laboratory of Mechanical Dentistry.	Laboratory of Mechanical Dentistry.
11 A. M.	Mechanical Dentistry.					
12 M.	Practical Normal Histology. One Section Two Hours.	Practical Normal Histology. One Section Two Hours.	Practical Normal Histology. One Section Two Hours.	Practical Normal Histology. One Section Two Hours.	Practical Normal Histology. One Section Two Hours.	Dental Materia Medica.
1 P. M.	Practice in Operative Dentistry.	Practice in Operative Dentistry.	Practice in Operative Dentistry.	Practice in Operative Dentistry.	Practice in Operative Dentistry.	
3½ P. M.	Anatomy.	Anatomical Demonstrat	Anatomy.		Anatomy.	
4½ P. M.	Physiology.	Operative Dentistry.	Physiology.	Operative Dentistry.	Physiology.	
5½ P. M.	Mechanical Dentistry.		Mechanical Dentistry, until Jan. 1. Metallurgy, after Jan. 1.			

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.



## SECOND YEAR.

<i>Hour.</i>	<i>Monday.</i>	<i>Tuesday.</i>	<i>Wednesday.</i>	<i>Thursday.</i>	<i>Friday.</i>	<i>Saturday.</i>
9 A.M.	Operative and Mechanical Clinics and Instruction in Crown and Bridge Work.	Operative and Mechanical Clinics and Instruction in Crown and Bridge Work.	Operative and Mechanical Clinics and Instruction in Crown and Bridge Work.	Operative and Mechanical Clinics and Instruction in Crown and Bridge Work.	Operative and Mechanical Clinics and Instruction in Crown and Bridge Work.	Operative Clinic.
10 A.M.						
11 A.M.						
12 M.			Medical and Surgical Clinics, University Hospital.	Operative Clinic.	Operative Clinic.	Medical and Surgical Clinics, University Hospital.
1 P.M.	Operative Clinic.	Operative Clinic.				
3½ P.M.	Anatomy.		Anatomy.		Anatomy.	
4½ P.M.	Physiology.	Operative Dentistry.	Physiology.	Operative Dentistry.	Physiology.	
5½ P.M.	Mechanical Dentistry.		Mechanical Dentistry, until Jan. 1. Metallurgy, after Jan. 1.		Dental Pathology and Therapeutics.	

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.

<i>Hour.</i>	<i>Monday.</i>	<i>Tuesday.</i>	<i>Wednesday.</i>	<i>Thursday.</i>	<i>Friday.</i>	<i>Saturday.</i>
9 A.M.	Operative Clinic and Clinical Practice in Crown and Bridge Work.	Operative Clinic and Clinical Practice in Crown and Bridge Work.	Operative Clinic and Clinical Practice in Crown and Bridge Work.	Operative Clinic and Clinical Practice in Crown and Bridge Work.	Operative Clinic and Clinical Practice in Crown and Bridge Work.	Operative Clinic.
10 A.M.						
11 A.M.						
12 M.			Medical and Surgical Clinics, University Hospital.			Medical and Surgical Clinics, University Hospital.
1 P.M.	Operative Clinic.	Operative Clinic.		Operative Clinic.	Operative Clinic.	
2 P.M.			Operative Clinic.			
3½ P.M.						
4½ P.M.		Operative Dentistry.		Operative Dentistry.		
5½ P.M.	Mechanical Dentistry.		Mechanical Dentistry, until Jan. 1. Metallurgy after Jan. 1.		Dental Pathology and Therapeutics.	

## 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 mechanics. 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 winter sessions are 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 1893-94.

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.



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 METALLURGY 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 new Library Building is now completed. The Stillé Medical Library has been removed to the spacious department devoted to the books belonging to the University.

The Library Building 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 unequalled 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 SESSIONS.

The Collegiate Year is divided into two sessions: First, the Winter Session, on which alone attendance is required; and, second, the Spring Session.

The *Spring Session*, 1893, begins on Monday, May 8th, and ends the last of June. The work of this session is entirely practical; no lectures are delivered.

The *Winter Session*, 1893-94, begins on Monday, October 2d, 1893, and ends at Commencement, early in May, 1894.

*Students are earnestly requested to be in attendance at the beginning of the Winter 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 April, 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.

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\*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.

- On Operative Dentistry and Dental Histology:* Harris' *Principles and Practice*; Tomes' *Dental Surgery*; Taft's *Operative Dentistry*; Tomes' *Dental Anatomy*; Guilford's *Orthodontia*; Farrar's *Irregularities of the Teeth and their Correction*.
- On Mechanical Dentistry and Metallurgy:* Richardson's *Mechanical Dentistry*; Wildman's *Instruction in Vulcanite Work*; Kingsley's *Oral Deformities*; Essig's *Dental Metallurgy*.
- On Anatomy:* Leidy's *Elementary Treatise on Human Anatomy*; Gray's *Anatomy*.
- Dental Follicle:* Legros and Magitot, translated by M. S. Dean.
- On Chemistry:* Marshall's *First Year Notes*; Medicus *Qualitative Analysis*; Fownes' or Wurtz's *Chemistry*; Wormley's *Micro-Chemistry of Poisons*; Mitchell's *Dental Chemistry*.
- On Physiology:* Foster's *Physiology with Frey's Compendium of Histology*; Tyson's *Cell Doctrine*; Yeo's *Physiology*.
- On Materia Medica:* H. C. Wood's *Therapeutics*; Gorgas' *Dental Medicine*; Geo. B. Wood's *Therapeutics*; Wood and Bache's *Dispensatory*.
- On Surgery:* Agnew's *Surgery*; Ashhurst's *Surgery*; Billroth's *Surgical Pathology*.
- On Histology:* Klein's *Histology*; Miller's *Micro-Organisms of the Human Mouth*.

## EXPENSES.

## WINTER TERM.

*First Year.*

Matriculation Fee (paid once only) . . . . .	\$5 00
Tuition Fee . . . . .	100 00

*Second Year.*

Tuition Fee . . . . .	\$100 00
Fee for Dissection . . . . .	10 00

*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

JAMES TRUMAN, Dean,

3243 Chestnut Street, Philadelphia, Pa.

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 5,536 gold fillings can be appreciated only by the experienced operator.

The number of patients (8,536) 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 1891-92.

Number of Patients . . . . . 8,536.

Gold Fillings . . . . .	5,533
Tin Fillings . . . . .	1,497
Cement Fillings . . . . .	1,718
Amalgam “ . . . . .	642
Gutta Percha Fillings . . . . .	857
Canal Fillings . . . . .	368
Pulps capped . . . . .	394
“ devitalized . . . . .	333
“ extracted . . . . .	341
Pulpitis . . . . .	972
Treatment Pulp Canals . . . . .	1,257
Pericementitis . . . . .	145
Alveolar Abscess . . . . .	129
Inflammation of Gums . . . . .	219
Pyorrhœa Alveolaris . . . . .	143
Irregularities Corrected . . . . .	138
Salivary Calculi . . . . .	1,321
Teeth and Roots extracted . . . . .	5,179
<b>Total . . . . .</b>	<b>21,186</b>

MECHANICAL DEPARTMENT.

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Amount of gold used for fillings, and exclusive of that used for plate and crown work in Laboratory, 69 ounces (5 lbs. 9 ounces).

MECHANICAL DEPARTMENT.

SESSION OF 1891-92.

Full cases . . . . .	348
Partial cases . . . . .	204
Pivot teeth and Crown Work . . . . .	146
Repairing cases . . . . .	39
Regulating " . . . . .	24
Gold Bridge Work . . . . .	33
Total . . . . .	<u>794</u>

SOCIETY OF THE ALUMNI OF THE DEPARTMENT OF  
DENTISTRY OF THE UNIVERSITY OF  
PENNSYLVANIA.

For a list of officers, and other information, see ALUMNI ORGANIZATIONS, on a later page.



DEPARTMENT OF VETERINARY  
MEDICINE.

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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.  
JOSEPH T. ROTHROCK, B.S., M.D., Professor of Botany.  
ROBERT MEADE SMITH, M.D., Professor of Comparative Physi-  
ology.  
WILLIAM L. ZUILL, M.D., D.V.S., Professor of Veterinary Surgery  
and Obstetrics.  
WILLIAM POWELL WILSON, Sc.D., Professor of Anatomy and  
Physiology of Plants.  
JOHN GUITÉRAS, M.D., Professor of General Pathology and Morbid  
Anatomy.  
JOHN MARSHALL, M.D., NAT.Sc.D., DEAN OF THE FACULTY,  
Assistant Professor of Chemistry.  
SIMON J. J. HARGER, V.M.D., Professor of Veterinary Anatomy  
and Zootechnics.  
LEONARD PEARSON, B.S., V.M.D., Assistant Professor of the  
Theory and Practice of Veterinary Medicine.  
JOHN M. MACFARLANE, D.Sc., Professor of General Biology.

DEMONSTRATORS.

- ALEXANDER GLASS, V.S., Lecturer on the Theory and Practice of  
Canine Medicine.  
CHALKLEY H. MAGILL, V.M.D., Demonstrator of Veterinary  
Surgery.  
ROBERT FORMAD, V.M.D., Lecturer on Veterinary Sanitary  
Science, and Demonstrator of Normal and Pathological Histology.  
WILLIAM H. RIDGE, V.M.D., Demonstrator of Veterinary Ob-  
stetrics.  
EDWIN S. MUIR, Ph.G., V.M.D., Demonstrator of Veterinary  
Materia Medica and Pharmacy.

- LEO BREISACHER, V.M.D., Demonstrator of Comparative Physiology.  
 B. FRANK SENSEMAN, V.M.D., Demonstrator of Veterinary Anatomy.  
 HENRY W. CATTELL, M.D., Demonstrator of Morbid Anatomy.  
 W. A. W. TURNBULL, V.M.D., Assistant Demonstrator of Veterinary Anatomy.  
 ZACHARIAH R. SCHOLL, Farrier, Demonstrator of Forging and Horse-shoeing.

JOHN MARSHALL, M.D., Dean,  
 36th and Pine Streets, Philadelphia, Pa.

## MATRICULATES, 1892-'93.

## THIRD YEAR.

Name.	Residence.
Connor, John F.,	Philadelphia.
Corson, Percy H.,	New Richland, Minn.
Cotton, Charles E.,	Prescott, Wis.
Earnest, Charles M.,	Philadelphia.
Fitzpatrick, Dennis B.,	Philadelphia.
Forsyth, George O.,	Pemberton, N. J.
Gray, G. Walton,	Philadelphia.
Greeson, James O.,	Kokomo, Ind.
James, John Alvin,	Aberdeen, Md.
Jefferis, Joseph R.,	Wilmington, Del.
Jolly, George O.,	Philadelphia.
Kellner, Edward L.,	Philadelphia.
Koenig, August O.,	Philadelphia.
McCarty, Orwell, A.,	Piatt.
McCurdy, Frank C., A.B.,	Tioga, Phila.
Magill, Charles E.,	Haddonfield, N. J.
Patterson, Henry G.,	Mifflintown.
Paxson, Harry D.,	West Chester.
Shields, William A. H.,	Philadelphia.
Smith, Evis A.,	Philadelphia.
Smith, Harry F.,	Philadelphia.
Stuart, James A.,	Beverly, N. J.
Stuart, George E. H.,	Holmesburg.
Terry, Edward E.,	Trevose.
Turner, Henry W.,	West Chester.
Walls, Alexander C.,	St. Paul, Minn.
Walter, Harry K.,	Point Pleasant.
Wertz, William T. S.,	Philadelphia.
Willganz, Chris. J.,	Buffalo, N. Y.
Young, William, Jr.,	Riverton, N. J.

## SECOND YEAR.

Name.	Residence.
Andrews, Frank H.,	Syracuse, N. Y.
Black, Horace G.,	Hammonton, N. J.



## DEPARTMENT OF VETERINARY MEDICINE.

Name.	Residence.
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.
Green, L. Kenneth,	Booth's Corner.
Grogan, Joseph P.,	Baltimore, Md.
Harder, George E.,	Philadelphia.
Hendren, Samuel G.,	Roxborough.
Knight, Emil,	Rochester, N. Y.
Marshall, Clarence J.,	Rome.
Mitton, Philip G.,	Philadelphia.
Molyneux, Wm. M., D.D.S.,	Forksville.
Moore, Enoch H.,	Bridgeton, N. J.
Mount, Ellsworth,	Burlington, N. J.
Rectenwald, John J.,	Pittsburgh.
Richardson, A. G. G.,	Ithaca, N. Y.
Salinger, Arthur,	Philadelphia.
Shannon, Frank F.,	Lexington, Ky.
Swank, George K.,	East Mauch Chunk.
Weicksel, Harvey J.,	Line Mountain.

## FIRST YEAR.

Name.	Residence.
Black, R. Markley,	Cecilton, Md.
Boyd, Charles W.,	Allegheny City.
Brackbill, Marsh L.,	Strasburg.
Browning, Lincoln F.	Delair, N. J.
Coble, Ira G.,	Tamaqua.
Connell, John,	Philadelphia.
Cox, Harry B.,	Philadelphia.
Felber, Frederick L.	Baltimore, Md.
Gross, Harry E.,	Philadelphia.
Hagenbuch, Bert.,	Mahanoy City.
Hayden, Joseph S.,	Bryn Mawr.
Hood, William R.,	Atlantic City, N. J.
Hogg, Edwin,	Kirkwood.
Houck, Ulysses G.,	Berwick.
Huston, Charles H.,	Philadelphia.
Johnston, S. Harry,	Philadelphia.
Kille, Wilmer B.,	Masonville, N. J.
Lacock, J. Stewart,	Allegheny City.
Lienhardt, Richard,	Wayne.
Lorraine, Harry,	Philipsburg.
Martin, W. Walter,	Philadelphia.
Mecray, James M.,	Maple Shade, N. J.
Oesterling, Harry E.,	Wheeling, W. Va.
Peralta, Carlos J.,	Costa Rica, C. A.
Phipps, William P.,	Lionville.

