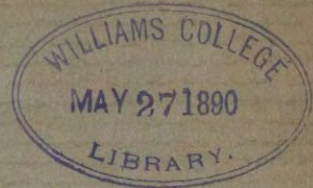


UNIVERSITY

OF



PENNSYLVANIA

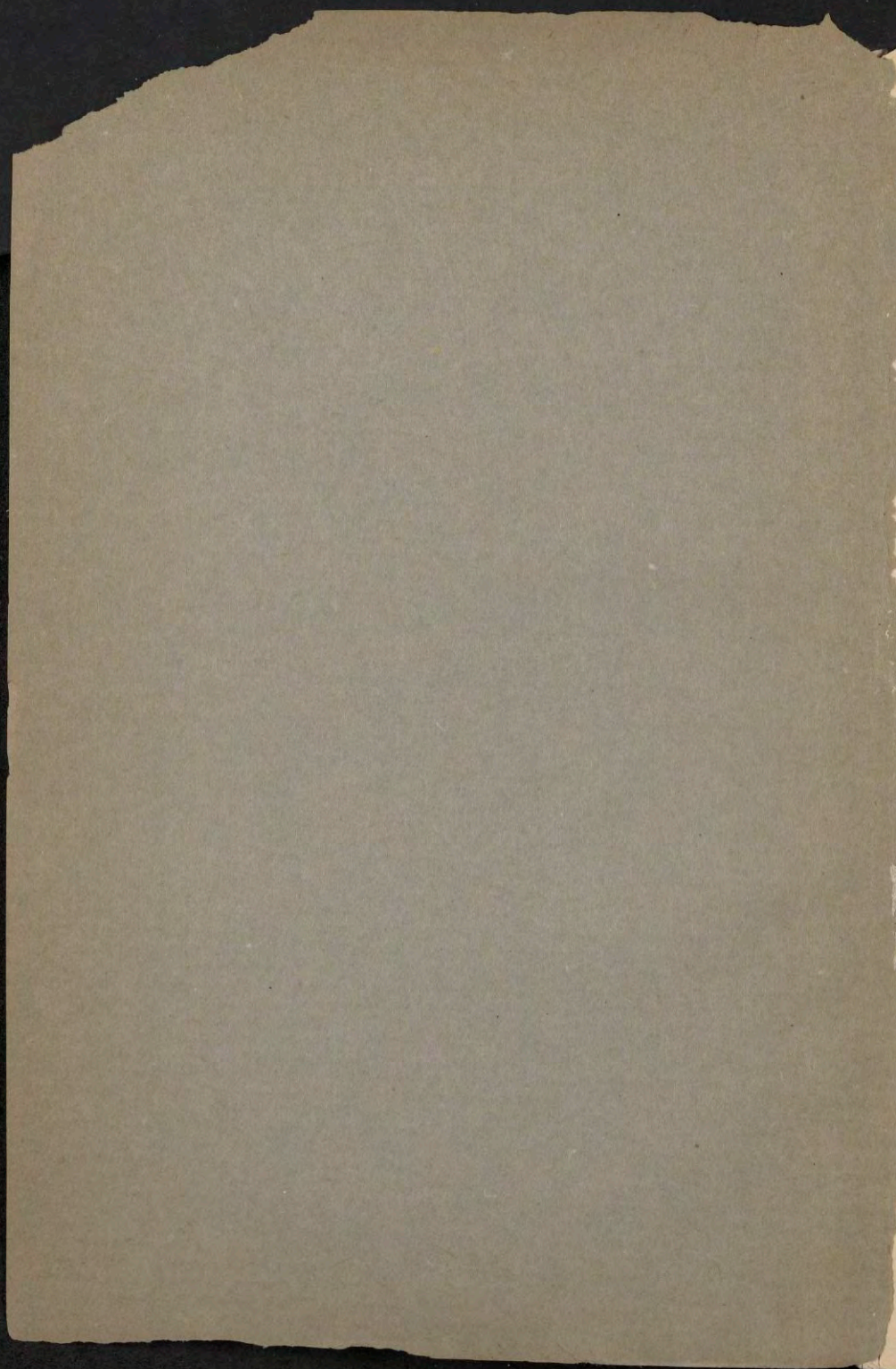
Catalogue and Announcements

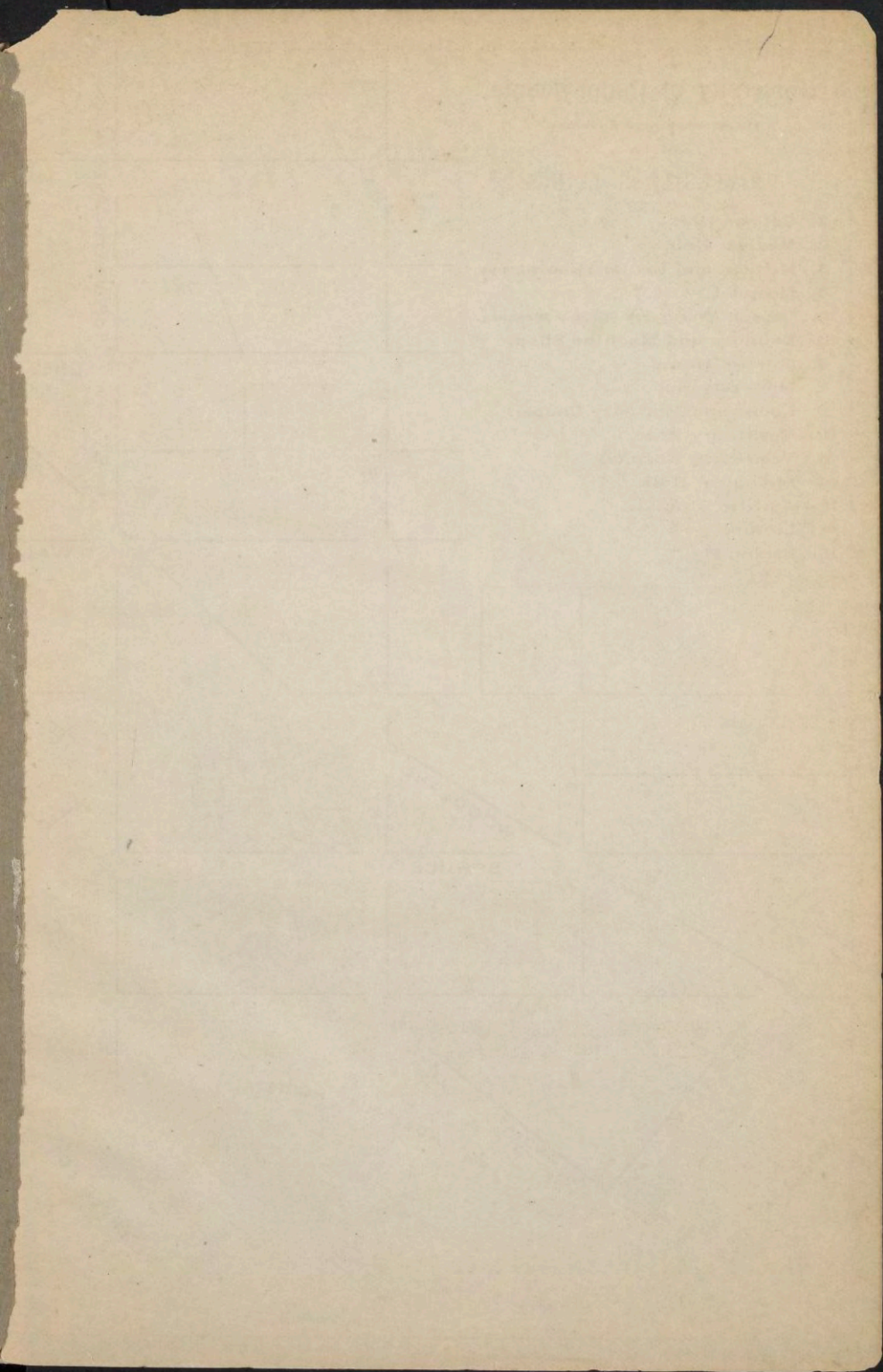
1889-90

PHILADELPHIA

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1890



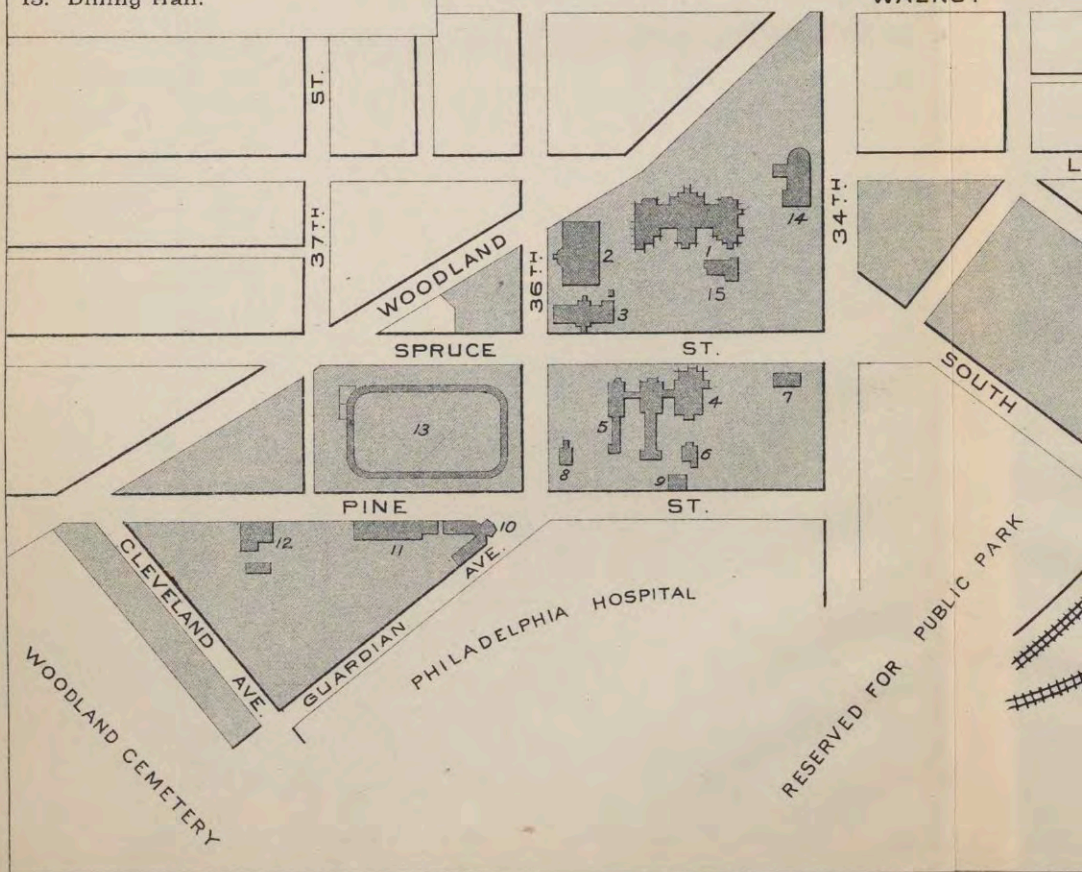


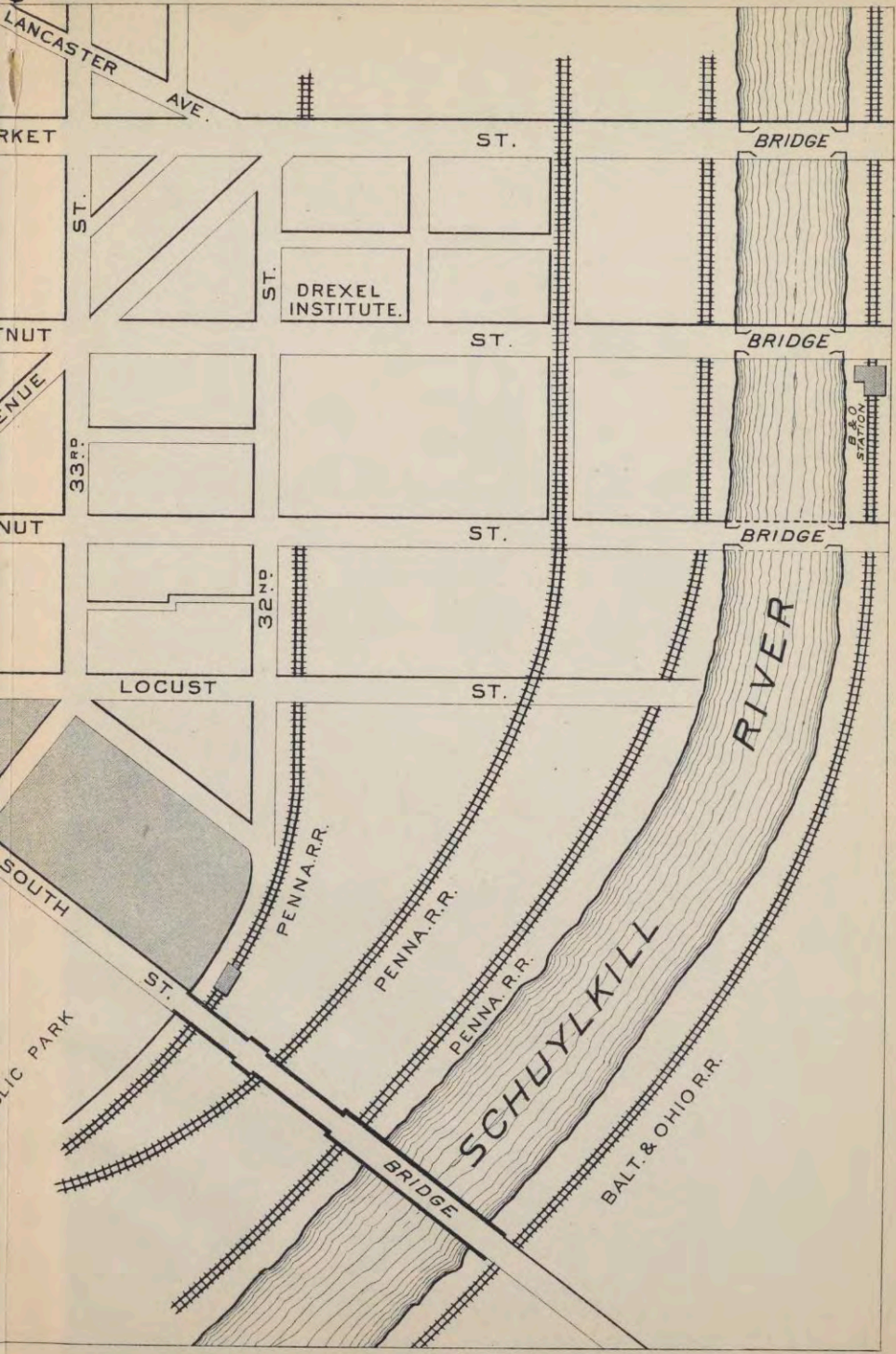
University of Pennsylvania.

ITS PROPERTY AND ENVIRONS.

UNIVERSITY BUILDINGS.

1. College Hall.
2. Medical Hall.
3. Medical and Dental Laboratory.
4. Hospital.
5. Gibson Wing, for Chronic Diseases.
6. Laundry and Machine Shop.
7. Nurses' Home.
8. Maternity Hospital.
9. Lodge and Mortuary Chapel.
10. Veterinary Hall.
11. Veterinary Hospital.
12. Biological Hall.
13. Athletic Grounds.
14. Library.
15. Dining Hall.





LANCASTER AVE.

MARKET ST.

WALNUT ST.

WALNUT ST.

WALNUT ST.

SOUTH ST.

PUBLIC PARK

ST.

33 P.P.

32 P.P.

LOCUST ST.

ST.

ST.

32 P.P.

PENNA. R.R.

PENNA. R.R.

PENNA. R.R.

BRIDGE

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DREXEL INSTITUTE.

BRIDGE

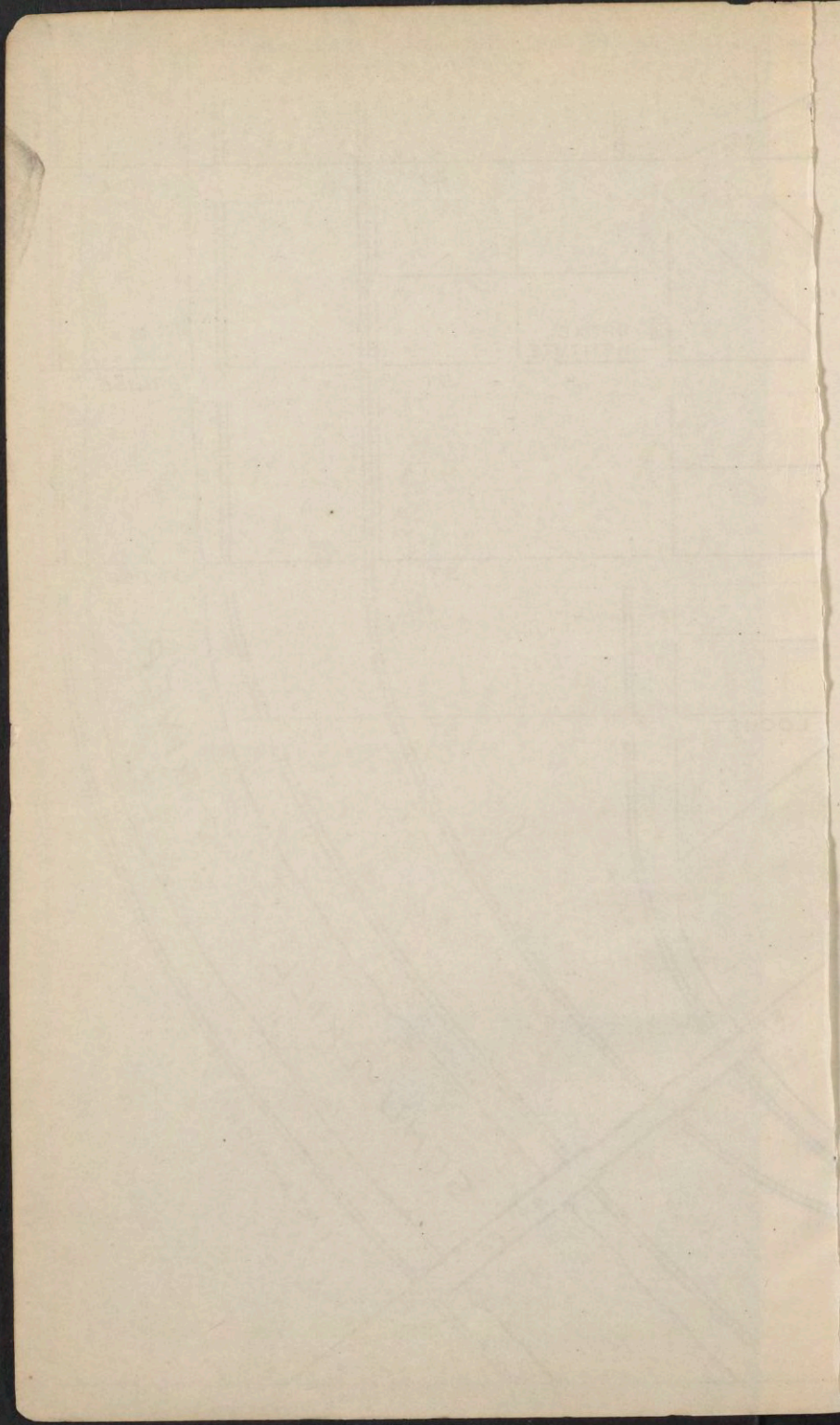
BRIDGE

BRIDGE

SCHUYLKILL RIVER

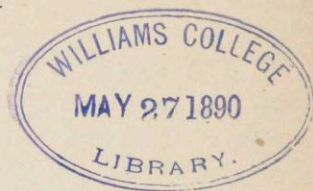
BALT. & OHIO R.R.

B&O STATION



UNIVERSITY

OF



PENNSYLVANIA

Catalogue and Announcements

1889-90

PHILADELPHIA

PRINTED FOR THE UNIVERSITY

1890

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CALENDAR.

1889.

- Sept. 18, Wednesday. Introductory Course begins: Departments of Medicine and Dentistry. 11 A.M.
- “ 23, Monday. First Term begins: College Department. 10 A.M.
- Oct. 1, Tuesday. Winter Session begins: Departments of Medicine, Dentistry, Veterinary Medicine, and Biology, and Auxiliary Department of Medicine. 12 Noon.
- “ 7, Monday. First Term begins: Course in Music. 2 P.M.
- “ 7, Monday. First Term begins: Department of Law. 4 P.M.
- Nov. 28, Thursday. Thanksgiving Day. (With Friday, 29th, holiday.)
- Dec. 21, Saturday. Christmas Recess begins: College Department. 1 P.M. Departments of Medicine, etc. 5.30 P.M.

1890.

CHRISTMAS RECESS.

- Jan. 3, Friday. Christmas Recess ends. 9 A.M.
- Feb. 3, Monday. Second Term begins: College Department and Department of Law.
- “ 22, Saturday. Washington's Birthday. Celebration in College Chapel, 11 A.M.
- April 2, Wednesday. Easter Recess begins: College Department. 5 P.M.

EASTER RECESS.

- “ 9, Wednesday. Examination Resident Physicians, Maternity Hospital, 12 M.
- “ 9, Wednesday. Easter Recess ends: College Department. 9 A.M.
- “ 14, Monday. Final and Term Examinations begin: Departments of Medicine and Dentistry.
- “ 22, Tuesday. Examination for Resident Physicians, University Hospital. 12 Noon.
- “ 25, Friday. Last day for the receipt of Theses and Prize Essays, College Department.
- May 1, Thursday. Annual Commencement: Departments of Medicine and Dentistry. 12 Noon.
- “ 3, Saturday. Senior Examinations end: College Department.
- May 5, Monday. Spring Session begins: Departments of Medicine and Dentistry. 11 A.M. Entrance Examination, Department of Medicine.

- May 19, Monday. Examinations begin: Departments of Law and Veterinary Medicine, and Auxiliary Department of Medicine.
- “ 30, Friday. Second Term ends: Department of Law.
- June 3, Tuesday. Announcement of Results, Annual Examinations: College Department. 10 A.M.
- “ 5, Thursday. Annual Commencement: College Department, Departments of Law, Veterinary Medicine, and Auxiliary Department of Medicine. 11 A.M.
- “ 6, Friday. Entrance Examinations begin: College Department. 9 A.M.

SUMMER VACATION.

- Sept. 11, Thursday. Entrance Examinations begin: College Department. 9 A.M.
- “ 22, Monday. Introductory Course begins: Departments of Medicine and Dentistry. 11 A.M.
- “ 22, Monday. First Term begins: College Department. 10 A.M.
- “ 24, Wednesday. Competitive Examination for Medical Scholarships. 12 Noon.
- “ 25, Thursday. Examinations for Admission to Advanced Standing and Re-examinations of Undergraduates: Departments of Medicine and Dentistry. 12 Noon.
- “ 26, Friday. Entrance Examination: Departments of Medicine and Veterinary Medicine. 12 Noon.
- Oct. 1, Wednesday. Winter Session begins: Departments of Medicine, Dentistry, and Veterinary Medicine, and Auxiliary Department of Medicine. 12 Noon.
- “ 6, Monday. First Term begins: Course in Music. 2 P.M.
- “ 6, Monday. First Term begins: Department of Law. 4 P.M.
- Nov. 27, Thursday. Thanksgiving Day (with Friday, 28th, holiday).
- Dec. 20, Saturday. Christmas Recess begins: College Department and Department of Law. 1 P.M. Department of Medicine. 5 P.M.

1891.

CHRISTMAS RECESS.

- Jan. 5, Monday. Christmas Recess ends: College Department and Department of Law. 9 A.M.
- “ 30, Friday. 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 skilful 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 chari-

table 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 politick, 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 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 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.

PROVOST OF THE UNIVERSITY,
WILLIAM PEPPER, M.D., LL.D.,
President *pro tempore* of the Board of Trustees.

TRUSTEES.

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

REV. HENRY J. MORTON, D.D.,
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,
JAMES H. HUTCHINSON, M.D.*
REV. GEORGE DANA BOARDMAN, D.D., LL.D.,
WILLIAM HUNT, M.D.,
HORACE HOWARD FURNESS, PH.D., LL.D.,
WHARTON BARKER,
SAMUEL DICKSON,
JOHN SCOTT,
JAMES MACALISTER,
JOHN C. SIMS, JR.,
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.

REV. JESSE Y. BURK, Secretary, University.
WHARTON BARKER, Treasurer, 125 South 4th St.

* Deceased.

CHAIRMEN OF STANDING COMMITTEES FOR THE YEAR
1889-90.

WAYS AND MEANS :

MR. HARRISON, 101 South Front 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, 3808 Chestnut Street.

DEPARTMENT OF SCIENCE :

MR. MERRICK, Roxboro'.

DEPARTMENT OF FINANCE AND ECONOMY :

MR. BARKER, 125 South Fourth Street.

DEPARTMENT OF VETERINARY MEDICINE :

DR. HUNT, 1300 Spruce Street.

DEPARTMENT OF PHYSICAL EDUCATION :

MR. SIMS, 233 South 4th Street.

DEPARTMENT OF BIOLOGY :

MR. MACALISTER, 713 Filbert Street.

DEPARTMENT OF PHILOSOPHY :

MR. FRALEY, 1000 Walnut Street.

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.
—	
JOSEPH LEIDY, M.D., LL.D., Professor of Anatomy and Zoölogy, and Hon- orary Dean of the Medical Faculty.	1302 Filbert St.
HENRY H. SMITH, M.D., Emeritus Professor of Surgery.	1800 Spruce St.
FRANCIS A. JACKSON, A.M., Professor of the Latin Language and Literature.	Overbrook, Pa.
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., Emeritus Professor of Physiology.	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.
JOHN J. REESE, M.D., Professor of Medical Jurisprudence, including Toxicology.	Landsdowne, Pa.
CHARLES J. STILLÉ, LL.D., Emeritus JOHN WELSH CENTENNIAL Professor of History and English Literature.	2201 St. James's Place.

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

- OSWALD SEIDENSTICKER, PH.D. (Göttingen), Litt.D.,
Professor of the German Language and Literature. 309 S. 40th St.
- JOHN G. R. McELROY, A.M.,
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Professor of Hebrew. 4408 Chestnut St.

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U.S.N., Assistant Professor of Dynamical En-
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Director of Physical Education. 129 S. 36th St.
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Associate Professor of Obstetrics. 1624 Pine St.
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Professor of the Greek Language and Literature. 4504 Pine St.
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Professor of Entomology. 874 N. 4th St.
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- HARRY F. KELLER, PH.NAT.D., Instructor in General and Organic Chemistry.
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- DAVID R. GRIFFITH, Assistant Instructor in Mechanical Engineering.
- JOSEPH L. HECHT, B.S., Assistant Instructor in General Chemistry.

GRADUATE STUDENTS.

- George Flowers Stradling, A.B., HECTOR TYNDALE Fellow in Physics, Strassburg, Germany.
- William Stanley Marshall, B.S., Fellow in Biology, Berlin, Germany.

POST-SENIORS.

The Courses are indicated as follows:—Arts, A.; Science, Sc.; Philosophy, Ph.; Natural History, N. H.; Finance and Economy, Wh.; Pure and Applied Chemistry, 1; Metallurgy and Mining, 2; Civil Engineering, 3; Mechanical Engineering, 4; Architecture, 5. Special and partial students, attending with the several classes, are printed in italics; partial students, with an asterisk () added.*

	Course.	Residence.	City Address.
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Timothy Raymond Beyer, B.S.,	Sc. 3,	do.	4835 Green St., Gtn.
<i>Jacob Orie Clarke,</i>	Sc. 3,	do.	2536 Park Terrace.
Christian Frederic Fisher, B.S.,	Sc. 3,	do.	515 Green St.
Joseph Lazarus Hecht,	Sc. 1,	do.	1738 Warnock St.
Thomas Wilkins Hulme, B.S.,	Sc. 3,	Mount Holly,	N. J.
Rudolph Howard Klauder,	Sc. 4,	Philadelphia,	2208 Venango St.
<i>August Appleton Miller,</i>	Sc. 1,	do.	623 N. 13th St.
G. Whitfield Taylor Miller, B.S.,	Sc. 3,	do.	200 E. Cheltenham Av., Gtn.
Edward Asa Partridge, B.S.,	Sc. 1,	do.	1738 Sydenham St.
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David Bowen Salter, B.S.,	Sc. 3,	do.	2016 Mt. Vernon St.
Alfred Newlin Seal, B.S.,	Sc. 1,	do.	1418 Bouvier St.
<i>Archibald Wright,</i>	Sc. 1,	do.	1804 Race St.

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SENIORS.

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Robert Isaac Gamon,	A.,	do.	1629 Christian St.
George Washington Gist, Jr.,	Sc. 3,	Westminster, Md.,	3264 Chancellor Pl.
William Goodwin,	A.,	Philadelphia,	Chestnut Hill.
Benjamin Lease Crozer Griffith,	A.,	Upland.	
William Oglesby Griffith,	Sc. 4,	Philadelphia,	2213 Locust St.
Henry Riley Gummey, Jr.,	A.,	do.	E. Walnut Lane, Gtn.
Henry Warren Kilburn Hale,	Sc. 4,	do.	636 Race St.
Frederic Valerius Hetzel,	Sc. 4,	do.	2325 Hare St.
<i>Richard Lewis Humphrey,</i>	Sc. 3,	do.	1813 Ridgway Terrace.
James Clark Irwin,	Sc. 3,	Cheyney.	
Henry Leopold Jeffreys,	A.,	Philadelphia,	3928 Walnut St.
Manzo Kushida,	Wh.,	Tokio, Japan,	603 S. 42d St.
Benjamin Brentnall Lathbury,	Sc. 3,	Philadelphia,	2112 Ueber St.
<i>Harrison Wainwright Latta,</i>	Sc. 3,	do.	1525 Mt. Vernon St.
<i>Francis Bazley Lee,</i>	Wh.,	Trenton, N. J.	
Henry Ashton Little,	A.,	Wallingford.	
<i>William Simpson Lorimer,</i>	Sc. 1,	Philadelphia,	201 E. Cheltenham Av., Gtn.
William Henry Lloyd, Jr.,	A.,	do.	4309 Spruce St.
<i>Arthur William McCauley,</i>	Sc. 1,	do.	1310 N. 6th St.
Nelson Baum Mayer,	Sc. 1,	do.	945 N. 8th St.
James Hartley Merrick,	A.,	do.	Roxboro'.
Caspar Wistar Miller,	Ph.,	Media.	
<i>William Sieger Miller,</i>	Sc. 1,	Philadelphia,	2032 Spring Garden St.
Joseph MacGregor Mitcheson,	A.,	do.	1608 Locust St.
<i>Frederick Brooke Neilson,*</i>	A.,	do.	325 S. 12th St.
<i>Frederick Shaw Nelson,</i>	Sc. 5,	do.	3234 Chestnut St.

Delancey Verplanck Newlin,	A.,	Philadelphia,	1018 Clinton St.
William Rufus Nicholson, Jr.,	Ph.,	do.	2106 Chestnut St.
Hugh Walker Ogden,	A.,	Portland, Me.	Ogontz.
<i>Harry Van Buren Osbourn,</i>	Sc. 3,	Philadelphia,	1433 Euclid Ave.
William Hahn Patterson,	A.,	do.	1633 Locust St.
Josiah Harmar Penniman,	A.,	do.	2316 St. Alban's Place.
<i>Charles Getz Peacock,</i>	Wh.,	Reading,	3340 Walnut St.
Robert McClellan Ramsey,	A.,	Philadelphia,	1717 Carpenter St.
George David Rosengarten, Jr.,	Sc. 1,	do.	325 S. 17th St.
Leo Stanton Rowe,	Wh.,	do.	958 Franklin St.
John Francis Rowland, Jr.,	Sc. 4,	do.	Cor. Centre & Ritchie Sts., Manayunk.
Holden Bovee Schermerhorn,	Wh.,	do.	3217 Hamilton St.
Adolph William Schramm,	Sc. 4,	Camden, N. J.,	(521 N. 2d St.)
<i>Harrison Souder,</i>	Sc. 3,	Philadelphia,	3927 Baltimore Ave.
John Franklin Stevens,	Sc. 4,	do.	3913 Walnut St.
<i>Morton Stevens,</i>	Sc. 2,	do.	414 Richmond St.
John Gilbert Stoddart,	Wh.,	do.	107 S. 21st St.
Richard Saunders Stoyale,	Wh.,	do.	2217 Vine St.
<i>Franklin Nelson Strader,</i>	Wh.,	do.	Wissahickon.
William Henry Trotter, Jr.,	Wh.,	do.	1303 Spruce St.
Robert Reineck Truitt, Jr.,	A.,	do.	3505 Baring St.
<i>Benjamin Schell Walters,</i>	Sc. 3,	Lansdowne.	
Horace Andrew Walton,	A.,	Philadelphia,	Roxboro'.
<i>Thomas Brown Whitney,</i>	Sc. 2,	do.	1815 Vine St.
<i>George Guest Williams,</i>	Sc. 1,	do.	102 N. 19th St.
Peter Silas Zimmerman,	A.,	do.	1814 Diamond St.

Seniors, 75.

JUNIORS.

<i>David Guy Anderson,</i>	Sc. 3,	Philadelphia,	328 Preston St.
John Antrobus,	A.,	do.	2512 Hagert St.
<i>William Henry Ashhurst,*</i>	A.,	Stanton, Del.,	3333 Walnut St.
<i>Percial Roberts Bailey,</i>	Sc. 2,	Philadelphia,	750 N. 20th St.
James Lord Bernard,	Sc. 4,	do.	117 Green Lane, Myk.
<i>Benjamin Harris Brewster,</i>	Wh.,	Radnor.	
Henry Ingersol Brown,	Sc. 4,	Philadelphia,	Wayne Ave., Gtn.
James Manderson Castle,	Wh.,	do.	4241 Walnut St.
Daniel Bell Cummins Cather- wood,	Wh.,	do.	2112 Walnut St.
Edgar Moore Church,	Wh.,	do.	Knox and Penn Sts.
<i>Harry B. Clingan,</i>	Sc. 5,	Sioux City, Ia.,	1423 Stiles St.
Samuel Rakestraw Colladay,	A.,	Philadelphia,	4051 Sansom St.
<i>Trevanion Border Dallas,*</i>	Sc. 3,	do.	265 S. 4th St.
Henry Delaplaine,	Sc. 3,	do.	3706 Baring St.
<i>Charles Albert Dickson,</i>	Sc. 2,	Pittsburgh,	3917 Baltimore Ave.
Erskine Hazard Dickson,	A.,	Philadelphia,	3706 Baring St.
James MacIntosh Longstreth Eckard,	A.,	Abington.	
<i>John Joseph Elcock,*</i>	Sc. 4,	Waverly Heights.	
<i>Oliver Blackburn Finn, A.B.,</i>	Sc. 4,	Caln,	627 N. 10th St.
Abram Myer Feldman,	Sc. 4,	Zitomir, Russia,	627 South St.

<i>Richard Field,</i>	Sc. 5,	Philadelphia,	56 Lansdowne Ave.
<i>Sparta Fritz, Jr.,</i>	Sc. 4,	do.	5006 Green St., Gtn.
<i>Edward Prime Goodell,</i>	Wh.,	do.	1418 Spruce St.
<i>John C. Greer,</i>	Wh.,	do.	1420 S. Broad St.
<i>Lloyd Carpenter Griscom,</i>	Wh.,	Haverford College.	
<i>Edward Townsend Hager,</i>	Sc. 2,	Lancaster,	3261 Woodland Ave.
<i>Thomas Powers Harris,</i>	A.,	Philadelphia,	1607 Walnut St.
<i>Francis Head,</i>	Sc. 4,	do.	132 Price St., Gtn.
<i>Abraham Henwood,</i>	Sc. 1,	do.	753 N. 20th St.
<i>Herbert Rutherford Hogg,</i>	A.,	do.	929 N. Broad St.
<i>John Jay Lafayette Houston,</i>	Sc. 3,	do.	3333 Walnut St.
<i>Philip Eugene Howard,*</i>	A.,	do.	3710 Walnut St.
<i>Thomas Wallis Huidekoper,</i>	A.,	do.	2020 Spruce St.
<i>Ellsworth J. Hults,*</i>	Wh.,	do.	863 N. 7th St.
<i>Hisaya Iwasaki,</i>	Wh.,	Tokio, Japan,	4048 Chestnut St.
<i>Topliff Johnson,</i>	Wh.,	Philadelphia,	Locust Ave., Gtn.
<i>Stacy Woodman Kapp,</i>	Sc. 3,	Baltimore, Md.	(Haddonfield, N. J.)
<i>Chester Hughes Kirk,</i>	Sc. 5,	Philadelphia,	1518 N. 18th St.
<i>William Gray Knowles,</i>	Wh.,	do.	1628 Spruce St.
<i>Charles Ridgely Lee,</i>	Wh.,	do.	4216 Walnut St.
<i>Frederick Lennig,*</i>	A.,	Andalusia.	
<i>Frederick Leser, Jr.,</i>	Wh.,	Philadelphia,	1700 Tioga St.
<i>George Francis Levan,</i>	A.,	do.	733 N. 41st St.
<i>Alfred Meyer Liveright,</i>	A.,	do.	1737 N. 8th St.
<i>William Wilson Long,</i>	A.,	Honeybrook,	S. 36th St.
<i>George Ingels MacLeod, Jr.,</i>	Ph.,	Philadelphia,	3905 Locust St.
<i>Clayton Fottleral McMichael,</i>	Wh.,	do.	2041 Walnut St.
<i>David Mandel,</i>	Wh.,	do.	1320 N. 6th St.
<i>Jules Ephraim Mastbaum,</i>	Wh.,	do.	1336 Franklin St.
<i>John Maurer,</i>	Wh.,	do.	102 S. 2d St.
<i>Frederick Kellner Mears,*</i>	Sc. 4,	Clifton Heights.	
<i>Frank Muhr,</i>	Sc. 1,	Philadelphia,	823 N. 6th St.
<i>Vickers Oberholtzer, Jr.,</i>	Sc. 1,	Norristown,	(Green and Airy Sts.)
<i>John Chatlin Ogden,</i>	Sc. 4,	Philadelphia,	72d & Greenway Ave.
<i>William Stephen Outerbridge,</i>	Wh.,	do.	764 S. 2d St.
<i>Jr.,</i>	Wh.,	do.	
<i>J. G. Patterson,</i>	A.,	do.	Manheim St., Gtn.
<i>James De Wolf Perry, Jr.,</i>	Sc. 3,	do.	721 Spruce St.
<i>Wilson Worrell Pile,</i>	Sc. 4,	Wayne.	
<i>William Woods Pinckerton,</i>	Wh.,	Philadelphia,	2026 Wallace St.
<i>Harvey E. Platt,</i>	Wh.,	do.	4012 Spruce St.
<i>Wilmer Hershey Righter,</i>	Wh.,	do.	1423 N. 15th St.
<i>William Beni Roskam,</i>	do.	do.	2029 Spruce St.
<i>Edward Koons Rowland,</i>	Sc. 1,	do.	Frankford.
<i>Walter Rowland,</i>	do.	do.	1740 Green St.
<i>Edward Adams Shumway,</i>	Ph.,	do.	2240 Franklin Ave.
<i>Henry Hall Sinnamon,</i>	Wh.,	do.	1918 Judson Place.
<i>George Hughes Smith,</i>	Wh.,	Mahanoy City,	
<i>Sidney Wheaton Smith,*</i>	Wh.,	Philadelphia,	218 N. 32d St.
<i>James Starr,</i>	Sc. 2,	do.	Clivedon & Morton Sts., Gtn.
<i>James Herbert Stevenson,</i>	Sc. 3,	do.	240 S. 3d St.
<i>George Beaumont Taylor,</i>	Sc. 3,	do.	Overbrook.

John Hermon Terry,	Sc. 3,	Philadelphia,	2119 N. 13th St.
Louis de Pui Vail,	Wh.,	do.	114 W. Cheltenham Av., Gtn.
<i>John Reed Valentine,*</i>	A.,	do.	2027 Pine St.
<i>William Charles August Veditz,</i>	Wh.,	do.	4406 Frankford Ave.
<i>Marcel Alphonse Viti,</i>		do.	2129 Spruce St.
James Mortimer West, Jr.,	Sc. 3,	do.	1524 Swain St.
Cornelius Weygandt,	A.,	do.	124 Tulpehocken St., Gtn.
<i>John Robert White, Jr.,</i>	Wh.,	do.	20th St. & Ontario Ave.
<i>Frank Milne Willard,</i>	Sc. 2,	do.	1818 Chestnut St.
<i>Francis Churchill Williams,*</i>	A.,	do.	4725 Green St., Gtn.
Horatio Curtis Wood,	Sc. 4,	do.	147 School St., Gtn.
James Charles Ziegler,	Sc. 3,	do.	636 N. 35th St.

Juniors, 83.

SOPHOMORES.

Walter Barclay,	A.,	Philadelphia,	1816 Pine St.
<i>Wesley Bartine,</i>	Sc.,	do.	1539 N. 20th St.
<i>Eugene Beauharnais Beaumont, Jr.,*</i>	Sc.,	do.	4409 Sansom St.
<i>Charles Louis Borie, Jr.,*</i>	Sc.,	do.	1035 Spruce St.
<i>Frank Bossert,</i>	Sc.,	Phoenixville.	
Frank Bernaudou Bower,	Sc.,	Philadelphia,	130 S. 23d St.
<i>Lee Schwartz Bowers,</i>	Sc.,	do.	1606 N. 15th St.
John Harold Brockie,	A.,	do.	Tulpehocken St., Gtn.
Charles Nicoll Bancker Camac,	A.,	do.	Wissahickon.
William Lund Clampffer,	Sc.,	do.	325 Walnut St.
Thomas Luther Coley,	A.,	Trenton, N. J.,	704 Franklin St.
Harry Warren Cook,	A.,	Philadelphia,	2002 N. 13th St.
<i>Theodore Wesley Cook,*</i>	A.,	do.	2002 N. 13th St.
Edward William Coon,	Sc.,	do.	1718 Green St.
Francis Thibault Cross,	Sc.,	do.	32 S. 21st St.
Charles James Dougherty,	Sc.,	Englewood, N. J.,	1501 Filbert St.
William Duane,	A.,	Philadelphia,	115 N. 34th St.
John Warner Grigg Dunn,	Sc.,	do.	Chestnut Hill.
<i>Samuel Rulon Earl,*</i>	A.,	Wynnewood.	
Charles Bower Early,	Sc.,	Philadelphia,	1520 N. 6th St.
Joseph Williams Fell,	A.,	do.	1534 N. Broad St.
Samuel Fleisher,	Sc.,	do.	2220 Green St.
Percial Vaisey French,	Sc.,	do.	4226 Chester Ave.
<i>Edwin Stauffer Gault,*</i>	A.,	do.	4204 Aspen St.
Edward Robert Green,	Sc.,	do.	240 S. 8th St.
Ryland Warriner Greene,	A.,	Merchantville, N. J.	
<i>Frank Thomson Gucker,*</i>	Sc.,	Philadelphia,	3422 Hamilton St.
Arthur Hagen, Jr.,	Sc.,	do.	1725 Girard Ave.
Frank Bacon Hancock,	Sc.,	do.	3841 Powelton Ave.
Albert Lawrence Harris,	Sc.,	do.	2010 Girard Ave.
Clinton Gardner Harris,	Sc.,	do.	144 School Lane, Gtn.
Carl Friedrich Haussmann, Jr.,	A.,	Adrian, Mich.,	907 Hutchinson St.
<i>Wilmer Worthington Hoopes,*</i>	Sc.,	West Chester.	
William Stewart Jamison,	Sc.,	Philadelphia,	3912 Walnut St.
Harry Ellwood Keller,	Sc.,	do.	495 N. 4th St.

Albert Bartram Kelley,	Sc.,	Philadelphia,	Cor. 41st & Parrish Sts.
<i>George Washington Kendrick, 3d,*</i>	A.,	do.	3507 Baring St.
<i>Addison Farwell Lansing,*</i>	Sc.,	Burlington, N. J.	
George Edmunds Lawrence,	Sc.,	Camden, N. J.,	(1034 S. 5th St.)
Charles Trumbull Lee,	Sc.,	Philadelphia,	1532 Pine St.
Clifford Lewis, Jr.,	A.,	do.	313 S. 12th St.
Joseph Hunter Lewis,	Sc.,	do.	768 Florida St.
<i>Jay Bucknell Lippincott,*</i>	Sc.,	do.	2012 Walnut St.
<i>Thomas Luke,*</i>	Sc.,	Rockland, Del.	
William Weaver Lukens,	A.,	Conshohocken.	
Archibald McCullagh, Jr.,	A.,	Brooklyn, N. Y.,	2012 Race St.
Clayton McElroy,	Sc.,	Philadelphia,	115 S. 20th St.
Clifton Maloney,	A.,	do.	625 N. 15th St.
<i>Howard Ware Middleton, Jr.,*</i>	Sc.,	do.	E. Walnut Lane, Gtn.
John Kaufman Mohr,	Sc.,	do.	1611 N. 15th St.
William Stuart Morris,	A.,	do.	1514 Spruce St.
<i>Charles Francis Morrow,*</i>	Sc.,	Greenville, Del.	
<i>Jay Bird Moyer,*</i>	Sc.,	Philadelphia,	2227 Columbia Ave.
Charles Thornton Murphy, Jr.,	A.,	do.	2121 Arch St.
Richard Marshall Newlin,	Sc.,	do.	1018 Clinton St.
<i>William B. Oberholzer,*</i>	Sc.,	Phoenixville.	
Samuel Davis Parry,	Sc.,	Breadyville.	
Franklin Peale Patterson,	Sc.,	Philadelphia,	1633 Locust St.
Matthew Patton,	A.,	do.	609 E. Girard Ave.
Alonzo Willoughby Platt,	Sc.,	do.	2026 Wallace St.
Samuel Kingsley Probasco,	Sc.,	Burlington, N. J.	
Adolph George Rosengarten,	Sc.,	Philadelphia,	325 S. 17th St.
Ulysses Simpson Schaul,	A.,	do.	Eastwick Place.
Francis Steenbergen Schmucker,	A.,	do.	1348 Spruce St.
<i>William M. Scott,*</i>	Sc.,	do.	1911 Mt. Vernon St.
<i>William Reese Scott, Jr.,*</i>	A.,	do.	2159 Dauphin St.
Louis Raymond Shellenberger,	Sc.,	do.	4783 Germantown Ave.
Henry Simons Shillingford,	Sc.,	do.	1118 Wallace St.
Owen Louis Shinn,	Sc.,	do.	1714 Willington St.
<i>Arthur Gregg Singer,*</i>	Sc.,	do.	4762 Penn St., Fkd.
<i>Edgar Arthur Singer, Jr.,*</i>	Sc.,	do.	Frankford.
William Emil Snyder,	Sc.,	Wilmington, Del.	
<i>Harry Bismarck Sobernheimer,*</i>	A.,	Philadelphia,	4743 Washington St., Manayunk.
James Alexander Stewart,	Sc.,	do.	2532 Brown St.
Harry Chapman Thayer,	Sc.,	Merion.	
Adam Clarke Thompson,	Sc.,	Philadelphia,	2414 Jefferson St.
<i>Arthur Conover Thomson,*</i>	A.,	Ashbourne.	
Ernest Macdowel Vail,	A.,	Philadelphia,	114 W. Cheltenham Av., Gtn.
<i>Abram Sharpless Valentine,*</i>	Sc.,	do.	235 School Lane, Gtn.
Joseph Wood Wagner,	Sc.,	do.	School Lane, Gtn.
<i>Karl Albert Walraven,*</i>	Sc.,	do.	341 S. 18th St.
Olin Leslie West,	Sc.,	Wilmington, Del.	
<i>Edwin Bennett Wheeler,*</i>	Sc.,	St. Louis, Mo.	
<i>Samuel Bowman Wheeler,*</i>	Sc.,	Bryn Mawr.	
Clarence Russell Williams,	A.,	Philadelphia,	10 W. Walnut Lane, Gtn. Sophomores, 85.

FRESHMEN.

Henry Rihl Alburger,	A.,	Philadelphia,	135 School Lane, Gtn.
Wm. Young Campbell Anderson,	Sc.,	do.	745 South 9th St.
William Ludwig Baker,	A.,	do.	2024 Chestnut St.
Elliston Perot Bissell,	A.,	do.	2047 Locust St.
<i>Charles Philip Bower,</i>	Sc.,	do.	2909 Ridge Ave.
<i>Thomas Bradley, Jr.,</i>	Sc.,	do.	242 West Logan Sq.
Ward Brinton,	N.H.,	do.	1423 Spruce St.
<i>Philip Howard Brice, Jr.,</i>	Sc.,	do.	1802 Spruce St.
<i>Henry Cartwright Burr,</i>	Sc.,	do.	2107 Green St.
Henry Paul Busch,	N.H.,	do.	2007 Pine St.
Henry Clay Butcher, Jr.,	Sc.,	do.	2001 DeLancey Place.
John Cadwalader, Jr.,	A.,	do.	1519 Locust St.
William Edgar Stitt Capp,	Sc.,	do.	1715 Spruce St.
Herbert Mason Clapp,	A.,	do.	W. Johnson St., Gtn.
Edward Salisbury Clark,	A.,	do.	517 Brown St.
Edward Burton Colket,	Sc.,	do.	2037 Chestnut St.
Jay Cooke, 3d,	A.,	do.	228 South 22d St.
Andrew Wright Crawford,	A.,	Bryn Mawr.	
Frank Penrose Croft,	Sc.,	Merion.	
Payson Crowell,	Sc.,	Philadelphia,	1731 North 8th St.
Joseph Robbins Curtis,	Sc.,	do.	202 S. 36th St.
Thomas Frederick Davies, Jr.,	A.,	do.	717 Pine St.
Joseph Corbit Davis,	Sc.,	do.	Branchtown.
Howard Harlan Dickey,	A.,	do.	4719 Chester Ave.
Raymond Renaud Donges,	A.,	Camden, N. J.,	(1801 Broadway).
Edward John Dooner,	A.,	Philadelphia,	1734 Master St.
<i>Charles Welsh Edmunds,*</i>	Sc.,	do.	808 N. Broad St.
Rudolph Skinner Elliott,	Sc.,	do.	W. Johnson St., Gtn.
<i>Herbert Payne Fisher,*</i>	Sc.,	do.	1921 Race St.
Alfred C. Fleckenstein,	Sc.,	do.	321 N. 19th St.
Charles Schlesinger Friedman,	Sc.,	do.	1704 Lambert St.
William Alexander Ferguson,	A.,	do.	2043 Bainbridge St.
Arthur Maurice Greene, Jr.,	Sc.,	do.	331 W. Cheltenham Av., Gtn.
Louis E. A. Greenleaf,	A.,	Wilmington, Del.	
Jesse Moore Greenman,	N.H.,	Cleveland, O.,	875 Doan St.
George Schaffer Gummey,	N.H.,	Philadelphia,	High St., Gtn.
Francis Chambers Harris,	Sc.,	do.	1826 Pine St.
George L. Harrison, Jr.,	Sc.,	do.	1618 Locust St.
<i>Joseph Maurice Haywood,*</i>	Sc.,	Ambler.	
John Norman Henry,	A.,	Philadelphia,	721 Pine St.
Philip Fitzpatrick Heraty,	Sc.,	do.	1022 Spruce St.
Joseph H. Gillingham Hibbs,	Sc.,	do.	1514 N. 17th St.
Arthur Wellesley Howes,	A.,	do.	3328 Woodland Ave.
David Wendell Hulburd,	A.,	do.	2023 Wallace St.
Stephen Linnard Innes,	A.,	do.	3813 Walnut St.
William Hamilton Jefferys,	A.,	do.	3928 Walnut St.
George Johnson,	A.,	do.	833 N. 22d St.
George von Phul Jones,	A.,	Wissahickon.	
Samuel Murdoch Kendrick,	A.,	Philadelphia,	3507 Baring St.
Francis Herbert Lee,	A.,	do.	4216 Walnut St.
<i>Howell Lloyd,*</i>	Sc.,	do.	329 South 17th St.

Howard Adler Loeb,	Sc.,	Philadelphia,	2124 Spring Garden St.
Norman Macleod,	Sc.,	do.	3905 Locust St.
George McFadden,	Sc.,	do.	1428 Walnut St.
<i>Clarence Stanley McIntire,</i>	A.,	do.	1204 Race St.
William Clark McKnight,	A.,	Ridley Park.	
<i>Ellwood Wilbur Middleton,</i>	A.,	Philadelphia,	1519 Cambridge St.
Dayton Hobart Miller,	A.,	do.	1309 Pine St.
Clyde Milne,	Sc.,	do.	1714 Spruce St.
Thos. Harrison Montgomery, Jr.,	A.,	West Chester.	
James Clark Moore, Jr.,	Sc.,	Philadelphia,	4201 Walnut St.
John Eyre Morgan,	Sc.,	Johnstown.	do.
Robert Churchman Morgan,	Sc.,	do.	do.
Arthur Villiers Morton,	Sc.,	Philadelphia,	1421 Chestnut St.
George Reese Newbold,	A.,	do.	1420 Spruce St.
James Caverly Newlin,	Sc.,	do.	1018 Clinton St.
Richard Thomas O'Malley,	A.,	do.	2001 Race St.
William Overington, Jr.,	Sc.,	do.	Frankford.
<i>Christopher Stuart Patterson,</i>			Prospect Ave., Chest-
<i>Jr.*</i>	Sc.,	do.	nut Hill.
Horace Hill Patterson,	Sc.,	do.	3720 Locust St.
Roderick G. Pearson,	Sc.,	do.	4666 Green St., Gtn.
Robeson Lea Perot,	Sc.,	do.	W. Walnut Lane, Gtn.
William Henry Perry,	A.,	do.	2001 Race St.
Samuel Kreamer Reeves,	Sc.,	Phoenixville.	
<i>John H. Rex,</i>	A.,	Camden, N. J.	(533 Penn St.)
Marion Rinehart Rodgers,	Sc.,	Philadelphia,	1403 N. 13th St.
<i>Charles McElwain Rogers,</i>	Sc.,	do.	3411 Race St.
George T. Rowland,	Sc.,	do.	2029 Spruce St.
John Horner Ruckman,	Sc.,	Lahaska.	
Louis Bancroft Runk,	A.,	Philadelphia,	134 N. 18th St.
John Schwaln Schaul,	A.,	do.	Eastwick Place.
William M. Scott,	Sc.,	do.	1911 Mt. Vernon St.
Frank Willard Shoemaker,	Sc.,	do.	750 North 19th St.
John Falconer Sinclair,	A.,	do.	3909 Walnut St.
Charles Sinkler, Jr.,	A.,	do.	1534 Pine St.
Henry Bueth Sims,	Sc.,	Prescott, Can.,	3261 Chancellor St.
<i>Howard Persifor Smith,</i>	Sc.,	Camden, N. J.	(321 Penn St.)
<i>J. Anson Smith,</i>	Sc.,	Gloucester, N. J.	
George Albert Smyth,	A.,	Philadelphia,	Penn & Chew Sts., Gtn.
Henry Douglas Spaeth,	A.,	do.	1615 Girard Ave.
Harry Eugene Spencer,	Sc.,	Wilmington, Del.	(205 E. 13th St.)
Frederick Dawson Stone, Jr.,	Sc.,	Philadelphia,	Fisher's Lane, Gtn.
Myer Franklin Straus,	Sc.,	do.	1748 North 13th St.
Samuel Swift,	Sc.,	Wilmington, Del.	(1409 Delaware Ave.)
Justin Ralph Sypher,	A.,	Philadelphia,	4025 Walnut St.
Seyichiro Terashima,	Sc.,	Tokio, Japan,	4119 Pine St.
Walter Smith Thomson,	Sc.,	Philadelphia,	1426 Walnut St.
William Trautwine, Jr.,	Sc.,	do.	850 N. 41st St.
William Budd Trites,	A.,	do.	4500 Baker St., Myk.
John Howell Janeway Upham,	N.H.,	do.	1800 Park Ave.
William Budd Warne, Jr.,	Sc.,	do.	206 W. Logan Sq.
Charles Henry Weber,	A.,	do.	415 South 10th St.

Adrien Francois Wellens, <i>Walter Edward Whitaker,</i>	Sc., Philadelphia,	2145 Howard St.
Jesse Starr White,	Sc., do.	Adams St., Fkd.
Joseph Early Widener,	A., Camden, N. J.	(329 Cooper St.)
Edward Burke Wilford,	Sc., Philadelphia,	1200 N. Broad St.
Charles Willing,	Sc., do.	1520 North 18th St.
Robert Newton Willson, Jr.,	A., do.	2210 Walnut St.
<i>Reginald H. Woodward,</i>	A., do.	2226 Spruce St.
Erskine Wright,	A., do.	1926 Wallace St.
		Freshmen, 112.

SPECIAL STUDENTS IN BIOLOGY.

SECOND YEAR.

David Jayne Bullock,	Philadelphia,	1826 Chestnut St.
Josiah Travella Bunting,	Glen Mills.	
Martha Bunting, B.L.,	Philadelphia,	2000 Arch St.
Kathleen Carter,	do.	40 North 19th St.
Joseph Cooper Ferguson, Jr.,	do.	1423 North Broad St.
Clarence Payne Franklin,	do.	1526 South 5th St.
John William Harshberger,	do.	737 Corinthian Ave.
John Howard Jopson,	do.	1217 North 13th St.
Clara Custer Miller,	Ardmore,	3258 Walnut St.
John Percy Moore,	Philadelphia,	1931 Judson Place.
Frank Harry Widman,	do.	859 North 15th St.
George Bacon Wood,	do.	1925 Chestnut St.

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FIRST YEAR.

Josephine Feger Ancona,	Reading,	3258 Chestnut St.
Rose Ancona,	do.	3258 Chestnut St.
Joseph Lewis Baldwin,	Downingtown.	
Clifford Boston,	Philadelphia,	1410 Ridge Ave.
Thomas Harvey Dougherty,	do.	School Lane, Gtn.
Clark Dickerman Eaton,	Berwick,	3731 Locust St.
George Wildman Farquhar,	Pottsville,	3615 Locust St.
May Bell Garvin,	do.	1525 Christian St.
Caroline Martine Grambo,	Philadelphia,	1718 Green St.
Herman Williams Gross,	do.	1416 Girard Ave.
John Hemsath,	Zehner,	3304 Woodland Ave.
Irving Woodward Hollingshead,	Pemberton, N. J.,	
Augustus Otto Koenig,	Philadelphia,	3207 Summer St.
Ralph Hutchinson Light,	Lebanon,	202 DeKalb Sq.
Harry Frederick Leesch,	Philadelphia,	909 North 8th St.
Walter Wright McCormick,	Milton,	206 South 36th St.
Mary Lyons Middleton,	Philadelphia,	852 North 41st St.
Henry Sadgendorff Neff,	do.	1140 South 6th St.
Charles Rees Palmer,	West Chester.	
John Barclay Stevenson Rex,	Philadelphia,	1611 Race St.
Henry Abraham Rothrock,	West Chester,	3731 Locust St.
Wilfred Harvey Schoff,	Philadelphia,	3418 Baring St.
Alonzo Shaffer,	Fort Washington.	
Alice Shively,	Philadelphia,	1503 Centennial St.

Mary Hopkins Smith,	Parkesburg,	1300 North 22d St.
Allen Worthington Stewart,	Philadelphia,	1352 Marlborough St.
Catharine Rupert Stephens,	do.	1703 Oxford St.
Mary Lippincott Taylor,	do.	1623 Filbert St.
Carl William Toboldt,	do.	2012 North 17th St.
George Wenrich,	Wernersville,	3643 Locust St.
William Sowers Wray,	Philadelphia,	137 Price St., Gtn.
Thomas Jefferson Yarrow, Jr.,	do.	1335 North Broad St.

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STUDENTS IN THE COURSE IN MUSIC.

THIRD YEAR.

Ida E. Bowser,	Philadelphia.	481 North 4th St.
Julia A. Plantholz,	do.	2407 Christian St.
James C. Warhurst,	do.	
Jane L. Zebley,	do.	Wissahickon Heights.

SECOND YEAR.

Ella Blair,	Philadelphia.	3231 Race St.
Irene Butland,	do.	237 North 65th St.
Gertrude B. Duffee,	do.	3438 Walnut St.
Mary A. Evans,	do.	3716 Locust St.
Horace H. Furness, Jr.,	do.	222 W. Washington Sq.
Alma Roach,	do.	902 North 29th St.
Emma Smith,	do.	6204 Hamilton St.

FIRST YEAR.

Mary Eaton,	Philadelphia.	1821 North 18th St.
Charles I. Graf,	do.	2205 Thompson St.
Harriet Hassler,	do.	1340 Lombard St.

SUMMARY.

	Arts.	Science.	Philos.	Nat.Hist.	Finance.	Biology.	Music.	Total.
Fellows	1	—	—	—	—	1	—	2
Post-Seniors	—	14	—	—	—	—	—	14
Seniors	25	38	2	—	10	12	4	91
Juniors	21	33	2	—	27	32	7	122
Sophomores	27	58	—	—	—	—	3	88
Freshmen	47	60	—	5	—	—	—	112
Totals	121	203	4	5	37	45	14	429

COURSES OF STUDY.

The College Faculty conducts the following Courses of Study:

- I. The Course in Arts.
- II. The Course in Science in the Towne Scientific School.
- III. The Course in Natural History.
- IV. The Course in Finance and Economy in the Wharton School.
- V. The Course Preparatory to Medicine.
- VI. The Course in Music.

In Freshman and Sophomore years, these courses (except the last two) differ mainly in the languages elected by the student, whether Latin and Greek, Latin with French or German, or French and German without Latin. All four courses include Rhetoric, History, English Literature, Mathematics, Chemistry, and Mechanics. At the close of Sophomore year, the courses diverge into essentially different groups of studies, any one of which may be taken by the student; viz., (1) Further studies in Arts (in large part *elective*), (2) The Technical Courses in Science, (3) A Group of Studies mainly Biological, (4) Special Studies in Finance and Economy.

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 and to such private teachers as may be named for the privilege. The Faculty reserves the right, however, to withdraw from any school or teacher 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.)

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.—Etymology (as in McElroy's *Essential Lessons in English Etymology*, Chh. I.—III. and V.).
- C.—Composition and Reading.—1st. A short essay, correct in spelling, punctuation, grammar, division by paragraphs, and expression, on one of several subjects to be announced at the time of the examination, and to be taken from the last-named of the following books, all of which (or the last-named and equivalents for the first three) must have been read by each candidate, viz., Shakespeare's *Midsummer Night's Dream*, Scott's *Quentin Durward*, Thackeray's *English Humorists*, and Goldsmith's *Deserted Village*. 2d. Questions on the subject-matter of a passage to be taken from the same book as the subjects of composition are taken from. 3d. The correction of English bad in expression, with a brief statement of the principles on which the correction is made (as in Williams's *Composition and Rhetoric by Practice*).

In 1891 the books to be read by each candidate will be Scott's *Quentin Durward*, Goldsmith's *Deserted Village*, Shakespeare's *Merchant of Venice*, and Irving's *Bracebridge Hall*; in 1892, Shakespeare's *Merchant of Venice*, Irving's *Bracebridge Hall*, Addison's *Sir Roger de Coverly Papers*, and Scott's *Talisman*.

HISTORY.

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

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).

In 1890 and thereafter an elementary knowledge of Greek accentuation will be 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 20).
- C.—Cæsar (four books of the *Gallic 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 in the last four books of 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 20).
- 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, Ahn's *Method*, Fischer's edition (first course, pp. 1-100; second course, pp. 1-64).
- B.—German Reading, Grimm's *Märchen* (Otis's edition), 100 pages, or an equivalent.

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

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.—D.—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, B and C.

PHYSICAL GEOGRAPHY.

Any four of the following ten studies :—

1. LATIN.

A.—Latin Grammar.

B.—Latin Prose Composition (as in Arnold's *Latin Prose Composition* to the end of exercise 20).

C.—Caesar (four books of the *Gallic War*).

E.—Virgil (first three books of the *Aeneid*, with the scanning).

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 COURSE IN FINANCE AND ECONOMY.

Students entering Freshman class with a view to electing the Course in Finance and Economy in Junior year pass in the subjects required for any one of the courses named above.

ADMISSION TO SPECIAL AND PARTIAL COURSES.

For the requirements for admission to special and partial courses see page 80. Students, not candidates for a degree, who wish to take a purely technical course in Mining and Metallurgy,

or Civil Engineering, or Mechanical Engineering, must have at least the equivalents of the Freshman and Sophomore work in Mathematics, Physics and Drawing.

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.

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. McElroy's *Structure of English Prose*. Readings from an English prose author, with Compositions on Themes selected from these Readings. Exercises in Reading and Speaking, with special reference to Expression, Emphasis and Voice Culture. *Three hours*. Sect. I., *Fri. at 2*, Professor McELROY; *Mon. at 12, Wed. at 11*, Mr. SHUMWAY. Sect. II., *Tu. at 2*, Professor McELROY; *Mon., Wed., at 2*, Mr. SHUMWAY.
- GREEK 1.—Lysias. Euripides. Xenophon (*Economicus*). Plato (*Apology*). Greek Composition. Greek Moods and Tenses. *Four hours*. Sect. I., *Mon., Wed., at 9, Th. at 10, Fri. at 11*. Sect. II., *Mon. at 11, Wed. at 12, Th. at 2, Fri. at 10*. Professor LAMBERTON.
- LATIN 1.—Selections from Livy and from Horace (*Satires*). *Five hours*. *Mon., Wed., at 10*. Sect. I., *Tu. at 10, Th. at 12, Fri. at 10*. Sect. II., *Tu. at 11, Th. at 10, Fri. at 11*. Professor JACKSON.
- HISTORY 1.—Freeman's *General Sketch of History*. *Two hours*. *Tu. at 12, Th. at 11*. Professor THOMPSON.
- MATHEMATICS 1.—Algebra. Hall and Knight's *Advanced Algebra*. *Three hours (First Term)*. Sect. I., *Mon., Wed., at 2, Fri. at 12*. Sect. II., *Mon., Wed., Fri., at 9*. *Two hours (Second Term)*. Sect. I., *Tu. at 11, Th. at 2*. Sect. II., *Tu. at 10, Th. at 12*. Asst. Professor FISHER.
- MATHEMATICS 3.—Solid Geometry. Chauvenet's *Geometry*, Byerly edition. *Two hours (First Term)*. Sect. I., *Tu. at 11, Th. at 2*. Sect. II., *Tu. at 10, Th. at 12*. Asst. Professor FISHER.
- MATHEMATICS 5.—Trigonometry. Crawley's *Elements of Trigonometry*. *Three hours (Second Term)*. Sect. I., *Mon., Wed., at 2, Fri. at 12*. Sect. II., *Mon., Wed., Fri., at 9*. Asst. Professor FISHER.

SOPHOMORE CLASS.

- ENGLISH 2.—Rhetoric. Six Compositions during the year, read and discussed in small sections of the class at hours appointed by the instructors. Professor McELROY and Mr. SHUMWAY.
- ENGLISH 8.—Declamation. Two or more Declamations during the year by each student. Mr. SHUMWAY.
- ENGLISH LITERATURE 1.—Lectures on Modern Essayists. Themes written in the instructor's presence on subjects set from works of authors treated in lectures. *Two hours (First Term)*. *Wed. at 12, Fri. at 11*. Asst. Professor SCHELLING.
- ENGLISH LITERATURE 2.—Lectures on Modern Novelists. Themes written as in Course 1. *Two hours (Second Term)*. *Wed. at 12, Fri. at 11*. Asst. Professor SCHELLING.

- GREEK 2.—Herodotus. Sophocles. Thucydides. Greek Composition. *Three hours. Mon. at 12, Wed. at 10, Th. at 9.* Professor LAMBERTON.
- LATIN 3.—Tacitus (*Agricola, Germania or Annals*). Cicero (*De Senectute or De Officiis*). Horace (Selected Odes). *Four hours. Mon., Wed., at 11, Tu. at 2, Fri. at 12.* Professor JACKSON.
- HISTORY 3.—Freeman's *General Sketch* (completed). Constitution of the United States (Lectures). *Two hours. Tu., Th., at 10.* Professor THOMPSON.
- MATHEMATICS 10.—Analytic Geometry. Hardy's *Analytic Geometry. Four hours (First Term). Mon., Fri., at 10, Th. at 11.* Sect. I., *Tu. at 12.* Sect. II., *Tu. at 11.* Professor KENDALL.
- MATHEMATICS 14.—Elementary Differential and Integral Calculus. *Four hours (Second Term). Mon., Fri., at 10, Th. at 11.* Sect. I., *Tu. at 12.* Sect. II., *Tu. at 11.* Professor KENDALL.
- PHYSICS 1.—Mechanics, Lodge's *Mechanics. Two hours (Second Term). Mon. at 9, Wed. at 2.* Asst. Professor GOODSPEED.
- CHEMISTRY 1.—General Inorganic Chemistry. Laboratory work with Recitations. *Three hours. Sect. I., Fri., from 2 to 5. Sect. II., Th., from 2 to 5.* Dr. KELLER and Mr. HECHT.

JUNIOR CLASS.

REQUIRED STUDIES,—

- ENGLISH 3.—Rhetoric. Four Compositions during the year, read and discussed in small sections of the class at hours appointed by the instructor. Professor MCELROY.
- English 6 of the elective studies may be substituted for this course.
- ENGLISH LITERATURE 3.—Lectures on the Period of French Influence (Dryden to Cowper). *Two hours. Mon. at 11, Tu. at 2.* Asst. Professor SCHELLING.
- ENGLISH LITERATURE 4.—Seminary. Discussion and Criticism of papers prepared on subjects selected from authors treated in lectures. *Every third week. Sect. I., Mon. at 8 P.M. Sect. II., Th. at 2.* Asst. Professor SCHELLING.
- PHILOSOPHY 1.—Logic. Lectures and Recitations. Jevons's *Lessons in Logic. Two hours (First Term). Wed. at 12, Fri. at 10.* Professor FULLERTON.
- PHILOSOPHY 2.—Ethics. Lectures and Recitations. *Two hours (Second Term). Wed. at 12, Fri. at 10.* Professor FULLERTON.
- PHYSICS 2.—Sound, Heat, Light and Electricity. Stewart's *Physics. Four Hours. Lectures, Tu., Wed., Th., at 10.* Professor BARKER. Recitation, *Fri., at 12.* Asst. Professor GOODSPEED.