Name.	Residence.
Rilling, Benjamin F.,	Philadelphia.
Reagen, William J.,	Philadelphia.
Robert, Joseph C.,	Centreville, Miss.
Roesch, Louis W.,	Philadelphia.
Shumway, D. Gardner,	Hancock, Mass.
Shaw, John,	Wilmington, Del.
Stauffer, Willis B.,	Philadelphia.
Tate, Hunter,	Philadelphia.
Tegtmeier, August,	Philadelphia.
Underhill, Benjamin M.,	Knoxville, Iowa.
Watts, Edward H. B.	Philadelphia.

SPECIAL AND PREPARATORY STUDENTS.

Hart, John R.,	Philadelphia.
Heaton, Robert D.,	Ashland.

SUMMARY.

Students of the Third Year . . . . .	30
Students of the Second Year . . . . .	24
Students of the First Year . . . . .	36
Special and Preparatory Students . . . . .	2

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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 physician 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.

#### 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, Veterinary Anatomy, and Forging.*

SECOND YEAR.—*Medical Chemistry, Botany, Physiology, Therapeutics, General Pathology and Morbid Anatomy, Veterinary Anatomy, Zoölogy, Veterinary Surgery, Theory and Practice of Veterinary Medicine, and the Contagious Diseases, Theory and Practice of Canine Medicine.*

THIRD YEAR.—*Therapeutics, General Pathology and Morbid Anatomy, Veterinary Surgery and Operative Surgery, Theory and Practice of Veterinary Medicine, and the Contagious Diseases, 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 Demonstrator, with assistants. Students of the First year devote three hours each week to the study of General Chemistry. 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 Demonstrator of 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. Pharmacopœia which are of use in Veterinary Medicine, with the addition of the 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, zoölogy, 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 the 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 Food-stuffs, 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 whole 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 gained by the course of forty lectures in which these subjects are carefully elucidated.



The second object is to train observers, as well as to teach the practical relations of Forage plants, "loco plants" and noxious weeds to the veterinary art. It cannot be too fully impressed upon the student in this department that, owing to the intimate relations between agriculture and veterinary medicine, his future prosperity and usefulness may be largely determined by his ability to recognize promptly plants which are known or supposed to be injurious to our domestic animals. The so-called "loco plants" are the cause each year of an immense loss to stock raisers of the United States. Then, too, there is much to be learned and taught as to the relative nutritive values of the forage plants of every region of the country. This the future Veterinarian must be prepared to do. Some grasses sold as forage can be shown to be absolutely injurious. These should be recognized. To meet this second object the student has, during the first term, four hours' drill each week in observation and description of plants. During the second term he also has four hours each week devoted to analytical botany. The work then is done entirely in the laboratory, and, to accomplish it, each student is provided with a dissecting microscope, for which he receipts, and for which he is responsible.

#### ZOOLOGY.

General Zoölogy and Comparative Anatomy embrace the study of the Animal Kingdom, the Organic Cell and its aggregates, a short account of the tissues and their production; Organs, their structure, Reproduction, general facts of Embryology, Metamorphosis, Alternation of Generation, Polymorphism and Heterogeny, systems of Classification, the Evolution Theory, Species and Varieties, with a succinct account of the various groups of animals, their anatomy, development, and distribution.

Practical demonstrations are given of the characteristics of the organs in the various animal types, in order to prepare the student for original zoölogical research.

#### ANATOMY.

The instruction in Descriptive Anatomy extends over two entire sessions, and embraces the study of the Bones, Articulations, Muscles, Digestive tract, Respiratory apparatus, Urinogenital 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 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, articulations, 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.

#### FORGING.

While the Veterinarian is not expected to be a blacksmith, he should at least know the manual of a craft which he is constantly called upon to direct.

At eight forges the students are instructed twice a week, in sections of sixteen.

The student is required to forge the Horseshoe from the mould, and to prepare the horse's hoof, to remove the shoe, and to put it on. The shoeing is first learned on the dead hoof, then on the living hoof. Later, the practical work includes the forging of pathological and surgical shoes, with a course of lectures on Farriery and Pathological Shoeing.

#### THERAPEUTICS.

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,  
INCLUDING THE CONTAGIOUS DISEASES.

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 Hereditary Disposition, 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. AUTOPSIES.

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 Minor Surgery, and comprises a course of about one hundred lectures. The other year, given to the study of Major Surgery, comprises 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 fifteen 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, with the proper manner of application, is given in connection with Operative Surgery.

The lectures on Minor Surgery are comprised under the following headings :—

## SURGICAL DIAGNOSIS.

MODE OF SECURING ANIMALS.—Horse, Ox, Dog, etc.

LIGATION OF ARTERIES.

CLOSURE OF WOUNDS, SUTURES, etc.

INFLAMMATION.—Varieties and complications, Abscess, Suppuration, Mortification, Cicatrization.

WOUNDS.—Incised, lacerated, bruised and punctured Wounds, Bites, Gunshot wounds, Summer wounds.

FRACTURES.—Healing of Fractures, Incomplete Fracture, Special Fractures.

DISEASES OF BONE.—Inflammation of Bone, Bone Tumors, Ring Bones, Side Bones, Splints, Spavin, Curb, Osteomalacia, Osteoporosis.

DISEASES OF SYNOVIAL MEMBRANES.

“ “ ARTICULATIONS.

“ “ TEETH.

“ “ TESTICLES AND THEIR ENVELOPES.

“ “ TENDONS.

“ “ MUSCULAR TISSUE.

DISLOCATIONS.



DISEASES OF VEINS.—Thrombus, Phlebitis.

“ “ LYMPHATICS.

“ “ WITHERS, NECK, and POLL.

SPRAINS.—Subcutaneous Emphysema.

PHYSIOLOGICAL, HORSE-SHOEING.

#### CLASSIFICATION OF LECTURES ON MAJOR SURGERY.

DISEASES OF THE FOOT.—Anatomy, Physiology, Pathology.

CORNS, FISSURES, KERAPHYLLOCELE, KERATOCELE, PRICKING, BURNT SOLE.

QUITTOR.—Cutaneous, Cartilaginous, Tendinous.

STREET NAIL, Acute Founder, Navicular Disease, Thrush, Gangrene, Necrosis, Caries, Purulent Infection.

HERNIA.—Acute, Chronic, Inguinal, Ventral, Eversion, Diaphragmatic, Umbilical.

TUMORS.—Lipoma, Encondroma, Osteoma, Odontoma, Lymphadenoma, Osteosarcoma, Carcinoma, Inflammation of the Sinus.

CASTRATION.—Normal, Cryptorchia, Female, Other Animals.

PATHOLOGICAL SHOETING.

#### 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 Fœtal Dystokia, Diseases of the Fœtus, Monstrosities, Dystokia from Malpresentation, Obstetrical Operations, Accidents of Parturition, Diseases, and Abnormalities of the young animal.

#### ZOÖTECHNICS 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 : echinococæ, cysticercus, psorospermien and trichinæ. 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 veterinary specimens. Valuable and rare specimens are constantly added to it from the animals which die in the extensive Zoölogical 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 for 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.

1825 animals were treated in the Hospital during the year ending August 31st, 1892.

#### FARRIERY.

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 *Veterinariæ Medicinæ 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.

#### FEEES.

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 \$1.00 per part.

At the beginning of the first and second years 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 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
	<hr/>
	\$110 00

*Second Year.*

Tuition Fee . . . . .	\$100 00
Dissecting Material, about . . . . .	5 00
	<hr/>
	\$105 00

*Third Year.*

Tuition Fee . . . . .	\$100 00
Material for Operative Surgery, about . . . . .	8 00
	<hr/>
	\$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.*—Klein.

*Physiology.*—Smith's Physiology of the Domesticated Animals.

*Zoölogy.*—Nicholson's Manual.

*Horse-shoeing.*—Fleming.



## SECOND YEAR.

*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; Gray's Manual.

## THIRD YEAR.

*Obstetrics.*—Fleming.

The Journal of Comparative Medicine and Veterinary Archives.  
The American Veterinary Review.

ROSTER,—1892-1893. First Year.

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HOUE.	MONDAY.	TUESDAY.	WEDNESDAY.	THUESDAY.	FRIDAY.	SATURDAY.
9 A.M.	*Wormley Chemistry	*Wormley. Chemistry.			Farriery, One Section. Others Dissect.	
10 A.M.	Dissection.	Dissection.	Harger. Anatomy.			
11 A.M.			*Marshall. Chemical Lab. 9 to 12 o'clock, after Feb. 1.	Harger. Anatomy.		Dissection.
12 M.	Harger. Anatomy.	Smith. Physiology.		Smith. Physiology.	Smith. Physiology.	
2 P.M.		†Macfarlan. Laboratory, Gen. Biology. Until February 1st.	Allen. Zoölogy.	†Macfarlan. Laboratory, Gen. Biology. Until February 1st.		
3 P.M.	Farriery, One Section. Others Dissect.	R. Formad. Histological Laboratory. After February 1st.		R. Formad. Histological Laboratory. After February 1st.	Muir. Pharmaceut'l Laboratory. Section A.	
4 P.M.	†Macfarlan. General Biology.		Farriery. One Section. Others Dissect.			
4½ P.M.		Muir. Materia Medica.				
5 P.M.						
7 to 9½	Dissection.	Muir. Pharmaceut'l Laboratory. Section B.	Dissection.	Dissection.	Dissection.	

ROSTER,—1892-1893. Second Year.

HOUE.	MONDAY.	TUESDAY.	WEDNESDAY.	THUESDAY.	FRIDAY.	SATURDAY.
8 A.M.				Pearson. Clinic.		Harger. Clinic
9 A.M.	Pearson. Clinic.	Zuill. Clinic.	Harger. Clinic.	*Wormley. Medical Chemistry.	Zuill. Clinic.	
10 A.M.	Pearson. Practice.	Zuill. Surgery.	Harger. Anatomy.	Pearson. Practice.	*Guiteras. Morbid Anatomy.	*Marshall. Chemical Laboratory.
11 A.M.	Zuill. Surgery.	*Guiteras. Morbid Anatomy.	Pearson. Practice.	Harger. Anatomy.	Zuill. Surgery.	
12 M.	Harger. Anatomy.	Smith. Physiology.		Smith. Physiology.	Smith. Physiology.	
2 P.M.	†Wilson. Structural Botany. Until Feb. 1st.	Glass. Canine Practice.	†Allen. Zoölogy.		†Wilson. Structural Botany. Until Feb. 1st.	Dissection.
3 P.M.	†Rothrock. Systematic Botany. After Feb. 1st.	Dissection.	†Wilson. Botany.	Dissection.	†Rothrock. Systematic Botany. After Feb. 1st.	R. Formad. Pathological Histology Laboratory. After April 1st.
4 P.M.			Dissection.	*Wood. Therapeutics.		*Wood. Therapeutics.
4½ P.M.						
7 to 9½	Dissection.	Dissection.	Dissection.	Dissection.	Dissection.	

Lectures marked \* are held in the Medical Department.  
Lectures marked † are held in the Biological Department.



## ROSTER,—1892-1893. Third Year.

HOUR.	MONDAY.	TUESDAY.	WEDNESDAY.	THURSDAY.	FRIDAY.	SATURDAY.
8 A.M.	Pearson. Clinic.	Zuill. Clinic.	Harger. Clinic.	Pearson. Clinic.	Zuill. Clinic.	Harger. Clinic.
9 A.M.				Bacteriology. Part of Sess.		
10 A.M.	Pearson. Practice.	Zuill. Surgery.	R. Formad. Sanitary Science.	Pearson. Practice.	*Guiteras. Morbid Anatomy.	Harger. Zootechnics.
11 A.M.	Zuill. Surgery.	* Guiteras. Morbid Anatomy.	Pearson. Practice.		Zuill. Surgery.	Ridge. Obstetrics.
12 M.			*Cattell. Morbid Anat. Demonstrat'ns			
2 P.M.		Glass. Canine Practice.				
	Foot Operations.		Foot Operations.	Pathological Farriery.	Magill. Operative Surgery.	Foot Operations.
4 P.M.		Pathological Farriery.				
4½P.M.				* Wood. Therapeutics.		* Wood. Therapeutics.

Lectures marked \* are held in the Medical Department.  
Lectures marked † are held in the Biological Department.

THE ASSOCIATION OF ALUMNI OF THE VETERINARY  
DEPARTMENT.

For a list of officers, and other information, see ALUMNI ORGANI-  
ZATIONS, on a later page.

VETERINARY HOSPITAL OF THE UNIVERSITY OF  
PENNSYLVANIA.

Thirty-sixth and Pine Streets, Philadelphia.

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## HOSPITAL STAFF.

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SIMON J. J. HARGER, V.M.D., Professor of Veterinary Anatomy and Zootechnics.

LEONARD PEARSON, B.S., V.M.D., Assistant Professor of the Theory and Practice of Veterinary Medicine.

W. A. W. TURNBULL, V.M.D., House Surgeon.

J. R. ANGNEY, JR., Superintendent of 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.

The animals are under the professional care of the Hospital Staff and of the House Surgeon, who resides in the Hospital.

1825 animals were treated in the Hospital during the year ending August 31, 1892.

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.



## DEPARTMENT OF LAW.

### FACULTY.

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GEORGE WHARTON PEPPER, A.M., LL.B.

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### LIBRARIAN.

S. STANGER ISZARD, A.M., LL.B.

## MATRICULATES.

### THIRD YEAR.

Name.	Residence.	Preceptor.
Alworth, Henry Stephen,	Harford, Pa.,	J. F. Knaus.
Beatty, John Eckstein,	Philadelphia,	C. Stuart Patterson.
Bonniwell, Eugene Cleophas,	do.	S. Edwin Megargee.
Breitinger, J. Louis,	do.	F. L. Breitinger.
Brooks, Edward, Jr., A.B. (Yale),	do.	W. W. Porter.
Buckman, Jacob Hibbs,	Langhorne, Pa.,	A. W. Horton.