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.—Demosthenes. Euripides. Plato (*Protagoras*). Aristophanes. Greek Antiquities. *Three hours. Tu., Th., at 11, Fri. at 2.* Professor LAMBERTON.
- LATIN 5.—Selections from Juvenal. Cicero (*De Officiis, De Finibus or De Amicitia*). Horace (*Epistles*). Reading at sight. *Three hours. Mon., Wed., Th., at 9.* Professor JACKSON.
- HEBREW 1.—Harper's *Elements* and *Method and Manual*. Selections from *Genesis* and *Judges*. Reading at sight. English into Hebrew. *Two hours. Mon. at 2, Fri. at 3.* Mr. MONTGOMERY.
- SANSKRIT 1.—Whitney's *Sanskrit Grammar*. Lanman's *Reader*. *Two hours.* Professor EASTON.
- ANGLO-SAXON 1.—Sweet's *Reader*. Selections from Orosius or the *Chronicle*. *Two hours. Tu. at 3, Th. at 11.* Professor MCELROY.
- GOTHIC 1.—Stamm and Heyne's *Ulfilas*. *Two hours.* Professor SEIDENSTICKER.
- GERMAN 3.—Whitney's *Grammar and Exercises*. Leanders's *Träumereien*. Schiller's *Jungfrau von Orleans*. *Three hours. Mon., Tu., at 12, Fri. at 11.* Professor SEIDENSTICKER.
- FRENCH 1.—Easy Prose. Harrison's *French Syntax*. *Three hours. Tu., Fri., at 9, Th. at 12.* Professor EASTON.
- ITALIAN 1.—Toscani's *Grammar*, with exercises. Pellico (*Le Mie Prigionî*). Manzoni (*I Promessi Sposi*). *Two hours. Mon. at 5, Wed. at 12.* Mr. RENNERT.

B.

- ENGLISH 6.—Rhetoric. Advanced Composition. Weekly or daily exercises, to be criticised by the instructor at the weekly meetings. *One hour. Tu. at 10 or Th. at 2.* Professor MCELROY.
- ENGLISH 7.—English Prose Authors. Readings with special reference to Rhetorical Criticism. *Two hours. Mon. at 2, Th. at 10.* Professor MCELROY.
- ENGLISH 9.—Declamation. Debating and Original Speaking, extemporaneous and prepared. *Wed. at 2.* Professor MCELROY.
- ENGLISH 10.—English Philology. Lectures on Old and Early English, with practical exercises. *Two hours.* Professor MCELROY.
- HISTORY 8.—Church and State in America (Lectures). *Two hours (First Term). Mon. at 10, Wed. at 11.* Professor THOMPSON.
- HISTORY 10.—Economic History of the United States. *Two hours (Second Term). Mon. at 10, Wed. at 11.* Professor THOMPSON.

- MATHEMATICS 13.—Advanced Analytic Geometry. Plane Geometry. Solid Geometry (Salmon). *Two hours. Th. at 3, and another hour fixed by the instructor.* Asst. Professor FISHER.
- MATHEMATICS 17.—Advanced Differential and Integral Calculus. (Williamson or Todhunter). *Two hours. Wed., Th., at 10.* Professor KENDALL.
- MATHEMATICS 20.—Vector Analysis. First Course. Lectures. For Faculty Prize to members of the Junior Class. *One hour. Mon. at 1.* Asst. Professor FISHER.
- MATHEMATICS 21.—Determinants. (Scott or Salmon.) *One hour.* Asst. Professor CRAWLEY.
- MATHEMATICS 22.—Theory of Equations. (Burnside and Panton.) *Two hours.* Asst. Professor FISHER.
- MATHEMATICS 24.—Projective Geometry. (Cremona.) *Two hours.* Asst. Professor FISHER.
- 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. Recitations on Tu. at 11, Wed. at 12 and at other hours appointed by the instructors.* Professor SMITH and Mr. FRANKEL.
- CHEMISTRY 3.—Organic Chemistry. Lectures. *Two hours. Mon. at 12, Wed. at 9.* Professor SADTLER.
- MINERALOGY 1.—Crystallography. Native elements and Sulphides. *Two hours. Tu. at 12, Fri. at 11.* Professor KOENIG.
- GEOLOGY 5.—Principles of Geology. Outline of Vertebrate Palæontology. *Two hours. Fri., Sat., at 11.* Professor COPE.
- BIOLOGY 1.—General Biology. Lectures and Laboratory work. *Six hours. Tu., Th., from 2 to 4. Sat. from 9 to 11.* Professor DOLLEY and Mr. GREENMAN.
- PSYCHOLOGY 2.—Scientific Methods in Psychology. Lectures, with Laboratory work. *Two hours (First Term). Th., from 3 to 6.* Professor CATTELL.
- PSYCHOLOGY 3.—Experimental Psychology. Lectures, with Laboratory work. *Two hours (Second Term). Th. from 3 to 6.* Professor CATTELL.

SENIOR CLASS.

REQUIRED STUDIES,—

- ENGLISH 4.—Rhetoric. Four Compositions during the year, as in Junior year. Professor MCELROY.
- English 6 of the elective studies may be substituted for this course.
- ENGLISH LITERATURE 7.—Lectures on the Elizabethan Period. (Sir Thomas More to James Shirley.) Lectures on English versification. *Two hours (First Term). Mon. at 10, Tu. at 11.* Asst. Professor SCHELLING.

ENGLISH LITERATURE 8.—Lectures on Modern and Contemporary Poets. *Two hours (Second Term). Mon. at 10, Tu. at 11.* Asst. Professor SCHELLING.

ENGLISH LITERATURE 9.—Seminary. Discussion and Criticism of papers prepared on subjects selected from authors treated in lectures. *In three sections, each section once in two weeks.* Sect. I., *Wed. at 8 P.M.* Sect. II., *Fri. at 10.* Sect. III., *Th. at 10.* Asst. Professor SCHELLING.

PHILOSOPHY 3.—History of Philosophy. Lectures, with use of Schwegler's *Manual*. *Two hours (First Term). Tu. at 9, Wed. at 11.* Professor FULLERTON.

PHILOSOPHY 4.—Philosophy. The Development of Idealism. Lectures and recitations. *Two hours (Second Term). Tu. at 9, Wed. at 11.* Professor FULLERTON.

PSYCHOLOGY 1.—Elementary Psychology. Lectures, with Lotze's Outlines. *One hour (First Term). Mon. at 12.* Professor FULLERTON.

ECONOMICS AND SOCIAL SCIENCE 3.—Social Science. Thompson's *Elements of Political Economy*. *Two hours. Th. at 9, Fri. at 11.* Professor THOMPSON.

MATHEMATICS 19.—Astronomy. Young's *Astronomy*. *Two hours. Th., Fri., at 12.* Professor KENDALL.

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.—Homer. Pindar. Æschylus. Aristophanes. Greek Literature. *Two hours. Tu., Wed., at 2.* Professor LAMBERTON.

LATIN 6.—Cicero (*Tusculanae*) or Lucretius (Selections). Horace (*Ars Poetica*). Reading at sight. *Three hours. Tu., Wed., at 12.* Sect. I., *Fri. at 9.* Sect. II., *Th. at 11.* Professor JACKSON.

HEBREW 1.—Harper's *Elements* and *Method and Manual*. Selections from *Genesis* and *Judges*. Reading at sight. English into Hebrew. *Two hours. Mon. at 2, Fri. at 3.* Mr. MONTGOMERY.

HEBREW 2.—Selections from *Historical Books*, *Psalms* and *Prophets*. Syntax in Mitchell's *Gesenius' Hebrew Grammar*. Reading at sight. *Two hours. Mon. at 3, Fri. at 2.* Mr. MONTGOMERY.

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

SANSKRIT 1.—Whitney's *Sanskrit Grammar*. Lanman's *Reader*. *Two hours.* Professor EASTON.

SANSKRIT 2.—Lanman's *Reader*. Selected Hymns from the Veda. *Two hours.* Professor EASTON.

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

ANGLO-SAXON 1.—Sweet's *Reader*. Selections from Orosius or the Chronicle. *Two hours. Tu. at 3, Th. at 11.* Professor MCELROY.

ANGLO-SAXON 2.—Béowulf. Cook's *Sievers' Grammar of Old English*. *Two hours*. Professor MCELROY.

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

GOTHIC 1.—Stamm and Heyne's *Ulfilas*. *Two hours*. Professor SEIDENSTICKER.

GOTHIC 2.—Stamm and Heyne's *Ulfilas* (Advanced Course). *Two hours*. Professor SEIDENSTICKER.

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

GERMAN 5.—Goethe's *Egmont*. Schiller's *Poems*. Grillparzer's *Sappho*. *Three hours*. *Tu., Fri., at 10, Wed. at 9*. Professor SEIDENSTICKER.

FRENCH 4.—Modern French Drama. Molière. French Philology and the History of French Literature. *Two hours*. *Mon., Th., at 11*. Professor EASTON.

FRENCH 6.—Old French. Selections (Cledat's or Constan's Chrestomathy). *Le Chanson de Roland*. *Two hours*. Professor EASTON.

ITALIAN 1.—Toscani's *Grammar*, with exercises. Pellico (*Le Mie Prigioni*). Manzoni (*I Promessi Sposi*). *Two hours*. *Mon. at 5, Wed. at 12*. Mr. RENNERT.

ITALIAN 2.—Dante (Selections from the *Inferno*). Boccaccio (Selections). Lectures on Italian Literature. *Two hours*. Mr. RENNERT.

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

B.

ENGLISH 6.—Rhetoric. Advanced Composition. Weekly or daily exercises, to be criticised by the instructor at the weekly meetings. *One hour*. *Tu. at 10 or Th. at 2*. Professor MCELROY.

ENGLISH 7.—English Prose Authors. Readings with special reference to Rhetorical Criticism. *Two hours*. *Mon. at 2, Th. at 10*. Professor MCELROY.

ENGLISH 9.—Declamation. Debating and Original Speaking, extemporaneous and prepared. *Wed. at 2*. Professor MCELROY.

ENGLISH 10.—English Philology. Lectures on Old and Early English, with practical exercises. *Two hours*. Professor MCELROY.

ENGLISH 11.—English Philology. Lectures on Middle and Early Modern English, with practical exercises. *Two hours*. Professor MCELROY.

LINGUISTICS I.—Whitney's *Language and the Study of Language*. Lectures and exercises in comparison, especially of Greek, Latin and English forms. *Tu. at 10*. Professor EASTON.

HISTORY II.—Philosophy of History. (Lectures.) *Two hours* (*First Term*). *Mon. at 9, Wed. at 10*. Professor THOMPSON.

- HISTORY 12.—Modern History since 1789. *Two hours (Second Term). Mon. at 9, Wed. at 10.* Professor THOMPSON.
- MATHEMATICS 22.—Theory of Equations. (Burnside and Pantou.) *Two hours.* Asst. Professor FISHER.
- MATHEMATICS 23.—Differential Equations. (Forsyth.) *Two hours. Tu. at 4, and another hour fixed by the instructor.* Asst. Professor FISHER.
Course 23 is open to those only who have taken Courses 7 or 18.
- MATHEMATICS 24.—Projective Geometry. (Cremona.) *Two hours.* Asst. Professor FISHER.
- MATHEMATICS 25.—Higher Plane Curves. (Salmon.) *Two hours.* Asst. Professor CRAWLEY.
- 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. Recitations on Mon. at 9 and at other hours appointed by the instructors.* Professor SMITH and Mr. FRANKEL.
- MINERALOGY 1.—Crystallography. Native Elements and Sulphides. *Two hours. Tu. at 12, Fri. at 11.* Professor KOENIG.
- GEOLOGY 1.—Lithology. *One hour. Mon. at 11.* Professor KOENIG.
- BIOLOGY 2.—General Zoölogy of Invertebrates. Lectures. *One hour (First Term). Wed. at 2.* Professor LEIDY.
- BIOLOGY 3.—Systematic Study of the Invertebrates. Laboratory work with explanatory lectures. *Six hours (First Term). Wed. from 10 to 12, and at 3; Fri. from 2 to 5.* Professor DOLLEY.
- BIOLOGY 4.—General Zoölogy of Vertebrates. Lectures. *One hour (Second Term). Wed. at 2.* Professor LEIDY.
- BIOLOGY 5.—Systematic Study of the Vertebrates. Laboratory work with explanatory lectures. *Six hours (Second Term). Wed., from 10 to 12, and at 3; Fri. from 2 to 5.* Professor JAYNE.
- BIOLOGY 6.—Animal Histology. Lectures and Laboratory work. *Six hours (First Term). Mon., Th., from 2 to 4; Fri. from 9 to 11.* Professor RYDER.
- BIOLOGY 7.—Animal Embryology. Lectures and Laboratory work. *Six hours (Second Term). Mon., Th., from 2 to 4; Fri. from 9 to 11.* Professor RYDER.
- BIOLOGY 14.—General Structural Botany. Lectures and Laboratory work. *Five hours (First Term). Mon. from 2 to 5, Fri. from 2 to 4.* Professor WILSON.
- BIOLOGY 15.—Systematic Study of the Phænogams. Lectures and Laboratory work. *Five hours (Second Term). Mon. from 2 to 5, Fri. from 2 to 4.* Professor ROTHROCK.

- BIOLOGY 20.—Animal Physiology. Lectures and demonstrations. *Two hours. Tu. at 11, Fri. at 1.* Dr. HARE.
- PSYCHOLOGY 2.—Scientific Methods in Psychology. Lectures with Laboratory work. *Two hours (First Term). Th. from 3 to 6.* Professor CATTELL.
- PSYCHOLOGY 3.—Experimental Psychology. Lectures with Laboratory work. *Two hours (Second Term). Th. from 3 to 6.* Professor CATTELL.
- PSYCHOLOGY 4.—Comparative, Social and Abnormal Psychology. Lectures with Laboratory work. *Two hours (First Term). Mon. from 2 to 4.* Professor CATTELL.
- PSYCHOLOGY 5.—Special Psychological Problems. Lectures with Research in Laboratory. *Two hours (Second Term). Mon. from 2 to 4.* Professor CATTELL.
- PHYSICS 3.—Mathematical Physics. *Two hours.* Professor BARKER.
- PHYSICS 5.—Practical work in the Physical Laboratory. *Four hours. Tu. and Th. from 2 to 4.* Professor BARKER and Asst. Professor GOODSPEED.

THE COURSE IN SCIENCE.

FRESHMAN CLASS.

ENGLISH 1.—McElroy's *Structure of English Prose*. Readings from an English prose author with Compositions on Themes selected from these Readings. Exercises in Reading and Speaking with special reference to Expression, Emphasis and Voice Culture. *Three hours*. Sect. III., *Tu. at 9, Wed. at 3, and Fri. at 2*; Sect. IV., *Th. at 2, Fri. at 9 and at 3*. Professor McELROY and Mr. SHUMWAY.

MATHEMATICS 2.—Algebra. Wentworth's *College Algebra*. *Two hours*. Sec I., *Th. at 10, Fri. at 12*; Sec. II., *Th. at 11, Fri. at 2*. Asst. Professor CRAWLEY.

MATHEMATICS 6.—Trigonometry. Chauvenet's *Trigonometry*. *Three hours (First Term)*. Sect. I., *Mon., Tu., Wed. at 11*; Sect. II., *Mon., Wed., at 2, Tu. at 10*. Asst. Professor CRAWLEY.

MATHEMATICS 9.—Analytic Geometry. Point and Straight Line. Runkle's *Analytic Geometry*. *Three hours (Second Term)*. Sect. I., *Mon., Tu., Wed., at 11*; Sect. II., *Mon., Wed., at 2, Tu. at 10*. Asst. Professor CRAWLEY.

DRAWING 1.—Geometrical and Isometrical Drawing (*Minifie*), and drawing from the Flat. Free-hand Drawing. Sketching. Use of the Scale and Protractor. Shading in India Ink. Graphical representations from Geometry. *Three hours. Mon. at 10, Wed., Th., at 12*. Professor RICHARDS.

HISTORY 2.—Myers' *Mediæval and Modern History*. *Two hours*. Sect. I., *Wed. at 2, Fri. at 10*; Sect. II., *Mon. at 12, Tu. at 2*. Mr. CHEYNEY.

LATIN 2.—Sallust (*Catiline*). Selections from Ovid. *Three hours. Mon., Th., at 2, Wed. at 9*. Mr. NEWBOLD.

GERMAN 1.—Review of Grammar. *Fünftes Lesebuch*. Storm's *Immensee*. *Four hours*. Sect. I., *Mon. at 9, Tu. at 12, Wed. at 10, Th. at 11*; Sect. II., *Tu., Wed., at 11, Th., Fri., at 10*. Mr. RENNERT.

FRENCH 2.—Harrison's *French Syntax*. Modern French Prose. Bôcher's *French Plays*. *Four hours*. Sect. I., *Mon. at 12, Tu. at 2, Th., Fri., at 9*; Sect. II., *Mon., Fri., at 11, Tu. at 12, Wed. at 9*. Professor EASTON and Mr. RENNERT.

Each student elects two of these three languages.

SOPHOMORE CLASS.

ENGLISH 2.—Rhetoric. Six Compositions during the year, read and discussed in small sections of the class at hours appointed by the instructors. Professor McELROY and Mr. SHUMWAY.

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

ENGLISH LITERATURE 1.—Lectures on Modern Essayists. Themes written in the instructor's presence, on subjects set from works of authors treated in lectures. *Two hours (First Term). Tu. at 10, Th. at 12.* Asst. Professor SCHELLING.

ENGLISH LITERATURE 2.—Lectures on Modern Novelists. Themes written in the instructor's presence, on subjects set from works of authors treated in lectures. *Two hours (Second Term). Tu. at 10, Th. at 12.* Asst. Professor SCHELLING.

HISTORY 4.—Political and Constitutional History of Europe since 1789. *Two hours (First Term).* Sect. I., *Wed., Fri., at 9.* Sect. II., *Mon., Fri., at 2.* Mr. CHEYNEY.

HISTORY 5.—English History since 1760. Bright's *History of England, Vols. 3 and 4.* *Three hours. Wed. at 10, Th. at 9, Fri. at 12.* Mr. CHEYNEY.

This course is recommended only for students in Science who propose entering the Wharton School in Junior year.

DRAWING 3.—Linear Perspective. Geometric and Isometric Drawing. Projection of Shadows. Architectural Detail and Ornament. Gothic Tracery. Shading in India Ink. Free-hand Drawing. *Three hours. Tu., Th., at 9, Wed. at 11.* Professor RICHARDS.

This course is not required of students in Science who propose entering the Wharton School in Junior year.

MATHEMATICS 11.—Analytic Geometry. Runkle's *Analytic Geometry.* *Four hours (First Term).* Sect. I., *Mon. at 9, Tu. at 12, Th. at 2, Fri. at 11.* Asst. Professor CRAWLEY. Sect. II., *Mon. at 11, Tu., Wed., at 12, Fri. at 10.* Asst. Professor FISHER.

MATHEMATICS 15.—Differential and Integral Calculus. Preliminary Course. Part of Rice and Johnson's *Calculus*, Abridged. *Four hours (Second Term).* Sect. I., *Mon. at 9, Tu. at 12, Th. at 2, Fri. at 11.* Asst. Professor CRAWLEY. Sect. II., *Mon. at 11, Tu., Wed., at 12, Fri. at 10.* Asst. Professor FISHER.

MATHEMATICS 4.—Descriptive Geometry. *Two hours.* Sect. I., *Wed. at 10, Fri. at 12.* Mr. HAUPT. Sect. II., *Mon. at 9, Wed. at 10.* Mr. FRANKLIN.

This course is not required of students who propose entering the Wharton School in Junior year.

PHYSICS 1.—Mechanics. Lodge's *Mechanics.* *Two hours (Second Term).* Sect. I., *Wed., Fri., at 9.* Sect. II., *Mon., Fri., at 2.* Asst. Professor GOODSPEED.

CHEMISTRY 1.—General Inorganic Chemistry. Laboratory work with recitations. *Three hours. Mon., Tu., Wed. (in sections), from 2 to 5.* Dr. KELLER.

LATIN 4.—Tacitus (*Agricola*). Cicero (*De Senectute*). Selections from Horace. *Three hours. Mon. at 10, Tu., Wed., at 2.* Mr. NEWBOLD.

GERMAN 2.—Cohn's *Bakterien*. Zittel's *Die Kreide*. Goethe's *Hermann und Dorothea*. Schiller's *Wilhelm Tell*. Practical Exercises. *Four hours.* Sect. I., *Mon. at 11, Wed. at 12, Th. at 10, Fri. at 2.* Sect. II., *Mon. at 10, Tu., Th., Fri., at 11.* Prof. SEIDENSTICKER and Mr. RENNERT.

FRENCH 3.—Modern French Prose (continued). *Three hours. Mon. at 12. Sect. I., Tu. at 11, Fri. at 10. Sect. II., Wed. at 9, Th. at 10.*
Professor EASTON.

Each student elects two of these three languages.

THE TECHNICAL COURSES IN THE TOWNE SCIENTIFIC SCHOOL.

The object of the Courses in this School (named from its largest benefactor, John Henry Towne) is to give a thorough scientific education with technical training. They 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.
- V. ARCHITECTURE.

JUNIOR CLASS.

STUDIES PURSUED BY THE WHOLE CLASS.

ENGLISH 3.—Rhetoric. Four Compositions during the year, as in Sophomore year. Professor MCELROY.

English 6 of the elective studies in Arts (p. 44) may be substituted for this course.

ENGLISH 9.—Declamation. Debating and Original Speaking, extemporaneous and prepared. (Optional.) *Wed. at 2.* Professor MCELROY.

ENGLISH LITERATURE 5.—Lectures on the Period of French Influence. *Two hours (First Term). Th. at 9, Fri. at 12.* Asst. Professor SCHELLING.

ENGLISH LITERATURE 6.—Lectures on the greatest English Poets. *Two hours (Second Term). Th. at 9, Fri. at 12.* Asst. Professor SCHELLING.

GERMAN 4.—Helmholtz, *Goethe's Naturwissenschaftliche Arbeiten*, Pinner's *Gesetze der Naturerscheinungen*. Stein's *Exercises*. *Two hours, Mon. at 9, Wed. at 11.* Professor SEIDENSTICKER.

FRENCH 5.—*Tableaux de la Révolution française*. Molière. *Two hours. Mon. at 9, Wed. at 11.* Professor EASTON.

Of these two languages each Junior elects one.

PHILOSOPHY 1.—Logic. Lectures and Recitations. Jevons's *Lessons in Logic*. *Two hours (First Term). Wed. at 12, Fri. at 10.* Professor FULLERTON.

This course is not required of students in Chemistry or in Metallurgy and Mining.

PHILOSOPHY 2.—Ethics. Lectures and Recitations. *Two hours (Second Term). Wed. at 12, Fri. at 10.* Professor FULLERTON.

This course is not required of students in Chemistry or in Metallurgy and Mining.

HISTORY 6.—Economic and Social History of Europe since 1789. *Two hours. Mon., Th., at 11.* Mr. CHEYNEY.

This course is not required of students in Metallurgy and Mining.

MATHEMATICS 12.—Analytic Geometry of Three Dimensions. (Lectures) *One hour. Th. at 12.* Asst. Professor CRAWLEY.

MATHEMATICS 16.—Differential and Integral Calculus. Rice and Johnson's *Calculus*, Abridged. *Three hours. Mon. at 10, Tu., Fri., at 9.* Asst. Professor CRAWLEY.

PHYSICS 2.—Physics. Sound, Heat, Light and Electricity. Stewart's *Physics. Four hours. Lectures, Tu., Wed., Th. at 10.* Professor BARKER. *Recitations, Sects. I., II., IV., V., Tu. at 11; Sect. III., Fri. at 3.* Asst. Professor GOODSPEED.

1. Additional Studies pursued by the Chemical Section.

CHEMISTRY 2.—Analytical Chemistry. Laboratory practice and Recitations in Qualitative Analysis. Making of Inorganic Preparations. *Twelve hours. Recitations on Tu. at 11, Wed. at 12 and at other hours appointed by the instructors.* Professor SMITH and Mr. FRANKEL.

CHEMISTRY 3.—Organic Chemistry. Lectures. *Two hours. Mon. at 12, Wed. at 9.* Professor SADTLER.

MINERALOGY 1.—Crystallography. Native elements and Sulphides. *Two hours. Tu. at 12, Fri. at 11.* Professor KOENIG.

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. *Eight hours. Mon. from 2 to 5, Wed. from 2 to 4, Th. at 11 and at 3, Fri. at 10.* Mr. BROWN.

MINERALOGY 1.—Crystallography. Native elements and Sulphides. *Two hours. Tu. at 12, Fri. at 11.* Professor KOENIG.

GEOLOGY 1.—Lithology. *One hour. Mon. at 11.* Professor KOENIG.

CHEMISTRY 2.—Analytical Chemistry. Laboratory practice and recitations in Qualitative Analysis. Making of Inorganic Preparations. *Six hours. Recitations on Tu. at 11, Wed. at 12, and at other hours appointed by the instructors.* Professor SMITH and Mr. FRANKEL.

CIVIL ENGINEERING 1.—Topographical Charts in ink and colors. Details of frames, joints, etc. Map Projections. *Two hours. Tu. from 3 to 5.* Professor HAUPT and Mr. HAUPT.

CIVIL ENGINEERING 2.—Applied Mechanics, Map Projections, Orthographic and Stereographic Mercators, Lorgnas, Polyconic, etc. *One hour (First Term). Wed. at 2.* Mr. HAUPT.

- CIVIL ENGINEERING 4.—Surveying. Theory. Plane surveying of lines and areas. Principles, instruments, etc., as applied for ways of communication, Mining, Tunnelling, Hydrography, Topography, Levels, Geodesy, United States Land Surveying, etc. *One hour. Mon. at 12.* Professor HAUPT.
- CIVIL ENGINEERING 5.—Surveying. Applications to Field Practice in the various problems arising in all classes of work, as farm, railroad, canal, topographical, dividing up land, location, etc., embracing the use of Transit, Compass, Level, Plane Taper, Sextant, Stadia, Solar Compass, etc. *Three hours. Sat. from 9 to 1.* Professor HAUPT and assistants.
- CIVIL ENGINEERING 7.—Graphics. Statics of Roof Trusses of various standard designs. *Two hours. Wed. at 9, Th. at 2.* Mr. FRANKLIN.
3. *Additional Studies pursued by the Civil Engineering Section.*
- CIVIL ENGINEERING 1.—Topographical Charts in ink and colors. Details of frames, joints, etc. Map Projections. *Two hours. Tu. from 3 to 5.* Professor HAUPT and Mr. HAUPT.
- CIVIL ENGINEERING 2.—Applied Mathematics. Map Projections, Orthographic Stereographic Mercators, Logrinas, Polyconic, etc. *One hour (First Term). Wed. at 2.* Mr. HAUPT.
- CIVIL ENGINEERING 3.—Mechanics of Materials (Merriman). Tension, Compression, Shear Bending Moments, Moments of Inertia and Resilience. Forms of Sections and of Members. Centres of Gravity. Combined Stresses. Columns, etc. *Two hours. Tu., Fri., at 2.* Mr. HAUPT.
- CIVIL ENGINEERING 4.—Surveying. Theory. Plane Surveying of lines and areas. Principles, Instruments, etc., as applied for ways of communication, Mining, Tunnelling, Hydrography, Topography, Levels, Geodesy, United States Land Surveying, etc. *One hour. Mon. at 12.* Professor HAUPT.
- CIVIL ENGINEERING 5.—Surveying. Application to Field Practice in the various problems arising in all classes of work; as farm, railroad, canal, topographical, dividing up land, location, etc.; embracing the use of Transit, Compass, and Level, Plane Taper, Sextant, Stadia, Solar Compass, etc. *Three hours. Sat. from 9 till 1.* Professor HAUPT and assistants.
- CIVIL ENGINEERING 6.—Railroad Location. Theory, Curves, simple, compound, reverse and transition; Tangents, Grades, Staking out work, Slope Stapes, Volumes, Computation of, etc. *One hour (Second Term). Wed. at 2.* Mr. HAUPT.
- CIVIL ENGINEERING 7.—Graphics. Statics of Roof Trusses of various standard designs. *Two hours. Wed. at 9, Th. at 2.* Mr. FRANKLIN.
- CHEMISTRY 2.—Analytical Chemistry. Laboratory practice and recitations in Qualitative Analysis. Making of Inorganic Preparations. *Three hours. Recitations on Tu. at 11, Wed. at 12, and at other hours appointed by the instructors,* Professor SMITH and Mr. FRANKEL.

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

MECHANICAL ENGINEERING 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. *Two hours. Mon. at 12, Th. at 3, until finished.* Mr. KIDWELL.

As this course underlies the entire work in Mechanical Engineering it is continued until a thorough, practical knowledge of the subject is obtained. In addition each student makes a series of tests in extension, compression, etc., on the laboratory testing machines.

MECHANICAL ENGINEERING 2.—Hydrostatics and Hydraulics. Transmission of pressure. Determining centres of pressure and amount of same under different conditions. Depth of floatation 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.*) *Mon. at 12, Th. at 3, after statics are finished.* Mr. KIDWELL.

MECHANICAL ENGINEERING 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. *Three hours. Tu. from 2 to 5.* Mr. KIDWELL.

MECHANICAL ENGINEERING 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.) *One hour (First Term). Tu. at 12.* Asst. Professor SPANGLER.

MECHANICAL ENGINEERING 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. Taught from notes based on the Zeuner Diagram and applied to the principal automatic and radial gears as well as the slide valve. *Fri. at 11 during the whole year, and Tu. at 12 during Second Term.* Asst. Professor SPANGLER.

MECHANICAL ENGINEERING 12.—Shop work. Manual training in wood and iron work. *Nine hours. Mon., Wed. and Fri. from 2 to 5.* Mr. FERGUSON and Mr. GRIFFITH.

CIVIL ENGINEERING 7.—Graphics. Statics of Roof Trusses of various standard designs. *Two hours. Wed. at 9, Th. at 2.* Mr. FRANKLIN.

5. *Additional Studies pursued by the Architectural Section.*

ARCHITECTURE 1.—Classical Architecture and Mediæval Ornament. Shading in India Ink. Sketching. *Nine hours. Mon., Tu. at 12. Wed. from 2 to 4, Fri. at 11 and at 2, Sat. from 9 to 12.* Professor RICHARDS.

CIVIL ENGINEERING 7.—Graphics. Statics of Roof Trusses of various standard designs. *Two hours. Wed. at 9. Th. at 2.* Mr. FRANKLIN.

SENIOR CLASS.

Studies pursued by the Whole Class.

ENGLISH 5.—Rhetoric. Four Compositions during the year, as in Junior year. Professor MCELROY.

English 6 of the elective studies in Arts (p. 47) may be substituted for this course.

ENGLISH 9.—Declamation. Debating and Original Speaking, extemporaneous and prepared. (Optional.) *Wed. at 2.* Professor MCELROY.

ECONOMICS AND SOCIAL SCIENCE 3.—Social Science. Thompson's *Elements of Political Economy.* *Two hours. Th. at 9, Fri. at 11.* Professor THOMPSON.

MATHEMATICS 19.—Astronomy. Young's *Astronomy.* *Two hours. Mon. at 11, Wed. at 12.* Professor KENDALL.

PHYSICS 4.—Practical Physics. Lectures. *Three hours. Mon., Th., at 12.* Professor BARKER. Recitations. Sect. III., *Tu. at 12.* Sects. I., II., IV., V., *Fri. at 10.* Asst. Professor GOODSPEED.

PHYSICS 5.—Practical work in the Physical Laboratory. *Four hours. Tu., Th., from 2 to 4.* Professor BARKER and Asst. Professor GOODSPEED.

METALLURGY 1.—Theory of Metallurgical processes. Theory of Dressing and Mechanical Treatment of Ores. *One hour. Mon. at 10.* Professor KOENIG.

1. Additional Studies pursued by the Chemical Section.

CHEMISTRY 4.—Analytical Chemistry. Laboratory practice lectures and recitations in Gravimetric and Volumetric Analysis. *Six hours. Recitations on Mon. at 9, and at other hours appointed by the instructors.* Professor SMITH and Mr. FRANKEL.

CHEMISTRY 5.—Applied Inorganic Chemistry. Lectures with Reviews. *Two hours. Tu., Fri., at 12.* Excursions to chemical works. Professor SADTLER.

CHEMISTRY 6.—Applied Organic Chemistry. Lectures with Reviews. *Two hours. Mon. at 1, Th. at 11.* Excursions to chemical works. Professor SADTLER.

CHEMISTRY 7.—Organic Chemistry. Laboratory work in making Organic Preparations. Proximate and Ultimate Organic Analysis. *Six hours. Tu., Wed., from 9 to 12.* Professor SADTLER and Dr. KELLER.

CHEMISTRY 8.—Seminary. Organic and Industrial Chemistry. *One hour every other week. Wed. at 4.30.* Professor SADTLER and Dr. KELLER.

CHEMISTRY 9.—Seminary. Inorganic and Analytical Chemistry. *One hour. Every other week. Wed. at 4.30.* Professor SMITH and Mr. FRANKEL.

CHEMISTRY 16.—Mechanical Drawing, with special reference to Chemical Applications. *Two hours. Tu. from 2 to 4.* Asst. Professor SPANGLER.

MINERALOGY 2.—Mineralogy. Oxides, Chlorides and Fluorides, Sulphates, etc., Phosphates, etc., Carbonates and Silicates. *Two hours. Th. at 10, Fri. at 9.* Professor KOENIG.

MINERALOGY 3.—Determinative Mineralogy. *Two hours. Fri., from 2 to 4.* Professor KOENIG.

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

METALLURGY 2.—Assaying. *Four hours. Th. after 2.* Professor KOENIG and Mr. BROWN.

MINING 1.—Mining Engineering. Construction of parts of Mines and of Mining Machinery from notes and sketches. *Eight hours. Mon. from 2 to 5, Wed. from 2 to 4, Th. at 11 and at 3, Fri. at 10.* Mr. BROWN.

MINING 2.—Mining Engineering. Lectures on the Methods used in prospecting for and in developing ore and coal deposits. *Five hours. Mon. from 2 to 5, Tu., Wed. at 9.* Mr. BROWN.

MINERALOGY 2.—Mineralogy. Oxides, Chlorides and Fluorides, Sulphates, etc., Phosphates, etc., Carbonates and Silicates. *Two hours. Th. at 10, Fri. at 9.* Professor KOENIG.

MINERALOGY 3.—Determinative Mineralogy. *Two hours. Fri. from 2 to 4.* Professor KOENIG.

GEOLOGY 2.—Palæontology of Mollusca and Crustacea. *One hour.* Professor KOENIG.

CHEMISTRY 4.—Analytical Chemistry. Laboratory Practice, Lectures and Recitations in Gravimetric and Volumetric Analysis. *Four hours. Recitations on Mon. at 9 and at other hours appointed by the instructors.* Professor SMITH and Mr. FRANKEL.

3. Additional Studies pursued by the Civil Engineering Section.

CIVIL ENGINEERING 8.—Drawing. Shades, Shadows, and Perspective. Platting, Field Notes. Engineering Construction and Stereotomy. *Two hours. Tu. from 3 to 5.* Professor HAUPT and assistants.

CIVIL ENGINEERING 9.—Theoretical and practical topography, including the use of special field and office instruments, reconnaissance, surveys, field sketching and modelling. *Four hours (Second Term). Wed. at 12, and from 2 to 6.* Prof. Haupt and assistants.

- CIVIL ENGINEERING 10.—Materials of Construction, with their physical and chemical properties, and applications to engineering structures. Roofs, bridges, tunnels, culverts, sewers, canals. Explosives. Constructions in masonry, timber, metals, etc. *Three hours. Mon., Tu., at 10, Wed. at 11.* Professor HAUPT.
- CIVIL ENGINEERING 11.—Modelling. Shop work, use of wood working tools, etc. *Two hours. Fri. from 9 to 11.* Mr. HAUPT.
- CIVIL ENGINEERING 12.—Graphics. Bridge and Roof Trusses (Green). *Two hours. Tu. at 2, Th. at 10.* Mr. FRANKLIN.
- CIVIL ENGINEERING 13.—Surveying. Field Practice. R. R. Location. Cross sections, profiles, etc. *Three hours (First Term). Wed. from 3 to 6.* Mr. FRANKLIN and Mr. HOUSTON.
- CIVIL ENGINEERING 14.—Graphical Analysis of Continuous and Draw Span Bridges. *Three hours (Second Term).* Mr. FRANKLIN.
- CIVIL ENGINEERING 15.—Bridge Details. Typical forms of connections, with analysis. *One hour.* Professor HAUPT.
- CIVIL ENGINEERING 16.—Arches and Suspension Bridges (Analytical). *One hour (Second Term).* Mr. FRANKLIN.
- ARCHITECTURE 3.—History of Architecture. Lectures. *One hour. Fri. at 12. Decoration and Shading. Three hours. Tu. from 10 to 12, Th. at 11.* Professor RICHARDS.
- MINERALOGY 2.—Mineralogy. Oxides, Chlorides, and Fluorides, Sulphates, etc., Phosphates, etc., Carbonates and Silicates. *Two hours. Th. at 10, Fri. at 9.* Professor KOENIG.
- MINERALOGY 3.—Determinative Mineralogy. *Two hours. Fri. from 2 to 4.* Professor KOENIG.

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

- MECHANICAL ENGINEERING 2.—Hydrostatics and Hydraulics. Transmission of pressure. Determining centres of pressure and amount of same under different conditions. Depth of floatation 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*.) *Mon. at 9 and Wed. at 10.* Mr. KIDWELL.
- MECHANICAL ENGINEERING 4, a.—Sketching and Drawing. Making working sketches, finished drawings, tracings and blue prints for the tools and machines in the laboratories. *Two hours. Tu. at 10, Wed. at 9.* Asst. Professor SPANGLER.
- MECHANICAL ENGINEERING 7.—Kinematics. Laws of motion. Elementary combination of pure mechanics. Pulleys and belts. Trains of gearing and forms of teeth of wheels. Link work. (Goodeve's *Elements of Mechanism*.) *Two hours. Tu. at 11, Fri. at 9.* Mr. KIDWELL.

MECHANICAL ENGINEERING 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*. 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. *Two hours. Tu. at 9, Th. at 10.* Mr. KIDWELL.

MECHANICAL ENGINEERING 9.—Steam boilers. Value of fuels. Determination of proper proportions for grate and heating surfaces, area and height of chimneys, thickness of shell, size of braces, etc., for various forms of boilers. Making rough sketches and working drawings from original designs. Wilson's *Treatise on 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. *Two hours. Wed., Th., at 11.* Asst. Professor SPANGLER.

MECHANICAL ENGINEERING 10.—Engineering Appliances. Lectures and recitations on steam-engine indicators, gauges, safety valves, oil-cups, pumps, speed indicators, dynamometers, testing machines, etc. Illustrated by the apparatus in the Laboratories and workshop. (Trade circulars and current periodicals.) *One hour. Fri. at 12.* Asst. Professor SPANGLER.

MECHANICAL ENGINEERING 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. Tu. at 12.* Mr. PETERSON.

MECHANICAL ENGINEERING 13.—Shop work. Making patterns from working drawings, finishing castings and making, finishing and fitting parts of machinery. Pipe-fitting. *Nine hours. Mon., Wed., and Fri., 2 to 5.* Mr. FERGUSON and Mr. GRIFFITH.

5. *Additional Studies pursued by the Architectural Section.*

ARCHITECTURE 2.—History of Architecture. Lectures, illustrated by views of structures of all ages. *One hour. Fri. at 12.* Study of executed works and of buildings in progress. Ornaments. Shading in India Ink. Sketching. *Thirteen hours. Mon. at 2, Tu. from 10 to 1, Wed. from 9 to 11, Th. at 11, Fri. at 9 and at 2, Sat. from 9 to 12.* Professor RICHARDS.

CIVIL ENGINEERING 10.—Materials of Construction, with their physical and chemical properties, and applications to engineering structures. Roofs, bridges, tunnels, culverts, canals. Explosives. Constructions in masonry, timber, metals, etc. *Three hours. Mon., Tu., at 10, Wed. at 11.* Professor HAUPT.

MINERALOGY 2.—Mineralogy. Oxides, Chlorides, and Fluorides. Sulphates, etc., Phosphates, etc., Carbonates and Silicates. *Two hours. Th. at 10, Fri. at 9.* Professor KOENIG.

MINERALOGY 3.—Determinative Mineralogy.—*Two hours. Fri. from 2 to 4.* Professor KOENIG.

POST-SENIOR CLASS.

1. *Studies pursued by the Chemical Section.*

CHEMISTRY 11.—Applied Organic Chemistry (Advanced Course). Lectures. *Two hours. Wed. at 10, Th. at 9.* Excursions to works. Professor SADTLER.

CHEMISTRY 12.—Industrial Chemistry.—Experimental Studies in Applied Inorganic Chemistry. *Ten hours. Mon., Tu., from 10 to 1; Fri. from 9 to 1.* Professor SADTLER and Dr. KELLER.

CHEMISTRY 13.—Industrial Chemistry.—Experimental Studies in Applied Organic Chemistry. *Ten hours. Mon., Tu., from 10 to 1; Fri. from 9 to 1.* Professor SADTLER and Dr. KELLER.

Students elect either Course 12 or Course 13.

CHEMISTRY 15.—Advanced Chemical Theory. Lectures. *One hour. Th. at 11.* Professor SMITH.

CHEMISTRY 10.—Analytical Chemistry (Advanced Course). Electrolysis and Electrolytic Methods. Lectures. *One hour. Th. at 10.* Laboratory work. *Seven hours.* Professor SMITH.

CHEMISTRY 14.—Organic Chemistry (Advanced Course). Mainly Laboratory work. *Eight hours.* Professor SADTLER and Dr. KELLER.

Students either elect Course 10 or Course 14, or else spend an equivalent number of hours in the Metallurgical Laboratory.

GEOLOGY 3.—Stratigraphy in connection with Palaeontology of the rock systems. 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. *Two hours. Mon., Tu., at 9.* Professor KOENIG.

METALLURGY 3.—Demonstrations of the principal metallurgical processes by furnace. *Two hours. Wed. from 11 to 1.* Professor KOENIG.

METALLURGY 4.—Lectures on the production of pig, weld, and temper iron, and of silver, copper, and lead. Experimental testing of metallurgical processes. *Two hours. Wed. at 9 and at 2.* Visits to the metallurgical works in the city and State. Professor KOENIG.

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

METALLURGY 3.—Demonstrations of the principal metallurgical processes by furnace. *Two hours. Wed. from 11 to 1.* Professor KOENIG.

METALLURGY 4.—Lectures on the production of pig, weld, and temper iron, and of silver, copper, and lead. Experimental testing of metallurgical processes. *Two hours. Wed. at 9 and at 2.* Visits to metallurgical works in the city and State. Professor KOENIG.

- MINING 3.—Mining Engineering. Lectures on the ventilation and drainage of mines. Special mining problems in faulted strata, more especially in coal mining. *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.—Stratigraphy in connection with Palæontology of the rock systems. 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. *Two hours. Mon. and Tu. at 9.* Professor KOENIG.
- GEOLOGY 4.—The topographical and structural relations of the principal ore deposits in America and Mexico. *Two hours.* Professor KOENIG.
- CHEMISTRY 10.—Analytical Chemistry (Advanced Course). Electrolysis and Electrolytic methods. Lectures. *One hour. Th. at 10.* Laboratory work. *Seven hours.* Professor SMITH.

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

- CIVIL ENGINEERING 18.—Hydromechanics. Theory. Pressure and energy of fluids. Motors, water supply, hydraulic problems, &c. *One hour. Tu. at 10.* Professor HAUPT.
- CIVIL ENGINEERING 19.—Physical Hydrography, and River and Harbor Improvements, with review of system in use for regulating works, costs, results, &c. Movable and fixed dams, reservoirs, &c. *One hour (First Term). Wed. at 10.* Professor HAUPT.
- CIVIL ENGINEERING 20.—Sanitary Engineering Systems. Dry Removal and Water Carriage, precipitations, filtration, irrigation, &c. *One hour (Second Term). Wed. at 10.* Professor HAUPT.
- CIVIL ENGINEERING 21.—Irrigation and Drainage. Indian, Egyptian, Italian, and American. Dams, head-waters, sluicing-gates, &c. *One hour (second part of Second Term). Wed. at 10.* Professor HAUPT.
- CIVIL ENGINEERING 22.—Economics of Engineering. Transportation problems. Municipal Engineering. Plans and arrangements of streets, sub-ways, &c. Rapid transit, statistics, &c. *One hour (second part of Second Term). Wed. at 10.* Professor HAUPT.
- CIVIL ENGINEERING 23.—Engineering Contracts. Theory of Contracts, with preparation of drawings, specifications, proposals, estimates, and arrangements. *One hour. Mon. at 10.* Professor HAUPT.
- CIVIL ENGINEERING 24.—Commercial Law, and Business Methods and Forms. *One hour. Wed. at 9.* Mr. HAUPT.
- CIVIL ENGINEERING 25.—Tours. Practical visits to engineering works, *Th. and Fri.* Preparation of written and illustrated reports on tours, *Sat., four to eight hours.* Professor HAUPT and Mr. FRANKLIN.

- CIVIL ENGINEERING 26.—Drawings. Details of Engineering works, compositions, plans, sections, elevations, profiles and cross sections. Working drawings from data collected in the field. *Six hours. Tu. 11 to 1, and at other hours fixed by the instructor.* Professor HAUPT.
- CIVIL ENGINEERING 27.—Modelling. Shop Practice with tools. *Two hours. Wed. 11 to 1.* Mr. HAUPT.
- CIVIL ENGINEERING 28.—Photography, applied to surveying. *Two hours. Mon. from 11 to 1.* Mr. HAUPT.
- ARCHITECTURE 5.—History of Architecture (continued). Shading and decorating. *Fours hours.* Professor RICHARDS.
- GEOLOGY 3.—Stratigraphy in connection with Palæontology of the rock system. 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. *Two hours. Mon., Tu., at 9.* Professor KOENIG.
- 4. Studies pursued by the Mechanical Engineering Section.*
- MECHANICAL ENGINEERING 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*. *Two hours. Mon. at 11, Tu. at 10.* Mr. KIDWELL.
- MECHANICAL ENGINEERING 14.—Thermodynamics. Mechanical theory of Heat. Application to Steam, Air, and Gas Engines, and Refrigerating Machinery. Wood's *Thermodynamics*. *Three hours. Tues. at 9, Wed. at 10, Fri. at 9.* Asst. Professor SPANGLER.
- MECHANICAL ENGINEERING 15.—Thermodynamics. Testing engines, boilers, gauges, and indicators, determining duty of pumps and injectors, calorimetric work. (All in Laboratory.) *Six hours. Mon. from 2 to 5, Wed. from 2 to 5.* Asst. Professor SPANGLER.
- MECHANICAL ENGINEERING 16.—Marine Engineering and Naval Architecture. Descriptive Lectures of Marine Engines; special instruction when desired. *One hour. Th. at 9.* Asst. Professor SPANGLER.
- MECHANICAL ENGINEERING 17.—Designing Machinery. Continuation of work on Steam Engines and Boilers from Senior year. Application of the principles of design to special machinery. *Wed., Th., at 12, Fri. after 11, when visits to manufacturing establishments are discontinued.* Asst. Professor SPANGLER.
- MECHANICAL ENGINEERING 18.—Visits to manufacturing establishments. Students are required to visit various machine-shops, foundries, iron and steel rolling mills, shipyards, electric light plants, etc., and to make reports (illustrated) on the general arrangement of plant, arrangement of power, tools, etc., in shops, descriptions of particular machines and processes. *Sixteen weeks, one visit per week. Friday after 11.* Asst. Professor SPANGLER.

MECHANICAL ENGINEERING 19.—Contracts and Specifications. Methods of drawing specifications and contracts for engines, boilers, foundations, etc. Making estimates as to cost, weight, etc. Haupt's *Contracts and Specifications*, and special specification and contracts. *One hour. Fri. at 10.* Asst. Professor SPANGLER.

MECHANICAL ENGINEERING 20.—Electrodynamics. Measurement of electrical quantities and their application to the theory, construction, and use of dynamos, motors, galvanometers, batteries, etc. *Five hours.* Ayrton's *Practical Electricity. Tu., Th., at 11, Wed. at 9.* Thompson's *Dynamo Electric Machinery. Mon. at 12, Wed. at 11.* Salomon's *Accumulators.* Mr. PETERSON.

MECHANICAL ENGINEERING 21.—Electrodynamics. Laboratory work, wiring, testing dynamos, motors, and storage batteries, calorimetry, measurement of currents, insulation, etc. *Six hours. Tu., Th., from 2 to 5.* Mr. PETERSON.

5. *Studies pursued by the Architectural Section.*

ARCHITECTURE 4.—History of Architecture (concluded). Elements of design and principles of composition. Ornament of all styles. Sketching and measurement of works executed and in progress. Building materials and processes. Specifications. Contracts. *Twelve hours.* Professor RICHARDS.

ARCHITECTURE 6.—Plans, elevations and sections of original designs. Exercises with perspective views. Water-colors. Sketching. *Nine hours.* Professor RICHARDS.

CIVIL ENGINEERING 20.—Sanitary Engineering Systems. Dry Removal and Water Carriage, precipitation, filtration, irrigation, &c. *One hour (Second Term). Wed. at 10.* Professor HAUPT.

CIVIL ENGINEERING 21.—Irrigation and Drainage, Indian, Egyptian, Italian, and American. Dams, head-waters, sluicing-gates, &c. *One hour (second part of Second Term). Wed. at 10.* Professor HAUPT.

CIVIL ENGINEERING 22.—Economics of Engineering. Transportation problems. Municipal Engineering. Plans and arrangements of streets, sub-ways, rapid transit, statistics, &c. *One hour (last part of Second Term). Wed. at 10.* Professor HAUPT.

CIVIL ENGINEERING 25.—Tours. Practical visits to engineering works. *Th. and Fr.* Preparation of written and illustrated reports on tours, *Sat. Four to eight hours.* Professor HAUPT and Mr. FRANKLIN.

GEOLOGY 3.—Stratigraphy in connection with Palæontology of the rock systems. Law 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. *Two hours. Mon., Tu., at 9.* Professor KOENIG.

METHODS OF STUDY.

Instruction is thoroughly practical. It is given by lectures and recitations, and in the laboratories and the drawing and model rooms. These are open to the students all day.

In CHEMISTRY, the Sophomores receive instruction by practical laboratory exercises covering the principal points in theoretical and general and organic chemistry. The Juniors attend courses in organic chemistry, mineralogy, and qualitative analysis. They also work in the laboratories by making the characteristic reactions of inorganic bases and acids, as well as qualitative separations of the most complex substances. Written reports on the results of their work are required.

The Seniors receive instruction by lectures and recitations in all branches of quantitative analysis, applied chemistry, metallurgy, and organic and theoretical chemistry. Practical work, embracing all of the above-named branches, is continued.

During the first term of Post-Senior year, the work of Senior year may be continued, if deemed advisable. In the mean while the subject for thesis may be chosen in order to allow the student time to read up all accessible matter relating to it, so that the greater portion of the second term can be devoted to the necessary experimental researches.

The Seniors and Post-Seniors attend courses of lectures on the application of inorganic and organic chemistry in the industrial arts. These courses are fully illustrated by lantern projections, and by suites of specimens from the chemical collections. The classes also make excursions to chemical works.

The Post-Seniors attend lectures on theoretical chemistry and electrolysis applied to quantitative analysis.

Students in METALLURGY and MINING are trained to take intelligent care of the ever growing, important interests represented by these industries. In recognition of the extent of knowledge embraced in this field, they are given the option of devoting themselves more particularly to either branch. Those who incline to become managers of mines, or examining and reporting engineers, will take more studies in civil and mechanical engineering, and those who possess greater aptitude for chemical

studies will devote themselves rather to experimental metallurgy, whilst the lectures provided for the course are participated in by all. A greater thoroughness is expected to result from this provision. This instruction aims to develop the student's power of initiative. During the past year new laboratories have been furnished for students in mining and metallurgy. They contain all that is needed for thorough instruction in the different branches of these subjects.

Students in CIVIL ENGINEERING are instructed by recitations, lectures, and practical work. Afternoons and Saturdays are devoted to drawing and practical work in the shop, or to surveying or visiting public or private works, manufactories, etc. During the last year, the time is devoted largely to examinations and reports upon engineering works in process of construction, to making estimates and designs for new projects, from data collected in the field, and to the preparation of Theses.

In *visiting shops and manufactories*, students are required to collect all the practical information possible, and to embody it in a written report, noting particularly any new or special features for economizing time or materials, improved methods of assembling parts, etc., as well as the general plant, apparatus, and facilities for receiving and shipping materials.

The *field practice* embraces the various problems in chain surveying, the measurement of areas, and the computation of results; line surveys and location, cross sections and levels for estimating quantities, hydrography, topography with the plane-table, and the solution of such geodetic problems as relate to the orientation of maps.

The *Course in Drawing* includes the projection of maps, various methods of representing Topography, conventional signs, problems in shades, shadows, and perspective, details of framing, composition, general drawing for constructions in wood, stone, and iron, special designs, working drawings for modeling, platting, drawing of profiles and cross sections, and drawing for theses.

Students of MECHANICAL ENGINEERING are required to give particular attention to the kinematics of mechanism, to the conditions under which work and power act, and the means of regu-

lating and transmitting the same, to the problems of hydraulics and hydraulic motors, and to the mechanical theories of heat and electro-dynamics with applications to the steam engine, etc., as will appear from the detailed course of study already given.

The new laboratories have been fitted with new engines, dynamos and testing machines, and will be the most complete of their kind in the country.

Special attention is given to the execution of drawings, first from designs and models, and afterwards from calculation, as well as to the methods of casting and working in iron, and of making and using machine tools.

Adequate instruction is also provided in Marine Engineering and Naval Architecture.

Special instruction in that part of Electrical Engineering which requires a knowledge of Dynamics is given in Senior and Post-Senior years.

A special Laboratory, thoroughly equipped with the necessary instruments of precision, is devoted to measurements in Electro-dynamics.

The course in manual training covers three afternoons a week for two years.

The new workshops are furnished with benches, lathes, and all the tools needed for satisfactory practical work in wood and metal.

The third year is given to practical work in the Dynamic Laboratory, to special technical work, and to the preparation of a Thesis.

The instruction in PHYSICS extends over three years. In Sophomore year the class studies the Mechanics of Physics. In Junior year the subjects treated are Sound, Heat, Light, and Electricity, the exercises consisting of lectures, illustrated by experiments, with recitations. In Senior year, instruction is given in Physical Measurement. Instruction in the Physical Laboratory is maintained throughout the year.

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.

THE COURSE IN NATURAL HISTORY
 IN THE
SCHOOL OF BIOLOGY.

FRESHMEN YEAR.

ENGLISH I.—Rhetoric. McElroy's *Structure of English Prose*. Readings from an English prose author, with Compositions on Themes selected from these Readings. Exercises in Reading and Speaking, with special reference to Expression, Emphasis, and Voice Culture. *Three hours.* Sect. I., *Mon. at 12, Wed. at 11, and Fri. at 2.* Sect. II., *Mon., Tu. and Wed. at 2.* Sect. III., *Tu. at 9, Wed. at 3, and Fri. at 2.* Sect. IV., *Th. at 2, Fri. at 9.* Sect. V., *Wed. at 9, Th. at 12, and Fri. at 2.* Professor MCELROY and Mr. SHUMWAY.

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.

HISTORY 1.—Freeman's *General Sketch of History*. *Two hours.* *Tu. at 12, Th. at 11.* Professor THOMPSON.

HISTORY 2.—Myer's *Mediæval and Modern History*. *Two hours.* Sect. I., *Wed. at 2, Fri. at 10.* Sect. II., *Mon. at 12, Tu. at 2.* Sect. III., *Wed. at 12, Fri. at 9.* Mr. CHEYNEY.

Either Course 1 or Course 2 may be taken.

MATHEMATICS 1.—Algebra. Hall and Knight's *Advanced Algebra*. *Three hours (First Term).* Sect. I., *Mon., Wed., at 2, Fri. at 12.* Sect. II., *Mon., Wed., Fri., at 9.* *Two hours (Second Term).* Sect. I., *Tu. at 11, Th. at 2.* Sect. II., *Tu. at 10, Th. at 12.* Asst. Professor FISHER.

MATHEMATICS 3.—Solid Geometry. Cauvenet's *Geometry*, Byerly Edition. *Two hours (First Term).* Sect. I., *Tu. at 11, Th. at 2.* Sect. II., *Tu. at 10, Th. at 12.* Asst. Professor FISHER.

MATHEMATICS 5.—Trigonometry. Crawley's *Elements of Trigonometry*. *Three hours (Second Term).* Sect. I., *Mon., Wed., at 2, Fri. at 12.* Sect. II., *Mon., Wed., Fri., at 9.* Asst. Professor FISHER.

MATHEMATICS 2.—Algebra. Wentworth's *College Algebra*. *Two hours.* Sect. I., *Th. at 10, Fri. at 12.* Sect. II., *Th. at 11, Fri. at 2.* Asst. Professor CRAWLEY.

MATHEMATICS 6.—Trigonometry. Chauvenet's *Trigonometry*. *Three hours (First Term).* Sect. I., *Mon., Tu., Wed., at 11.* Sect. II., *Mon., Wed. at 2, Tu. at 10.* Asst. Professor CRAWLEY.

MATHEMATICS 9.—Analytic Geometry. Point and Straight Line. Runkle's *Analytic Geometry*. Three hours (*Second Term*). Sect. I., *Mon., Tu., Wed., at 11.* Sect. II., *Mon., Wed., at 2, Tu. at 10.* Asst. Professor CRAWLEY.

Courses 1, 3 and 5 or 2, 6 and 9 are required.

DRAWING I.—Free-hand Drawing from Models. Three hours. *Mon., Wed., Fri., at 9.* Professor RICHARDS.

BIOLOGY 6.—General Biology. Lectures and laboratory work. Six hours. *Tu., Th., from 2 to 4, Sat. from 9 to 11.* Professor DOLLEY.

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

SOPHOMORE YEAR.

PRESCRIBED STUDIES—

ENGLISH 2.—Rhetoric. Six Compositions during the year, read and discussed in small sections of the class at hours appointed by the instructors. Professor MCELROY and Mr. SHUMWAY.

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

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. (See pages 80 *et seq.*)

ENGLISH LITERATURE 1.—Lectures on Modern Essayists. Themes written in the instructor's presence, on subjects set from works of authors treated in lectures. Two hours (*First Term*). Sect. I., *Wed. at 12, Fri. at 11.* Sect. II., *Tu. at 10, Th. at 12.* Asst. Professor SCHELLING.

ENGLISH LITERATURE 2.—Lectures on Modern Novelists. Themes written in the instructor's presence, on subjects set from work of authors treated in lectures. Two hours (*Second Term*). Sect. I., *Wed. at 12, Fri. at 11.* Sect. II., *Tu. at 10, Th. at 12.* Asst. Professor SCHELLING.

HISTORY 3.—Freeman's *General Sketch* (completed). Constitution of the United States (Lectures). Two hours. *Tu., Th., at 10.* Professor THOMPSON.

HISTORY 4.—Political and Constitutional History of Europe since 1789. Two hours (*First Term*). Sect. I., *Wed., Fri., at 9.* Sect. II., *Mon., Fri., at 2.* Mr. CHEYNEY.

HISTORY 5.—English History since 1760. Bright's *History of England*, Vols. 3 and 4. Three hours. *Wed. at 10, Th. at 9, Fri. at 12.* Mr. CHEYNEY.

- MATHEMATICS 10.—Analytic Geometry. Hardy's *Analytic Geometry*. Four hours (First Term). Mon., Fri., at 10, Th. at 11. Sect. I., Tu. at 12. Sect. II., Tu. at 11. Professor KENDALL.
- MATHEMATICS 14.—Elementary Differential and Integral Calculus. Four hours (Second Term). Mon., Fri., at 10, Th. at 11. Sect. I., Tu. at 12. Sect. II., Tu. at 11. Professor KENDALL.
- MATHEMATICS 4.—Descriptive Geometry. Two hours. Sect. I., Wed. at 10, Fri. at 12. Mr. HAUPT. Sect. II., Mon. at 9, Wed. at 10. Mr. FRANKLIN.
- MATHEMATICS 11.—Analytical Geometry. Runkle's *Analytic Geometry*. Four hours (First Term). Sect. I., Mon. at 9, Tu. at 12, Wed. at 9, Fri. at 11. Asst. Professor CRAWLEY. Sect. II., Mon. at 11, Tu., Wed., at 12, Fri. at 10. Asst. Professor FISHER.
- MATHEMATICS 15.—Differential and Integral Calculus. Preliminary Course. Part of Rice and Johnson's *Calculus*, Abridged. Four hours (Second Term). Sect. I., Mon. at 9, Tu. at 12, Th. at 2, Fri. at 11. Asst. Professor CRAWLEY. Sect. II., Mon. at 11, Tu., Wed., at 12, Fri. at 10. Asst. Professor FISHER.
- CHEMISTRY 1.—General Inorganic Chemistry. Laboratory work with recitations. Three hours. In sections, Mon., Tu., Wed., Th., Fri., from 2 to 5. Dr. KELLER and Mr. HECHT.
- PHYSICS 1.—Mechanics. Lodge's *Mechanics*. Two hours (Second Term). Mon. at 9, Wed. at 2, or Wed., Fri., at 9, or Mon., Fri., at 2. Asst. Professor GOODSPEED.
- BIOLOGY 2.—General Zoölogy of Invertebrates. Lectures. One hour (First Term). Wed. at 2. Professor LEIDY.
- BIOLOGY 3.—Systematic Study of the Invertebrates. Laboratory work with explanatory lectures. Six hours (First Term). Wed. from 10 to 12 and at 3, Fri. from 2 to 5. Professor DOLLEY.
- BIOLOGY 4.—General Zoölogy of Vertebrates. Lectures. One hour (Second Term). Wed. at 2. Professor LEIDY.
- BIOLOGY 5.—Systematic Study of the Vertebrates. Laboratory work with explanatory lectures. Six hours (Second Term). Wed. from 10 to 12 and at 3, Fri. from 2 to 5. Professor JAYNE.
- BIOLOGY 14.—General Structural Botany. Lectures and laboratory work. Five hours (First Term). Mon. from 2 to 5, Fri. from 2 to 4. Professor WILSON.
- BIOLOGY 15.—Systematic Study of the Phaenogams. Lectures and laboratory work. Five hours (Second Term). Mon. from 2 to 5, Fri. from 2 to 4. Professor ROTHROCK.

JUNIOR YEAR.

PRESCRIBED STUDIES—

- ENGLISH 3.—Rhetoric. Four compositions during the year, as in Sophomore year. Professor MCELROY.
- 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.—Rhetoric. Advanced Composition. Weekly or daily exercises to be criticised by the instructor at the weekly meetings. *One hour. Tu. at 10 or Th. at 2.* Prof. MCELROY.
- ENGLISH 9.—Declamation. Debating and Original Speaking, extemporaneous and prepared. *Wed. at 2.* Professor MCELROY.
- ENGLISH LITERATURE 3.—Lectures on the Period of French Influence (Dryden to Cowper). *Two hours. Mon. at 11, Tu. at 2.* Asst. Professor SCHELLING.
- ENGLISH LITERATURE 4.—Seminary. Discussion and Criticism of papers prepared on subjects selected from authors treated in lectures. *Once every other week. Mon. at 8 P.M., or Th. at 2.* Asst. Professor SCHELLING.
- ENGLISH LITERATURE 5.—Lectures on the Period of French Influence. *Two hours (First Term). Th. at 9, Fri. at 12.* Asst. Professor SCHELLING.
- ENGLISH LITERATURE 6.—Lectures on the greatest English Poets. *Two hours (Second Term). Th. at 9, Fri. at 12.* Asst. Professor SCHELLING.
- HISTORY 6.—Economic and Social History of Europe since 1789. *Two hours. Mon., Th., at 11.* MR. CHEYNEY.
- HISTORY 8.—Church and State in America (Lectures). *Two hours (First Term). Mon. at 10, Wed. at 11.* Professor THOMPSON.
- HISTORY 10.—Economic History of the United States. *Two hours (Second Term). Mon. at 10, Wed. at 11.* Professor THOMPSON.
- PHILOSOPHY 1.—Logic. Lectures and recitations. Jevons's *Lessons in Logic. Two hours (First Term). Wed. at 12, Fri. at 10.* Professor FULLERTON.
- PHILOSOPHY 2.—Ethics. Lectures and recitations. *Two hours (Second Term). Wed. at 12, Fri. at 10.* Professor FULLERTON.
- PSYCHOLOGY 2.—Scientific Methods in Psychology. Lectures with laboratory work. *Two hours (First Term). Th. from 3 to 6.* Professor CATTELL.
- PSYCHOLOGY 3.—Experimental Psychology. Lectures with laboratory work. *Two hours (Second Term). Th. from 3 to 6.* Professor CATTELL.
- PHYSICS 2.—Physics. Sound, Heat, Light, and Electricity. Stewart's *Physics. Four hours. Lectures, Tu., Wed., Th., at 10.* Professor BARKER. *Recitations, Juniors in Arts, Fri. at 12; Juniors in Science, Sects. I, II, IV., V., Tu. at 11. Sect. III., Fri. at 3.* Asst. Professor GOODSPEED.

- MINERALOGY 1.—Crystallography. Native elements and sulphides. *Two hours. Tu. at 12, Fri. at 11.* Professor KOENIG.
- GEOLOGY 5.—Principles of Geology. Outline of Vertebrate Palæontology. *Two hours. Fri., Sat., at 11.* Professor COPE.
- 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. Recitations on Tu. at 11, Wed. at 12, and at other hours appointed by the instructors.* Professor SMITH and Mr. FRANKEL.
- CHEMISTRY 3.—Organic Chemistry. Lectures. *Two hours. Mon. at 12, Wed. at 9.* Professor SADTLER.
- BIOLOGY 6.—Animal Histology. Lectures and laboratory work. *Six hours (First Term). Mon., Th., from 2 to 4, Fri. from 9 to 11.* Professor RYDER.
- BIOLOGY 7.—Animal Embryology. Lectures and laboratory work. *Six hours (Second Term). Mon., Th., from 2 to 4; Fri. from 9 to 11.* Professor RYDER.
- BIOLOGY 16.—Plant Histology. Lectures and laboratory work. *Six hours (First Term). Tu. from 2 to 5, Th. from 10 to 1.* Professor WILSON.
- BIOLOGY 17.—Systematic study of Cryptogams. Lectures and laboratory work. *Six hours (Second Term). Tu. from 2 to 5, Th. from 10 to 1.* Professor ROTHROCK.

SENIOR YEAR.

PRESCRIBED STUDIES—

- ENGLISH 4.—Rhetoric. Four compositions during the year, as in Junior year. Professor MCELROY.
- LATIN, GERMAN, OR FRENCH.
- ECONOMICS AND SOCIAL SCIENCE 3.—Thompson's *Elements of Political Economy*. *Two hours. Th. at 9, Fri. at 11.* Professor THOMPSON.

ELECTIVE STUDIES—

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

- GEOLOGY 1.—Lithology. *One hour. Mon. at 11.* Professor KOENIG.
- BIOLOGY 20.—Animal Physiology. Lectures and demonstrations. *Two hours. Tu. at 11, Fri. at 1.* Dr. HARE.
- 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. Recitations on Mon. at 9, and at other hours appointed by the instructor.* Professor SMITH and Mr. FRANKEL.

MINERALOGY 12.—Mineralogy. Oxides, Chlorides, and Fluorides. Sulphates, etc., Phosphates, etc., Carbonates and Silicates. *Two hours. Th. at 10, Fri. at 9.* Professor KOENIG.

MINERALOGY 3.—Determinative Mineralogy. *Two hours. Fri. from 2 to 4.* Professor KOENIG.

And the following Advanced Courses:—

HISTORY 11.—Philosophy of History (Lectures.) *Two hours (First Term). Mon. at 9, Wed. at 10.* Professor THOMPSON.

HISTORY 12.—Modern History since 1789 (Lectures). *Two hours (Second Term). Mon. at 9, Wed. at 10.* Professor THOMPSON.

ENGLISH LITERATURE 7.—Lectures on the Elizabethan Period (Sir Thomas More to James Shirley). Lectures on English versification. *Two hours (First Term). Mon. at 10, Tu. at 11.* Asst. Professor SCHELLING.

ENGLISH LITERATURE 8.—Lectures on Modern and Contemporary Poets. *Two hours (Second Term). Mon. at 10, Tu. at 11.* Asst. Professor SCHELLING.

ENGLISH LITERATURE 9.—Seminary. Discussion and Criticism of papers prepared on subjects selected from authors treated in lectures. *Once in two weeks. Wed. at 8 P.M., Th. at 10 or Fri. at 10.* Asst. Professor SCHELLING.

Course 9 must be taken by students electing Courses 7 and 8.

PHILOSOPHY 3.—History of Philosophy. Lectures with use of Schwegler's *Manual*. *Two hours (First Term). Tu. at 9, Wed. at 11.* Professor FULLERTON.

PHILOSOPHY 4.—Philosophy. The Development of Idealism. Lectures and recitations. *Two hours (Second Term). Tu. at 9, Wed. at 11.* Professor FULLERTON.

PHILOSOPHY 5.—Ethics (Advanced Course). Lectures. *One hour (Second Term). Mon. at 12.* Professor FULLERTON.

PHILOSOPHY 6.—Philosophy (Advanced Course). Lectures. *Two hours (Second Term).* Professor FULLERTON.

PSYCHOLOGY 1.—Elementary Psychology. Lecture, with Lotze's *Outlines*. *One hour (First Term). Mon. at 12.* Professor FULLERTON.

PSYCHOLOGY 4.—Comparative, Social, and Abnormal Psychology. Lectures, with laboratory work. *Two hours (First Term). Mon. from 2 to 4.* Professor CATTELL.

PSYCHOLOGY 5.—Special Psychological Problems. Lectures, with research in laboratory. *Two hours (Second Term). Mon. from 2 to 4.* Professor CATTELL.

PSYCHOLOGY 6.—Advanced Psychology. *Two hours. Sat. from 11 to 1.* Professor CATTELL.

PHYSICS 3.—Mathematical Physics. *Two hours.* Professor BARKER.

PHYSICS 5.—Practical work in the Physical Laboratory. *Four hours. Tu., Th., from 2 to 4.* Professor BARKER and Asst. Professor GOODSPEED.

BIOLOGY 8.—Mammalian Anatomy. Lectures and laboratory work. *Seven hours (Second Term).* Professor JAYNE and Mr. BURK.