Name.	Residence.	Preceptor. *
Burr, Charles Henry, Jr., A. M. (Haverford),	Philadelphia,	Thomas Leaming.
Camp, Everett Bruce,	Bangor, Pa.	
Collier, William Volkmar, A. B. (C. H. S.),	Haverford, Pa.,	Arthur M. Burton.
Conard, Charles Wilfred,	Lansdowne, Pa.,	J. J. White.
Coulston, Joseph Warren, Jr., A. B. (University),	Philadelphia,	J. Warren Coulston.
Craig, Henry Alexander, A. B. (C. H. S.),	do.	
Crankshaw, Frederick Weir,	Norristown, Pa.,	Wm. J. Smyth.
Depue, Arthur Wilson,	Philadelphia,	Lincoln L. Eyre.
Eggleston, Charles Fellows, A. B. (Wesleyan),	New York City,	Samuel B. Huey.
Ellis, Frank B.,	Duncannon, Pa.	
Embery, Joseph Ryerss,	Frankford, Pa.,	H. E. Garsed.
Furst, William Sanderson, A. B. (Princeton),	Bellefonte, Pa.,	Lister, Barlow & Chase
Goldsmith, Charles, Hawkes, Thomas Gilbert, A. B. (C. H. S.),	Danville, Pa., Philadelphia,	Joseph L. Greenwald.
Hayes, J. Carroll, A. B. (Swarthmore and Harvard),	West Chester, Pa.,	William M. Hayes.
Huey, Henry Clay, A. B. (C. H. S.),	Philadelphia,	Lister, Barlow & Chase
Jackson, Rowland Herbert,	do.	
Jenkins, G. Washington, Jr.,	do.	Theodore F. Jenkins.
Jenkins, George Herbert,	Gwynedd, Pa.,	Hollingsworth & Fraleay.
Judson, Oliver Boyce, A. B. (Harvard),	Philadelphia,	John G. Johnson.
Koch, Charles Howard, A. B. (C. H. S.),	do.	
Kochersperger, C. Haines,	do.	Geo. Tucker Bispham.
Kolb, Winfield Scott,	do.	Jerome Carty.
Large, Joseph Barton,	do.	Page, Allinson & Penrose.
Lewis, David, Jr.,	do.	Finletter & Finletter.
Lewis, Evan Benedict, A. B. (Muhlenberg),	Royersford,	W. H. Hepburn & W. H. Browne.
Little, Henry Ashton, A. B. (University),	Philadelphia,	James H. Little.
Loyd, William Henry, Jr., A. B. (University),	do.	Geo. Tucker Bispham.
Louchheim, Samuel Kahn, Ph. B. (University), A. B. (C. H. S.),	do.	Biddle & Ward.
Mackey, Harry Arista, A. B. (Lafayette),	Bangor, Pa.	
Magill, William H.,	Danville, Pa.	
Maurer, John Henry,	Philadelphia,	John F. Lewis.
McCully, John Elliott,	do.	Gavitt & Shannon.



* Name.	Residence.	Preceptor.
McInnes, Walter S.,	Philadelphia,	William Henry Lex.
Miller, Emlen Hare, Esq.,	do.	E. Spencer Miller.
A.B. (University),		
Neilson, Frederick Brooke,	do.	Neilson & Neilson.
Nevin, Edwin Channing,	do.	E. Cooper Shapley.
O'Donovan, P. C. Bernard,	Camden, N. J.	
Pierce, James Anton,	Sharpsville, Pa.	
Ravenel, Sam'l Prioleau, Jr.,	Philadelphia.	
A.B. (Haverford),		
Rhoads, Joseph Howard,	Overbrook, Pa.,	John S. Gerhard.
Schermerhorn, H. Bovee,	Philadelphia.	
Ph.B. (University),		
Shober, Reginald Kearney,	do.	MacVeagh & Bispham
A.B. (Princeton),		
Shryock, William Allen,	do.	Wm. Knight Shryock.
Stoyle, Richard Saunders,	do.	W. W. Smith.
Ph.B. (University),		
Suddards, William James,	do.	Biddle & Ward.
Swartley, John Cassel,	Doylestown, Pa.,	Henry Lear.
Umsted, John Rittenhouse,	Philadelphia.	
A.B. (C.H.S.),		
Viti, Marcel Alonzo,	do.	Finletter & Finletter.
Woltjen, Charles Henry, Jr.,	Pottsville, Pa.,	C. Stuart Patterson.

## SECOND YEAR.

Name.	Residence.	Preceptor.
Anderson, James Robert,	Philadelphia,	G. E. Schlegelmilch.
Balch, Thomas Willing,	do.	Biddle & Ward.
A.B. (Harvard),		
Bauer, Frederick Wallace,	do.	Alex. Simpson, Jr.
A.B. (C.H.S.),		
Borneman, Henry S.	Norristown, Pa.,	C. Stuart Patterson.
Boyd, Herbert Hart,	Philadelphia.	
Ph.B. (University),		
Bradley, Edward Leonidas,	Omaha, Nebraska,	Bradley & Delamatre.
Brown, Reynolds Driver,	Philadelphia,	Morgan & Lewis.
A.B. (Harvard),		
Bullock, Geo. Anderson, Jr.,	do.	Gormley & Snare.
Butler, George Thomas,	West Chester, Pa.	
Cadwallader, Isaac Price,	Philadelphia,	C. Stuart Patterson.
Carr, William Augustus,	Farmington, Iowa,	Thomas E. French.
Clifford, James Stapleton,	Philadelphia,	Maxwell Stevenson.
Coulston, Charles Woods,	do.	
A.B. (Wesleyan),		
Covington, J. Harry,	Easton, Md.,	Chas. D. Gibson.
Dickson, Erskine Hazard,	Philadelphia,	John C. Bullitt.
A.B. (University),		
Dolman, Edward Coke,	do.	John Dolman.
Edmunds, Charles Welsh,	do.	Henry R. Edmunds.
Enich, Joseph Edmund,	do.	Biddle & Ward.
Ph.B. (University),		

Name.	Residence.	Preceptor.
Farr, Chester Nye, B.S. (University),	Philadelphia.	
Frazer, Emory D.,	Ridgely, Md.	
Freeman, Parker Ross,	Philadelphia,	Geo. Tucker Bispham.
Greenwald, Max,	do.	Joseph L. Greenwald.
Gorman, Joseph Aloysius,	do.	William Gorman.
Gould, Wm. Henry Gulick,	Mt. Carmel, Pa.,	Samuel B. Huey.
Hawkes, George Barclay, A.M. (C.H.S.),	Philadelphia.	
Keim, Alfred Newton,	Pottstown, Pa.	
Kennedy, Albert Edward,	Philadelphia,	Daniel Dougherty.
Koons, Ulysses Sidney,	do.	Chas. B. McMichael.
Lee, Frederick Howard,	Mt. Holly, N. J.,	J. F. Schaperkotter.
Lewis, E. St. Elmo,	Philadelphia,	Chas. Lex Smyth.
MacDade, Albert Dutton,	Chester, Pa.,	Thad. Vanderslice.
McFadden, John Joseph, M.D. (Jefferson),	Philadelphia,	MacVeagh & Bispham
Matlack, Samuel D., A.B. (C.H.S.),	do.	
Minton, Henry McKee,	do.	Theophilus J. Minton.
Monaghan, John, A.B. (C.H.S.),	do.	
Morris, William Norman,	L. Lexington, Pa.,	MacVeagh & Bispham
Morton, Robert P., Jr.,	Philadelphia,	Thomas W. Barlow.
Payne, Hubbard Barker,	Kingston, Pa.,	Johnston & Tustin.
Price, Luther Edmunds, A.B. (Princeton),	Philadelphia,	John Scott, Jr.
Potter, Edward Arthur,	Camden, N. J.,	William J. Turner.
Quinn, Charles Michael,	Clifton H'ghts, Pa.,	C. Stuart Patterson.
Rowland, William P.,	Ardmore, Pa.,	P. F. Rothermel, Jr.
Russell, George Smyth,	Philadelphia.	
Sailer, Randolph, A.B. (C.H.S.),	do.	Jos. C. Fraley.
Schermerhorn, Frank Earle, Ph.B. (University),	do.	Henry R. Edmunds.
Sion, Isaac,	Philadelphia,	Arthur S. Arnold.
Smith, George Hughes, Ph.B. (University),	do.	Samuel B. Huey.
Taylor, Benjamin Frank,	Langhorne, Pa.,	Charles F. Warwick.
Vail, Louis de Pui, A.B. (University),	Philadelphia,	Lewis D. Vail.
Walters, Louis Rhoades,	Phoenixville, Pa.,	C. Stuart Patterson.
Warren, Reid, A. B. (C.H.S.),	Philadelphia,	Johnson & Tustin.
Wright, Charles Wardleigh,	do.	Dechert & Dechert.
Wright, Robert Kemp, Jr., Grad. U. S. Naval Academy.	Germantown,	Morton P. Henry.

## FIRST YEAR.

Name.	Residence.	Preceptor.
Adair, Robert,	Wilmington, Del.,	Wm. C. Spruance.
Baird, William McFunn,	West Chester, Pa.	



Name.	Residence.	Preceptor.
Beaumont, E. Beauharnais,	Philadelphia.	
Betts, Rodman Louis,	do	
Bleakly, Howard Graham,	Camden, N. J.,	Jones, Carson & Phillips.
Bowers, Lee Mastbaum	Philadelphia.	
Schwartz, B.S. (University),		
Boyle, Frank Edmund,	Scranton, Pa.,	Jones, Carson & Phillips.
A. B. (Mt. St. Mary),		
Brennan, William Fryburg,	Philadelphia,	Alfred F. Custis.
A. B. (Rockhill),		
Brown, C. Montgomery,	do.	Sheldon Potter.
Buchholz, C. Theodore,	do.	
Bur, Lawrence John,	do.	Martin H. Stutzbach.
Burke, Peter C.,	do.	C. Stuart Patterson.
Butz, E. W.		
Carlin, Thomas Marks,	Philadelphia,	Harrity & Beck.
Chase, Howard Gibbs,	do.	
Clapp, Herbert Mason,	Germantown,	Hollingsworth & Fraleay.
Cope, Porter Farquharson,	Philadelphia.	
Corson, Charles Gilbert,	do.	Robert T. Corson.
Dallas, George Wharton,	do.	Crawford & Laughlin.
Daly, Burrwood Joseph,	do.	Wm. F. Harrity.
Dannals, Pier,	Pittsburgh, Pa.,	John A. Burton.
Donohugh, Thomas Smith,	Philadelphia.	
Drovin, George Albert,	do.	Henry R. Edmunds.
Elwert, Max Berthold,	do.	
Ellwanger, Wm. Frederick,	do.	E. P. Smithers.
Emerick, John Adams, Jr.,	Langhorne, Pa.	
Fell, Joseph William,	Philadelphia,	Alfred Moore.
A. B. (University),		
Filbert, Frederick Victor,	Pine Grove, Pa.	
B.S. (University),		
Ford, William Wallace,	Pittsburgh, Pa.,	John A. Burton.
Fox, Henry Landell,	Philadelphia,	Henry K. Fox.
Gable, Vivian Frank,	do.	
A. B. (C.H.S.), Ph.B. (University),		
Goeckel, William John,	Wilkes-Barre.	
Goodell, Edward Prime,	Philadelphia,	J. S. Price.
Golze, Rudolph Leon,	do.	
Gordon-Davis, A. Burwell,	do.	Alexander & Magill.
Graham, John W., Jr.,	Kenton, Del.,	A. H. Mershon.
Hagen, Arthur, Jr.,	Haverford,	A. W. Hirst.
Hamilton, William Andrew,	Philadelphia.	
Hanley, Guy William,	do.	F. S. Brown.
Hassler, Isaac,	do.	Furth & Singer.
A. B. (C.H.S.),		
Huey, Arthur Baird,	do.	Samuel B. Huey.
Innes, Reginald Heber,	do.	Francis I. Gowen.
Jenkinson, James Chatwin,	do.	John Dolman.
Jennings, Joseph Maris,	do.	John W. Jennings.

Name.	Residence.	Preceptor.
Jones, Edmund,	Philadelphia,	Pierce Archer.
Jones, Von P.,	do.	Jones & Matthews.
Juilliard, Alfred Louis,	Louisville, Ohio.	
Keller, Harry Ellwood,	Philadelphia,	Adams & Huey.
B.S. (University),		
Kennedy, Amos D., Jr.,	do.	Chapman & Chapman
A.B. (C.H.S.),		
Kerr, J. F. S.,	do.	Rufus E. Shapley.
Klingensmith, J. Arthur,	Greensburg, Pa.	
Kuen, Samuel Eugene,	Philadelphia.	
Lewis, Ellis,	Milford, Pa.	
Maloney, Clifton,	Philadelphia,	Andrew J. Maloney.
A.B. (University),		
Maneely, Francis J.	do.	
A.B. (La Salle),		
Mecutchen, Pierce,	do.	Pierce Archer.
A.B. (C.H.S.),		
Milligan, Huston H.,	do.	John M. Strong.
A.M. (University),		
Mitcheson, Jos. MacGregor,	do.	C. Stuart Patterson.
A.B. (University),		
Murray, Abram Fisher,	do.	Edwin F. Glenn.
MacCartney, John F.,	Altoona, Pa.	
McClintock, John, Jr.,	Philadelphia,	Clarence Kennedy.
McDonald, John Thomas,	do.	Robert T. Corson.
MacLaughlin, Joseph Shaw,	do.	Samuel C. Perkins.
A.B. (C.H.S.),		
McLean, John Ralston, Jr.,	Philadelphia,	Frederick J. Shoyer.
O'Donoghue, John Francis,	do.	John A. Clark.
Parks, John Wesley,	do.	
Prichett, W. B.,	West Chester, Pa.	
Reese, Andrew Daniel,	Altoona, Pa.	
Register, Henry Vollmer,	Philadelphia.	
A.B. (Cornell),		
Richards, Paul S.,	do.	P. F. Rothermel.
B.A. (Yale),		
Shapley, Edwin,	do.	E. C. Shapley.
Smallwood, Alvin J.,	do.	
Smith, Robert Stuart,	Philadelphia.	
B.A. (Amherst),		
Somerby, Charles Wood,	do.	
A.B. (Princeton),		
Sparks, John Adams,	Stevensville, Va.	
Stoddart, Harry T.,	Wilkes-Barre, Pa.	
PH.B (Yale),		
Thompson, William J., Jr.,	Gloucester City, N. J.	
Ulmer, Charles Porter,	Philadelphia.	
Vollmer, Adrian A. Winston,	do.	
Wagoner, Charles Shalkop,	Spring City, Pa.,	Monaghan & Hause.
Wanamaker, Alfred L.,	Philadelphia,	P. F. Rothermel, Jr.
A. B. (C.H.S.),		



## DEPARTMENT OF LAW.

Name.	Residence.	Preceptor.
Webster, Horace Bickley,	Delmont, N. J.,	C. Stuart Patterson.
Weinhaus, Benjamin C.,	Allegheny, Pa.,	Albert E. Peterson.
Wells, Guy Everette,	Wilmington, Del.,	Hon. T. F. Bayard.
West, Wm. Nelson Lofin, A. B. (Haverford),	Philadelphia,	Henry J. McCarthy.
Wolf, Samuel,	do.	Read & Pettit.
Woodruff, Geo. Washington, B. A. (Yale),	do.	