BIOLOGY 9.—Animal Histology (Advanced Course). Lectures and laboratory work. *Seven hours (First Term).* Professor RYDER.

BIOLOGY 10.—Animal Embryology (Advanced Course). Lectures and laboratory work. *Seven hours (Second Term).* Professor RYDER.

BIOLOGY 11.—Invertebrate Morphology (Advanced Course). Lectures and laboratory work. *Seven hours (Second Term).* Professor DOLLEY.

BIOLOGY 12.—Vertebrate Morphology (Advanced Course). Lectures and laboratory work. *Seven hours (First Term).* Professor JAYNE.

BIOLOGY 13.—Osteology of the Mammalia. Lectures and laboratory work. *Seven hours (First Term).* Professor JAYNE.

BIOLOGY 18.—Plant Physiology. Lectures and laboratory work. *Seven hours (First Term).* Professor WILSON.

BIOLOGY 19.—Economic Botany. Lectures and laboratory work. *Seven hours (Second Term).* Professor ROTHROCK.

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 1.—Constitution of the United States. *Three hours (First Term). Mon., Th., at 11, Tu. at 12.* Professor JAMES.
- BUSINESS LAW AND PRACTICE 1.—Methods of Accounting. *Two hours. Mon. at 12, Tu. at 9, Wed. at 1, Fri. at 9.* Dr. FALKNER.
- HISTORY 7.—American Political and Social History. Colonial History. History of the Public Domain. Distribution of Population (*Outline* printed for the class). Preparation of Boundary, Population, and Economic Maps. *Three hours (First Term). Tu. at 11, Wed., Th., at 10. Wharton School Congress meets once each week.* Professor McMASTER.
- HISTORY 8.—Church and State in America (Lectures). *Two hours (First Term). Mon. at 10, Wed. at 11.* Professor THOMPSON.
- ECONOMICS AND SOCIAL SCIENCE 1.—Political Economy. Walker's *Political Economy* and Adam Smith's *Wealth of Nations*. *Three hours (First Term). Mon., Wed., at 9, Tu. at 10.* Professor PATTEN.
- ECONOMICS AND SOCIAL SCIENCE 3.—Social Science. Thompson's *Elements of Political Economy*. *Two hours. Th. at 9, Fri. at 11.* Professor THOMPSON.
- PHILOSOPHY 1.—Logic. Lectures and Recitations. Jevons's *Lessons in Logic*. *Two hours (First Term). Wed. at 12, Fri. at 10.* Professor FULLERTON.

SECOND TERM.

- PUBLIC LAW AND POLITICS 3.—History and Theory of the State. *One hour (Second Term). Tu. at 12.* Professor JAMES.
- PUBLIC LAW AND POLITICS 4.—Constitutions of leading foreign countries. *Two hours (Second Term). Mon., Th., at 11.* Professor JAMES.
- PUBLIC LAW AND POLITICS 2.—State Constitutional Law. *Two hours (Second Term).* Dr. THORPE.
- BUSINESS LAW AND PRACTICE 1.—Methods of Accounting. *Two hours. Mon. at 12, Tu. at 9, Wed. at 1, Fri. at 9.* Dr. FALKNER.
- HISTORY 9.—American Political and Social History (Washington to Jackson). Lectures, Maps, *Outline* printed for the class. *Three hours (Second Term). Tu. at 11, Wed., Th., at 10. Wharton School Congress meets once each week.* Professor McMASTER.
- HISTORY 10.—Economic History of the United States. *Two hours (Second Term). Mon. at 10, Wed. at 11.* Professor THOMPSON.
- ECONOMICS AND SOCIAL SCIENCE 2.—Currency and Banking. Jevons's *Money and the Mechanism of Exchange*. *Three hours (Second Term). Mon., Wed., at 9, Tu. at 10.* Professor PATTEN.
- PHILOSOPHY 2.—Ethics. Lectures and Recitations. *Two hours (Second Term). Wed. at 12, Fri. at 10.* Professor FULLERTON.

SENIOR CLASS.

FIRST TERM.

- PUBLIC LAW AND POLITICS 5.—Public Administration in the United States. *Two hours (First Term). Mon. at 12, Th. at 10.* Professor JAMES.
- ECONOMICS AND SOCIAL SCIENCE 7.—Revenue System in the United States and leading foreign countries. *Two hours (First Term). Wed., Fri., at 11.* Professor JAMES.
- BUSINESS LAW AND PRACTICE 2.—Mercantile Law. *Parsons's Law of Business. Two hours (First Term). Mon. at 11, Tu. at 12.* Dr. FALKNER.
- ECONOMICS AND SOCIAL SCIENCE 4.—Social Science. Lectures and Compositions. *Three hours (First Term). Mon. at 11, Fri. at 10.* Professor THOMPSON.
- ECONOMICS AND SOCIAL SCIENCE 5.—Political Economy. *Mill's Political Economy. Three hours (First Term). Tu., Th., at 9, Wed. at 10.* Professor PATTEN.
- HISTORY 13.—American Political and Social History (1825-1889). Lectures, Maps. *Four hours (First Term). Mon., Tu., at 10, Wed. at 12, Th. at 11. Wharton School Congress meets once each week.* Professor MCMMASTER.

SECOND TERM.

- PUBLIC LAW AND POLITICS 6.—Public Administration in leading foreign countries. *Two hours (Second Term). Mon. at 12, Th. at 10.* Professor JAMES.
- BUSINESS LAW AND PRACTICE 3.—Mercantile Practice. Lectures. *Two hours (Second Term). Mon. at 11, Tu. at 12.* Mr. FALKNER.
- ECONOMICS AND SOCIAL SCIENCE 6.—Political Economy. *Ingram's History of Political Economy. Three hours (Second Term). Tu., Th., at 9, Wed. at 10.* Professor PATTEN.
- ECONOMICS AND SOCIAL SCIENCE 8.—History and Theories of Public Finance, especially of Taxation. *Two hours (Second Term). Wed., Fri., at 11.* Professor JAMES.
- ECONOMICS AND SOCIAL SCIENCE 9.—Statistics. General Theory. Statistics of Population. Lectures. *Two hours (Second Term).* Dr. FALKNER.
- HISTORY 14.—American Constitutional History (1776-1889). Diplomatic History. Biography of American Statesmen. Lectures. *Three hours (Second Term). Tu. at 10, Wed. at 12, Th. at 11.* Professor MCMMASTER.
- HISTORY 15.—Seminary of American History. Constitutional History of the United States. *Two hours.* Professor MCMMASTER.

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.

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.

The following courses 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 val-

uable 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.

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.

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.

Instruction in the following studies is offered by the College Faculty, from which special courses may be selected:—

HEBREW.

1. Harper's *Elements and Method and Manual*. Selections from *Genesis and Judges*. Reading at sight. English into Hebrew. *Two hours. Mon. at 2, Fri. at 3.* Mr. MONTGOMERY.
 2. Selections from Historical Books. *Psalms and Prophets*. Syntax in Mitchell's *Gesenius' Hebrew Grammar*. Reading at sight. *Two hours. Mon. at 3, Fri. at 2.* Mr. MONTGOMERY.
- Course 2 is open to those only who have taken Course 1.

SANSKRIT.

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

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

GREEK.

1. Lysias. Euripides. Xenophon (*Economicus*). Plato (*Apology*). Greek Composition. Greek Moods and Tenses. *Four hours. Sect. I., Mon., Wed., at 9, Th. at 10, Fri. at 11. Sect. II., Mon. at 11, Wed. at 12, Th. at 2, Fri. at 10.* Professor LAMBERTON.
- Course 1 is prescribed for Freshmen in Arts.
2. Herodotus. Sophocles. Thucydides. Greek Composition. *Three hours. Mon. at 12, Wed. at 10, Th. at 9.* Professor LAMBERTON.
- Course 2 is prescribed for Sophomores in Arts.
3. Demosthenes. Euripides. Plato (*Protagoras*). Aristophanes. Greek Antiquities. *Three hours. Tu., Th., at 11, Fri. at 2.* Professor LAMBERTON.
- Course 3 is open to those only who have taken Course 2.
4. Homer. Pindar. Æschylus. Aristophanes. Greek Literature. *Two hours. Tu., Wed., at 2.* Professor LAMBERTON.
- Course 4 is open to those only who have taken Course 3.
5. Demosthenes (*Oration, on the Crown*). *Tu. at 3.* Professor LAMBERTON.
 6. Critical Study of the Greek Historians. *Two hours.* Professor LAMBERTON.
 7. Critical Study of the Greek Orators. *Two hours.* Professor LAMBERTON.

Courses 6 and 7 are open to advanced students.

LATIN.

1. Selections from Livy and Horace (*Satires*). *Five hours. Mon., Wed., at 10. Sect. I., Tu. at 10, Th. at 12, Fri. at 10. Sect. II., Tu., Fri., at 11, Th. at 10. Professor JACKSON.*
Course 1 is prescribed for Freshmen in Arts.
2. Sallust (*Catiline*). Selections from Ovid. *Three hours. Mon., Th., at 2, Wed. at 9. Mr. NEWBOLD.*
3. Tacitus (*Agricola, Germania, or Annals*). Cicero (*De Senectute* or *De Officiis*). Horace (Selected *Odes*). *Four hours. Mon., Wed., at 11, Tu. at 2, Fri. at 12. Professor JACKSON.*
Course 3 is open to those only who have taken Course 1, and is prescribed for Sophomores in Art.
4. Tacitus (*Agricola*). Cicero (*De Senectute*). Selections from Horace. *Three hours. Mon. at 10, Tu., Wed., at 2. Mr. NEWBOLD.*
Course 4 is open to those only who have taken Course 2.
5. Selections from Juvenal. Cicero (*De Officiis, De Finibus, or De Amicitia*). Horace (*Epistles*). Reading at sight. *Three hours. Mon., Wed., Th., at 9. Professor JACKSON.*
Course 5 is open to those only who have taken Course 3.
6. Cicero (*Tusculanae*) or Lucretius (*Selections*). Horace (*Ars Poetica*). Reading at sight. *Three hours. Tu., Wed., at 12. Sect. I., Fri. at 9. Sect. II., Th. at 11. Professor JACKSON.*
7. Latin Grammar. Latin Prose Composition. Cæsar (*Commentaries*). *Three hours. Mon. at 12, Th. at 11, Fri. at 10. Mr. NEWBOLD.*
8. Cæsar. Virgil (*Æneid*). Latin Prose Composition. *Three hours. Mr. NEWBOLD.*

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 cannot take Courses 2, 7 or 8 to prepare for re-examination in that subject.

ENGLISH.

1. Rhetoric.—McElroy's *Structure of English Prose*. Readings from an English prose author, with Compositions on Themes selected from these Readings. Exercises in Reading and Speaking, with special reference to Expression, Emphasis, and Voice Culture. *Three hours. Sect. I., Mon. at 12, Wed. at 11, and Fri. at 2. Sect. II., Mon., Tu. and Wed. at 2. Sect. III., Tu. at 9, Wed. at 3, and Fri. at 2. Sect. IV., Th. at 2, Fri. at 9 and at 3; and Sect. V., Wed. at 10, Th. at 12, and Fri. at 2. Professor MCELROY and Mr. SHUMWAY.*
Course 1 is prescribed for all Freshmen.
2. Rhetoric.—Six Compositions during the year, read and discussed in small sections of the class at hours appointed by the instructor. Professor MCELROY.
Course 2 is prescribed for all Sophomores.

3. Rhetoric.—Four Compositions during the year, as in Course 2. Professor MCELROY.
Course 3 is prescribed for all Juniors except those who elect Course 6.
4. Rhetoric.—Four Compositions during the year, as in Course 2. Professor MCELROY.
Course 4 is prescribed for Seniors in Arts and Natural History except those who elect Course 6.
5. Rhetoric.—Four Compositions during the year, as in Course 2. Professor MCELROY.
Course 5 is prescribed for Seniors in Science except those who elect English 6.
6. Rhetoric.—Advanced Composition. Weekly or daily exercises, to be criticised by the instructor at the weekly meeting. *Tu. at 10 or Th. at 2. One hour.* Professor MCELROY.
7. English Prose Authors.—Readings with special reference to Rhetorical Criticism. *Two hours. Mon. at 2, and Th. at 10.* Professor MCELROY.
8. Declamation.—Two or more Declamations during the year by each student. Mr. SHUMWAY.
Course 8 is prescribed for all Sophomores.
9. Declamation.—Debating and Original speaking, extemporaneous and prepared. *Wed. at 2.* Professor MCELROY.
10. English Philology.—Lectures on Old and Early English, with practical exercises. *Two hours.* Professor MCELROY.
11. English Philology.—Lectures on Middle and Early Modern English, with practical exercises. *Two hours.* Professor MCELROY.
Course 11 is open (1889-90) to Seniors only.

ENGLISH LITERATURE.

1. Lectures on Modern Essayists.—Themes written in the instructor's presence, on subjects set from works of authors treated in lectures. *Two hours (First Term). Science, Wed. at 12, Fri. at 11. Arts, Tu. at 10, Th. at 12.* Asst. Professor SCHELLING.
Course 1 is prescribed for all Sophomores.
2. Lectures on Modern Novelists.—Themes written in the instructor's presence, on subjects set from works of authors treated in lectures. *Two hours (Second Term). Science, Wed. at 12, Fri. at 11. Arts, Tu. at 10, Th. at 12.* Asst. Professor SCHELLING.
Course 2 is prescribed for all Sophomores.
3. Lectures on the Period of French Influence (Dryden to Cowper). *Two hours. Mon. at 11, Tu. at 2.* Asst. Professor SCHELLING.
Course 3 is prescribed for Juniors in Arts.
4. Seminary. Discussion and Criticism of papers prepared on subjects selected from authors treated in lectures. *In two sections, each section every other week. Sect. I., Mon. at 8 P.M. Sect. II., Th. at 2.* Asst. Professor SCHELLING.
Course 4 is prescribed for Juniors in Arts.

5. Lectures on the Period of French Influence. *Two hours (First Term). Th. at 9, Fri. at 12.* Asst. Professor SCHELLING.
Course 5 is prescribed for Juniors in Science.
6. Lectures on the greatest English Poets. *Two hours (Second Term). Th. at 9, Fri. at 12.* Asst. Professor SCHELLING.
Course 6 is prescribed for Juniors in Science.
7. Lectures on the Elizabethan Period (Sir Thomas More to James Shirley). Lectures on English Versification. *Two hours (First Term). Mon. at 10, Tu. at 11.* Asst. Professor SCHELLING.
Course 7 is prescribed for Seniors in Arts.
8. Lectures on Modern and Contemporary Poets. *Two hours (Second Term). Mon. at 10, Tu. at 11.* Assistant Professor SCHELLING.
Course 8 is prescribed for Seniors in Arts.
9. Seminary.—Discussion and Criticism of papers prepared on subjects selected from authors treated in lectures. *In three sections, each section once in two weeks.* Sect. I., *Wed. at 8 P.M.* Sect. II., *Fri. at 10.* Sect. III., *Th. at 10.* Professor SCHELLING.
Course 9 is prescribed for Seniors in Arts.

ANGLO-SAXON.

1. Sweet's *Reader*. Selections from Orosius or the Chronicle. *Two hours. Tu. at 3, Th. at 11.* Professor MCELROY.
2. Béowulf. Cook's *Sievers' Grammar of Old English*. *Two hours.* Professor MCELROY.

GOTHIC.

1. Stamm and Heyne's *Ulfilas*. *Two hours.* Professor SEIDENSTICKER.
2. Stamm and Heyne's *Ulfilas* (Advanced Course). *Two hours.* Professor SEIDENSTICKER.

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

GERMAN.

1. Review of Grammar. *Fünftes Lesebuch*. Storm's *Immensee*. *Four hours.* Sect. I., *Mon. at 9, Tu. at 12, Wed. at 10, Th. at 11.* Sect. II., *Tu., Wed., at 11, Th., Fri., at 10.* Mr. RENNERT.
2. Cohn's *Bakterien*. Zittel's *Die Kreide*. Goethe's *Hermann und Dorothea*. Schiller's *Wilhelm Tell*. Practical Exercises. *Four hours.* Sect. I., *Mon. at 11, Wed. at 12, Th. at 10, Fri. at 2.* Sect. II., *Mon. at 10, Tu., Th., Fri., at 11.* Professor SEIDENSTICKER and Mr. RENNERT.

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

3. Whitney's *Grammar and Exercises*. Leander's *Traumereien*. Schiller's *Jungfrau von Orleans*. *Three hours.* *Mon., Tu., at 12, Fri. at 11.* Professor SEIDENSTICKER.
4. Helmholtz. Goethe's *Naturwissenschaftliche Arbeiten*. Pinner's *Gesetze der Naturerscheinungen*. Stein's *Exercises*. *Two hours.* *Mon. at 9, Wed. at 11.* Professor SEIDENSTICKER.

Course 4 is open to those only who have taken Course 2.

5. Goethe's *Egmont*. Schiller's *Poems*. Grillparzer's *Sappho*. *Three hours*. *Tu., Fri., at 10, Wed. at 9*. Professor SEIDENSTICKER.

Course 5 is open to those only who have taken Course 3.

6. Elementary German. German Grammar. *Three hours*. *Mon., Tu., at 10, Wed. at 9*. Mr. RENNERT.

Course 6 is open only to students in the Course in Natural History who do not present German for admission, and for those taking the Course Preparatory to Medicine. Students failing in German in the entrance examination cannot take this course to prepare for re-examination in that subject.

FRENCH.

1. Easy Prose. Harrison's *French Syntax*. *Three hours*. *Tu., Fri., at 9, Th. at 12*. Professor EASTON.

2. Harrison's *French Syntax*. Modern French Prose. Bôcher's *French Plays*. *Four hours*. Sect. I., *Mon. at 12, Tu. at 2, Th., Fri., at 9*. Sect. II., *Mon., Fri., at 11, Tu. at 12, Wed. at 9*. Professor EASTON and Mr. RENNERT.

3. Modern French Prose (continued). *Three hours*. *Mon. at 12*. Sect. I., *Tu. at 11, Fri. at 10*. Sect. II., *Wed. at 9, Th. at 10*. Professor EASTON.

Course 3 is open to those only who have taken Course 2.

4. Modern French Drama. Molière. French Philology and the History of French Literature. *Two hours*. *Mon., Th., at 11*. Professor EASTON.

Course 4 is open to those only who have taken Course 1.

5. *Tableaux de la Révolution Française*. Molière. *Two hours*. *Mon. at 9, Wed. at 11*. Professor EASTON.

Course 5 is open to those only who have taken Course 3.

6. Old French. Selections (Clédât's or Constans's *Chrestomathy*). *La Chanson de Roland*. *Two hours*. Professor EASTON.

ITALIAN.

1. Toscani's *Grammar*, with exercises. Pellico (*Le Mie Prigioni*). Manzoni (*I Promessi Sposi*). *Two hours*. *Mon. at 5, Wed. at 12*. Mr. RENNERT.

2. Dante (Selections from the *Inferno*). Boccaccio (Selections). Lectures on Italian Literature. *Two hours*. Mr. RENNERT.

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

SPANISH.

1. Knapp's *Spanish Grammar and Reader*. *One hour*. *Mon. at 1*. Professor EASTON or Mr. RENNERT.

LINGUISTICS.

1. Whitney's *Language and the Study of Language*. Lectures and exercises in comparison, especially of Greek, Latin, and English forms. *Tu. at 10*. Professor EASTON.

PHILOSOPHY.

1. Logic. Lectures and recitations. Jevons's *Lessons in Logic*. *Two hours (First Term)*. *Wed. at 12, Fri. at 10*. Professor FULLERTON.

Course 1 is prescribed for Juniors in Arts, in the Wharton School, and in Science, excepting those in Chemistry and in Metallurgy and Mining.

2. Ethics. Lectures and recitations. *Two hours (Second Term). Wed. at 12, Fri. at 10.* Professor FULLERTON.

Course 2 is prescribed for Juniors in Arts, in the Wharton School, and in Science except those in Chemistry and in Metallurgy and Mining.

3. History of Philosophy. Lectures, with use of Schwegler's *Manual. Two hours (First Term). Tu. at 9, Wed. at 11.* Professor FULLERTON.

Course 3 is prescribed (1889-90) for Seniors in Arts.

4. Philosophy. The Development of Idealism. Lectures and recitations. *Two hours (Second Term). Tu. at 9, Wed. at 11.* Professor FULLERTON.

Course 4 is open only to those who have taken Psychology, and is prescribed (1889-90) for Seniors in Arts.

5. Ethics (Advanced Course). Lectures. *One hour (Second Term). Mon. at 12.* Professor FULLERTON.

Course 5 is open only to those who have taken Course 2, and is prescribed (1889-90) for Seniors in Arts.

6. Philosophy (Advanced Course). Lectures. *Two hours (Second Term).* Professor FULLERTON.

Course 6 is open only to those who have taken Course 4.

Equivalent courses in Psychology may be substituted for the Courses in Philosophy prescribed for Seniors in Arts.

PSYCHOLOGY.

1. Elementary Psychology. Lectures, with Lotze's *Outlines. One hour (First Term). Mon. at 12.* Professor FULLERTON.

Course 1 is prescribed in 1889-90 for Seniors in Arts.

2. Scientific Methods in Psychology. Lectures, with laboratory work. *Two hours (First Term). Th. from 3 to 6.* Professor CATTELL.

3. Experimental Psychology. Lectures, with laboratory work. *Two hours (Second Term). Th. from 3 to 6.* Professor CATTELL.

4. Comparative, Social, and Abnormal Psychology. Lectures, with laboratory work. *Two hours (First Term). Mon. from 2 to 4.* Professor CATTELL.

Course 4 is open only to those who have taken Courses 2 and 3.

5. Special Psychological Problems. Lectures, with research in laboratory. *Two hours (Second Term). Mon. from 2 to 4.* Professor CATTELL.

Course 5 is open only to those who have taken Course 4.

6. Advanced Psychology. *Two hours. Sat. from 11 to 1.* Professor CATTELL.

HISTORY.

1. Freeman's *General Sketch of History. Two hours. Tu. at 12, Th. at 11.* Professor THOMPSON.

Course 1 is prescribed for Freshmen in Arts. Freshmen in Natural History take either Course 1 or Course 2.

2. Myers's *Mediæval and Modern History*. *Two hours*. Sect. I., *Wed. at 2, Fri. at 10*. Sect. II., *Mon. at 12, Tu. at 2*. Sect. III., *Tu. at 9, Wed. at 12*. Mr. CHEYNEY.

Course 2 is prescribed for Freshmen in Science. Freshmen in Natural History take either Course 1 or Course 2.

3. Freeman's *General Sketch* (completed). Constitution of the United States (Lectures). *Two hours. Tu., Th., at 10*. Professor THOMPSON.

Course 3 is open to those only who have taken Course 1, and is prescribed for Sophomores in Arts.

4. Political and Constitutional History of Europe since 1789. *Two hours (First Term)*. Sect. I., *Wed., Fri., at 9*. Sect. II., *Mon., Fri., at 2*. Mr. CHEYNEY.

Course 4 is prescribed for Sophomores in Science.

5. English History since 1760. (Bright's *History of England, Vols. 3 and 4*.) *Three hours. Wed. at 10, Th. at 9, Fri. at 12*. Mr. CHEYNEY.

Course 5 is recommended for Sophomores in Science who intend entering the Wharton School.

6. Economic and Social History of Europe since 1789. *Two hours. Mon., Th., at 11*. Mr. CHEYNEY.

Course 6 is prescribed for Juniors in Science, except for Juniors in Metallurgy and Mining.

7. American Political and Social History.—Colonial History.—History of the Public Domain.—Distribution of Population (*outline printed for the class*). Preparation of Boundary, Population, and Economic maps. *Three hours (First Term). Tu. at 11, Wed., Th., at 10. Wharton School Congress meets once each week*. Professor MCMMASTER.

Course 7 is prescribed for Juniors in the Wharton School.

8. Church and State in America (Lectures). *Two hours (First Term). Mon. at 10, Wed. at 11*. Professor THOMPSON.

Course 8 is prescribed for Juniors in the Wharton School.

9. American Political and Social History (Washington to Jackson). Lectures, Maps (*outline printed for the class*). *Three hours (Second Term). Tu. at 11, Wed., Th., at 10. Wharton School Congress meets once each week*. Professor MCMMASTER.

Course 9 is open only to those who have taken Course 7, and is prescribed for Juniors in the Wharton School.

10. Economic History of the United States. *Two hours (Second Term). Mon. at 10, Wed. at 11*. Professor THOMPSON.

Course 10 is prescribed for Juniors in the Wharton School.

11. Philosophy of History (Lectures). *Fri. at 3. Two hours (First Term). Mon. at 9, Wed. at 10*. Professor THOMPSON.

12. Modern History since 1789 (Lectures). *Two hours (Second Term). Mon. at 9, Wed. at 10*. Professor THOMPSON.

13. American Political and Social History (1825-1889). Lectures, Maps. *Four hours (First Term). Mon., Tu., at 10, Wed. at 12, Th. at 11. Wharton School Congress meets once each week*. Professor MCMMASTER.

Course 13 is prescribed for Seniors in the Wharton School, and is open to those only who have taken Courses 7 and 9.

14. American Constitutional History (1776-1889).—Diplomatic History. —Biography of American Statesmen. Lectures. *Three hours (Second Term)*. Tu. at 10, Wed. at 12, Th. at 11. Professor MCMASTER.

Course 14 is prescribed for Seniors in the Wharton School, and is open to those only who have taken Course 12.

15. Seminary of American History.—Constitutional History of the United States. *Two hours*. Professor MCMASTER.

ECONOMICS AND SOCIAL SCIENCE.

1. Political Economy. Walker's *Political Economy* and Adam Smith's *Wealth of Nations*. *Three hours (First Term)*. Mon., Wed., at 9, Tu. at 10. Professor PATTEN.

Course 1 is prescribed for Juniors in the Wharton School.

2. Currency and Banking. Jevons's *Money and the Mechanism of Exchange*. *Three hours (Second Term)*. Mon., Wed., at 9, Tu. at 10. Professor PATTEN.

Course 2 is prescribed for Juniors in the Wharton School.

3. Social Science. Thompson's *Elements of Political Economy*. *Two hours*. Th. at 9, Fri. at 11. Professor THOMPSON.

Course 3 is prescribed for Seniors in Arts, Science, and Natural History, and for Juniors in the Wharton School.

4. Social Science. Lectures and Compositions. *Three hours (First Term)*. Mon. at 11, Fri. at 10. Professor THOMPSON.

Course 4 is prescribed for Seniors in the Wharton School.

5. Political Economy. Mill's *Political Economy*. *Three hours (First Term)*. Tu., Th., at 9, Wed. at 10. Professor PATTEN.

Course 5 is prescribed for Seniors in the Wharton School.

6. Political Economy. Ingram's *History of Political Economy*. *Three hours (Second Term)*. Tu., Th., at 9, Wed. at 10. Professor PATTEN.

Course 6 is prescribed for Seniors in the Wharton School.

7. Revenue System in the United States and leading foreign countries. *Two hours (First Term)*. Wed., Fri., at 11. Professor JAMES.

Course 7 is prescribed for Seniors in the Wharton School.

8. History and Theories of Public Finance, especially of Taxation. *Two hours (Second Term)*. Wed., Fri., at 11. Professor JAMES.

Course 8 is prescribed for Seniors in the Wharton School.

9. Statistics. General Theory. Statistics of Population. Lectures. *Two hours (Second Term)*. Dr. FALKNER.

Course 9 is prescribed for Seniors in the Wharton School.

PUBLIC LAW AND POLITICS.

1. Constitution of the United States. *Three hours (First Term)*. Mon., Th., at 11, Tu. at 12. Professor JAMES.

Course 1 is prescribed for Juniors in the Wharton School.

2. State Constitutional Law. *Two hours (Second Term)*. Dr. THORPE.

3. History and Theory of the State. *One hour (Second Term). Tu. at 12.* Professor JAMES.

Course 3 is prescribed for Juniors in the Wharton School.

4. Constitutions of leading foreign countries. *Two hours (Second Term). Mon., Th., at 11.* Professor JAMES.

Course 4 is prescribed for Juniors in the Wharton School.

5. Public Administration in the United States. *Two hours (First Term). Mon. at 12, Th. at 10.* Professor JAMES.

Course 5 is prescribed for Seniors in the Wharton School.

6. Public Administration in leading foreign countries. *Two hours (Second Term). Mon. at 12, Th. at 10.* Professor JAMES.

Course 6 is prescribed for Seniors in the Wharton School.

BUSINESS LAW AND PRACTICE.

1. Methods of Accounting. *Two hours. Mon. at 12, Tu. at 9, Wed. at 1, Fri. at 9.* Dr. FALKNER.

Course 1 is prescribed for Juniors in the Wharton School.

2. Mercantile Law. Parsons's *Laws of Business.* *Two hours (First Term). Mon. at 11, Tu. at 12.* Dr. FALKNER.

Course 2 is prescribed for Seniors in the Wharton School.

3. Mercantile Practice. Lectures. *Two hours (Second Term). Mon. at 11, Tu. at 12.* Dr. FALKNER.

Course 3 is prescribed for Seniors in the Wharton School.

DRAWING.

1. Geometrical and Isometrical Drawing (*Minifie*), and drawing from the Flat. Free-hand Drawing. Sketching. Use of the Scale and Protractor. Shading in India Ink. Graphical representations from Geometry. *Three hours. Mon. at 10, Wed., Th., at 12.* Professor RICHARDS.

Course 1 is prescribed for Freshmen in Science.

2. Free-hand Drawing from Models. *Three hours. Mon., Wed., Fri., at 9.* Professor RICHARDS.

Course 2 is prescribed for Freshmen in Natural History.

3. Linear Perspective. Geometric and Isometric Drawing. Projection of Shadows. Architectural Detail and Ornament. Gothic Tracery. Shading in India Ink. Free-hand Drawing. *Three hours. Tu., Th., at 9, Wed. at 11.* Professor RICHARDS.

Course 3 is prescribed for Sophomores in Science.

The courses in drawing for students in the Technical Courses in the Towne Scientific School will be found under Chemistry, Mining and Metallurgy, Civil Engineering, Mechanical Engineering and Architecture.

MATHEMATICS.

1. Algebra. Hall and Knight's *Advanced Algebra.* *Three hours (First Term). Sect. I., Mon., Wed., at 2, Fri. at 12. Sect. II., Mon., Wed., Fri., at 9. Two hours (Second Term). Sect. I., Tu. at 11, Th. at 2. Sect. II., Tu. at 10, Th. at 12.* Asst. Professor FISHER.

Course 1 is prescribed for Freshmen in Arts. Freshmen in Natural History take either Course 1 or Course 2.

2. Algebra. Wentworth's *College Algebra*. Two hours. Sect. I., Th. at 10, Fri. at 12. Sect. II., Th. at 11, Fri. at 2. Asst. Professor CRAWLEY.

Course 2 is prescribed for Freshmen in Science. Freshmen in Natural History take either Course 2 or Course 1.

3. Solid Geometry.—Chauvenet's *Geometry*, Byerly Edition. Two hours (First Term). Sect. I., Tu. at 11, Th. at 2. Sect. II., Tu. at 10, Th. at 12. Asst. Professor FISHER.

Course 3 is prescribed for Freshmen in Arts. Freshmen in Natural History take either Course 3 or Course 6.

4. Descriptive Geometry. Two hours. Sect. I., Wed. at 10, Fri. at 12. Mr. HAUPT. Sect. II., Mon. at 9, Wed. at 10. Mr. FRANKLIN.

Course 4 is prescribed for Sophomores in Science, except for those who propose entering the Wharton School in Junior year.

5. Trigonometry. Crawley's *Elements of Trigonometry*. Three hours (Second Term). Sect. I., Mon., Wed., at 2, Fri. at 12. Sect. II., Mon., Wed., Fri., at 9. Asst. Professor FISHER.

Course 5 is prescribed for Freshmen in Arts. Freshmen in Natural History take either Course 5 or Course 9.

6. Trigonometry. Chauvenet's *Trigonometry*. Three hours (First Term). Sect. I., Mon., Tu., Wed., at 11. Sect. II., Mon., Wed., at 2, Tu. at 10. Asst. Professor CRAWLEY.

Course 6 is prescribed for Freshmen in Science. Freshmen in Natural History take either Course 6 or Course 3.

7. Special work in Geometry, Algebra, and Trigonometry. One hour. Th. at 3. Asst. Professor FISHER.

Course 7 may be taken as a voluntary by Freshmen.

8. Advanced Trigonometry and Introduction to Modern Methods in Analytical Geometry. One hour. Asst. Professor CRAWLEY.

Course 8 may be taken as a voluntary by Sophomores.

9. Analytic Geometry. Point and Straight Line. Runkle's *Analytic Geometry*. Three hours (Second Term). Sect. I., Mon., Tu., Wed., at 11. Sect. II., Mon., Wed., at 2, Tu. at 10. Asst. Professor CRAWLEY.

Course 9 is prescribed for Freshmen in Science. Freshmen in Natural History take either Course 9 or Course 5.

10. Analytic Geometry. Hardy's *Analytic Geometry*. Four hours (First Term). Mon., Fri., at 10, Th. at 11. Sect. I., Tu. at 12. Sect. II., Tu. at 11. Professor KENDALL.

Course 10 is prescribed for Sophomores in Arts.

11. Analytic Geometry. Runkle's *Analytic Geometry*. Four hours (First Term). Sect. I., Mon. at 9, Tu. at 12, Th. at 2, Fri. at 11. Asst. Professor CRAWLEY. Sect. II., Mon. at 11, Tu., Wed., at 12, Fri. at 10. Asst. Professor FISHER.

Course 11 is prescribed for Sophomores in Science.

12. Analytic Geometry of Three Dimensions. (Lectures.) One hour. Th. at 12. Asst. Professor CRAWLEY.

Course 12 is prescribed for Juniors in Science.

13. Advanced Analytic Geometry. Plane Geometry. Solid Geometry (Salmon). *Two hours. Th. at 3, and at another hour fixed by the instructor.* Asst. Professor FISHER.

Course 13 is open to those only who have taken Course 21, and when possible Courses 7 and 8.

14. Elementary Differential and Integral Calculus. *Four hours (Second Term). Mon., Fri., at 10, Th. at 11.* Sect. I., *Tu. at 12.* Sect. II., *Tu. at 11.* Professor KENDALL.

Course 14 is prescribed for Sophomores in Arts.

15. Differential and Integral Calculus. Preliminary Course. Part of Rice and Johnson's *Calculus*, Abridged. *Four hours (Second Term).* Sect. I., *Mon. at 9, Tu. at 12, Th. at 2, Fri. at 11.* Asst. Professor CRAWLEY. Sect. II., *Mon. at 11, Tu., Wed., at 12, Fri. at 10.* Asst. Professor FISHER.

Course 15 is prescribed for Sophomores in Science.

16. Differential and Integral Calculus. Rice and Johnson's *Calculus*, Abridged. *Three hours. Mon. at 10, Tu., Fri., at 9.* Asst. Professor CRAWLEY.

Course 16 is prescribed for Juniors in Science.

17. Advanced Differential and Integral Calculus. Williamson or Todhunter. *Two hours. Wed., Th., at 10.* Professor KENDALL.

18. Advanced Differential and Integral Calculus. Williamson or Todhunter. *Two hours. Tu. at 1, and another hour fixed by the instructor.* Asst. Professor CRAWLEY.

19. Astronomy. Young's *Astronomy*. *Two hours.* Sect. I., *Mon. at 11, Wed. at 12.* Sect. II., *Th., Fri., at 12.* Professor KENDALL.

Course 19 is prescribed (1889-90) for all Seniors. In 1890-91 it will be prescribed for Juniors and Seniors. In 1891-92, for Juniors.

20. Vector Analysis. First Course. Lectures. For Faculty Prize to members of the Junior Class. *One hour. Mon. at 1.* Asst. Professor FISHER.

21. Determinants (Scott or Salmon). *One hour.* Asst. Professor CRAWLEY.

22. Theory of Equations (Burnside and Panton). *Two hours.* Asst. Professor FISHER.

23. Differential Equations (Forsyth). *Two hours. Tu. at 4, and at another hour fixed by the instructor.* Asst. Professor FISHER.

Course 23 is open to those only who have taken Course 17 or Course 18.

24. Projective Geometry (Cremona). *Two hours.* Asst. Professor FISHER.

25. Higher Plane Curves (Salmon). *Two hours.* Asst. Professor CRAWLEY.

In addition to the above courses those in the Department of Philosophy are open to any undergraduates who may be fitted by their ability or attainments to profit by them.

PHYSICS.

1. Mechanics. Lodge's *Mechanics*. Two hours (*Second Term*). Arts, *Mon. at 9, Wed. at 2*. Science, Sect. I., *Wed., Fri., at 9*; Sect. II., *Mon., Fri., at 2*. Asst. Professor GOODSPEED.

Course 1 is prescribed for all Sophomores, and is open only to those who have taken Mathematics 1, 3 and 5, or 2, 6 and 9.

2. Physics. Sound, Heat, Light, and Electricity. Stewart's *Physics*. Four hours. Lectures, *Tu., Wed., Th., at 10*. Professor BARKER. Recitations. Juniors in Arts, *Fri. at 12*. Juniors in Science. Sects. I., II., IV., V., *Tu. at 11*. Sect. III., *Fri. at 3*. Asst. Professor GOODSPEED.

Course 2 is prescribed for Juniors in Arts and Science, and must be preceded by Course 1 and by Mathematics 1, 3, 5 or 2, 6 and 9.

3. Mathematical Physics. Two hours. Professor BARKER.

Course 3 is open only to those who have taken Course 2.

4. Practical Physics. Lectures. Three hours. *Mon., Th., at 12*. Professor BARKER. Recitations, Sect. III. *Tu. at 12*. Sects. I., II., IV., V., *Fri. at 10*. Asst. Professor GOODSPEED.

Course 4 is open to those only who have taken Course 2, and is prescribed for Seniors in Science.

5. Practical work in the Physical Laboratory. Four hours. *Tu., Th., from 2 to 4*. Professor BARKER and Asst. Professor GOODSPEED.

CHEMISTRY.

1. General Inorganic Chemistry. Laboratory work with recitations. Three hours. *Mon., Tu., Wed., Th., Fri. (in sections), from 2 to 5*. Dr. KELLER and Mr. HECHT.

Course 1 is prescribed for all Sophomores.

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. Recitations on Tu. at 11, Wed. at 12, and at other hours appointed by the instructors.* Professor SMITH and Mr. FRANKEL.

Twelve hours are prescribed for Juniors in Chemistry, six hours for Juniors in Metallurgy and Mining, and four hours for Juniors in Civil Engineering.

3. Organic Chemistry. Lectures. Two hours. *Mon. at 12, Wed. at 9*. Professor SADTLER.

Course 3 is open to those only who have taken Course 1 or Course 2, and is prescribed for Juniors in 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. Recitations on Mon. at 9 and at other hours appointed by the instructor.* Professor SMITH and Mr. FRANKEL.

Course 4 is open to those only who have taken Course 2. Six hours are prescribed for Seniors in Chemistry and four hours for Seniors in Metallurgy and Mining.

5. Applied Inorganic Chemistry. Lectures with reviews. *Two hours. Tu., Fri., at 12.* Excursions to chemical works. Professor SADTLER.

Course 5 is open to those only who have taken Course 2, and is prescribed for Seniors in Chemistry.

6. Applied Organic Chemistry. Lectures with reviews. *Two hours. Mon. at 1, Th. at 11.* Excursions to chemical works. Professor SADTLER.

Course 6 is open to those only who have taken Courses 2 and 3, and is prescribed for Seniors in Chemistry.

7. Organic Chemistry. Laboratory work in making Organic Preparations. Proximate and Ultimate Organic Analysis. *Six hours. Tu., Wed., from 9 to 12.* Professor SADTLER and Dr. KELLER.

Course 7 is open to those only who have taken Courses 2 and 3, and is prescribed for Seniors in Chemistry.

8. Seminary. Organic and Industrial Chemistry. *One hour every other week. Wed. at 4.30.* Professor SADTLER and Dr. KELLER.

9. Seminary. Inorganic and Analytical Chemistry. *One hour every other week. Wed. at 4.30.* Professor SMITH and Mr. FRANKEL.

10. Analytical Chemistry (Advanced Course). Electrolysis and Electrolytic Methods. Lectures. *One hour. Th. at 10.* Laboratory work. *Seven hours.* Professor SMITH.

11. Applied Organic Chemistry (Advanced Course). Lectures. *Two hours. Wed. at 10, Th. at 9.* Excursions to works. Professor SADTLER.

Course 11 is open to those only who have taken Courses 3 and 6, and is prescribed for Post-Seniors in Chemistry.

12. Industrial Chemistry. Experimental Studies in Applied Inorganic Chemistry. *Ten hours. Mon., Tu., from 10 to 1, Fri. from 9 to 1.* Professor SADTLER and Dr. KELLER.

Course 12 is open to those only who have taken Courses 4 and 5.

13. Industrial Chemistry. Experimental Studies in Applied Organic Chemistry. *Ten hours. Mon., Tu., from 10 to 1, Fri. from 9 to 1.* Professor SADTLER and Dr. KELLER.

Course 13 is open to those only who have taken Courses 6 and 7.

14. Organic Chemistry (Advanced Course). Mainly laboratory work. *Eight hours.* Professor SADTLER and Dr. KELLER.

Course 14 is open to those only who have taken Courses 3 and 7.

15. Advanced Chemical Theory. Lectures. *One hour. Th. at 11.* Professor SMITH.

Course 15 is open to those only who have taken Courses 2 and 3, and is prescribed for Post-Seniors in Chemistry.

16. Mechanical Drawing, with special reference to Chemical applications. *Two hours. Tu. from 2 to 4.* Asst. Professor SPANGLER.

Course 16 is prescribed for Seniors in Chemistry.

BIOLOGY.

1. General Biology. Lectures and laboratory work. *Six hours. Tu., Th., from 2 to 4, Sat. from 9 to 11.* Professor DOLLEY and Mr. GREENMAN.

Course 1 is prescribed for Freshmen in Natural History.

Zoölogy.

2. General Zoölogy of Invertebrates. Lectures. *One hour (First Term). Wed. at 2.* Professor LEIDY.
3. Systematic Study of the Invertebrates. Laboratory work with explanatory lectures. *Six hours (First Term). Wed. from 10 to 12 and at 3, Fri. from 2 to 5.* Professor DOLLEY.
Course 3 is open to those only who have taken Course 1 and are taking Course 2.
4. General Zoölogy of Vertebrates. Lectures. *One hour (Second Term). Wed. at 2.* Professor LEIDY.
5. Systematic Study of the Vertebrates. Laboratory work with explanatory lectures. *Six hours (Second Term). Wed. from 10 to 12 and at 3, Fri. from 2 to 5.* Professor JAYNE.
Course 5 is open to those only who have taken Courses 1 and 3, and are taking Course 4.
6. Animal Histology. Lectures and laboratory work. *Six hours (First Term). Mon., Th., from 2 to 4, Fri. from 9 to 11.* Professor RYDER.
Course 6 is open to those only who have taken Course 1.
7. Animal Embryology. Lectures and laboratory work. *Six hours (Second Term). Mon., Th., from 2 to 4, Fri. from 9 to 11.* Professor RYDER.
Course 7 is open to those only who have taken Course 6.
8. Mammalian Anatomy. Lectures and laboratory work. *Seven hours (Second Term).* Professor JAYNE and Mr. BURK.
Course 8 is open to those only who have taken Course 5.
22. Mammalian Anatomy. Lectures and laboratory work. *Six hours. Mon., Tu., at 9, Th., Fri., from 9 to 11.* Professor JAYNE and Mr. BURK.
9. Animal Histology (Advanced Course). Lectures and laboratory work. *Seven hours (First Term).* Professor RYDER.
Course 9 is open to those only who have taken Course 6.
10. Animal Embryology (Advanced Course). Lectures and laboratory work. *Seven hours (Second Term).* Professor RYDER.
Course 10 is open to those only who have taken Course 7.
11. Invertebrate Morphology (Advanced Course). Lectures and laboratory work. *Seven hours (Second Term).* Professor DOLLEY.
Course 11 is open to those only who have taken Courses 2 and 3.
12. Vertebrate Morphology (Advanced Course). Lectures and laboratory work. *Seven hours (First Term).* Professor JAYNE.
Course 12 is open to those only who have taken Courses 4 and 5.

13. Osteology of the Mammalia. Lectures and laboratory work. *Seven hours (First Term)*. Professor JAYNE.

Course 13 is open to those only who have taken Courses 4 and 5.

21. Entomology. The General Anatomy of Insects, with practical exercises in Systematic Coleopterology. *Hours fixed by the instructor*. Professor HORN.

Course 21 is open only to advanced students.

Botany.

14. General Structural Botany. Lectures and laboratory work. *Five hours (First Term)*. *Mon. from 2 to 5, Fri. from 2 to 4*. Professor WILSON.

Course 14 is open to those only who have taken Course 1.

24. General Structural Botany (Second Course). *Six hours (First Term)*. Professor WILSON.

15. Systematic Study of the Phaenogams. Lectures and laboratory work. *Five hours (Second Term)*. *Mon. from 2 to 5, Fri. from 2 to 4*. Professor ROTHROCK.

Course 15 is open to those only who have taken Course 14.

23. Analytical Botany for beginners. *Six hours (Second Term)*. Professor ROTHROCK.

16. Plant Histology. Lectures and laboratory work. *Six hours (First Term)*. *Tu. from 2 to 5, Th. from 10 to 1*. Professor WILSON.

Course 16 is open to those only who have taken Course 14.

17. Systematic study of Cryptogams. Lectures and laboratory work. *Six hours (Second Term)*. *Tu. from 2 to 5, Th. from 10 to 1*. Professor ROTHROCK.

Course 17 is open to those only who have taken Course 1.
Courses 15 and 17 may be taken together.

18. Plant Physiology. Lectures and laboratory work. *Seven hours (First Term)*. Professor WILSON.

Course 18 is open to those only who have taken Courses 14 and 16.

19. Economic Botany. Lectures and laboratory work. *Seven hours (Second Term)*. Professor ROTHROCK.

Course 19 is open to those only who have taken Courses 14 and 15.

Physiology.

20. Animal Physiology. Lectures and demonstrations. *Two hours*. *Tu. at 11, Fri. at 1*. Dr. HARE.

Course 20 is open to those only who have taken Course 1.
The laboratory is open to advanced students.

GEOLOGY.

- I. Lithology. *One hour*. *Mon. at 11*. Professor KOENIG.

Course 1 is prescribed for Juniors in Metallurgy and Mining.

2. Palæontology of Mollusca and Crustacea. *One hour.* Professor KOENIG.

Course 2 is prescribed for Seniors in Metallurgy and Mining. (Omitted 1889-90.)

3. Stratigraphy in connection with Palæontology of the rock systems. 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. *Two hours. Mon., Tu., at 9.* Professor KOENIG.

Course 3 is prescribed for Post-Seniors in Chemistry, in Metallurgy and Mining, and in Civil Engineering.

4. Geology. The topographical and structural relations of the principal ore deposits in America and Mexico. *Two hours.* Professor KOENIG.

Course 4 is prescribed for Post-Seniors in Metallurgy and Mining. (Omitted 1889-90.)

5. Principles of Geology. Outline of Vertebrate Palæontology. *Two hours. Fri., Sat., at 11.* Professor COPE.

MINERALOGY.

1. Crystallography. Native elements and Sulphides. *Two hours. Tu. at 12, Fri. at 11.* Professor KOENIG.

Course 1 is prescribed for Juniors in Chemistry, in Metallurgy and Mining, and in Civil Engineering.

2. Mineralogy. Oxides, Chlorides and Fluorides, Sulphates, etc., Phosphates, etc., Carbonates and Silicates. *Two hours. Th. at 10, Fri. at 9.* Professor KOENIG.

Course 2 is prescribed for all Seniors in Science, except those in Mechanical Engineering.

3. Determinative Mineralogy. *Two hours. Fri., from 2 to 4.* Professor KOENIG.

Course 3 is prescribed for Seniors in Chemistry, Metallurgy and Mining, and in Civil Engineering.

METALLURGY.

1. Theory of Metallurgical processes. Theory of Dressing and Mechanical treatment of ores. *One hour. Mon. at 10.* Professor KOENIG.

Course 1 is prescribed for all Seniors in Science.

2. Assaying. *Four hours. Th. after 2.* Professor KOENIG and Mr. BROWN.

Course 2 is prescribed for Seniors in Metallurgy and Mining.

3. Demonstrations of the principal metallurgical processes by furnace. *Two hours. Wed. from 11 to 1.* Professor KOENIG.

Course 3 is prescribed for Post-Seniors in Metallurgy and Mining.

4. Lectures on the production of pig, weld, and temper iron and of silver, copper, and lead. Experimental testing of metallurgical processes. *Two hours. Wed. at 9 and at 2.* Visits to metallurgical works in the city and State. Professor KOENIG.

Course 4 is prescribed for Post-Seniors in Metallurgy and Mining.

MINING.

1. Mining Engineering. Construction of parts of Mines and Mining Machinery, from notes and sketches. *Eight hours. Mon. from 2 to 5, Wed. from 2 to 4, Th. at 11 and at 3, Fri. at 10.* Mr. BROWN.

Course 1 is prescribed for Juniors and Seniors in Metallurgy and Mining.

2. Mining Engineering. Lectures on the methods used in prospecting for and developing ore and coal deposits. *Five hours. Mon. from 2 to 5, Tu., Wed., at 9.* Mr. BROWN.

Course 2 is prescribed for Seniors in Metallurgy and Mining.

3. Mining Engineering. Lectures on the ventilation and drainage of Mines. Special mining problems in faulted strata, more especially in coal mining. *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.

Course 3 is prescribed for Post-Seniors in Metallurgy and Mining. (Omitted in 1889-90.)

CIVIL ENGINEERING.

The Courses in Civil Engineering are open to students who have pursued the regular course in Science through Freshman and Sophomore Years and to others who have taken Mathematics 1, 3, 4 and 5, or 2, 4 and 6, Drawing 1 and 3, Physics 1.

1. Topographical Charts in ink and colors. Details of frames, joints, etc. Map Projections. *Two-hours. Tu. from 3 to 5.* Professor HAUPT and Mr. HAUPT.

Course 1 is prescribed for Juniors in Civil Engineering and in Metallurgy and Mining.

2. Applied Mathematics. Map Projections, Orthographic Stereographic Mercators, Lorgnas, Polyconic, etc. *One hour (First Term). Wed. at 2.* Mr. HAUPT.

Course 2 is prescribed for Juniors in Civil Engineering and in Metallurgy and Mining.

3. Mechanics of Materials (Merriman). Tension, Compression, Shear, Bending Moments, Moments of Inertia and Resilience. Forms of sections and of members. Centres of Gravity. Combined stresses. Columns, etc. *Two hours. Tu., Fri., at 2.* Mr. HAUPT.

Course 3 is prescribed for Juniors in Civil Engineering.

4. Surveying. Theory. Plane surveying of lines and areas. Principles, instruments, etc., as applied for ways of communication. Mining, tunnelling, Hydrography, Topography, levels, geodesy, United States Land surveying, &c. *One hour. Mon. at 12.* Professor HAUPT.

Course 4 is prescribed for Juniors in Civil Engineering and in Metallurgy and Mining.

5. Surveying. Applications to Field Practice in the various problems arising in all classes of work, as farm, railroad, canal, topographical, dividing up land, location, etc., embracing the use of transit, compass, level, plane taper, sextant, stadia, solar compass, &c. *Three hours. Sat. from 9 to 1.* Professor HAUPT and assistants.

Course 5 is prescribed for Juniors in Civil Engineering and in Metallurgy and Mining.

6. Railroad Location. Theory. Curves, simple, compound, reverse, and transition. Tangents. Grades. Staking out work, slope stakes. Volumes, computation of, &c. *One hour (Second Term). Wed. at 2.* Mr. HAUPT.

Course 6 is prescribed for Juniors in Civil Engineering.

7. Graphics. Statics of Roof Trusses of various standard designs. *Two hours. Wed. at 9, Th. at 2.* Mr. FRANKLIN.

Course 7 is prescribed for all Juniors in Science except those in Chemistry.

8. Drawing. Shades, Shadows, and Perspectives. Platting field notes. Engineering construction and Stereotomy. *Two hours. Tu. from 3 to 5.* Professor HAUPT and assistants.

Course 8 is prescribed for Seniors in Civil Engineering.

9. Theoretical and practical Topography, including the use of special field and office instruments. Reconnoissance, surveys, field sketching and modelling. *Four hours (Second Term). Wed. at 12, and from 2 to 6.* Professor HAUPT and assistants.

Course 9 is prescribed for Seniors in Civil Engineering.

10. Materials of Construction, with their physical and chemical properties, and applications to engineering structures—roofs, bridges, tunnels, culverts, sewers, canals. Explosives. Constructions in masonry, timber, metals, &c. *Three hours. Mon., Tu., at 10, Wed. at 11.* Professor HAUPT.

Course 10 is prescribed for Seniors in Civil Engineering and Architecture.

11. Modelling. Shop work, use of wood-working tools, &c. *Two hours. Fri. from 9 to 11.* Mr. HAUPT.

Course 11 is prescribed for Seniors in Civil Engineering.

12. Graphics. Bridge and Roof Trusses (Green). *Two hours. Tu. at 2, Th. at 10.* Mr. FRANKLIN.

Course 12 is prescribed for Seniors in Civil Engineering.

13. Surveying. Field Practice. Railroad Location. Cross sections, profiles, &c. *Three hours (First Term). Wed. from 3 to 5.* Mr. FRANKLIN and Mr. HOUSTON.

Course 13 is prescribed for Seniors in Civil Engineering.

14. Graphical Analysis of Continuous and Draw Span Bridges. *Three hours (Second Term).* Mr. FRANKLIN.

Course 14 is prescribed for Seniors in Civil Engineering.

15. Bridge Details. Typical forms of connections, with analysis. *One hour.* Professor HAUPT.

Course 15 is prescribed for Seniors in Civil Engineering.

16. Arches and Suspension Bridges (Analytical). *One hour (Second Term).* Mr. FRANKLIN.

Course 16 is prescribed for Seniors in Civil Engineering.

18. Hydromechanics. Theory. Pressure and energy of fluids. Water motors, water supply, hydraulic problems, etc. *One hour. Tu. at 10.* Professor HAUPT.

Course 18 is prescribed for Post-Seniors in Civil Engineering.

19. Physical Hydrography, and River and Harbor Improvements, with review of system in use for regulating works, cost, results, etc. Movable and fixed dams, reservoirs, etc. *One hour (First Term). Wed. at 10.* Professor HAUPT.
Course 19 is prescribed for Post-Seniors in Civil Engineering.
20. Sanitary Engineering Systems. Dry removal and water carriage, precipitations, filtration, irrigation, etc. *One hour (Second Term). Wed. at 10.* Professor HAUPT.
Course 20 is prescribed for Post-Seniors in Civil Engineering and Architecture.
21. Irrigation and Drainage, Indian, Egyptian, Italian, and American. Dams, head-waters, sluicing-gates, etc. *One hour (second part of Second Term). Wed. at 10.* Professor HAUPT.
Course 21 is prescribed for Post-Seniors in Civil Engineering and Architecture.
22. Economics of Engineering. Transportation problems. Municipal Engineering. Plans and arrangements of streets, sub-ways, etc. Rapid transit, statistics, etc. *One hour (last part of Second Term). Wed. at 10.* Professor HAUPT.
Course 22 is prescribed for Post-Seniors in Civil Engineering and Architecture.
23. Engineering Contracts. Theory of Contracts, with preparation of drawings, specifications, proposals, estimates, and agreements. *One hour. Mon. at 10.* Professor HAUPT.
Course 23 is prescribed for Post-Seniors in Civil Engineering.
24. Commercial Law and Business Methods and Forms. *One hour. Wed. at 9.* Mr. HAUPT.
Course 24 is prescribed for Post-Seniors in Civil Engineering.
25. Tours. Practical visits to engineering works, *Th. and Fri.* Preparation of written and illustrated reports on tours, *Sat. Four to eight hours.* Professor HAUPT and Mr. FRANKLIN.
Course 25 is prescribed for Post-Seniors in Civil Engineering and Architecture.
26. Drawing. Details of Engineering works,—composition, plans, sections, elevations, profiles, and cross sections. Working drawings from data collected in the field. *Six hours. Tu., 11 to 1, and at other hours fixed by the instructor.* Professor HAUPT.
Course 26 is prescribed for Post-Seniors in Civil Engineering.
27. Modelling. Shop Practice with tools. *Two hours. Wed., 11 to 1.* Mr. HAUPT.
Course 27 is prescribed for Post-Seniors in Civil Engineering.
28. Photography applied to surveying. *Two hours. Mon. from 11 to 1.* Mr. HAUPT.
Course 28 is prescribed for Post-Seniors in Civil Engineering.

MECHANICAL ENGINEERING.

The courses in Mechanical Engineering are open to students who have pursued the regular scientific course in Freshman and Sophomore years, or others who have had Mathematics 1, 3, 4, 5, 10 and 14, or 2, 4, 6, 9, 11 and 15, Physics 1, and Drawing 1 and 3.

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. *Two hours. Mon. at 12, Th. at 3, until finished.* Mr. KIDWELL.

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.

2. Hydrostatics and Hydraulics. Transmission of pressure, determining centres of pressure and amount of same under different conditions. Depth of floatation 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*.) *Mon. at 12, Th. at 3, after statics are finished with Junior Class, and Mon. at 9 and Wed. at 10 with Senior Class.* Mr. KIDWELL.
3. Hydrodynamics. The design of re-action and impulse turbines, measurement of flowing water, description and discussion of experiments. Hydraulic pressure engines (Bodmer's *Hydraulic Motors*). *Two hours. Mon. at 11, Tu. at 10.* Mr. KIDWELL.

Course 3 is prescribed for Post-Seniors in Mechanical Engineering, and must be preceded by 1 and 2.

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. *Three hours. Tu., 2 to 5.* Mr. KIDWELL.

Course 4 is prescribed for Juniors in Mechanical Engineering, 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.

- 4 a. Sketching and Drawing. Making working sketches, finished drawings, tracings and blue prints for the tools and machines in the laboratories. *Two hours. Tu. at 10, Wed. at 9.* Asst. Professor SPANGLER.

Course 4 a is prescribed for Seniors in Mechanical Engineering, and must be preceded by Course 4.

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's *The Steam Engine*, supplemented by the engines and boilers in the laboratory.) *One hour (First Term). Tu. at 12.* Asst. Professor SPANGLER.

Course 5 is prescribed for the Juniors in Mechanical Engineering, and covers elementary work in the details of engines and boilers.

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. Taught from notes based on the Zeuner Diagram and applied to the principal automatic and radial gears as well as the slide-valve. *Friday at 11 during the whole year, and Tu. at 12 during Second Term.* Asst. Professor SPANGLER.

Course 6 is prescribed for Juniors in Mechanical Engineering.

7. Kinematics. Laws of motion. Elementary combination of pure mechanics. Pulleys and belts. Trains of gearing and forms of teeth of wheels. Link work. Goodeve's *Elements of Mechanism*. *Two hours. Tu. at 11, Fri. at 9.* Mr. KIDWELL.

Required for Seniors in Mechanical Engineering.

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*.) (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.) *Two hours. Tu. at 9, Th. at 10.* Mr. KIDWELL.

Course 8 is prescribed for Seniors in Mechanical Engineering, and must be preceded by 1, first part of 2, 4, 5 and 6.

9. Steam Boilers. Value of fuels, determination of proper proportions for grate and heating surfaces, area and height of chimneys, thickness of shell, size of braces, etc., for various forms of boilers. Making rough sketches and working drawings from original designs. Wilson's *Treatise on 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. *Two hours. Wed., Th., at 11.* Asst. Professor SPANGLER.

Course 9 is prescribed for Seniors in Mechanical Engineering, and must be preceded by 1, 4, 5, 6, and first part of 2.

10. Engineering Appliances. Lectures and recitations on steam-engine indicators, injectors, gauges, safety-valves, oil-cups, pumps, speed indicators, dynamometers, testing machines, etc. (Trade circulars and current periodicals.) *One hour. Fri. at 12.* Asst. Professor SPANGLER.

Course 10 is prescribed for Seniors in Mechanical Engineering, and is designed to give a fair idea of the tools and apparatus used by the Engineer. The apparatus in the laboratories and workshops are used in illustrations.

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. Tu. at 12.* Mr. PETERSON.

12. Shop work. Manual training in wood and iron work. *Nine hours. Mon., Wed., Fri., from 2 to 5.* Mr. FERGUSON and Mr. GRIFFITH.

Course 12 is prescribed for Juniors in Mechanical Engineering.

13. Shop work. Making patterns from working drawings, finishing castings and making, finishing and fitting parts of machinery. Pipe fitting. *Nine hours. Mon., Wed., Fri., 2 to 5.* Mr. FERGUSON and Mr. GRIFFITH.

Course 13 is prescribed for Seniors in Mechanical Engineering and must be preceded by Course 12.

14. Thermodynamics. Mechanical theory of Heat. Application to steam, air, and gas engines, and Refrigerating Machinery. Wood's *Thermodynamics*. *Three hours. Tu. at 9, Wed. at 10, Fri. at 9.* Asst. Professor SPANGLER.

Course 14 is prescribed for Post-Seniors in Mechanical Engineering.

15. Thermodynamics. Testing engines, boilers, gauges, and indicators, determining duty of pumps, and injectors, calorimetric work. (All in Laboratory.) *Six hours. Mon., Wed., from 2 to 5.* Asst. Professor SPANGLER.

Course 15 is prescribed for Post-Seniors in Mechanical Engineering.

16. Marine engineering and naval architecture. Descriptive lectures of marine engines. Special instruction when desired. *One hour. Th. at 9.* Asst. Professor SPANGLER.

Course 16 is voluntary for students in Mechanical Engineering and others having the necessary preparation, and must be preceded by Courses 8 and 9.

17. Designing machinery. Continuation of work on Steam Engines and Boilers from Senior year. Application of the principles of design to special machinery. *Wed., Th., at 12, Fri. after 11, when visits to manufacturing establishments are discontinued.* Asst. Professor SPANGLER.

Course 17 is prescribed for Post-Seniors in Mechanical Engineering.

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. *Sixteen weeks, one visit per week. Fri. after 11.* Asst. Professor SPANGLER.

Course 18 is prescribed for Post-Seniors in Mechanical Engineering.

19. Contracts and Specifications. Methods of drawing specifications and contracts for engines, boilers, foundations, etc. Making estimates as to cost, weight, etc. Haupt's *Contracts and Specifications*, and special specifications and contracts. *One hour. Fri. at 10.* Asst. Professor SPANGLER.

Course 19 is prescribed for Post-Seniors in Mechanical Engineering.

20. Electrodynamics. Measurement of electrical quantities and their application to the theory, construction and use of dynamos, motors, galvanometers, batteries, etc. *Five hours.* Ayrton's *Practical Electricity. Tu., Th., at 11, Wed. at 9.* Thompson's *Dynamo Electric Machinery. Mon. at 12, Wed. at 11.* Salomon's *Accumulations.* Mr. PETERSON.

Course 20 is prescribed for Post-Seniors in Mechanical Engineering and must be preceded by Course 10.

21. Electrodynamics. Laboratory work. Wiring, testing dynamos, motors and storage batteries, calorimetry, measurement of currents, insulation, etc. *Six hours. Tu., Th., from 2 to 5.* Mr. PETERSON.

Course 21 is prescribed for Post-Seniors in Mechanical Engineering.

ARCHITECTURE.

1. Classical Architecture and Mediæval Ornament. Shading in India Ink. Sketching. *Nine hours. Mon., Tu., at 12, Wed. from 2 to 4, Fri. at 11 and at 2, Sat. from 9 to 12.* Professor RICHARDS.

Course 1 is prescribed for Juniors in Architecture.

2. History of Architecture. Lectures, illustrated by views of structures of all ages. *One hour. Fri. at 12.* Study of executed works and of buildings in progress. Ornaments. Shading in India Ink. Sketching. *Thirteen hours. Mon. at 2, Tu. from 10 to 1, Wed. from 9 to 11, Th. at 11, Fri. at 9 and at 2, Sat. from 9 to 12.* Professor RICHARDS.

Course 2 is prescribed for Seniors in Architecture.

3. History of Architecture. Lectures. *One hour. Fri. at 12.* Decoration and Shading. *Three hours. Tu. from 10 to 12, Th. at 11.* Professor RICHARDS.

Course 3 is prescribed for Seniors in Civil Engineering.

4. History of Architecture (concluded). Elements of design and principles of composition. Ornament of all styles. Sketching and measurement of works executed and in progress. Building materials and processes. Specifications. Contracts. *Twelve hours.* Professor RICHARDS.

Course 4 is prescribed for Post-Seniors in Architecture. (Omitted in 1889-90.)

5. History of Architecture (continued). Shading and Decoration. *Four hours.* Professor RICHARDS.

Course 5 is prescribed for Post-Seniors in Civil Engineering. (Omitted in 1889-90.)

6. Plans, elevations, and sections of original designs. Exercises with perspective views. Water-colors. Sketching. *Nine hours.* Professor RICHARDS.

Course 6 is prescribed for Post-Seniors in Architecture. (Omitted in 1889-90.)

MUSIC.

1. Harmony. Formation of Scales. Formation and succession of chords. The use of Dissonants and Modulation. *Two hours. Mon., Th., at 3.* Professor CLARKE.

Course 1 is prescribed for students of Music of the first year, and is open to those only who have a knowledge of the rudiments of Music and who can play upon some instrument—preferably the piano or organ.

2. Counterpoint. Simple and double Counterpoint. Canon and Fugue. *Two hours. Mon., Th., at 2.* Professor CLARKE.

Course 2 is prescribed for students of Music of the Second Year, and is open only to those who have taken Course 1.

3. Form and Orchestration. The development of the Sonata and Rondo forms from the Lyric. The Range, Quality, and the Combination of Instruments in the Orchestra. *Two hours. Mon., Th., at 4.* Professor CLARKE.

Course 3 is prescribed for students of Music of the Third Year, and is open to those only who have taken Course 2.

THE COURSE PREPARATORY TO MEDICINE
 IN THE
SCHOOL OF BIOLOGY.

This course was established in 1885 for 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. The results have already shown conclusively that such a course was greatly needed, and that the students who have faithfully pursued the work have excelled in their subsequent professional studies. No regular entrance examinations are prescribed, but candidates must satisfy the Faculty that they are able to pursue the course with profit. The course is open to women.

FIRST YEAR.

- BIOLOGY 1.—General Biology. Lectures and Laboratory work. *Six hours. Tu., Th., from 2 to 4, Sat. from 9 to 11.* Professor DOLLEY and Mr. GREENMAN.
- BIOLOGY 22.—Mammalian Anatomy. Lectures and Laboratory work. *Six hours. Mon., Tu., at 9, Th., Fri., from 9 to 11.* Professor JAYNE and Mr. BURK.
- BIOLOGY 24.—General Structural Botany (Second Course). *Six hours (First Term).* Professor WILSON.
- BIOLOGY 23.—Analytical Botany for beginners. *Six hours (Second Term).* Professor ROTHROCK.
- DRAWING 2.—Free-hand Drawing from Models. *Three hours. Mon., Wed., at 9.* Professor RICHARDS.
- CHEMISTRY 1.—General Inorganic Chemistry. Laboratory work with recitations. *Three hours. Mon., Tu., Wed., Th., Fri. (in sections), from 2 to 5.* Dr. KELLER.
- LATIN 7.—Latin Grammar. Latin Prose Composition. *Cæsar (Commentaries). Three hours. Mon. at 12, Th. at 11, Fri. at 10.* Mr. NEWBOLD.
- GERMAN 6.—Elementary German. German Grammar. *Three hours. Mon., Tu., at 10, Wed. at 9.* Mr. RENNERT.
 Only one of these two languages is required.

SECOND YEAR.

- BIOLOGY. General Zoölogy of Invertebrates. Lectures. *One hour (First Term). Wed. at 2.* Professor LEIDY.

- BIOLOGY 3.—Systematic Study of the Invertebrates. Laboratory work with explanatory lectures. *Six hours (First Term). Wed. from 10 to 12 and at 3, Fri. from 2 to 5.* Professor DOLLEY.
- BIOLOGY 4.—General Zoölogy of Vertebrates. Lectures. *One hour (Second Term). Wed. at 2.* Professor LEIDY.
- BIOLOGY 5.—Systematic Study of the Vertebrates. Laboratory work with explanatory lectures. *Six hours (Second Term). Wed. from 10 to 12 and at 3, Fri. from 2 to 5.* Professor JAYNE.
- BIOLOGY 6.—Animal Histology. Lectures and Laboratory work. *Six hours (First Term). Mon., Th., from 2 to 4, Fri. from 9 to 11.* Professor RYDER.
- BIOLOGY 7.—Animal Embryology. Lectures and Laboratory work. *Six hours (Second Term). Mon., Th., from 2 to 4, Fri. from 9 to 11.* Professor RYDER.
- BIOLOGY 16.—Plant Histology. Lectures and Laboratory work. *Seven hours (First Term). Tu. from 2 to 5, Th. from 10 to 1.* Professor WILSON.
- BIOLOGY 17.—Systematic Study of Cryptogams. Lectures and Laboratory work. *Seven hours (Second Term). Tu. from 2 to 5, Th. from 10 to 1.* Professor ROTHROCK.
- BIOLOGY 20.—Animal Physiology. Lectures, and demonstrations. *Two hours. Tu. at 11, Fri. at 1.* Dr. HARE.
- 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. Recitations on *Tu. at 11, Wed. at 12,* and at other hours appointed by the instructors. Professor SMITH and Mr. FRANKEL.
- LATIN 8.—Cæsar. Virgil (*Æneid*). Latin Prose Composition. *Three hours.* Mr. NEWBOLD.
- GERMAN 3.—Whitney's *Grammar and Exercises.* Leander's *Träumereien.* Schiller's *Jungfrau von Orleans.* *Three hours. Mon., Tu., at 12, Fri. at 11.* Professor SEIDENSTICKER.

Only one of these two languages is required.

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

The 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.

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. It is intended to hold hereafter a Commencement of the Department of Music for the granting of Degrees and awarding of Certificates, and from the theses of the graduating class a certain number will be selected by the Professor to be performed on that occasion. Persons holding these 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.

For detailed information, apply to Prof. H. A. Clarke, Mus. D., 223 S. 38th Street.

ARRANGEMENT OF SESSIONS.