## SPECIAL STUDENTS.

## FULL COURSE.

Name.	[Residence.	Preceptor.
Adams, John Frank, A. B. (Princeton),	Denver, Col.,	Hartzell & Patterson.
Arteaga, Ernesto Fernandez,	Paris, France.	
Barnes, Rufus Melon,	Connellsville, Pa.	
Bradway, Edward T.,	Woodbury, N. J.	
Dalzell, William Sage,	Pittsburgh, Pa.,	Geo. Tucker Bispham.
Field, James Little,	Wilmington, Del.,	Benjamin Nields.
Foulke, Roland Roberts,	Philadelphia.	
Griscom, Lloyd Carpenter,	Haverford,	Biddle & Ward.
Jones, Benjamin Rowland,	Warrior Run, Pa.,	Halsey & Strauss.
Marcy, Leonard Ira,	Wilkes-Barre, Pa.	
Martin, Nathan Dresher, A. B. (Muhlenberg),	Allentown, Pa.,	
Patterson, Charles Forsyth,	Allegheny, Pa.,	C. C. Dickey.
Reedy, David J.,	Scranton, Pa.,	F. J. Fitzsimmons.
Stevens, Andrew Frazier,	Titusville, Pa.,	Sherman & Grumbine.
Thompson, Arthur Rumford,	do.	Sherman & Grumbine.
Wales, Leonard Eugene, Jr., A. B. (Yale),	Wilmington, Del.,	Hon. L. E. Wales.
Ward, Eugene,	Wilkes-Barre, Pa.,	Thomas H. Atherton.

## PARTIAL COURSE.

Name.	Residence.	Preceptor.
Demming, George,	Philadelphia.	
Fisher, Harry William,	do.	
Moore, Ellis Walker,	do.	John Develin.
Stradling, Walter,	do.	H. C. Todd.
White, William, Jr.,	do.	R. C. McMurtrie.

## RECAPITULATION.

Dean and Professors . . . . .	6
Fellows . . . . .	4
Librarian . . . . .	I
	—
Total . . . . .	II

## MATRICULATES.

Third Year . . . . .	56
Second Year . . . . .	53
First Year . . . . .	87
Special Full Course . . . . .	17
Special Partial Course . . . . .	5
Total . . . . .	<u>218</u>

## 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 Sharswood, 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 GEORGE BIDDLE MEMORIAL 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 8500 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.

#### READING-ROOM.

The University maintains a Reading-room with over 350 periodicals.

The Library building has recently been completed at a cost of more than \$200,000.

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.

#### ADMISSION.

Application 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 Athenæum 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 Owen Wister, Esq., and his address is Brown Building, Fourth and Chestnut Streets, 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 *Æneid*, the orations of Cicero against Cataline, Sallust's *Jugurtha* or *Cataline*, or Cæsar'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, and matriculating after 1 February, 1893, 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.

##### FIRST YEAR.

The DEAN—Principles of Real Property.

Professor BISPHAM—Elementary Equity.

Professor HOLLINGSWORTH—Contracts.

Professor DALLAS—Torts.

Mr. PATTERSON—Pleading at Law.

##### 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*: Stephen 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.

#### 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 Laws 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.

#### 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 type-written 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 Algernon Sydney Biddle Fellowship" has been founded by the family of the late Professor Biddle as a memorial of that distinguished lawyer. The incumbent of this Fellowship is annually elected by the Board of Trustees of the University upon the nomination of the Faculty of the Law School and he receives an annual salary of five hundred dollars, and performs such duties of instruction as may be designated by the Dean of the Faculty.

THE LAW DEPARTMENT 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

examinations in Evidence, Pleading and Practice at Law and in Equity is annually awarded to a member of the graduating class.

The names of students in each class who pass the annual examination with distinction will be printed in the annual catalogue of the University.

Hereafter honors will be granted only to those students who, attaining an average of 80, or over, with every professor, shall also attain a 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 rule:

"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."

"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 1 February, 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 Laws is, therefore, \$455. The term fee of seventy-five dollars must be paid within the first week of each term.

*Students in attendance before 1 February, 1893, will continue to pay fifty dollars per term.*

#### SCHOLARSHIPS.

1. THE FACULTY SCHOLARSHIPS.—Three free scholarships in each class are granted by the Faculty to deserving and needy students. These will be open to competitive examination. Each candidate must present to the Dean, at or before the 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 1893 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 forty-five 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 upwards. A list of recommended boarding houses can be seen on application to E. W. Mumford, Assistant Secretary of the Board of Trustees, at the University.

#### LENGTH OF TERMS.

The college year opens 1st October, 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 31 January, and the second beginning 1 February.

#### MINIMUM EXPENSES.

Board—33 weeks . . . . .	\$165
Matriculation (1st year) . . . . .	5
Tuition . . . . .	150
Text-books . . . . .	15
	<hr/>
Total . . . . .	\$335

#### RELIGIOUS INFLUENCES.

All the large religious denominations have commodious churches near the University, Buildings, including Baptist, 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, foot-ball and tennis 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 Department of Law, University of Pennsylvania,  
600 Girard Building,  
Philadelphia.

#### SOCIETY OF THE ALUMNI.

(LAW DEPARTMENT.)

For a list of officers, and other information, see ALUMNI ORGANIZATIONS, on a later page.

## POST-GRADUATE COURSE IN LAW.

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### MATRICULATES.

#### SENIOR CLASS.

Harry F. Stitzell, LL.B., Philadelphia, 1430 South Penn Sq.

#### JUNIOR CLASS.

Mayne R. Longstreth, LL.B., Philadelphia, 1823 Arch St.  
Joseph Mellors, LL.B., do. 528 Arch St.

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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 mediæval 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 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.



## 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. 177 to 185.

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.

# LABORATORY OF HYGIENE.

## STAFF OF THE LABORATORY.

*Director.*—JOHN S. BILLINGS, M.D.

*First Assistant.*—A. C. ABBOTT, M.D.

*Assistant in Bacteriology.*—ALBERT A. GHRISKEY, M.D.

*Assistant in Chemistry.*—HILL SLOANE WARWICK, M.D., Ph.D.

*Thomas A. Scott Fellow in Hygiene.*—JAS. HOMER WRIGHT, A.B., M.D.

## MATRICULATES.

	Residence.	City Address.
Charles Harrison Frazier, M.D.,	Philadelphia,	Univ. Hospital.
Helena Goodwin, M.D.,	do.	3926 Chestnut St.
Samuel H. Kneass, M.D.,	do.	261 S. Broad St.
A. H. Marvin, M.D.,	Cleveland, O.,	University.
Adelaide Ward Peckham, M.D.,	Philadelphia,	42d and Pine Sts.
Mary Engle Pennington,	do.	3908 Walnut St.
Mazyck Porcher Ravenel, M.D.,	Charleston, S. C.,	University.
Anna P. Sharpless, M.D.,	Philadelphia,	3926 Chestnut St.
Lawrence S. Smith, M.D.,	do.	Univ. Hospital.
Archibald Graham Thomson, M.D.,	do.	“ “
Frances Culbreth Van Gasken, M.D.,	do.	402 S. Broad St.

## ANNOUNCEMENT OF COURSES OF INSTRUCTION GIVEN DURING 1892-93.

### 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.



(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 hæmocyto-meter ; 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), ptomains and leucomains.

Special attention will be directed to the methods for the production



and isolation of certain compounds possessing immunifying and anti-toxic properties, and to the study of their characteristic differential reactions. The course will begin Monday, January 2, 1893, 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.

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.

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,

Thirty-fourth and Locust Streets, Philadelphia, Pa.

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#### 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.

## UNIVERSITY 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,

ELIZABETH W. ROBINS.

The Library is one of the original departments of the University, possessing among its treasures works presented to the Academy of Philadelphia in 1749 (the year of its institution), 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 110,000 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 MCCARTEE 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 Department 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 HAYDEN and LEIDY LIBRARIES comprise works on geology, palæontology, zoölogy 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 8000 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 4000 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 1000 volumes, a collection on Semitic Epigraphy (Phœnician, Palmyrene, Moabitish, 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; 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 new Library building has been completed, and 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.



## THE UNIVERSITY LECTURE ASSOCIATION.

*President :*

WILLIAM PEPPER, M.D., LL.D.,

*Vice-Presidents :*

MRS. THOMAS MCKEAN,	MR. JOHN C. SIMS,
MRS. MATTHEW BAIRD,	MR. WAYNE MACVEAGH,
MRS. THOMAS A. SCOTT,	DR. S. WEIR MITCHELL,
MRS. CLARENCE S. BEMENT,	MR. TALCOTT WILLIAMS,
MISS M. A. BURNHAM,	MR. JOSEPH S. HARRIS,
MRS. CHARLES C. HARRISON,	MR. JAY COOKE, JR.,
MR. H. LA BARRE JAYNE.	

*Secretary and Treasurer :*

MRS. HUNT, 1300 Spruce Street.

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 presenting 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, beginning January 5 :—

LECTURERS AND SUBJECTS.

1. S. WEIR MITCHELL, M.D., LL.D. January 5. One Lecture. Subject : "Some Influences Exerted by the Age of Elizabeth in Its Drama."
2. TALCOTT WILLIAMS, ESQ. January 9. One Lecture. Subject : "The Why of Philadelphia."
3. W. HUDSON SHAW, M.A., Oxford. Beginning January 12. Six Lectures. Subject : "English Social Reformers."
4. F. HOPKINSON SMITH. February 2. One Lecture. Subject : "Halfway—A Middle Ground in Art."

5. HORACE HOWARD FURNESS, PH.D., LL.D. Beginning February 6. Four Readings. Subjects: "Shakespeare."
6. TALCOTT WILLIAMS, ESQ. February 20. One Lecture. Subject: "The Gates and Straits of Europe and Africa."
7. LOCKE RICHARDSON. Beginning February 23. Four Recitals. Subjects: Miscellaneous.
8. F. HOPKINSON SMITH. March 9. One Lecture. Subject: "Bohemian Days Here and Abroad."
9. MAX OHNEFALSCH RICHTER, PH.D. Beginning March 13. Four Lectures. Subject: "Recent Explorations in Cyprus."
10. RICHARD G. MOULTON, PH.D. Beginning March 27. Six Lectures. Subject: "Literary Study of the Bible."

The annual fee is \$5.00, entitling each member to a ticket admitting to *all* lectures. For further information or membership, address Mrs. Hunt, Secretary and Treasurer, 1300 Spruce Street.



DEPARTMENT OF ARCHÆOLOGY AND  
PALÆONTOLOGY.

*President :*

CHARLEMAGNE TOWER, JR.

*Vice-Presidents :*

DANIEL G. BRINTON,  
MRS. JOHN HARRISON,  
EDWARD W. CLARK,  
EDWARD H. WILLIAMS.

*Treasurer :*

MRS. J. DUNDAS LIPPINCOTT, 509 South Broad Street.

*General Secretary and Director :*

STEWART CULIN, 127 South Front Street.

*Curators :*

CHARLES C. ABBOTT, *American Section.*  
HERMAN V. HILPRECHT, *Babylonian Section.*  
MORRIS JASTROW, JR., *Associate Curator.*  
MRS. CORNELIUS STEVENSON, *Egyptian Section.*  
STEWART CULIN, *Oriental Section.*

*Board of Managers :*

MRS. MATTHEW BAIRD,  
DANIEL BAUGH,  
CLARENCE S. BEMENT,  
DANIEL G. BRINTON,  
E. W. CLARK,  
EDWARD H. COATES,  
JOSEPH H. COATES,  
C. HOWARD COLKET,  
STEWART CULIN,  
HENRY CHAPMAN, JR.,  
CARL EDELHEIM,  
MRS. RUDULPH ELLIS,  
W. W. FRAZIER,  
MRS. W. W. FRAZIER,

MRS. E. A. P. DE GUERRERO,  
CHARLES C. HARRISON,  
MRS. JOHN HARRISON,  
HORACE JAYNE,  
ROBERT H. LAMBORN,  
FRANCIS W. LEWIS,  
MRS. J. DUNDAS LIPPINCOTT,  
BENJAMIN SMITH LYMAN,  
HENRY C. MERCER,  
JOHN T. MORRIS,  
WILLIAM PEPPER,  
JOSEPH D. POTTS,  
HARRY ROGERS,  
MAXWELL SOMMERVILLE,  
MRS. CORNELIUS STEVENSON,  
CHARLEMAGNE TOWER, JR.,  
HENRY CLAY TRUMBULL,  
MRS. WILLIAM WEIGHTMAN, JR.,  
JOSEPH WILCOX,  
EDWARD H. WILLIAMS,  
TALCOTT WILLIAMS,  
STUART WOOD.