The College year is divided into two terms of about eighteen weeks each. The first term will begin in 1889 on September 23d at 10 o'clock, A.M., and end on January 31st, at 5 o'clock, P.M. The second term will begin on February 3d at 10 o'clock, and end with commencement on June 5th.

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. Certain Free Scholarships (about five in each class) are granted to deserving and needy students in this Department, under the following regulations:—

Each candidate must present to the Dean of the Faculty, at or before the entrance examinations in June or September, written testimonials as to his deserts and needs. After passing his examinations satisfactorily, he will be recommended for admission to the Committee of the Board of Trustees. The scholarships are granted for one year only.

III. 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, and the SAMUEL V. MERRICK SCHOLARSHIP,

have been endowed. 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 Education, 713 Filbert Street.

IV. THE BAIRD SCHOLARSHIP, founded in 1889 by Mrs. Matthew Baird, provides free tuition for one deserving student.

PRIZES.

The following prizes are offered annually to 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.

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 Monadology of Leibnitz.*
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 Alleged Decadence of Public Life in America since 1789.*
6. A prize of twenty dollars for the best Essay by a member of the Junior Class. Subject: *The Literary Essays of Matthew Arnold.*
7. A prize of fifteen dollars for the best Declamation by a member of the Sophomore Class.

8. 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 1890, 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.

9. 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 1890, the examination will be on *Jones's Greek Exercises*, or its equivalent. (A knowledge of Greek accentuation will be required.)

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

11. A first prize of twenty-five dollars, and a second prize of fifteen dollars, for the best dissected preparations illustrating the anatomy of any animal or vegetable by the student.

12. A prize of twenty-five dollars for the best series of mounted preparations of plant histology.

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: *The Writings of Sir Thomas Browne*.

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 Original Declamation by a member of the Junior Class. It entitles the successful competitor to one year's interest on three hundred dollars. (The Prize is 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: *Sherman's March to the Sea*.

V. THE JOSEPH WARNER YARDLEY PRIZE, founded by the class of 1887 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 Alternative of Restrictive License and Prohibition in the Legal Regulation of the Traffic in Intoxicants*.

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.

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 SCIENTIFIC SOCIETY holds weekly meetings at its rooms in the University throughout the College year. All undergraduates of the University are eligible to membership. Scientific

essays are read, and discussions are held with a general comparison of observations and experiments. Besides a considerable scientific library, large collections of minerals, fossils, ornithological specimens, and other objects of scientific interest, are owned by the Society.

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 Card. 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 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 on Bachelors of Arts of the University of not less than three years' standing, who have pursued liberal studies since their graduation, and who present a satisfactory Thesis to the Faculty.

After 1892 this degree will not be conferred by the College Faculty, but by the Faculty of Philosophy, and only 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 years' course in Natural History; (3) to students in Finance and Economy 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 Technical Degree of *Practical Chemist (P.C.)*, *Mining Engineer (E.M.)*, *Civil Engineer (C.E.)*, *Mechanical Engineer (M.E.)*, or *Architect (Arch.)*, is given to Bachelors of Science in the Towne School at the end of Post-Senior year. Alumni of

the Towne School who hold a Bachelor's Degree may receive the Technical Degree corresponding to their Special Course on completing satisfactorily at any time the studies of Post-Senior year.

The Degree of *Bachelor of Philosophy (Ph.B.)* is given on graduation to students who have pursued the full Course of the Wharton School.

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 fifty dollars a year, except that for the last three years in the Towne Scientific School it is two hundred dollars a year, and for the Course in Music thirty dollars a year. In addition, a fee of five dollars is charged by the Department of Physical Culture. The annual fees for Partial Courses are as follows: For each course of one hour of instruction per week, fifteen dollars; of two hours per week, twenty-five dollars; of six hours per week, fifty dollars. But in no case shall the tuition fee be less than fifteen dollars, or more than two hundred dollars a year. Deposits of from five to twenty dollars are required in the different laboratories to cover breakage. Any balance is returned.

The Annual Tuition Fees are payable to the Treasurer of the University in two instalments, on October 1st and February 1st.

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 Prof. Horace Jayne, Dean of the Faculty.

THE SOCIETY OF THE ALUMNI.

THE Alumni Society of the College Department is composed of (1) Regular Members, graduates of any of the full College courses, Arts, Science, Finance and Economy, or Natural History; (2) Associate Members, matriculates of the College who have not graduated, but who have been elected to associate membership by the Board of Managers of the Society, after due nomination at a previous meeting.

The aim of the Society is to sustain and advance the interests of the University of Pennsylvania, and to cherish feelings of brotherhood and amity among its graduates.

The Annual Meeting is held on the evening of Commencement Day, and is followed by the Annual Collation, at which the Provost and other speakers address the Alumni on the events of the closing year.

Graduates become Members on payment to the Treasurer of two dollars, the initiation fee and dues for the first year. The annual dues after the first year 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.

The Society is at present engaged in preparing a Catalogue of all Matriculates in the College Department. Full information for this Catalogue is earnestly desired of each matriculate, whether it concern himself or others of whom he may have knowledge. This information may be sent to Dr. Ewing Jordan, Coulter House, Germantown, Phila.

OFFICERS FOR 1889-90.

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Recording Secretary: PROF. FELIX E. SCHELLING.

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DEPARTMENT OF PHILOSOPHY.

FACULTY.

WILLIAM PEPPER, M.D., LL.D., PROVOST, and *ex-officio* President.
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GEORGE A. KENIG, PH.D., Professor of Mineralogy.

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

EDMUND J. JAMES, PH.D., Professor of Political and Social Science.

REV. GEORGE S. FULLERTON, A.M., B.D., DEAN, and Professor
of Intellectual and Moral Philosophy.

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

MORRIS JASTROW, JR., PH.D., Professor of Arabic.

OSWALD SEIDENSTICKER, PH.D., LITT.D., Professor of Ger-
manic Philology.

SAMUEL P. SADTLER, PH.D., Professor of Organic Chemistry.

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

WILLIAM POWELL WILSON, Sc.D., Professor of Botany.

HORACE JAYNE, A.M., M.D., Professor of Biology.

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

CHARLES S. DOLLEY, M.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 Analytical Chemistry.

EDWARD T. REICHERT, M.D., Professor of Physiology.

FRANCIS N. THORPE, PH.D., Lecturer on American History.

REV. GEORGE S. FULLERTON, A.M., B.D., *Dean*.

MATRICULATES.

Loring W. Batten, A.B. (Harvard),	61st St. & Hazel Ave.
Louis A. Biddle, A.B. (Harvard),	712 Walnut St.
Martha Bunting, B.L. (Swarthmore),	2000 Arch St.
Edward P. Cheyney, A.M. (Univ. of Pa.),	4301 Haverford St.
Jessie L. Colson, A.B. (Swarthmore),	Daretown, N. J.
Robert S. DeBow, A.B.,	611 North 44th St.
Frederick Edwards, Ph.B. (Dickinson),	Woodbury, N. J.
Lee Kaufer Frankel, B.S. (Univ. of Pa.),	1315 Marshall St.
John L. Hatch, B.S. (Univ. of Pa.),	3615 Locust St.
George Henderson, Ph.B. (Univ. of Pa.),	1422 Master St.
Robert C. Hill, A.B. (Univ. of Pa.),	129 North 18th St.
Earnest Theodore Kretschmann, A.B. (Muhlenberg),	The Trappe, Pa.
Theodore Wm. Kretschmann, A.B. (Univ. of Pa.),	Mount Airy, Phila.
William D. Lewis, B.S. (Haverford),	Bullitt Building, Phila.
Samuel McCune Lindsay, Ph.B. (Univ. of Pa.),	3912 Chestnut St.
James Alan Montgomery, A.B. (Univ. of Pa.),	West Chester, Pa.
William Romaine Newbold, A.B. (Univ. of Pa.),	4228 Chester Ave.
Lois Meiss Otis, B.S. (Cornell),	1510 North 12th St.
F. C. Phillips, A.M. (Univ. of Pa.),	University.
Horace Clarke Richards, A.B. (Univ. of Pa.),	4812 Fairmount Ave.
Joseph E. Sagebeer, A.M. (Bucknell),	Broad & Arch Sts.
T. H. P. Sailer, A.B. (Princeton),	217 So. 42d St.
William H. Samuel, A.M.,	2505 North 12th St.
Samuel Christian Schmucker, A.B. (Muhlenberg),	University.
William C. Scott, A.M. (Princeton),	131 So. 4th St.
James D. Steele, A.M. (Univ. of Pa.),	2102 Spring Garden St.
John L. Stewart, Ph.B. (Univ. of Pa.),	1826 Dickinson St.
George F. Stradling, A.B. (Univ. of Pa.),	Hatboro, Pa.
Henry Trimble (Certif. Univ. of Pa.),	632 Marshall St.
Hill Sloane Warwick, B.S. (Univ. of Pa.),	University.
Lightner Witmer, A.B. (Univ. of Pa.),	1734 Park Ave.
Clinton R. Woodruff, Ph.B. (Univ. of Pa.),	731 Nth. 20th St.

SPECIAL STUDENTS.

James L. Chesnut,	2206 Callowhill St.
Sherbourne William Dougherty, A.B. (Univ. of Pa.),	1435 Girard Ave.
Warner H. Fite, A.B. (Haverford),	50th and Woodland Ave.
L. L. Forman,	3911 Pine St.
John George Sadtler, A.B. (Johns Hopkins),	Mount Airy, Philadelphia.
David H. Stout,	2114 Ueber St.
Gerritt E. H. Weaver, A.B. (Swarthmore), A.M. (Harvard).	
Sophia Weygandt, A.B. (Bryn Mawr),	124 Tulpehocken St., Ger'twn.

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.) 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.

For the year 1889-90 instruction is offered by the following professors in the subjects named:

	Hours per week.
GEORGE F. BARKER, Professor of Physics.	
Instruction in the Physical Laboratory,	4
DANIEL G. BRINTON, Professor of American Archæology and Linguistics.	
1. General Philology of American Languages,	2
2. Special Readings on the Grammatical Structure of the following groups of American tongues :	
The Algonquin,	1
The Nahuatl,	1
The Maya,	1
The Kechua,	1
3. Archæology—Methods of Study in Archæology, General outlines of American Archæology,	1
JAMES MCKEEN CATTELL, Professor of Psychology.	
1. Advanced Psychology,	2
2. Research in Laboratory.*	
3. Seminar,	2
CHARLES S. DOLLEY, Professor of General Biology.	
1. General Biology; Laboratory Work, with Supervision,	8
2. Invertebrate Morphology; Laboratory Work, with Supervision,	4
• MORTON W. EASTON, Professor of Comparative Philology.	
1. Sanskrit Grammar and Readings,	2
2. Çakuntala and the Veda,	2
3. Linguistics and Comparative Philology of the Indo-European Languages, with special reference to Phonetics. Hours undetermined.	

* NOTE.—Students taking work in any of the laboratories are not limited to the hours in which instruction is given, but have the privileges of the laboratories daily, under the general supervision of the Professor in charge.

4. Lectures on Phonetics and the Principles of Comparative Grammar, with special reference to the forms of Greek and Latin. Hours undetermined.

GEORGE S. FULLERTON, Professor of Intellectual and Moral Philosophy.

History of Ancient Philosophy,	2
Psychology,	1
Seminar,	1

HERMANN N. HILPRECHT, Professor of Assyrian, and Curator of Babylonian Antiquities.

1. <i>Assyrian Grammar</i> (with a historical development of cuneiform writing and with reading exercises),	3
2. <i>Selected Babylonian texts</i> (with the use of the Babylonian collections now in the University Museum),	3
3. <i>Cursive reading of Assyrian texts</i> (with the use of casts),	1
4. <i>Interpretation of Ethiopic texts</i> (from Prætorius' and Dillmann's chrestomathies), with a review of the Grammar,	2

This latter course opens February 1st, 1890.

EDMUND J. JAMES, Professor of Political and Social Science.

Political Science—History and Theories of the State,	2
Seminar,	1

*MORRIS JASTROW, JR., Professor of Arabic and Rabbinical Literature.

Hebrew.

The Elements of Hebrew Grammar, with practical exercises and selected readings,	2
Study of some Historical Text of the Old Testament,	1
Critical Study of the Book of Jeremiah, Chapters 1-39,	1

Biblical Aramaic.

Elements of the Grammar, with readings from the Books of Daniel and Ezra,	1
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Arabic.

Elements of the Grammar, with exercises and readings,	2
Selected Suras from the Koran, with constant reference to the Arabic commentators,	2
The Moallakat Kasidê of Imru'l-Kais,	1

*NOTE.—In the absence of Prof. Peters on the University of Pennsylvania Expedition to Mesopotamia, Prof. Jastrow has charge of the courses in Hebrew also.

Post-Biblical and Rabbinical Literature.

- The Misnâ to the Talmudic Treatise, Abodâ Zârâ, *i. e.*, "Idolatry," I

Syriac.

- Elements of Syriac Grammar, with selected readings, I

In March, 1890:

- A Public Course of three lectures on the Talmud—its origin, contents and history. For dates, see Circular of the Public Lectures Association of the University.

GEORGE A. KOENIG, Professor of Mineralogy and Metallurgy.

1. Physiography of Minerals, and Paragenesis, I
 2. Theoretical Crystallography, I
 3. Chemical Geology, I

WILLIAM A. LAMBERTON, Professor of the Greek Language and Literature.

1. Critical Study of the Greek Historians, 2
 2. Critical Study of the Greek Orators, 2

JOHN BACH McMASTER, Professor of American History.

- Constitutional History of the United States from 1789 to 1888, . . 2
 Political History of the United States from 1787 to 1889, . . . 2
 Seminar, I

JAMES PARSONS, Professor of Law.

- Roman Law and Jurisprudence, 2

SIMON N. PATTEN, Professor of Political Economy.

- A Study of Cairnes' System of Political Economy, 2
 Seminar, I

JOSEPH T. ROTHROCK, Professor of Botany.

The Classification of Plants.

- Laboratory Work, with Instruction, during second term, . . . 12

JOHN A. RYDER, Professor of Comparative Embryology.

1. *Comparative Histology.*

- Lectures and Laboratory Instruction, during first term, . . . 8

2. *Comparative Embryology.*

- Lectures and Laboratory Instruction, during second term, . . . 8

SAMUEL P. SADTLER, Professor of Organic and Industrial Chemistry.

1. Methods of Proximate Analysis of Organic Compounds, . . . I
 2. Lectures on Synthetic Methods of Organic Chemistry, . . . I

3. Lectures on the Industrial Applications of Chemistry ; Laboratory Work, with Supervision,	2
Seminar,	2
OSWALD SEIDENSTICKER, Professor of German Language and Literature.	
<i>Gothic</i> .—Phonology, Grammar and Readings in Ulfilas.	
EDGAR F. SMITH, Professor of Inorganic Chemistry.	
Chemical Theory,	2
Thermo-Chemistry,	1
Lectures on Special Topics in Pure Inorganic and Analytical Chemistry,	2
Laboratory Work with Supervision.	
Seminar,	2
FRANCIS N. THORPE, Lecturer on American History.	
Development of Constitutional Government in the United States.	
I. State. II. National.	2
WILLIAM POWELL WILSON, Professor of the Anatomy and Physiology of Plants.	
1. <i>Plant Histology</i> .	
Laboratory Work, with Instruction, first term,	6
2. <i>Plant Physiology</i> .	
Laboratory Work, with Instruction, second term,	6

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 Languages.
2. American History—Political and Constitutional.
3. Botany.
4. Chemistry—Inorganic.
5. Chemistry—Organic.
6. Comparative Philology and Sanskrit.
7. Experimental Psychology.
8. Germanic Philology and Literature.
9. Greek Language and Literature.
10. History and Development of Legal Institutions.
11. Mathematics.
12. Mineralogy and Geology.
13. Political Economy.
14. Political Science.
15. Philosophy.
16. Physics.
17. Romance Philology and Literature.
18. Semitic Languages and Literature.
19. Zoölogy.

For the present, subjects 6 and 17 cannot be taken together.

If Political and Social Science be taken as a major, either Political Economy or Political Science, in the narrower sense, may be taken as the special field, but a general knowledge of the other will be required.

If Bötany or Zoölogy be chosen as a major, any department of either science may be chosen as the special field, but a general knowledge of the other departments will also be required.

SEMITIC LANGUAGES.

1. *a.* Any one of the following languages may be selected as a major study: Arabic, Assyrian, Ethiopic, Hebrew, Syriac.
- b.* In addition to these, any one of the following may be se-

lected as a minor study: Post-biblical Hebrew, Palestinian Aramaic, Babylonian Aramaic, Samaritan, Amharic.

2. A student who selects a Semitic language as his major study may choose another as a minor study; but no student is allowed to take two Semitic languages as his two minor studies, whether he selects a Semitic language as his major or not.

3. Whatever Semitic language a student may select as his major study, he will be required to show a good knowledge of Hebrew grammar, and be able to read an ordinary historical Hebrew text at sight.

4. If a Semitic language be taken as the major study, a general knowledge of two other Semitic languages shall be required, as follows: With Arabic, Ethiopic and Hebrew; with Assyrian, Hebrew and Arabic; with Hebrew, either Palestinian Aramaic or Syriac, and either Arabic or Assyrian; with Ethiopic, Arabic and Hebrew.

By a general knowledge is meant an acquaintance with the grammatical principles of the language and some practice in reading; such an amount in Arabic, for example, as would be equivalent to Socin's Arabic Grammar with the Chrestomathy.

5. If a student select the major study and one minor study in the Semitic group, the language chosen as the minor shall be other than the two languages required in connection with a Semitic language as a major study.

Any application for further subdivision of these subjects must be referred to the Executive Committee of the Faculty.

Under favorable circumstances it will be possible to obtain the Ph.D. degree after two years' graduate study; but if the subjects selected by the candidate are new to him, or if he does not give up his undivided time to the work of the course, this period will be sufficient only in exceptional cases.

Each candidate must register at the office of the Dean, at the beginning of each academic year, on or before the first 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.

Women are admitted to any course for the Ph.D. degree on the same conditions as men.

FEES.

For those who are in regular course for the Ph.D. degree the fee is \$150.00 a year. The charge for those who enter as special students, and take one or more courses, varies with the subject chosen and the amount of instruction given. The fee for a course of one hour a week through the college year is \$15. For each extra course of one hour with the same Professor, \$10. The matriculation fee (paid by all students) is \$5, and the graduation fee \$25.

For further information respecting this department, address
GEORGE STUART FULLERTON,
Dean of the Faculty of Philosophy,
University of Pennsylvania,
Philadelphia.

DEPARTMENT OF MEDICINE.

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

HENRY H. SMITH, M.D., Emeritus Professor of Surgery.

ALFRED STILLÉ, M.D., LL.D., Emeritus Professor of the Theory and Practice of Medicine and of Clinical Medicine.

HARRISON ALLEN, M.D., Emeritus Professor of Physiology.

RICHARD A. F. PENROSE, M.D., LL.D., Emeritus Professor of Obstetrics and of the Diseases of Women and Children.

D. HAYES AGNEW, M.D., LL.D., Emeritus Professor of Surgery.

FACULTY.

JOSEPH LEIDY, M.D., LL.D., Professor of Anatomy.

WILLIAM PEPPER, M.D., LL.D., Professor of Theory and Practice of Medicine and of Clinical Medicine.

WILLIAM GOODELL, M.D., Professor of Gynæcology.

JAMES TYSON, M.D., Professor of Clinical Medicine.

HORATIO C. WOOD, M.D., LL.D., Professor of Materia Medica, Pharmacy and General Therapeutics.

THEODORE G. WORMLEY, M.D., LL.D., Professor of Chemistry and Toxicology.

JOHN ASHHURST, JR., M.D., JOHN RHEA BARTON Professor of Surgery and Professor of Clinical Surgery.

EDWARD T. REICHERT, M.D., Professor of Physiology.

WILLIAM F. NORRIS, M.D., Honorary Professor of Ophthalmology.

BARTON COOKE HIRST, M.D., Professor of Obstetrics.

J. WILLIAM WHITE, M.D., Professor of Clinical Surgery.

JOHN GUITÉRAS, M.D., Professor of General Pathology and Morbid Anatomy.

GEORGE A. PIERSOL, M.D., Professor of Histology and Embryology.

SAMUEL G. DIXON, M.D., Professor of Hygiene.

JOHN MARSHALL, M.D., NAT.SC.D., Assistant Professor of Chemistry.

CLINICAL PROFESSORS.

WILLIAM F. NORRIS, M.D., Clinical Professor of Diseases of the Eye.

• GEORGE STRAWBRIDGE, M.D., Clinical Professor of Diseases of the Ear.

HORATIO C. WOOD, M.D., LL.D., Clinical Professor of Nervous Diseases.

LOUIS A. DUHRING, M.D., Clinical Professor of Skin Diseases.

LOUIS STARR, M.D., Clinical Professor of Diseases of Children.

DE FOREST WILLARD, M.D., Clinical Professor of Orthopædic Surgery.

———, Clinical Professor of Genito-Urinary Diseases.

ASSISTANT PROFESSOR.

JOHN H. MUSSER, M.D., Assistant Professor of Clinical Medicine.

AUXILIARY PROFESSOR.

JOHN J. REESE, M.D., Professor of Medical Jurisprudence, including Toxicology.

LECTURERS AND DEMONSTRATORS.

ROLAND G. CURTIN, M.D., Lecturer on Physical Diagnosis.

CHARLES K. MILLS, M.D., Lecturer on Mental Diseases.

ADOLPH W. MILLER, M.D., Lecturer on Materia Medica and Pharmacy, and Instructor in Practical Pharmacy.

HENRY F. FORMAD, M.D., Demonstrator of Morbid Anatomy and Pathological Histology, and Lecturer on Experimental Pathology.

HENRY R. WHARTON, M.D., Demonstrator of Surgery, and Lecturer on Surgical Diseases of Children.

JOHN B. DEEVER, M.D., Demonstrator of Anatomy, and Lecturer on Topographical Anatomy.

RICHARD H. HARTE, M.D., Demonstrator of Osteology.

THOMAS R. NEILSON, M.D., } Assistant Demonstrators

EDMUND W. HOLMES, M.D., } of Anatomy.

ALBERT L. A. TOBOLDT, M.D., Assistant Instructor in Practical Pharmacy.

JUDSON DALAND, M.D., Instructor in Clinical Medicine.

J. P. CROZER GRIFFITH, M.D., Instructor in Clinical Medicine.

SAMUEL D. RISLEY, M.D., Instructor in Ophthalmology.

WALTER M. L. ZIEGLER, M.D., Instructor in Otology.

CARL SEILER, M.D., Instructor in Laryngology.

FRANCIS X. DERCUM, M.D., Instructor in Nervous Diseases.

J. HENDRIE LLOYD, M.D., Instructor in Electro-Therapeutics.

HOBART A. HARE, M.D., Demonstrator of Experimental Therapeutics, and Instructor in Physical Diagnosis.

THOMAS R. NEILSON, M.D., Instructor in Genito-Urinary Diseases.

WILLIAM L. TAYLOR, M.D., Instructor in Clinical Gynæcology.

GWILLYM G. DAVIS, M.D., Assistant Demonstrator of Surgery.

- EDWARD MARTIN, M.D., Instructor in Clinical Surgery and in Operative Surgery, and Lecturer on Emergency Surgery.
- JOHN K. MITCHELL, M.D., Instructor in Clinical Medicine.
- W. FRANK HAEHNLEN, M.D., Instructor in Obstetrics and Lecturer on Clinical and Operative Obstetrics.
- GEORGE H. CHAMBERS, M.D., Assistant Demonstrator of Normal Histology.
- JAMES K. YOUNG, M.D., Assistant Demonstrator of Surgery, and Instructor in Orthopædic Surgery.
- JOHN B. ROBERTS, M.D., Lecturer in Anatomy.
- HENRY W. CATTELL, M.D., Assistant Demonstrator of Chemistry.
- ALLEN J. SMITH, M.D., Assistant Demonstrator of Morbid Anatomy and Pathological Histology.
- ROBERT FORMAD, V.M.D., Assistant Demonstrator of Normal Histology.
- ARTHUR A. STEVENS, M.D., Instructor in Physical Diagnosis.
- BENJAMIN F. STAHL, M.D., Instructor in Physical Diagnosis.
- HARRY C. DEAVER, M.D., Assistant Demonstrator of Anatomy.
- JOHN C. HEISLER, M.D., Prosector to the Professor of Anatomy.
- CHARLES B. PENROSE, M.D., Instructor in Clinical Surgery.
- WALTER D. GREEN, M.D., Assistant Demonstrator of Surgery.
- WALTER CHRYSTIE, M.D., Instructor in Physical Diagnosis.
- FREDERICK A. PACKARD, M.D., Instructor in Physical Diagnosis.
- RICHARD C. NORRIS, M.D., Demonstrator of Obstetrics.
- JOHN L. HATCH, M.D., Assistant Demonstrator of Morbid Anatomy and Pathological Histology.
- WILLIAM B. JAMESON, M.D., Assistant Demonstrator of Anatomy.
- MILTON B. HARTZELL, M.D., Instructor in Dermatology.
- LEON BRINKMANN, M.D., } Acting Assistant Demonstrators of
JOHN A. BOYER, M.D., } Anatomy.

The following students, selected on account of their proficiency in Chemistry, act as Assistants in the Chemical Laboratory:

J. W. Adams,	University of Minnesota.
J. H. Allwein,	Lafayette College.
J. E. Bacon,	Lafayette College.
A. E. Barnes,	Philadelphia High School.
H. O. J. Bennett,	Oberlin University.
H. B. Bertollette,	Wooster University.
W. S. Brenholtz,	Pennsylvania College.
A. E. Boozer,	University of South Carolina.
D. C. Boyce,	Washington and Jefferson College.
T. F. Bronson,	Haverford College.
J. A. Cake,	Lafayette College.
C. F. Campbell,	
H. B. Clearwater,	Cornell University.

J. K. Corss,	Amherst College.
A. G. Coumbe,	Columbian University.
G. E. Curry,	McKeesport High School.
A. H. Davisson,	University of Pennsylvania.
J. R. Devereux,	Manhattan College.
G. K. Edwards,	Princeton College.
V. H. Fager,	Pennsylvania College.
E. A. Fletcher,	University of Michigan.
Christopher Graham,	University of Minnesota.
A. M. Hamilton,	Mass. College of Pharmacy.
E. M. Harvey,	Swarthmore College.
J. D. Harmon,	University of Michigan.
W. L. Harris,	Mt. Allison University.
S. D. Hopkins,	University of Pennsylvania.
W. M. Kinports,	Bucknell University.
James McDougall, Jr.,	York Collegiate Institute.
Wm. Ruoff,	Philadelphia College of Pharmacy.
A. S. Russell,	Mt. Hermon School.
W. A. Siddall,	Oberlin University.
I. M. Shepherd,	Princeton College.
Henry Stewart,	Bucknell University.
H. A. Spangler,	Pennsylvania College.
A. F. Witmer,	Philadelphia College of Pharmacy.

The following Graduates of the School conduct the admission examinations in the several cities in which they reside :

- Dr. C. H. MASTIN, 110 St. Francis Street, Mobile, Ala.
 Dr. Jos. M. TOWLER, 6 N. Main Street, Columbia, Tenn.
 Dr. EUGENE A. GRISSOM, Raleigh, N. C.
 Dr. C. D. FISHBURN, 70 McMicken Avenue, Cincinnati, Ohio.
 Dr. E. C. BULLARD, 185 Harrison Avenue, Boston, Mass.
 Dr. C. GILMAN SMITH, 2220 Calumet Avenue, Chicago, Ill.
 Dr. C. H. BOARDMAN, 503 Wabasha Street, St. Paul, Minn.
 Dr. W. FITZ HUGH EDWARDS, 205 Fort Street, Detroit, Mich.
 Dr. W. S. ELKIN, 70½ Whitehall Street, Atlanta, Ga.
 Dr. J. W. WHITBECK, 125 East Avenue, Rochester, N. Y.
 Dr. W. T. BELL, City and County Hospital, San Francisco, Cal.
 Dr. W. D. HAMAKER, Meadville, Penna.
 Dr. EDWARD RANDALL, JR., Galveston, Texas.
 Dr. F. E. MAINE, Auburn, N. Y.
 Dr. B. M. WALKER, Danville, Va.
 Rev. D. MCNEILL, Charlottetown, P. E. I.

HOSPITAL STAFF.

- WILLIAM PEPPER, M.D., LL.D., Professor of Clinical Medicine.
 D. HAYES AGNEW, M.D., LL.D., Honorary Professor of Clinical Surgery.
 WILLIAM GOODELL, M.D., Professor of Clinical Gynæcology.
 JAMES TYSON, M.D., Professor of Clinical Medicine.
 JOHN ASHHURST, JR., M.D., Professor of Clinical Surgery.

- WILLIAM F. NORRIS, M.D., Clinical Professor of Diseases of the Eye.
 GEORGE STRAWBRIDGE, M.D., Clinical Professor of Diseases of the Ear.
 HORATIO C. WOOD, M.D., LL.D., Clinical Professor of Nervous Diseases.
 LOUIS A. DUHRING, M.D., Clinical Professor of Skin Diseases.
 BARTON COOKE HIRST, M.D., Professor of Obstetrics.
 LOUIS STARR, M.D., Clinical Professor of Diseases of Children.
 J. WILLIAM WHITE, M.D., Professor of Clinical Surgery.
 JOHN GUITÉRAS, M.D., Professor of General Pathology and Morbid Anatomy.
 DE FOREST WILLARD, M.D., Clinical Professor of Orthopædic Surgery.
 ———, Clinical Professor of Genito-Urinary Diseases.
 ROLAND G. CURTIN, M.D.,
 J. P. CROZER GRIFFITH, M.D., } Assistant Physicians.
 JOHN K. MITCHELL, M.D., }
 HARRY R. WHARTON, M.D., } Assistant Surgeons.
 RICHARD H. HARTE, M.D., }
 SAMUEL D. RISLEY, M.D., Assistant Ophthalmic Surgeon.
 WALTER M. L. ZIEGLER, M.D., Assistant Aural Surgeon.
 HENRY W. STELWAGON, M.D., Assistant Dermatologist.
 FRANCIS X. DERCUM, M.D., Assistant Neurologist.
 WILLIAM L. TAYLOR, M.D., } Assistant Gynæcologists.
 W. CONSTANTINE GOODELL, M.D., }
 JUDSON DALAND, M.D., Assistant Physician.

JOHN S. BILLINGS, M.D., U.S.A., Director of the Hospital.

- ANNIE L. LOCKE, Superintendent of the Hospital.
 HENRY F. FORMAD, M.D., Pathologist.
 JUDSON DALAND, M.D., Curator.
 DAVID B. BIRNEY, M.D., Surgical Anæsthetizer.
 DANIEL M. EASTER, M.D.,
 W. MALLET-PREVOST, M.D.,
 SAMUEL S. KNEASS, M.D., } Resident Physicians.
 HARRY LAMOTTE, M.D., }
 WILLIAM M. ALRICH, M.D., }
 WILLIAM H. PRICE, M.D., }
 C. B. KIRBY, Ph.G., Apothecary.

DISPENSARY SERVICE.

SAMUEL D. RISLEY, M.D., Surgeon in the Dispensary for Diseases of the Eye.

- WALTER M. L. ZIEGLER, M.D., Surgeon in the Dispensary for Diseases of the Ear.
- WILLIAM L. TAYLOR, M.D., Surgeon in the Dispensary for Diseases of Women.
- CARL SEILER, M.D., Physician in the Dispensary for Diseases of the Throat.
- FRANCIS X. DERCUM, M.D., Physician in the Dispensary for Nervous Diseases.
- RICHARD H. HARTE, M.D., }
 JOHN B. DEEVER, M.D., } Attending Surgeons in the Surgical
 EDWARD MARTIN, M.D., } Dispensary.
 GEO. E. SHOEMAKER, M.D., }
- JAMES WALLACE, M.D., }
 G. E. DE SCHWEINITZ, M.D., } Assistant Surgeons in the Dispensary
 for Diseases of the Eye.
- JAMES HENDRIE LLOYD, M.D., Assistant Physician in the Dispensary for Nervous Diseases.
- THOMAS R. NEILSON, M.D., Surgeon in the Dispensary for Genito-Urinary Diseases.
- JOHN SHEETS, M.D., Assistant Physician in the Dispensary for Diseases of the Throat.
- HOBART A. HARE, M.D., Physician in the Dispensary for Diseases of Children.
- FREDERIC H. MILLIKEN, M.D., }
 JAMES K. YOUNG, M.D., } Assistant Surgeons in the Orthopædic Dispensary.
- J. HOWARD REEVES, M.D., Assistant Physician in the Dispensary for Diseases of the Throat.
- W. CONSTANTINE GOODELL, M.D., }
 WILLIAM A. CAREY, M.D., } Assistant Surgeons in the Dispensary for Diseases of Women.
- H. M. CHRISTIAN, M.D., Assistant Surgeon in the Dispensary for Genito-Urinary Diseases.
- B. ALEXANDER RANDALL, M.D., }
 G. ORAM RING, M.D., } Assistant Surgeons in the Dispensary for Diseases of the Eye.
- WILLIAM M. POWELL, M.D., Physician in the Dispensary for Diseases of Children.
- M. HOWARD FUSSELL, M.D., Physician in the Medical Dispensary.
- ALLEN J. SMITH, M.D., }
 WALTER CHRYSSTIE, M.D., } Physicians in the Dispensary for Diseases of Children.
- SAMUEL W. MORTON, M.D., Assistant Physician in the Medical Dispensary.
- JAMES M. BROWN, M.D., }
 LEVI J. HAMMOND, M.D., } Assistant Surgeons in the Dispensary for Diseases of the Ear.
- MILTON B. HARTZELL, M.D., Physician in the Dispensary for Diseases of the Skin.

A. C. WOOD, M.D.,
 T. MELLOR TYSON, M.D., } Assistant Physicians in the Medical Dis-
 J. HOWE ADAMS, M.D., } pensary.

All communications should be addressed to

JAMES TYSON, M.D.,
 Dean of the Faculty of Medicine, University of Penna.,
 Philadelphia, Penna.

The Dean's office is in Medical Hall, where all business is transacted.

MATRICULATES.

FOURTH YEAR.

NAME.	POST-OFFICE.	PRECEPTOR.
Davis, Charles N., M.D.,	Philadelphia,	University.
Geissinger, Harry G.,	Philadelphia,	R. W. Griffith.
Johnston, William G., M.D.,	Titusville,	University.
Kulp, John Stewart, M.D.,	Wilkes-Barre,	J. A. Murphy.
Sexton, Edward J., M.D.,	Washington, D. C.,	Columbian Univ.
Wilson, Richard,	Philadelphia,	University.

Students of the Fourth Year, 6.

THIRD YEAR.