This Department was instituted in 1889 as the Museum of Archæology 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 Building, 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 antiquities 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. An Oriental Section, last established, already contains valuable archæological 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 loaned to the Museum by its collector and owner, Dr. Maxwell Sommerville, has been enlarged by important additions secured by him during the past year. It is the aim of the Department 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 Archæological 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 ARCHÆOLOGICAL ASSOCIATION.

##### OFFICERS.

##### *President :*

WILLIAM PEPPER, *pro tempore*.

##### *Vice-Presidents :*

MRS. MATTHEW BAIRD,	FRANCIS C. MACAULEY,
DANIEL BAUGH,	HENRY C. MERCER,
CLARENCE H. CLARK,	MAXWELL, SOMMERVILLE,
EDWARD H. COATES,	LUCIUS H. WARREN

##### *Treasurer :*

MRS. J. DUNDAS LIPPINCOTT.

##### *Secretary :*

STEWART CULIN, 127 South Front Street.

This Association was formed to co-operate with the Museums which have been practically created by its efforts. It elects from its membership 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, 127 South Front Street.

## DEPARTMENT OF PHYSICAL EDUCATION.

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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 a college which holds out incentives to intellectual progress should not overlook the bodily progress without which all intellectual prizes, when won, are useless.

Impressed with the belief that those who seek to develop the mind should also exercise a supervision over the body, the University has instituted this Department, and, through the liberality of the City and the zeal of the Alumni, has provided the means, and, what is equally important, the system, for the due care and development of the Physical Education of the Students.

The means are supplied in the Athletic Grounds, lying near and partly surrounded\* by the College 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, tennis, 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 additional sum. 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 College Building, 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 the latest 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, if any exists.

The system consists in direct, personal, individual care of each student, who, immediately after entrance to College, 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 will show the improvement or deterioration of each student, and the amount and the quality of exercise which each one demands, both of which are administered or recommended by an experienced teacher. Merely competitive sports do not of themselves supply all bodily demands. Some men, naturally athletic and fond of exercise, need to be guided and directed, sometimes to be restrained; others, of sluggish temperament or of too studious habits, must be stimulated; all require to have their work, whether voluntary or compulsory, 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 are at all times freely advised, both in the gymnasium and in the field, concerning their work, diet, clothing and hours of sleep.

Experience has shown that those students who conscientiously follow the instructions received from the Department increase in mental vigor as they improve in bodily strength.

Students in the Freshmen 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 or Yeo's.

*Physiology of Bodily Exercise*—Le Grange.

For further information concerning this Department, address Dr. Randolph Faries, Director of Physical Education.

## ATHLETIC ASSOCIATION.

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The Athletic Association of the University of Pennsylvania controls and directs all the athletic affairs of the institution. It is a corporation, duly chartered under the laws of the Commonwealth, on June 30, 1883. To this Association the Board of Trustees assigns the grounds used for athletic training and exhibitions of all kinds, the Association being responsible for their proper preservation, etc. These grounds are situated at 36th and Spruce Streets, immediately adjoining the department buildings. They contain one of the best quarter-mile tracks in the country, a good base-ball diamond, and a fine foot-ball field. The stands afford seating capacity for 3000 persons, mostly under cover.

The organization of the Association is such that both graduates and undergraduates direct the course and policy of the University in all athletic matters, sitting as the Board of Directors of the Association. Thus the graduate Advisory Board feature, now so prominent in American college athletics, is made more than a mere court of appeal, and the University secures the best advantage of its numerous resident alumni. The Board of Directors, through Committees of two graduate and three undergraduate members of the Association upon each branch of athletics, so governs and controls, as a unit, all athletics, that no branch unduly prospers at the expense of others. The sports which are naturally unprofitable financially are duly fostered, so that the general athletic welfare is properly preserved.

The Board, charged with a general supervision of the affairs of the Association, composed of alumni and undergraduates, stand in the light of an Advisory Board to the Trustees upon all matters relating to athletics, while through a fairly good graduate membership roll the sentiment and support of the Alumni is centralized.

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### OFFICERS.

#### *President :*

JOHN C. SIMS, '65 C.

#### *Vice-President :*

H. LAUSSAT GEYELIN, '77 C.



## ATHLETIC ASSOCIATION.

*Secretary :*

JOHN C. BELL, '84 L.

*Treasurer :*

J. SOMERS SMITH, JR., '87 C.

*Board of Directors :*

JOHN C. SIMS, '65 C.

H. LAUSSAT GEYELIN, '77 C.

THOMAS G. HUNTER, '82 C.

DAVIDSON KENNEDY, '79 C.

JOHN E. REYBURN, '69 L.

JOHN C. BELL, '84 L.

PAUL THOMPSON, '85 C.

LOUIS C. MADEIRA, JR., '72 C.

J. SOMERS SMITH, JR., '87 C.

R. WILSON MCCREDY, '74 C.

F. H. LEE, '93 C.

EUGENE C. BONNIWELL, '93 L.

CHAS. H. SCHOFF, '93 M.

CLARENCE J. MARSHALL, '94 V.

CHAS. DELABARRE, '94 D.

*Committees :**Ground*—MR. THOMPSON, *Chairman.**Foot-ball*—MR. BELL, *Chairman.**Base-ball*—MR. THOMPSON, *Chairman.**Track Athletics*—MR. GEYELIN, *Chairman.**Rowing*—MR. HUNTER, *Chairman.**Cricket, Tennis, Shooting and La Crosse*—MR. SIMS, *Chairman.**Membership*—MR. MCCREDY, *Chairman.*

## ALUMNI ORGANIZATIONS.

The Alumni of the University, of whom there have been 14,910 in all, are organized according to the departments from which they graduated, there being five general societies, representing the College Department, and the Departments of Medicine, Law, Dentistry and Veterinary Medicine. There is also the Central Committee of the Alumni, representing all Departments of the University. The organization of this Committee, of the four general alumni societies, and of local alumni societies in different parts of the United States, is given below.

Alumni of all Departments are invited to freely address 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 of address.

### 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, too, 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 Department 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.

1893. \*

John H. Packard, A.M., M.D.,	1926 Spruce St., Philad'a.
George F. Martin, A.M.,	3903 Locust St., do.
Joseph G. Rosengarten, A.M.,	532 Walnut St., do.
Charles Claxton, A.M., M.D.,	1310 Walnut St., do.
James T. Mitchell, LL.B.,	1722 Walnut St., do.
William M. Stewart, Jr., A.M., LL.B.,	400 Chestnut St., do.

1894.

R. Dale Benson, A.M.,	510 Walnut St., Philad'a.
J. Douglass Brown, Jr., A.M., LL.B.,	Drexel Building, do.
Claudius H. Mastin, M.D., LL.D.,	Mobile, Alabama.
G. Colesberry Purves, A.M., LL.B.,	700 Walnut St., Philad'a.
Effingham B. Morris, A.M., LL.B.,	Girard Building, do.
William H. Bennett, A.M., M.D.,	332 S. 15th St., do.

1895.

Archibald R. Montgomery, A.M.,	231 S. Sixth St., Philad'a.
Rev. Charles Wadsworth, Jr., A.M.,	2038 Sp. Garden St., do.
Edward L. Duer, A.M., M.D.,	1606 Locust St., do.
Wharton Sinkler, A.M., M.D.,	1606 Walnut St., do.
Hampton L. Carson, A.M., LL.B.,	Drexel Building, do.
William R. Philler, A.M., LL.B.,	1340 Chestnut St., do.

1896.

Henry Budd, A.M.,	727 Walnut St., Philad'a.
William H. Klapp, A.M., M.D.,	2132 Pine St., do.
Herbert M. Howe, M.D.,	1606 Locust St., do.
Robert H. Neilson, A.M.,	215 S. Fifth St., do.
J. Sergeant Price, LL.B.,	709 Walnut St., do.
Dwight M. Lowry, LL.B.,	Drexel Building, do.

\*The term expires, in each case, on Commencement Day of the year indicated.

1897.

James W. Robins, D.D.,	Merion Station, P. R. R.
H. Laussat Geyelin, A.M., LL.B.	Girard Building, Philad'a.
J. Levering Jones, LL.B.,	Drexel Building, do.
Alfred Whelen, M.D.,	123 S. Twentieth St., do.
William L. Winner, D.D.S.,	309 N. Sixth St., do.
John Marshall Gest, A.M., LL.B.,	400 Chestnut St., do.

<i>President.</i> —J. Sergeant Price,	709 Walnut St., Philad'a.
<i>Secretary.</i> —William M. Stewart, Jr.,	400 Chestnut St., do.
<i>Treasurer.</i> —William H. Klapp, M.D.,	2132 Pine St., do.

## THE SOCIETY OF THE ALUMNI.

(COLLEGE DEPARTMENT.)

The Society of the Alumni is composed of graduates of the College Department 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 interests of the University of Pennsylvania, and to form an organized union of its graduates.

The Society holds an annual meeting on the evening of Commencement Day, which is followed by the annual collation. 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 Department, in Arts, Science, Finance and Economy, or Natural History, 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 Department 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 Department, but who shall have been a member for at least one year of a class in that department which shall have been graduated, and who 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, University of Pennsylvania, who will gladly propose the names of such as are eligible for membership under the amendment.

The Society has nearly completed, after seven years' work, a Catalogue of all Matriculates in the College Department. 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. Persifer Frazer, 1042 Drexel Building, Philadelphia.

#### OFFICERS FOR 1892-93.

*President.*—EFFINGHAM B. MORRIS, '75.

*Vice-Presidents.*—REV. JAMES W. ROBINS, '50.

WILLIAM S. BLIGHT, '46.

\* GENERAL S. WYLIE CRAWFORD, '45.

JOSEPH G. ROSENGARTEN, '52.

*Recording Secretary.*—Professor FELIX E. SCHELLING, '81, University of Pennsylvania.

*Corresponding Secretary.*—FRANK MILES DAY, '83.

*Treasurer.*—EDWARD W. MUMFORD, '89, University of Pennsylvania.

*Historiographer.*—GREGORY B. KEEN, '63.

#### BOARD OF MANAGERS.

Rev. John W. Faries, '31.

John B. Gest, '44.

John H. Packard, '50.

Rev. Jesse Y. Burk, '62.

William Henry Lex, '67.

Henry Budd, '68.

Walter George Smith, '71.

John Neill, '77.

Edward G. McCollin, '78.

Professor George S. Fullerton, '79.

John Douglass Brown, '79.

Professor Edward P. Cheyney, '83.

George Wharton Pepper, '87.

Miers Busch, '88.

Ellis P. Oberholtzer, '89.

Josiah H. Penniman, '90.

E. Hazard Dickson, '91.

Ulysses S. Schaul, '92.

#### THE SOCIETY OF THE ALUMNI.

(LAW DEPARTMENT.)

The object of the Society is "to sustain and advance the interests

\* Deceased.

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, '55.

*Vice-Presidents.*—John K. Valentine, 57.

\* Henry C. Olmstead, '72.

*Recording Secretary.*—H. Laussat Geyelin, '77.

*Corresponding Secretary.*—Hampton L. Carson, '71.

*Treasurer.*—George Vaux, Jr., '88.

BOARD OF MANAGERS.

Samuel C. Perkins, '52.	Frank D. Prichard, '74.
Effingham B. Morris, '75.	William M. Stewart, '79.
Joseph B. Townsend, Jr., '82.	Dwight M. Lowry, '76.
J. Douglass Brown, Jr., '81.	Frank M. Riter, '78.
Louis A. Biddle, '87.	Charles U. Esling, '82.
Francis Chapman, '91.	Henry Irick Budd, Jr., '92.
Charles Cooper Townsend, '87.	George Stuart Patterson, '90.

SOCIETY OF THE ALUMNI OF THE MEDICAL DEPARTMENT  
OF THE UNIVERSITY OF PENNSYLVANIA.

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.

\* Deceased.



## OFFICERS FOR 1893.

*President*—TRAILL GREEN, M.D.

*Vice-Presidents*—MEREDITH CLYMER, M.D.

W. S. W. RUSCHENBERGER, M.D.

CLAUDIUS H. MASTIN, M.D.

HIRAM CORSON, M.D.,

*Secretary and Treasurer*—JOSEPH P. TUNIS, M.D., 129 South 18th St., Philadelphia.

*Chairman of Executive Committee*—S. D. RISLEY, M.D., 1722 Walnut St., Philadelphia.

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, <i>complete</i> ,	. . . . .	\$1.25
Appendix alone,	. . . . .	.25

*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 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. S. Naudain Duer, '90.

Dr. Samuel D. Risley, '70.

Dr. Henry Beates, Jr., '79.

*Treasurer and Recording Secretary*.—Dr. Ellwood R. Kirby, '87.

*Corresponding Secretary*.—Dr. B. F. Stahl, '87.

*Executive Committee*. — Dr. Judson Daland, *Chairman*; Dr. A. C. Wood, Dr. Richard C. Norris, Dr. Walter R. Lincoln, Dr. Henry Toulmin.

THE SOCIETY OF THE ALUMNI OF THE DEPARTMENT OF  
DENTISTRY OF THE UNIVERSITY OF  
PENNSYLVANIA.

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.

OFFICERS FOR 1892-93.

*President*—GRAFTON MUNROE, D.D.S., Springfield, Ill.

*Vice-Presidents*—WILLIAM F. REHFUSS, D.D.S., Philadelphia, Pa.

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*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.*



THE ASSOCIATION OF ALUMNI OF THE VETERINARY  
DEPARTMENT.

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.

OFFICERS :

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*Vice-President*, GULDIN R. HARTMAN, V.M.D.,  
*Secretary and Treasurer*, EDWIN S. MUIR, PH.G. V.M.D.,  
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The headquarters of the Association are in Boston, Mass., where the annual reunions are held. The officers are :—

*President*.—George B. 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, Chicago, Ill.

Officers :—

*President*.—Charles Gilman Smith, M.D., '51.  
*Secretary*.—Edward C. Knight, B.S., '89.  
*Treasurer*.—William R. Cisna, A.M., M.D.  
*Vice-Presidents*.—Herman Haupt, Jr., M.D., Ph.D., '78  
Professor H. Allen, '54.  
Rev. Dr. E. G. Hirsch.  
R. Dillon, D.D.S., '82.  
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, 518 Fourth St., S. E., Washington, D. C.

*Executive Committee.*—W. H. Hawkes, '74, Edward Goodfellow, '48, and H. C. Yarrow, '61.

#### 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.*—George W. Wickersham, '75; S. Mallet-Prevost, '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.*—Dr. John P. Wales, '52.

*Vice-President.*—Francis G. du Pont, '70.

*Treasurer.*—Charles B. Dubree.

*Secretary.*—William C. Speakman, '91, 605 King St., Wilmington, Del.

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Dr. Swithin Chandler, '92.

Dr. J. P. Zuill, '91.

#### 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.*—W. R. Long, D.D.S., '85.

*1st Vice-President.*—F. P. Cook, D.D.S., '92.

*2d Vice-President.*—P. Max Foshay, M.D., '91.

*Recording Secretary.*—J. William Heisman, LL.B., '92.

*Corresponding Secretary.*—Oscar T. Thomas, M., 92,

401 Prospect St., Cleveland.

*Treasurer.*—G. F. Woodbury, D.D.S., '91.



# DEGREES, HONORS AND PRIZES.

1891-1892

## HONORARY DEGREES.

MAY 6, 1892.

*Doctor of Laws*—JACOB M. DACOSTA, M. D.

JUNE 16, 1892.

*Doctor of Laws*—RICHARD C. MCMURTRIE, Esq.

*Doctor of Music*—WILLIAM WALLACE GILCHRIST.

## DEGREES IN COURSE.

### *Bachelor of Arts*—

Walter Barclay,	Clifton Maloney,
William Duane,	William Stuart Morris,
Joseph Williams Fell,	Matthew Patton,
Ryland Warriner Greene,	Ulysses Simpson Schaul,
Carl Friederich Haussmann, Jr.,	William Reese Scott, Jr.,
Theodore Wesley Koch,	Stanislaw John Shoomkoff,
William Weaver Lukens,	Clarence Russell Williams.
Archibald McCullagh, Jr.,	

### *Bachelor of Philosophy*—

Joseph Edmund Enich,	Frank Earle Schermerhorn,
Vivian Frank Gable,	Walter Edward Weyl.
Willis Clark Rankin,	

### *Bachelor of Science*—

Wesley Bartine,	John Kaufman Mohr,
Leon Schwartz Bowers,	J. Percy Moore,
Edward Taggart Child,	Jay Bird Moyer,
Herman Louis Dieck,	Samuel Davis Parry,
Charles James Dougherty,	Samuel Kingsley Probasco,
John Joseph Elcock,	William Chester Reeder,
Percival Vaisey French,	Adolph George Rosengarten,

Frank Thompson Gucker,  
 Arthur Hagen, Jr.,  
 Albert Lawrence Harris,  
 John Harshberger,  
 Harry Ellwood Keller,  
 William Francis Kelly,  
 Addison Farwell Lansing,  
 George Edmunds Lawrence,  
 Charles Trumbull Lee,  
 Clifford Lewis, Jr.,  
 Joseph Hunter Lewis,  
 Thomas Luke,

William Reese Scott, Jr.,  
 Louis Raymond Shellenberger,  
 Arthur Gregg Singer,  
 Edgar Arthur Singer, Jr.,  
 William Emil Snyder,  
 James Alexander Stewart,  
 Harry Chapman Thayer,  
 Adam Clarke Thompson,  
 Joseph Wood Wagner,  
 Karl Albert Walraven,  
 Herbert Eugene White,  
 William MacIntire White.

*Bachelor of Music—*

Alonzo Stone.

*Bachelor of Law—*

Charles Yarnall Abbott,  
 Hector Lee Ball,  
 Maurice Guy Belknap,  
 George Clay Bowker, Ph.B.,  
 Francis Herman Bohlen,  
 Francis Bernard Bracken,  
 Robert Porter Bradford, A.M.,  
 Henry Irick Budd, Jr., A.M.,  
 Samuel Francis Clevenger,  
 Conway Dillingham, B.A.,  
 Homer Watton Edwards,  
 Thomas Biddle Ellis,  
 William Struthers Ellis, A.B.,  
 Samuel Blaine Ewing, A.B.,  
 Joseph Wolffe Gross,  
 John Russell Hayes, A.B.,  
 John William Heisman,  
 George Thorn Hunsicker, A.B.,  
 Clinton Rogers Woodruff.

Thomas William Jopson,  
 Edmund Earl Kiernan,  
 Mayne R. Longstreth,  
 Leo MacFarland,  
 John Aloysius McCarthy, A.B.,  
 Samuel Horace Myers, B.S.,  
 De Reynolds Owens,  
 Philip Thomas Penrose,  
 William Howell Powell,  
 Samuel Pennington Rotan, A.B.,  
 Hervey James Sherer,  
 Daniel Joseph Ahern,  
 Maurice Worrell Sloan,  
 Daniel Messick Stewart,  
 Howard Hungerford Sypher,  
 Joseph Baylis Thomas,  
 John Reed Valentine,  
 Henry Jackson Waters,  
 Clinton Rogers Woodruff.

*Master of Arts—*

Randolph Faries, M.D.,  
 Dallett Fuguet, A.B., [B.D.,  
 Rev. Ernest De Fremery Miel,  
 Elliston Joseph Perot, A.B.

William James Gregory, A.B.,  
 Charles Foster Leonard, A.B.,  
 George Lewis Plitt, A.B.,

*Civil Engineer—*

Henry Delaplaine, B.S.,  
 James Clarke Ziegler, B.S.

Stacy Woodman Kapp, B.S.,

*Mechanical Engineer—*

George Ross Green, B.S.,  
 Horatio Curtis Wood, B.S.

Francis Head, B.S.,



*Mining Engineer—*

James Starr, B.S.

*Doctor of Veterinary Medicine—*

John William Adams, A.B.,	John A. Pearson,	
Edward Henry Flood,	Joseph Bartram Seitter,	
Christopher Graham, B.S.,	George A. Smith,	[bull,
Joseph Dean Houldsworth,	William Arthur Wilfrid	Turn-
Horace Prizer Keely,	Albert Gooding Walker,	
Samuel James Nicholson, A.B.,	Harry Walter.	

*Doctor of Medicine—*

J. Howard Allwein,	J. William Pancoast,
Edmund W. Laidley,	George L. Wentz.

*Doctor of Dental Surgery—*

Stephen H. Carey,	A. Ribolla Nicodemi,
Henry Elfers,	Mariano N. Samaniego,
	D. Everett Taylor.

*Bachelor of Divinity—*

Walter Biddle Lowry, A.B.,	Elliston Joseph Perot, A.M.
----------------------------	-----------------------------

*Doctor of Philosophy—*

Anna Robertson Brown, A.M.,	Lee Kaufer Frankel, B.S., [A.B.,
Edwin S. Crawley, B.S.,	Ernest Theodore Kretschmann,
Theodore William Kretschmann, A.B., B.D.	

## CERTIFICATES.

*In Architecture, to—*

Harry Bruce Montgomery.

*In Science, to—*

Mary Engle Pennington,	Jacob Anthony Sautter,
Charles Fischer,	John L. Hall.

*In Finance and Economy, to—*

Frank Lieberman Newburger.

*In Biology, to—*

Elizabeth Allen Atkinson,	Mary Engle Pennington,
Philip Powell Calvert,	Charles Sigmund Raue,

Clarence Henry Fritz,  
May Bell Garvin,

Adeline Frances Schively,  
Edward Rommel Schreiner,  
William Albert Simpson.

*In Music, to—*

Charles J. Graf,

Harriet Hassler.

DEGREES IN COURSE.

MAY 6, 1892.

*Doctor of Medicine :*

Names.	Post Office.	State.
Angeny, Ferdinand G., Ph. G.,	Doylestown,	Pennsylvania.
Augé, Truman, A. B. (C. H. S.),	Philadelphia,	Pennsylvania.
Bacon, John E.,	Wellsborough,	Pennsylvania.
Baggs, Albert N.,	Abington,	Pennsylvania.
Baird, William J. B.,	Wheeling,	West Virginia.
Barnes, Albert Coombs,	Philadelphia,	Pennsylvania.
Bennett, Joseph H.,	Westerley,	Rhode Island.
Bennett, Oliver J., A. B. (Oberlin College),	Nashville,	Tennessee.
Bertolette, Harry B.,	Shreve,	Ohio.
Billings, John S., Jr., A. B.,	Washington,	District of Columbia.
Billstein, Aaron M.,	Philadelphia,	Pennsylvania.
Bolgiano, Walton, A. B. (Hop- kins),	Baltimore,	Maryland.
Boozer, A. Earle, B. S. (Uni- versity, S. C.),	Columbia,	South Carolina.
Boyce, David C., A. B. (Washington & Jefferson),	Philadelphia,	Pennsylvania.
Boyer, D. Pellman, A. B. (C. H. S.),	Philadelphia,	Pennsylvania.
Branson, Thomas F., B. A. (Haverford),	Philadelphia,	Pennsylvania.
Breisacher, Leo, V. M. D.,	Philadelphia,	Pennsylvania.
Brenholtz, Walter S., B. E.,	Hughesville,	Pennsylvania.
Bryan, Jay M., A. B. (C. H. S.),	Philadelphia,	Pennsylvania.
Buck, Augustus W., A. B. (Williams),	Fall River,	Massachusetts.
Buckner, M. Gano,	Paris,	Kentucky.
Buckman, Ernest U.,	Wilkes-Barre,	Pennsylvania.
Carman, Frank H., Ph. G.,	Pennsgrove,	New Jersey.
Carpenter, Wm. H.,	Salem,	New Jersey.
Chandler, Swithin,	Wilmington,	Delaware.
Conrow, Abram Engle, V. M. D.,	Moorestown,	New Jersey.
Corss, James K., A. B. (Am- herst),	Lock Haven,	Pennsylvania.
Curriden, George A., Ph. G.,	Washington,	District of Columbia.
Curry, Glendon E.,	McKeesport,	Pennsylvania.
Davis, Alvah M., Ph. G.,	Norristown,	Pennsylvania.
Davies, William O., Ph. G.,	Slatington,	Pennsylvania.



Names.	Post Office.	State.
Davisson, Alexander Heron,	Philadelphia,	Pennsylvania.
Day, Robert G., A.B.,	Sheffield,	New Brunswick.
Devereux, J. Ryan, B.S. (Manhattan),	Oswego,	New York.
Diehl, Alfred E., B.A. (Hobart),	Buffalo,	New York.
Donahay, DeWitt S.,	Turkey,	New Jersey.
Edwards, George K., B.S., (Princeton),	Washington,	District of Columbia
Eft, Frederick, Ph.G.,	Palatine,	New Jersey.
Erck, Theodore A., M.D.,	St. Louis,	Missouri.
Fager, V. Hummel, A.B. (Penna. Coll.),	Harrisburg,	Pennsylvania.
Feld, W. Carl,	Denver,	Colorado.
Fletcher, Emerson Armor,	Labre Linden,	Michigan.
Fowler, George W., A.M.,	San Jose,	California.
Frazier, Charles Harrison, B.A. (U. of P.),	Philadelphia,	Pennsylvania.
Fuller, Dwight B., D.D.S.,	Philadelphia,	Pennsylvania.
Gazzam, Edwin D.,	Philadelphia,	Pennsylvania.
Gibson, Frank, B.E.,	McKeesport,	Pennsylvania.
Girvin, John Harper,	Philadelphia,	Pennsylvania.
Graves, Amos, Jr.,	San Antonio,	Texas.
Greenman, Milton J., Ph.B. (U. of P.),	Philadelphia,	Pennsylvania.
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Haden, John B.,	Galveston,	Texas.
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Hand, Alfred, Jr., A.B., Ph.B. (Yale),	Scranton,	Pennsylvania.
Hanson, Arthur E., Ph.G.,	Rio de Janeiro,	Brazil.
Harmon, Julian D., A.B. (U. of M.),	Warren,	Ohio.
Harris, William L.,	Moncton,	Canada.
Hathcock, Alfred L.,	Palestine,	Texas.
Henry, David,	Philadelphia,	Pennsylvania.
Hitschler, William A., A.B. (C. H. S.),	Philadelphia,	Pennsylvania.
Hertz, J. Lincoln, M.E.,	Lexington,	Kentucky.
Hobson, Abraham J., M.D.,	Bristow,	Iowa.
Howard, H. Pope,	North River,	P. E. Island.
Howat, Frederick,	Bedegue,	P. E. Island.
Karib, Ruel B., A.B.,	Oroomia,	Persia.
Keller, William Edwin,	Stroudsburg,	Pennsylvania.
Kocher, Quintin S.,	Allentown,	Pennsylvania.
Kono, Tetsushi, M.D.,	Osaka,	Japan.
Lamon, Goldson T.,	Philadelphia,	Pennsylvania.
Leach, Wilmon W.,	Philadelphia,	Pennsylvania.
Lichty, Bruce,	Elk Lick,	Pennsylvania.
Linhart, Harry W.,	Pittsburgh,	Pennsylvania.
Lippincott, Frederick B.,	Pemberton,	New Jersey.
Mack, John S., Ph.G.,	Slatington,	Pennsylvania.

Names.	Post Office	State.
Macfarland, Frank H. A.B. (C. H. S.),	Philadelphia,	Pennsylvania.
Marion, George A.,	Greece,	New York.
Massey, Frank,	Philadelphia,	Pennsylvania.
Marvin, Albert H.,	Cleveland,	Ohio.
Mecray, Paul M.,	Cape May,	New Jersey.
Mejia, Jose I.,	Granada,	Nicaragua.
Miles, Thomas J.,	Chandler,	Oklahoma Territory.
Miller, Emmitt Palmer,	Stroudsburg,	Pennsylvania.
Miller, Samuel W.,	Lancaster,	Pennsylvania.
Mingus, Everett,	Ashland,	Oregon.
Montgomery, Charles J., B.S.,	Augusta,	Georgia.
Moore, J. Edward, M.D.,	Philadelphia,	Pennsylvania.
Morton, George D.,	Philadelphia,	Pennsylvania.
McComb, George S., M.E.,	Philadelphia,	Pennsylvania.
McDonald, Angus C.,	Murray Harbour Rd.,	P. E. Island.
McGeehin, Edward,	Hazleton,	Pennsylvania.
McKeage, William,	Philadelphia,	Pennsylvania.
McKee, James H.,	Philadelphia,	Pennsylvania.
McMillan, Isaac M.,	Stanley,	P. E. Island.
McMorris, Frank C., A.B. (C. H. S.),	Duncannon,	Pennsylvania.
Neiffer, Milton K.,	Philadelphia,	Pennsylvania.
Ogden, David W., A.M.,	Newark,	New Jersey.
O'Hara, Patrick H.,	Shenandoah,	Pennsylvania.
Packard, Francis R.,	Philadelphia,	Pennsylvania.
Padgett, Hazle,	Columbia,	Tennessee.
Patek, Arthur J., A.B. (Johns Hopkins),	Milwaukee,	Wisconsin.
Pitfield, Robert Lucas,	Germantown,	Pennsylvania.
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Pusey, Brown,	Elizabethtown,	Kentucky.
Raughley, Shadrach,	Dover,	Delaware.
Riegel, Walter S.,	Reading,	Pennsylvania.
Riesman, David,	Portsmouth,	Ohio.
Robertson, William E.,	Camden,	New Jersey.
Rodrigues, Antonio G., da S.,	Sorocaba,	Brazil.
Ruoff, William, Ph.G.,	Philadelphia,	Pennsylvania.
Russell, Andrew S.,	Mt. Hermon,	Massachusetts.
Santee, Harris E., A.B.,	Snodes,	Ohio.
Saunders, Dudley D., Jr.,	Memphis,	Tennessee.
Schamberg, Jay F., A.B. (C. H. S.),	Philadelphia,	Pennsylvania.
Schellenger, Edward A. Y.,	Camden,	New Jersey.
Scott, William James,	Los Angeles,	California.
Seaman, William, A.B.,	Minudie,	Nova Scotia.
Seler, Charles A., Ph.G.,	Allentown,	Pennsylvania.
Shepherd, Irenocus M., A.B. (Princeton),	Trenton,	New Jersey.
Sholler, George W.,	Chestnut Hill,	Pennsylvania.



Names.	Post Office.	State.
Slocum, William H., Jr.,	Oceanport,	New Jersey.
Smith, Chauncey Pelton,	Buffalo,	New York.
Somers, Lewis S.,	Philadelphia,	Pennsylvania.
Spangler, Harry A., A.B.	Arendtsville,	Pennsylvania.
(Pennsylvania College),		
Spiller, William G.,	Philadelphia,	Pennsylvania.
Stegner, Adam,	Minooka,	Pennsylvania.
Stewart, Henry,	Gettysburg,	Pennsylvania.
Stites, Ellsmore,	Bridgeton.	New Jersey.
Stoeckle, Charles H.,	Philadelphia,	Pennsylvania.
Sulzer, Gustavus A.,	Philadelphia,	Pennsylvania.
Sweeney, Edward A.,	Summit Hill,	Pennsylvania.
Synan, William E., A.B.	Fall River,	Massachusetts.
(H. C. Col.),		
Talley, James Ely, A.B.	Mendenhall,	Pennsylvania.
(Michigan),		
Taylor, Richard Powell,	Wilkes-Barre,	Pennsylvania.
Thomas, Oscar T.,	Ashley,	Pennsylvania.
Thomson, Archibald G., Ph.B.	Philadelphia,	Pennsylvania.
(U. of P.),		
Trau, Philip A. E.,	Philadelphia,	Pennsylvania.
Threlkeld-Edwards, Herbert,	Los Angeles,	California.
Usher, Frank M. C., Ph.G.,	Fulton,	Kentucky.
Venn, Ferdinand, Jr.,	Allegheny City,	Pennsylvania.
Wade, William N.,	Santa Barbara,	California.
Weiser, Walter R., Ph.G.,	York,	Pennsylvania.
White, M. William, M.D.,	Helmville,	Montana.
White, Reid,	Lexington,	Virginia.
Whiting, Albert D.,	Cambridge,	Massachusetts.
Wildberger, Arthur,	Spokane,	Washington.
Wilson, Arthur R.,	Bethlehem,	Pennsylvania.
Wilson, Alphonso S.,	Cambridge- borough.	Pennsylvania.
Wilson, William H.,	St. Joseph,	Missouri.
Yenney, Robert C., A.B.	Walla Walla,	Washington.
(Whitman),		
Zimmer, John,	Rochester,	New York.

JUNE 16, 1892.

J. Howard Allwein,	Lebanon,	Pennsylvania.
Edmund W. Laidley,	Carmichaels,	Pennsylvania.
J. William Paucoast,	Philadelphia,	Pennsylvania.
George L. Wentz,	Drifton,	Pennsylvania.

## SUMMARY.

Of the foregoing there were from—

Brazil . . . . .	2	District of Columbia . . . . .	3
California . . . . .	4	Georgia . . . . .	1
Canada . . . . .	1	Iowa . . . . .	1
Colorado . . . . .	1	Japan . . . . .	1
Delaware . . . . .	2	Kentucky . . . . .	4

## SUMMARY. (Continued.)

Manitoba . . . . .	I	Pennsylvania . . . . .	76
Maryland . . . . .	2	Persia . . . . .	I
Massachusetts . . . . .	4	Prince Edward Island . . . . .	4
Michigan . . . . .	I	Rhode Island . . . . .	I
Missouri . . . . .	2	South Carolina . . . . .	I
Montana . . . . .	I	Tennessee . . . . .	3
New Brunswick . . . . .	2	Texas . . . . .	3
New Jersey . . . . .	13	Virginia . . . . .	I
New York . . . . .	5	Washington . . . . .	2
Nicaragua . . . . .	I	West Virginia . . . . .	I
Nova Scotia . . . . .	I	Wisconsin . . . . .	I
Ohio . . . . .	5		
Oklahoma . . . . .	I	Total . . . . .	154
Oregon . . . . .	I		

*Doctor of Dental Surgery—*

Name.	Post Office.	State.
Armada, Carlos A. de,	Rio de Janeiro,	Brazil.
Ayers, Josiah,	Union Roads,	P. Ed. Island.
Baer, Harry K.,	Kready,	Pennsylvania.
Beitzel, Walter G.,	Atchison,	Kansas.
Benninghoff, Joseph L.,	Greenville,	Pennsylvania.
Berger, Johannes,	Görlitz,	Germany.
Bodine, Fred. M.,	Wellsboro,	Pennsylvania.
Bond, Francis H.,	Hazleton,	Pennsylvania.
Bonwill, Edward W.,	Philadelphia,	Pennsylvania.
Bowen, John J.,	Providence,	Rhode Island.
Brown, Andrew Law,	New Haven,	Connecticut.
Christensen, Wilhelm E.,	Nyborg,	Denmark.
Clark, Frank T.,	South Easton,	Pennsylvania.
Coen, Edward B.,	Bloomington,	Illinois.
Condict, Frederick L.,	Dover,	New Jersey.
Cook, Frank P.,	Fayette City,	Pennsylvania.
Cooper, William M.,	Port Perry,	Pennsylvania.
Crankshaw, Charles W.,	Norristown,	Pennsylvania.
Danforth, Joseph T.,	Warren,	Pennsylvania.
Diefenderfer, Victor H.,	New Castle,	Pennsylvania.
Dreher, Jeremiah H.,	Mt. Pleasant,	North Carolina.
Eldredge, J. Smallwood,	Cape May,	New Jersey.
Ernsmere, John B.,	Rochester,	New York.
Flexer, Richard J.,	Allentown,	Pennsylvania.
Gearhart, J. Beaver,	Danville,	Pennsylvania.
Gilbert, Lewis H.,	Rochester,	New York.
Goddard, Henry Ernest,	Nottingham,	England.
Grubb, A. Herbert,	West Chester,	Pennsylvania.
Gunn, William,	Timaru,	New Zealand.
Hamilton, Harry B.,	Ithaca,	New York.
Hart, Arch Coombs,	Pacific Grove,	California.
Hause, Edward B.,	Milton,	Pennsylvania.
Haynes, Melvin G.,	Centralia,	New York.



Name.	Post Office.	State.
Hine, Robert H.,	New Haven,	Connecticut.
Holmes, Walter T.,	New Haven,	Connecticut.
Hotz, Paul,	Zürich,	Switzerland.
Ives, A. Scott,	Sherbrooke,	Canada.
Joachim, Edward B.,	Philadelphia,	Pennsylvania.
Johnson, George H., Jr.,	Nassau,	Bahamas.
Johnson, Oakley,	Walla Walla,	Washington.
Johnston, H. Frank,	Belleville,	Canada.
Kittams, James H.,	Ilion,	New York.
Kniewel, Johannes,	Danzig,	Germany.
Landsberg, Bernhard,	Darmstadt,	Germany.
Lapp, Elbert W.,	Philadelphia,	Pennsylvania.
Lawton, Burtis E.,	Omaha,	Nebraska.
Lemker, W. J. ter Kuile,	Enschede,	Holland.
Leonhardi, Charles J.,	Sacramento,	California.
Le Suer, William J.,	Oneonta,	New York.
Ligondé, Louis G.,	Jean-Rabel,	Hayti.
López, José Lúcio.,	Guatemala,	Central America.
Lukens, Clarence D.,	Muscatine,	Iowa.
Lynch, Patrick F.,	Wilkes-Barre,	Pennsylvania.
Matthey, Edouard,	Brévine,	Switzerland.
Middaugh, W. Clay,	Easton,	Pennsylvania.
Mitchell, Vethake E.,	London,	Ohio.
Murto, Frank D.,	Pittsburgh,	Pennsylvania.
Nellis, George H.,	Union,	New York.
Newgarden, Charles,	Philadelphia,	Pennsylvania.
Parshall, Edward E.,	Tidioute,	Pennsylvania.
Phipps, Harry D.,	Paris,	Texas.
Protsman, Albert B.,	Vevay,	Indiana.
Richards, John W.,	Ransom,	Pennsylvania.
Ridgway, Shessie Worth,	Coatesville,	Pennsylvania.
Ross, Alfred T.,	Philadelphia,	Pennsylvania.
Rymer, James Francis,	Croydon,	England.
Saunders, T. Darwin,	Rochester,	New York.
Schoff, P. Frank,	York,	Pennsylvania.
Segar, J. Clark,	New Haven,	Connecticut.
Seymour, Robert J.,	Arkona,	Canada.
Skillman, E. Harvey,	Union,	New York.
Smith, A. Fowler,	Auburn,	New York.
Sowash, W. Harry,	Irwin,	Pennsylvania.
Stathers, James R.,	Wheeling,	West Virginia.
Stewart, Charles A.,	Tremont,	Pennsylvania.
Swing, Harry R.,	Coatesville,	Pennsylvania.
Wardell, Frank C.,	Towanda,	Pennsylvania.
Whitlock, Edward P.,	Scranton,	Pennsylvania.
Whitmer, S. Edwin,	Newport,	Pennsylvania.
Willis, Albert Lincoln,	Walla Walla,	Washington.
Wimmer, George J.,	Macungie,	Pennsylvania.
Windmüller, Percival,	Hamburg,	Germany.
Witthaus, Carl,	Osnabrück,	Germany.
Wuensché, Eugen C.,	Oberkunnorsdorf,	Germany.

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Brazil . . . . .	1	Indiana . . . . .	1	Pennsylvania . . . . .	34
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Canada . . . . .	3	Italy . . . . .	1	Rhode Island . . . . .	1
Connecticut . . . . .	5	Kansas . . . . .	1	Switzerland . . . . .	2
Denmark . . . . .	1	Mexico . . . . .	1	Texas . . . . .	1
England . . . . .	2	Nebraska . . . . .	1	Washington . . . . .	2
Germany . . . . .	7	New Jersey . . . . .	2	West Virginia . . . . .	1
Guatemala, C. A. . . . .	1	New York . . . . .	10		—
Hayti . . . . .	1	New Zealand . . . . .	1	Total . . . . .	89
Holland . . . . .	1	North Carolina . . . . .	1		

## HONORS.

## IN THE COLLEGE FACULTY.

At the Examination for Degrees, Honors were awarded as follows :—

In the Course in Arts to—

William Duane, Matthew Patton, Ulysses Simpson Schaul.

In the Towne Scientific School to—

Edward Taggart Child, George Edmunds Lawrence, Arthur Gregg Singer, Edgar Arthur Singer, Jr.

In the Wharton School to—

Vivian Frank Gable, Clifton Maloney, Frank Earle Schermerhorn, Walter Edward Weyl.

Honors awarded in the Sophomore Class :

In the Course in Arts to—

Edwin Henry Fetterolf.

In the Towne Scientific School to—

Paul Renno Heyl, Arthur Hobson Quinn.

Honorable mention in Particular Studies :

Roger Ashhurst, Freshman, *Mathematics*. George Lewis Brinton, Freshman, *Mathematics*. Howard Fuguet, Sophomore, *French*. Paul Renno Heyl, Sophomore, *Mathematics*. Charles Moore Magee, Freshman, *Greek and Latin*. Alfred Harrison Pancoast, Sophomore, *Mathematics*.



## IN THE FACULTY OF DENTISTRY.

At the Examination for Degrees, Honorable Mention for averages exceeding 90, to—

Charles J. Leonhardi . . . . .	California.
William J. Le Suer . . . . .	New York.
Walter G. Beitzel . . . . .	Kansas.
George H. Nellis . . . . .	New York.
Lewis H. Gilbert . . . . .	New York.
Edward B. Coen . . . . .	Illinois.
W. Clay Middaugh . . . . .	Pennsylvania.
Frank D. Murto . . . . .	Pennsylvania.
A. Fowler Smith . . . . .	New York.
George H. Johnson, Jr. . . . .	Bahamas.
Charles Newgarden . . . . .	Pennsylvania.
Albert L. Willis . . . . .	Washington.
S. Edwin Whitmer . . . . .	Pennsylvania.
John J. Bowen . . . . .	Rhode Island.
William Gunn . . . . .	New Zealand.
Edward E. Parshall . . . . .	Pennsylvania.
Robert J. Seymour . . . . .	Canada.
Arch C. Hart . . . . .	California.
Harry K. Baer . . . . .	Pennsylvania.
George J. Wimmer . . . . .	Pennsylvania.

## IN THE FACULTY OF LAW.

## IN THE GRADUATING CLASS.

Honors of the *First Grade*: Francis Herman Bohlen, Francis Bernard Bracken, Conway Dillingham.

Honors of the *Second Grade*: Thomas Biddle Ellis, Mayne R. Longstreth, John Aloysius McCarthy, Edmund Earl Kiernan, Henry Irick Budd, Jr., Robart Porter Bradford, Maurice Guy Belknap, Samuel Francis Clevenger, Samuel Pennington Rotan, Daniel Messick Stewart.

Honors of the *Third Grade*: De Reynolds Owens, Joseph Baylis Thomas, Maurice Worrell Sloan.

## IN THE SECOND YEAR CLASS.

Honors of the *First Grade*: Joseph R. Embery, Charles Henry Burr, Jr.

Honors of the *Second Grade*: Edward Brooks, Jr., J. Carrol Hayes, Samuel Kahn Louchheim, Charles Fellows Eggleston.

Honors of the *Third Grade*: George Washington Jenkins, Henry Clay Huey, Charles Goldsmith.

IN THE FIRST YEAR CLASS.

Honors of the *First Grade*: Henry S. Borneman.

Honors of the *Second Grade*: John Monaghan.

Honors of the *Third Grade*: William Augustus Carr, Robert Kemp Wright, Jr.

PRIZES.

JUNE 16, 1892.

I. IN THE COLLEGE FACULTY.

1. The George W. Childs Prize for the best examination on the subjects required for entrance to the Courses in Arts, to *Waller Rush Cuthbert*.

2. The Anthony J. Drexel Prize for the best examination on the subjects required for entrance to the Courses in Science, to *Nelson Lawrence Roray*.

3. For the best examination on the "Oration of Demosthenes on the Crown," by members of the Junior Class, to *Arthur Wellesley Howes*, with honorable mention of *George Johnson* and *Francis Herbert Lee*.

4. For the best examination by a member of the Freshman Class on Greek Prose Composition with the accents, to *Charles Moore Magee*.

5. For the best examination on the "Lectures on Quaternions," given to the Voluntary Junior Class. First prize to *Arthur Maurice Greene, Jr.*; second prize to *George Hervey Hallett*.

6. For the best Essay in History and English Literature by a member of the Junior Class—subject, "The Primitive Home and the Diffusion of the Aryan Race," to *Carl Friedrich Haussman, Jr.*

7. For the best Declamation by a member of the Sophomore Class, to *Ernest Moore Paddock*, with honorable mention of *Horatio Charles Wood, Jr.*

8. For the best special examination in Greek Prose Composition, by Freshmen on entering College. First prize, *Waller Rush Cuthbert*; second prize to *Fleming James, Jr.*

9. The Henry Reed Prize for the best English Essay by a member of the Senior Class—subject, "Dante Gabriel Rossetti," to *Ulysses Simpson Schaul*.

10. To a member of the Scientific Classes for improvement in



Drawing and general good conduct and application, to *James Hamilton Colket*, of the Freshman Class.

11. For the best Essay in Intellectual and Moral Philosophy by a member of the Senior Class—subject, "The Sophists," to *William Duane*.

12. The Society of the Alumni Prize for the best Original Declamation by a member of the Junior Class, to *Samuel Murdoch Kendrick*.

13. The Henry LaBarre Jayne Prize for the best English Composition by a member of the Freshman Class—subject, "The Autobiography of Benjamin Franklin," to *Charles Moore Magee*, with honorable mention of *John Wetherill*.

14. The Joseph Warner Yardley Prize for the best Thesis in Political Economy, by a member of the Senior Class—subject, "The Impolicy of an Unrestricted Coinage of Silver," equally to *William Duane*, *Vivian Frank Gable* and *Clifton Maloney*.

15. The Van Nostrand Prize for a member of the Junior Class in Civil Engineering who attains the highest general average of scholarship, to *Frank Potts Witmer*.

16. 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 *Edward Henry Fetterolf*, with honorable mention of *Harry Orrick Johnson Childs* and *Thomas Kilby Smith*.

## II. 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 *Christopher Graham, B. S.*

## III. IN THE FACULTY OF LAW.

1. Francis Herman Bohlen was appointed to be a Fellow of the Department of Law.

2. The Sharswood Prize of seventy-five dollars for the best Graduation Essay was awarded to Francis Herman Bohlen for his Essay, entitled "The Rescission of Divisible Contracts."

3. The Meredith Prize of fifty dollars for the second best Graduation Essay was awarded to Robert Porter Bradford for his Essay, entitled "Trustees as Purchasers of Trust Property."

4. The T. & J. W. Johnson Prize of a set of Smiths' Leading Cases

was awarded to John Aloysius McCarthy for his Essay, entitled "The Construction of Foreign Contracts."

Honorable mention was made of the following Essays: "The Principles governing the extent of estoppel by matter of record," by Henry Irick Budd, Jr. "Protection to private property under the Fourteenth Amendment," by William Struthers Ellis. "Oil and Gas Leases," by Samuel Blaine Ewing.

5. The P. Pemberton Morris Prize of forty dollars for the best examination in Evidence, Pleading and Practice at Law and in Equity, by a member of the Graduating Class was awarded to John Aloysius McCarthy, with honorable mention of Francis Herman Bohlen.

6. The Faculty Prize of fifty dollars for the best written examination with all the Professors was awarded to Francis Herman Bohlen, with honorable mention of Joseph R. Embery and Henry S. Borneman.

IN THE FACULTY OF MEDICINE.

MAY 6, 1892.

The "*Alumni Medal*," to the member of the Graduating Class who attained the highest general average in examination, was awarded to William G. Spiller, of Philadelphia.

A 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 1891-92, was awarded to Alfred Hand, Jr., of Scranton, Pa., with Honorable Mention of William E. Robertson and Lewis S. Somers.

A 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 Ellsmore Stites, of Bridgeton, N. J., and Frank H. Macfarland, of Philadelphia, for the report written jointly by them. Honorable Mention was awarded to Walter R. Weiser, of York, Pa.

A Prize of a Copy of Treves' Surgery, offered by Dr. Edward Martin, Clinical Professor of Genito-Urinary Diseases, for the best thesis upon a Clinical Study of Cases, was awarded to William H. Carpenter, of Salem, N. J., for his thesis entitled, "*A Study of the Gonococcus*."

A Prize of a Surgical Pocket-Case, offered by Dr. Edmund W. Holmes, Demonstrator of Anatomy, for the best record of Anomalies found in the Dissecting Room, was awarded to Everett Mingus, of Ashland, Oregon.

The prizes offered by Dr. H. R. Wharton, Demonstrator of Surgery, were awarded as follows: A Surgical Pocket-Case for proficiency in Fracture Dressings, Operating and in Bandaging, to Alfred Hand, Jr., of the Graduating Class, with Honorable Mention of Harris E. Santee



and John H. Girvin. A Surgical Pocket-Case to H. R. Goodrich, of the First-year Class, for proficiency in Bandaging, with Honorable Mention of C. W. Higgins and Otto C. Gaub.

A Prize of a copy of Ashhurst's Surgery, offered by Dr. Richard H. Harte, Demonstrator of Osteology, for the best examination in Osteology, was awarded to Hubert A. Royster, of the First-year Class, with Honorable Mention of J. Clinton Starbuck and Patrick H. McGovern.

The "*Zentmayer Prize*" of a Microscope for the best examination in Histology and Embryology, was awarded to John Mumford Swan, Jr., of Newport, R. I., with Honorable Mention of D. Edward Esterly and Walter L. Pyle.

The Louis J. C. Kimmell Prize of an Antiseptic Minor Surgery Operating-Case was awarded to Frederick B. Lippincott, of Pemberton, N. J., for his thesis entitled, "*A Statistical Study of Gun-shot Wounds of the Abdomen*."

In competition for the D. Hayes Agnew Surgical Society Prize, the award of Honorable Mention was made jointly to J. Mumford Swan, Jr., and William R. Nicholson, Jr.

The following graduates of the Medical Department, Class of 1892, arranged in alphabetical order, were appointed to Hospitals on competitive examination :

University Hospital—

Charles Harrison Frazier,  
Arthur J. Patek,  
David Riesman,

Jay F. Schamberg,  
Archibald G. Thomson.

Philadelphia Hospital—

Truman Angè,  
William H. Carpenter,  
Glendon E. Curry,  
Alvah M. Davis,  
Angus C. McDonald,  
James H. McKee,  
Robert L. Pitfield,  
Louis A. Prefontaine,

David Riesman,  
William E. Robertson,  
William J. Scott,  
Jay F. Schamberg,  
William Seaman,  
James E. Talley,  
Walter R. Weiser,  
John Zimmer.

Presbyterian Hospital—

Walter Belgiano,  
George K. Edwards,  
Alfred Hand, Jr.,

William E. Keller,  
Walter R. Weiser.

German Hospital—

Alfred Hand, Jr.,  
Arthur J. Patek,

Albert D. Whiting,  
Robert L. Pitfield.

St. Agnes' Hospital—

Alexander H. Davisson,  
J. Ryan Devereux,

Dudley D. Saunders,  
Reid White.

St. Mary's Hospital— William H. Carpenter,	Alphonso S. Wilson.
St. Joseph's Hospital— Glendon E. Curry,	George A. Marion.
Children's Hospital— Alfred Hand, Jr.,	James E. Talley.
New York Post-Graduate Hospital— Edwin D. Gazzam.	
Philadelphia Polyclinic Hospital— Albert C. Barnes, James K. Corss,	Alvah M. Davis, M. William White.
Howard Hospital— Albert C. Barnes.	
Methodist Episcopal Hospital— Augustus W. Buck,	Robert C. Yenney.
West Penn Hospital, Pittsburgh— Oliver J. Bennett,	Frank Gibson.
Mercy and St. Rosalie Hospital, Pittsburgh— M. Gano Buckner, Oliver J. Bennett,	Frank Gibson.
Michael Reese Hospital, Chicago— Arthur J. Patek.	
City Hospital, Wilkesbarre, Pa.— Adam Stegner.	
Cooper Hospital, Camden, N. J.— Paul M. Mecray,	Edward A. Y. Schellenger.

The following graduates were appointed to Hospitals without examination :

Miners' Hospital, Ashland, Pa.— Jay M. Bryan.	
Orthopædic Hospital— D. Pellman Boyer,	Frank Savery Pearce, '91.
St. Luke's Hospital, Bethlehem— Herbert Threlkeld-Edwards	
Harrisburg Hospital— Jay M. Bryan.	
St. Timothy's Hospital— Arthur R. Wilson.	
Germantown Hospital— William L. Harris,	Edwin S. Potter, '90.
Episcopal Hospital— Francis W. Bennett, '91,	Walter R. Lincoln, '90.



Pennsylvania Hospital—

Thomas F. Branson,  
Thomas A. Claytor, '91.

Joseph M. Spellissy, '90.

Seaside Hospital, Atlantic City, N. J.—

George A. Curriden.

Seaside House for Invalid Women, Atlantic City, N. J.—

Harry A. Spangler.

St. Joseph's Hospital, Reading, Pa.—

A. Wayne Baugh, '91.

Reading Hospital—

William Seaman.

City Hospital, Williamsport, Pa.—

Walter S. Brenholtz.

Samaritan Hospital—

William A. Hitschler,

William McKeage.

Wills' Eye Hospital—

Edward C. Ellett, '91,

Walter R. Parker, '91.

St. Christopher's Hospital—

George A. Curriden.

Philadelphia Dispensary—

Dwight B. Fuller.

## SUMMARY.

## PROFESSORS, LECTURERS AND INSTRUCTORS.

College Department . . . . .	88
Department of Medicine, including Hospital Service . .	109
“ “ “ (Auxiliary Faculty) . . . . .	5
“ “ Dentistry . . . . .	36
“ “ Veterinary Medicine . . . . .	21
“ “ Law . . . . .	10
“ “ Philosophy . . . . .	42
Laboratory of Hygiene . . . . .	5
Emeritus Professors . . . . .	5
	<hr/>
Repeated . . . . .	321
	66
	<hr/>
Total . . . . .	255

## STUDENTS.

College Department . . . . .	618
Department of Medicine . . . . .	847
“ “ “ (Auxiliary Faculty) . . . . .	13
“ “ Dentistry . . . . .	153
“ “ Veterinary Medicine . . . . .	92
“ “ Law . . . . .	217
“ “ Philosophy . . . . .	117
Laboratory of Hygiene . . . . .	11
Post-Graduate Course in Law . . . . .	3
	<hr/>
Repeated . . . . .	2,071
	16
	<hr/>
Total . . . . .	2,055

## ACCOMMODATIONS.

Good board can be had near the University at from five to seven dollars a week. A list of recommended boarding-houses can be seen on application to E. W. Mumford, Assistant Secretary, at the University.

## EXPENSES.

	Min.	Max.
Board, thirty weeks* . . . . .	\$150 00	\$210 00
Tuition (according to Department and Year of the Course) . . . . .	100 00	200 00
Text-books . . . . .	10 00	50 00
	<hr/>	<hr/>
	\$260 00	\$460 00

\* The session in some of the Departments is from five to nine weeks longer.



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