Anders, Howard S., B.A. (C.H.S.),	Philadelphïa,	Jas. M. Anders.
Anders, Wesley A.,	North Wales,	H. F. Slifer.
Anderson, Thomas B.,	Washington, D. C.,	I. W. Rayburn.
Ashhurst, William W.,	Philadelphia,	John Ashhurst, Jr.
Backenstoe, Martin J.,	Emaus,	A. J. Martin.
Barker, Fred D., Ph.B. (Den- nison),	McConnellsville, O.,	University.
Bennett, James C., Jr.,	Cape May City, N.J.,	University.
Bermudez, Salvador,	Managua, Nic.,	Judson Daland.
Bowman, Henry C.,	Schuylkill Haven,	C. Lenker.
Bowser, Alexander J.,	Schellsburg,	F. M. Marbourg.
Boyer, Samuel H.,	Titusville,	Geo. W. Barr.
Brimhall, John B.,	St. Paul, Minn.,	A. J. Gillette.
Bromley, John L.,	Philadelphia,	John B. Deaver & A. K. Minich.
Bryant, Ernest A.,	St. Paul, Minn.,	University.
Butcher, Alexander C.,	Philadelphia,	B. F. Butcher.
Carothers, William M., A.B.,	Turtle Creek,	H. N. Mateer.
Carter, William S.,	Easton,	Isaac Ott.
Chidsey, Russell Williams,	Easton,	J. S. Hunt.
Christie, Robert J., M.D.,	Quincy, Ill.,	Quincy Med. College.
Clark, Henry H.,	Woodbury, N. J.,	H. C. Clark and Jno. B. Deaver.
Clegg, William H., A.B. (C.H.S.),	Philadelphia,	University.

Culin, Walter, Ph.G.,	Philadelphia,	University.
Cummins, Robert H.,	Wheeling, W. Va.,	L. D. Wilson.
Dager, Howard, A.B. (C.H.S.),	Manayunk,	A. H. Mellesrh.
Dickson, Thomas G.,	Troy, N. Y.,	J. B. Harvie.
Doan, Henry H.,	Philadelphia,	Roland G. Curtin.
Doherty, Anthony F.,	Pittston,	W. R. Longshore.
Donahay, De Witt S.,	Turkey, N. J.,	Wm. M. Hepburn.
Duer, S. Naudain,	Philadelphia,	Edw. L. Duer.
Eagleton, S. Potts,	Philadelphia,	Jas. M. Eagleton.
Evans, Frederick H.,	Chester,	F. J. Evans.
Evans, William K.,	Chester,	Wm. G. Knowles.
Evins, Thomas E.,	Spartansburg, S. C.,	Ray, Blake & Greene.
Farish, James C.,	Liverpool, N. Scotia,	H. G. Farish.
Fox, Horace,	Philadelphia,	J. P. Crozer Griffith.
Frasse, Irvin N.,	Brooklyn, N. Y.,	Geo. G. Hopkins.
Frishmuth, John P., A.B. (C.H.S.),	Philadelphia,	University.
Galbraith, Jas. L., A.B. (C.H.S.),	Philadelphia,	A. G. Reed.
Geist, James W., M.E.,	Bechtelsville,	A. T. Welker.
Gilliland, A. Bertram, Ph.B. (Cornell),	Van Wert, Ohio,	University.
Green, Edward M., Jr., A.B. (Centre),	Danville, Ky.,	L. S. McMurtry.
Guest, Middleton Semmes,	Philadelphia,	C. J. Cleborne.
Gunning, Thomas F.,	Fall River, Mass.,	O. B. Jones.
Haines, Rowland I.,	Norristown,	C. S. Dolly.
Hamann, Carl A.,	Davenport, Iowa,	A. W. Cantwell.
Harland, William G. B.,	Germantown,	Thos. C. Potter.
Heard, James Delavan,	Pittsburgh,	S. N. Benham.
Hewins, Charles F., M.D.,	Loda, Ill.,	H. C. Howard.
Howell, William P.,	Wheeling, W. Va.,	University.
Hunter, R. Wallace,	Stormstown,	J. Y. Dale.
Johnson, Albert T. W.,	Nassau, W. I.,	T. W. Johnston.
Johnson, Frederick L., Ph.G.,	Cape May City, N. J.,	James Mecray.
Kamerly, E. Forrest, Jr.,	Town Hill,	E. F. Kamerly.
Kaufman, Frederick S.,	Auburn,	University.
Kawamoto, Junzo, Ph.B. (Oberlin),	Kobe, Japan,	University.
Kennedy, Robert M.,	Pottsville,	J.T. & J.S. Carpenter.
Kerr, Edward,	Downingtown,	Thos. E. Parke.
Lambert, John R., M.D.,	Quincy, Ill.,	L. H. A. Nickerson.
Langhorne, Stepney T., A.B.,	Farmville, Va.,	University.
Lathrop, Walter,	Montrose,	University.
Leisher, Charles A.,	McAlisterville,	W. H. Hoops.
Leshner, George S.,	Richland,	J. D. Zimmerman.
Levis, Minford,	Philadelphia,	R. J. Levis.
Lewars, Horace S.,	Philadelphia,	F. X. Dercum.
Leys, James Farquharson,	Philadelphia,	University.
Lightfoot, Sidley Jevers,	Dublin, Ireland,	Royal Coll. of Surg.
Lincoln, Walter R., B.A. (Univ. of Penna.),	Philadelphia,	John B. Deaver.
Longaker, Daniel,	Norristown,	J. Wm. White,
Look, Henry A., M.D.,	Pittsburgh,	T. A. Rex.

Longshore, James B.,	Philadelphia,	University.
MacRae, Alexander,	Central Mine, Mich.,	John MacRae.
McConkey, Thomas G.,	Springfield, Ohio,	University.
McConnell, James W.,	Philadelphia,	C. K. Mills.
McCormick, Louis P.,	Connellsville,	University.
Maison, Robert S., A.B. (Univ. of Penna.),	Philadelphia,	University.
Maloney, John B.,	Key West, Fla.,	Jno. B. & H. C. Deaver.
Manship, Sheridan P.	Milton, Del.,	University.
Martin, Charles S.,	Allentown,	E. G. Martin & John B. Deaver.
Maglaughlin, W. Kieffer, A.B. (Dickinson),	Carlisle,	A. R. Allen.
Maury, John M.,	Memphis, Tenn.,	University.
Menah, William McClellan,	Philadelphia,	University.
Miles, Thomas J.,	Sac & Fox ag'cy, I. T.	University.
Mercer, Charles P., Ph.B. (Univ. of Pa.),	Philadelphia,	Samuel T. Neuber.
Miller, Emmitt Palmer,	Stroudsburg,	University.
Milliken, George G., D.D.S.,	Philadelphia,	F. H. Milliken.
Mitcheson, Robert S. J., Ph.G.,	Philadelphia,	H. C. Cattell.
Motter, Murray Galt, A.M., B.S. (Penn.),	Washington, D. C.,	H. Beates, Jr., & J. B. Scott.
Morris, Daniel E.,	Millcove, P. E. I.,	Martin & McLean.
Muttart, George,	Souris, P. E. I.,	E. B. Muttart.
Myers, Frank F.,	Lewistown,	J. T. Mahon.
Neal, Charles B., Ph.G.,	Dudley, N. J.,	University.
Niblock, Charles A., A.B. (C.H.S.),	Philadelphia,	University.
Nicholson, Joseph L.,	Camden, N. J.,	University.
Niesley, Charles M., B.S. (Lafayette),	Mechanicsburg,	University.
O'Brien, Christopher, Ph.G.,	Conshohocken,	University.
O'Hara, Michael, Jr.,	Philadelphia,	J. B. Deaver & M. O'Hara.
Paff, Edwin H.,	Allentown,	University.
Pennepacker, Edward M.,	Scranton,	H. Pennepacker.
Pfisterer, William P.,	New Ulm, Minn.,	O. C. Strickler.
Pickerell, Evan,	Minerva, Ky.,	J. A. Reed.
Price, Lucius Grant,	Auburn, N. Y.,	F. E. Maine.
Rettew, David P.,	Brandywine Manor,	N. G. Thompson.
Reynolds, Frederick P.,	Elmira, N. Y.,	Henry Flood.
Rhein, John H.,	Philadelphia,	E. W. Watson.
Rhett, Henry J., Ph.B.,	Philadelphia,	University.
Richards, Oscar M., B.S. (Lafayette),	Easton,	D. W. Richards.
Roach, Walter, W. A. B. (C.H.S.),	Philadelphia,	Horace Ladd.
Rolerfort, George W., M.D.,	Lexington, Va.,	Leonard Med. Col.
Rote, John P., A.B. (K.S.U.),	San Antonio, Texas,	University.
Rottner, Charles S.,	Philadelphia,	Dr. Geissel.
Russell, William W., C.E. (Penn. Mil. Acad.),	Minneapolis, Minn.,	Thomas S. Roberts.

Samaniego, José Antonio,	Chihuahua, Mex.,	M. Samaniego.
Saxman, Nathaniel H., A.B.	Latrobe,	University.
(Franklin and Marshall),		
Schaadt, Clinton J., A.B. (Muh-	Coplay,	University.
lenberg),		
Schneider, Louis T.,	Philadelphia,	Geo. A. Bodamer.
Scott, J. Ernest,	Cross Creek,	T. C. M. Stockton.
Sharp, J. Riddle,	Harrington, Del.,	J. A. Klump.
Shaw, John W., Jr.,	Lewistown,	University.
Sherman, De Witt H., A.B.	Buffalo, N. Y.,	Roswell Park.
(Williams),		
Smith, Arthur L., A.B. (Roch-	Meridian, N. Y.,	Edw. B. Angell.
ester),		
Snyder, Harvey L.,	Old Zionsville,	University.
Spehman, James F.,	Fulda, Minn.,	L. L. Rewalt.
Spooner, Jared, M.D.,	Peru, Ind.,	University of Mich.
Steinicken, George A., Ph.G.,	Wilmington, Del.,	University.
Strain, Earle,	Flesherton, Ont.,	Dr. Carter.
Strayer, Edgar,	Patterson,	S. A. Suloff.
Strickler, Charles Miller,	Lebanon,	Geo. P. Lineaweaver.
Sunderland, Henry, Ph.G.,	Philadelphia,	E. L. B. Godfrey.
A.M. (C.H.S.),		
Torrance, Harry S.,	Cairo, Ill.,	John B. Deaver.
Tovar, Louis F., M.D.,	Bogota, U. S. of Col.,	University.
Trexler, Jacob F.,	Mertztown,	P. D. Wertz.
Tyson, Thomas P.,	Jenkintown,	Wm. C. Parry.
Updegrove, Jacob D., A.M.	Easton,	Trail Green & E. M.
(Lafayette),		Green.
Van Wart, George Clowes,	Fredericton, N. B.,	G. H. Coburn.
Wagner, Edward C. O., B.A.	Wilkes-Barre,	Univ. of Leipsic.
(Canisuis Coll.),		
Wagner, William F., Ph.G.,	Hartleton,	M. L. Mench.
Walmer, Ephraim L.,	Harrisburg,	E. H. James.
Waterhouse, Charles F.,	Cincinnati, Ohio,	J. P. Waterhouse.
Webster, I. Daniel,	Philadelphia,	Edw. Martin.
Weems, Marcus A.,	Columbia, Texas,	M. L. Weems.
Weida, Isidore J.,	Shamrock,	J. F. Wertz.
Welty, Cullen F.,	Canton, Ohio,	A. C. Brant.
Wethered, John L.,	Chestertown, Md.,	University.
Wheeler, Harry S.,	Phoenixville,	J. V. Reeder.
White, Abraham E., A.B. (Lin-		
coln University),	Clinton, Miss.,	University.
Wilde, John Russell,	New York, N. Y.,	University.
Woodward, Wm. C., M.D.,	Washington, D. C.,	Univ. of Georgetown.
Woodland, George T.,	Norristown,	J. W. White & E. M.
		Corson.
Yeager, Norton R.,	Allentown,	W. H. Hartzell.
		Students of the Third Year, 149.

SECOND YEAR.

Amadeo, Jesus Maria,	Maimabo, Puerto Rico,	A. J. Amadeo.
Baugh, A. Wayne,	Chester Valley,	James Aiken.

Baxter, Hart B., A.B. (C.H.S.),	Philadelphia,	H. F. Baxter.
Bennett, Francis W.,	Philadelphia,	W. H. Bennett.
Beyea, Harry D.,	Scranton,	N. Y. Leet.
Biemesderfer, Frank I., B.E.,	Lancaster,	C. J. Snively.
Billstein, Aaron M.,	Philadelphia,	Louis Jurist.
Blackburn, James P.,	Whitsett,	Lewis Sutton.
Bloodgood, Joseph C., B.S.	Milwaukee, Wis.,	University.
(Univ. of Wis.),		
Blouse, John A.,	York,	J. S. Miller.
Boyer, Henry P.,	Lafayette Hill,	University.
Brown, Barton,	Williamsport,	T. C. Detwiler.
Brown, Wistar P., D.D.S.,	Germantown,	University.
Bruner, William J., A.B. (Wes-	Columbia,	A. Craig.
leyan),		
Burk, Charles M.,	Philadelphia,	University.
Burtenshaw, James Hawley,	Detroit, Mich.,	Donald Maclean.
Cahill, Thomas H., A.B. (Holy	Fall River, Mass.,	University.
Cross),		
Carman, Frank H., Ph.G.,	Penn's Grove, N.J.,	Mayhew Johnson.
Chance, Burton K.,	Philadelphia,	Geo. I. McKelway.
Chew, Elisha C.,	Atlantic City, N. J.,	University.
Clark, John G.,	Economy, Ind.,	H. A. Hare & J. B.
		Clark.
Clark, Robert M.,	Vineyard Haven,	R. P. M. Ames.
	Mass.,	
Claytor, Thomas A.,	West River, Md.,	D. Murray Cheston.
Crumbie, George J., Ph.G.,	Philadelphia,	University.
Devlin, T. Francis, A.B.	Philadelphia,	J. D. Schoales.
(La Salle),		
Dewey, Julian H., Ph.B. (Univ.	Philadelphia,	University.
of Penna.),		
Dodd, Harry H.,	Lewes, Del.,	University.
Doerr, John E.,	Evansville, Ind.,	Geo. M. Young.
Dubbs, John H.,	Allentown,	H. H. Herbst.
Dunn, Ira J., A.B.,	Meadville,	T. D. Dunn.
Dunott, Daniel Z.,	Harrisburg,	T. J. Dunott.
Earnest, Simon F.,	Anncville,	E. B. Marshall.
Easton, David F., D.D.S.,	New York, N. Y.,	University.
Eldredge, Clarence S., Ph.G.,	Cape May, N. J.,	Samuel W. Morton.
Ellett, Edward C.,	Memphis, Tenn.,	University.
Enders, William James, Ph.G.,	Harrisburg,	E. A. Enders.
Etzler, William C.,	Wheeling, W. Va.,	W. J. Bates, Sr.
Fetterolf, George, A.B. (Univ.	Philadelphia,	Roland G. Curtin.
of Penna.),		
Fenn, William B., A.M.	Pittston,	University.
(Hamilton),		
Finch, Albert Ames, B.S.	Hastings, Minn.,	J. E. Finch.
(U. of M.),		
Focht, Frank D., D.D.S.,	Philadelphia,	University.
Foshay, P. Max, B.S. (Geneva),	Beaver Falls,	W. H. Grim.
Fuller, Dwight B., Jr., D.D.S.,	Philadelphia,	John B. Deaver.
Furness, William H., 3d, A.B.	Philadelphia,	University.
(Harvard),		

- | | | |
|--|-----------------------|-----------------------|
| Gano, Sidney Johnston, | Dallas, Texas, | University. |
| Gardiner, Warner, | Auburn, N. Y., | F. E. Haines. |
| Getty, Robert H., | White Bear Lake, M., | S. O. Francis. |
| Gillette, Edwin J., A.B. | Waterbury, Conn., | University. |
| (Williams), | | |
| Guilford, Paul, | Lebanon, | W. M. Guilford. |
| Guthrie, D. Clinton, Ph.G., | Wilkes-Barre, | G. W. Guthrie. |
| Hand, Leslie L., | Cape May C.H., N.J., | H. W. Cattell. |
| Harnish, Charles A., | Alexandria, | T. Harnish. |
| Harris, Clinton K., Ph.G., | Salem, N. J., | University. |
| Haseltine, Harvey McC., | Rochester, N. Y., | F. W. Zimmer. |
| Hertz, J. Lincoln, M.E., | Lexington, | J. K. Hertz. |
| Hileman, Joseph B., A.B. | Altoona, | Wm. E. Hughes. |
| (Harvard), | | |
| Hiller, Hiram M., Jr., B.S. | Kahoka, Mo., | University. |
| (Parsons), | | |
| Hinkle, W. Marshall, B.S. (Univ. Philadelphia, | | A. G. B. Hinkle. |
| of Penna.), | | |
| Hoyt, Mark D., | St. Paul, Minn., | Murphy & Hoyt. |
| Jarden, Albert B., | Philadelphia, | University. |
| Johnson, Newell L., | Milton, | J. McCauley. |
| Karib, Ruel B., A.B., | Oroomia, Persia, | University. |
| Kearney, Patrick H., | Archbald, | University. |
| Keefer, Charles DeWalt, Ph.G., | Chambersburg, | C. F. Palmer & J. C. |
| | | Greenewalt. |
| Kelchner, William I., | Fleetwood, | University. |
| Kelly, Aloysius O. J., A.B. (La | Manayunk, | Jno. B. Deaver & |
| Salle), | | Jos. V. Kelly. |
| Kennedy, Charles F. J., L. B. | Springfield, Mass., | B. B. Wilson. |
| (U. of Ottawa), | | |
| Kline, William, Jr., | Phillipsburg, N. J., | J. M. Reese. |
| Laros, William A., | Allentown, | M. H. Koch. |
| Lieber, Francis, | Washington, D. C., | J. H. Musser. |
| Lippincott, Fred. B., | Pemberton, N. J., | University. |
| Luhn, Henry B., | Fort Spokane, W.T., | University. |
| McComb, George S., M.E., | Hubers, | J. M. & H. C. Deaver. |
| McConkey, Wilbur F. B., | Evona, Mo., | M. M. Campbell. |
| McDonald, Thomas P., | Gold Hill, Nev., | Cooper Med. Coll. |
| McFadden, Charles J., | Lewistown, | J. T. Mahon. |
| McGehin, Edward, | Hazleton, | Wm. C. Gayley. |
| McIlwain, John A., A.B. | Philadelphia, | University. |
| (C.H.S.), Ph.B. (Univ. Pa.), | | |
| Mailly, Hamilton, | Bridgeton, N. J., | Theo. G. Davis. |
| Maldonado, Charles A., | Mexico City, Mexico, | Dartmouth Med. Col. |
| Masland, Harvey C., A.B. | Philadelphia, | W. C. Posey. |
| (C.H.S.), | | |
| Marcy, Frederick W., | Cape May City, N. J., | V. M. D. Marcy. |
| Martyn, Charles S., B.S. (Dick- | Hazleton, | W. R. Longshore. |
| inson), | | |
| Matlack, Lewis H., | Philadelphia, | University. |
| Metzler, Gottfried, | Philadelphia, | J. C. Hutzill. |
| Miller, Frederick M., A.B. | Philadelphia, | University. |
| (C.H.S.), | | |

Moon, W. Willet,	Fallsington,	University.
Morton, Howard M., B.S. (Lafayette),	Philadelphia,	R. B. Ewing.
Moyer, Frederick C., (F. & M.),	A.B. Reading,	University.
Nassau, Charles F.,	Philadelphia,	Jno. B. Deaver.
O'Brien, William J.,	Sugar Notch,	University.
O'Hara, Patrick H.,	Shenandoah,	D. J. Langton.
Parker, Walter Robert, (U. of M.),	B. S., Marine City, Mich.,	L. B. Parker.
Pearce, Frank Savary,	Steubenville, Ohio,	E. Pearce.
Pickle, J. Harry, M.E.,	Millersville,	University.
Pontius, Paul J., A.B. (Bucknell),	Lewisburg,	University.
Pool, Stewart N.,	McDonough, Del.,	William Hamilton.
Potts, Barton H.,	Pottstown,	J. Elmer Porter.
Powell, Lewis M., A.B. (Univ. of Kansas),	Topeka, Kansas,	University.
Preston, T. Wallbank,	Philadelphia,	R. P. Preston.
Reed, Howard, Ph.G.,	New Britain,	University.
Reigraf, John M.,	Philadelphia,	S. T. Neuber.
Reynolds, George B.,	Scranton,	M. J. Williams.
Richardson, George H.,	Camden, N. J.,	M. L. Ford.
Robinson, John M.,	Corning, N. Y.,	University.
Rodgers, Mark A.,	Brookville,	A. F. Balmer.
Ross, Charles C.,	Clarion,	J. Frank Ross.
Ross, George G.,	Philadelphia,	Jno. B. Deaver.
Russell, Howard C.,	Washington, D.C.,	University.
Sailer, Joseph, Ph.B. (Univ. of Pa.),	Philadelphia,	Chas. A. Oliver.
Sawyer, William P.,	Gasport, N. Y.,	Simeon Tucker Clark.
Scotfield, Alfred H., A.M. (Princeton),	Prince-Budd's Lake, N. J.,	J. H. Wikoff.
Scott, J. Clifford,	New Britain,	James E. Groff.
Scott, John T.,	Galveston, Texas,	University.
Seiple, J. Howard,	Centre Square,	S. C. Seiple.
Shoemaker, William T., (C.H.S.),	A.B. Philadelphia,	Jno. B. Deaver.
Shuman, J. Elmer,	Mainville,	J. J. Brown.
Slocum, William H., Jr.,	Oceanport, N. J.,	Thomas G. Chattle.
Smith, Lawrence S., A.B. (Univ. of Penna.),	Philadelphia,	University.
Somers, Lewis S.,	Philadelphia,	O. B. Gross.
Stears, Ralph, A.B. (Lafayette),	Mifflinburg,	J. C. Steans.
Stevens, Albert S.,	Shelby, Iowa,	University.
Stivers, Charles G.,	Philadelphia,	University.
Stoever, Harry V. N., Ph.G.,	Chester,	D. W. Jefferis.
Stout, George C.,	Bethlehem,	A. Stout.
Strong, Benjamin,	Aberdeen, Miss.,	University.
Thomas, Oscar T.,	Ashley,	University.
Trau, Philip A. E.,	Philadelphia,	Adam Trau.
Van Dyke, Charles W., A.B. (Princeton),	Cranbury, N. J.,	University.

Van Loon, Will E.,	Easton,	University.
Vastine, George H.,	Catawissa,	J. H. Vastine.
Velasquez, Miguel A., D.D.S.,	San Jose, Costa Rica,	University.
Venning, Richard E.,	Charleston, S. C.,	G. M. Guiteras.
Wales, Wesley R.,	Cape May, N. J.,	E. B. Wales.
Wallis, J. Frank, Ph.G.,	Philadelphia,	J. E. Wallis.
Walker, William K.,	Philadelphia,	University.
Warrick, William H.,	Philadelphia,	J. Wm. White.
Webb, Albert T., D.D.S.,	Freeport, Ill.,	University.
Weber, Alexander A., Ph.G.,	Mahony City,	L. Weber.
White, Calvin S.,	Coleraine,	I. C. Gable.
Whiting, Albert D.,	Boston, Mass.,	Jno. B. Deaver.
Willis, Park W., B.S. (Whitman),	Walla Walla, W. T.,	University.
Willson, Frederick G.,	Reading,	W. F. Muhlenberg.
Witmer, Frank B.,	Annville,	S. Weiss, Jr.
Woodward, George S., A.B., Ph.B. (Yale),	Wilkes-Barre,	John B. Deaver.
Woodward, William M., A.B. (Bucknell),	Coatesville,	G. R. Spratt.
Wright, Theodore, Jr.,	Philadelphia,	M. T. Prendergast.
Zell, J. Harry,	Little Britain,	B. F. Sides.
Zulick, Thomas C.,	Easton,	J. M. Reese.
Zweighaft, Bernard,	Philadelphia,	Hobart A. Hare.

Students of the Second Year, 151.

FIRST YEAR.

NAME.	POST-OFFICE.	PRECEPTOR.
Aguilar, Manuel M.,	San Jose, Costa Rica,	E. Pinto.
Allwein, J. Howard,	Lebanon,	V. Allwein.
Amoss, Joseph M.,	Muddy Creek Forks,	J. D. Amoss.
Augé, Truman, A.B. (C.H.S.),	Philadelphia,	D. P. Boyer.
Bacon, John E.,	Wellsborough,	M. L. Bacon.
Baggs, Albert N.,	Abington,	University.
Bartley, James P.,	Altoona,	D. W. Crosthwaite.
Baird, William J. B.,	Wheeling, W. Va.,	G. Baird, Sr.
Ballesteros, Adolfo,	New Leon, Mexico,	University.
Barnes, Albert Coombs, A.B.,	Philadelphia,	A. W. Duvall.
Bennett, Oliver J., A.B. (Oberlin College),	Nashville, Tenn.,	University of Tenn.
Bennett, Joseph M.,	Westerly, R. I.,	Fred. T. Rogers.
Bertolette, Harry B.,	Shreve, Ohio,	University.
Bolgiano, Walton, A.B. (Hop- kins),	Baltimore, Md.,	Johns Hopkins Univ.
Bomberger, Walter, B.S. (Ursi- nus),	Collegeville,	University.
Booser, A. Earle, B.S. (Univer- sity S. C.),	Columbia, S. C.,	University.
Boyce, David C., A.B. (W. & J.),	Washington,	University.
Boulet, Henry, A.B.,	Mobile, Ala.,	University.
Boyer, D. Pellman, A.B. (C.H.S.),	Philadelphia,	D. P. Boyer.
Branson, Thos. F., B.A. (Haver- ford),	Moorestown, N. J.,	University.

Brenholtz, Walter S., B.E.,	Hughesville,	G. W. Metzger.
Bryan, Jay M., A.B. (C.H.S.),	Philadelphia,	S. R. Skillern.
Buchanan, Samuel A., B.S.,	Smyrna, Del.,	N. H. Clark.
(Del. College),		
Buckman, Ernest U., M.E.,	Wilkes-Barre,	University.
Buckner, M. Gano,	Paris, Ky.,	University.
Burdsal, Chas. C.,	Medford, N. J.,	Dr. Sharp.
Burnett, J. Howard,	Camden, N. J.,	University.
Cake, John A.,	Sunbury,	F. B. Massir.
Cahill, Frank J.,	Trenton, N. J.,	Frank V. Cantwell.
Campbell, Charles F.,	Sunbury,	University.
Carpenter, Wm. H.,	Salem, N. J.,	University.
Casanova, L. y Almeida, A.B.	Cienfuegos, Cuba,	J. J. Casanova.
(Univ. of Havana),		
Chandler, Swithin,	Wilmington, Del.,	University.
Chrismar, Eugene Von,	Karlsruhe, Baden,	J. A. and E. R. Di-
	Germany,	brell.
Clark, Robert C.,	Philadelphia,	Leonardo S. Clark.
Cooper, Edward B.,	Selins Grove,	J. M. Cooper.
Cross, James K., A.B. (Amherst),	Lock Haven, Pa.,	R. Armstrong.
Cossitt, Duran S., A.B. (Thiel	Greenville,	B. E. Mossman.
College),		
Coumbe, Arthur G.,	Washington, D. C.,	J. T. Coumbe.
Curry, Glendon E.,	McKeesport,	University.
Damon, Edward Adams,	Philadelphia,	S. W. Morton.
Davison, Alexander Heron,	Philadelphia,	University.
Day, Robert G., A.B.,	Sheffield, N. B.,	P. T. Kierstead.
	Canada,	
Derr, Walter W.,	Norristown,	Lewis W. Read and
		John B. Deaver.
Devereux, J. Ryan, B.S. (Man-	Oswego, N. Y.,	R. B. Cruice.
hattan,)		
Diehl, Alfred E., B.A. (Hobart),	Buffalo, N. Y.,	C. Diehl.
Dix, Archibald L.,	Philadelphia,	T. V. Crandall.
Dover, William H., A.M., B.D.	Philadelphia,	University.
(Lincoln Univ.),		
Edwards, Preston M., A.B.	Savannah, Ga.,	University.
(Atlanta Univ.),		
Edwards, George K., B.S.,	Washington, D. C.,	J. J. Black.
(Princeton),		
Ehl, J. Morris, B.E.,	Pennsburg,	A. Trego Shertzen.
Fager, Valentine H. (Penna.	Harrisburg,	C. B. Fager.
Coll.),		
Feld, W. Carl,	Kansas City, Mo.,	J. Feld.
Fletcher, Emerson Armor,	Labre Linden, Mich.,	F. E. Fletcher.
Fowler, George W., A.M.,	San Jose, Cal.,	University.
Frazier, Charles Harrison, B.A.	Philadelphia,	University.
(U. of P.),		
Fritz, Harry,	Berwyn,	J. A. Aiken.
Galloway, Merrill J., A.B.	Philadelphia,	Albert B. Galloway.
(C.H.S.),		
Garitee, Clarence J.,	Philadelphia,	Wm. G. Porter.
Gay, Alexander S.,	Village Green,	W. S. S. Gay.

Gibson, Frank Z., B.E., Girvin, John Harper, Graves, Amos, Jr., Greenman, Milton J., Ph.B. (U. of P.),	McKeesport, Philadelphia, San Antonio, Tex., Philadelphia,	J. P. McCord. J. H. Musser. University. Chas. S. Dolley and Horace Jayne.
Greene, Gordon L., B.P., Hackett, Robley, Haden, John B., Hamilton, Arthur M.,	Aberdeen, Miss., Hillsboro, Md., Galveston, Tex., St. John, N. B., Canada,	J. M. Greene. Thomas Hackett. University. General Public Hos- pital.
Hand, Alfred, Jr., A.B., Ph.B. (Yale), Harmon, Julian D., A.B. (U. of M.),	Scranton, Warren, Ohio,	H. V. Logan. H. R. Wharton and Julian Harmon.
Harris, William L., Harvey, Ellis M., B.S., Hathcock, Alfred L., Henry, David, Heritage, Charles S., Hilton, George R., Hitschler, William A., A.B. (C.H.S.),	Moncton, Canada, Ward, P. O., Montalba, Texas, Philadelphia, Glassboro, N. J., Philadelphia, Philadelphia,	University. Isaac Massey. David S. Booth, Jr. Robt. Rodgers, Jr. J. D. Heritage. Jas. T. Potter. H. D. McLean.
Hodgson, Edward W., Holland, James W., Hopkins, Samuel D., Howard, Pope, Howat, Frederick, Huebner, Irwin F., Hughes, James B., Israeli, Baruch, A.B. (Yale), Jones, Frank G., A.B. (C.H.S.),	Bangor, Me., Westfield, Mass., Catasauqua, North River, P. E. I., Bedegue, P. E. I., Allentown, Mill Cove, P.E.I., Hartford, Conn., Philadelphia,	H. P. Thomas. J. A. Shepard. Henry W. Cattell. F. P. Taylor. Jno. Sutherland. T. T. Martin. J. Walsh. University. University.
Keller, William E.,	Stroudsburg,	T. C. Walton & J. C. Heisler.
Kerlin, J. M. Sharpless, M.E. (Lehigh),	Elwyn,	A. W. Wilmarth.
Kiersted, Henry Stevens, Kinports, William M., Knode, George E., Kocher, Quinton S., Lamon, Goldson J., Leach, Wilmon W., Lewald, Samuel, Linhart, Harry W., Lichty, Bruce, Lowe, Edward H., Macfarland, Frank H., A.B. (C.H.S.),	Philadelphia, Cherrytree, Alexandria, Allentown, Philadelphia, Philadelphia, Philadelphia, Pittsburgh, Elk Lick, Mt. Pleasant, Philadelphia,	University. University. University. W. H. Hartzell. J. M. Anders. University. University. University. University. A. M. Lichty. F. L. Marsh. University.
Maguire, John R., Marsh, Edward B., Marchand, John L., Marion, George A., Massey, Frank,	Philadelphia, Mt. Pleasant, Irwin, Greece, N. Y., Philadelphia,	University. F. L. Marsh. J. I. Marchand. University. A. L. A. Toboldt.

Mecray, Paul M.,	Cape May, N. J.,	James Mecray.
Meixell, Edwin W.,	Wilkes-Barre,	University.
Mejia, Jose I.,	Granada, Nicaragua,	University.
Mellor, Howard, Ph.B. (U of P.),	Philadelphia,	University.
Merritt, T. Gray,	Elmira, N. Y.,	D. P. Merritt.
Miller, Samuel W.,	Lancaster,	M. L. Herr.
Mingus, Everett,	Ashland, Ore.,	E. P. Geary.
Moore, John W., A.B. (W. & J.),	Bloomington, Ill.,	University.
Morton, George D.,	Philadelphia,	J. William White.
Mosquera, Manuel M.,	Guayaquil, Ecuador,	G. H. Turner.
Mount, Wm. Boswell, B.S. (Princeton),	Philadelphia,	University.
Murphy, Rollins B., A.B. (C.H.S.),	Philadelphia,	University.
McCaffery, George W., Jr.,	Philadelphia,	Wharton Sinkler.
McCullough, John H.,	Trenton, N. J.,	W. G. McCullough.
McDonald, Angus C.,	Murray Harbour Road, P. E. Island,	S. R. Jenkins.
McDougall, James, Jr.,	York,	W. F. Bacon.
McGuire, Thomas,	Philadelphia,	University.
McKeage, William,	Philadelphia,	H. C. Deaver.
McKee, James H.,	Philadelphia,	University.
McMillian, Isaac M.,	Stanley, P. E. Is- land, Canada,	Dr. R. McNeill.
McMorris, Frank C., A.B. (C.H.S.),	Duncannon,	N. C. McMorris.
Neiffer, Milton K.,	Neiffer,	University.
Nichols, Cicero M.,	Galveston, Tex.,	N. F. Mossell.
Packard, Francis R.,	Philadelphia,	J. H. Packard.
Pancoast, J. William,	Philadelphia,	University.
Patek, Arthur J., A.B. (Johns Hopkins),	Milwaukee, Wis.,	Johns Hopkins Uni- versity.
Pearce, C. Tabb,	Maysville, Ky.,	C. C. Owens.
Pitfield, Robert Lucas,	Germantown,	University.
Prefontaine, Louis A.,	St. Agatha, Mani- toba,	University.
Raughley, Shadrach,	Berlin, N. J.,	W. C. Raughley,
Ricker, John R.,	Galveston, Tex.,	University.
Riegel, Walter S.,	Reading,	C. G. Loose.
Robertson, William E.,	Camden, N. J.,	G. T. Robinson.
Rodrigues, Antonio G. da S.,	Sorocaba, Brazil,	W. G. Chamberlain.
Rothrock, Addison M.,	West Chester,	University.
Ruoff, William, Ph.G.,	Philadelphia,	P. N. K. Schwenk.
Russell, Andrew S.,	Mt. Hermon, Mass.,	University.
Santee, Harris E., A.B.,	Snodes, Ohio,	Dr. Santee.
Saunders, Dudley D.,	Memphis, Tenn.,	University.
Schamberg, Jay, A.B. (C.H.S.),	Philadelphia,	University.
Schellinger, Edward,	Camden, N. J.,	A. M. Mecray.
Seaman, William, A.B.,	Meriden, Canada,	C. W. Hewson.
Shepherd, Iranaeus M., A.B. (Princeton),	Trenton, N. J.,	Cornelius Shepherd.
Sholler, George W.,	Chestnut Hill,	Radcliffe Cheston.
Shortlidge, Edmund D.,	Wilmington, Del.,	E. G. Shortlidge.

Smith, Chauncey P.,	Buffalo, N. Y.,	University.
Spangler, Harry A., A.B. (Penna Coll.),	Arendtsville,	Dr. Henninger.
Spiller, William G.,	Philadelphia,	University.
Stahl, Rudolph J.,	Catskill, N. Y.,	University.
Stegner, Adam,	Minooka,	University.
Stewart, Henry,	Gettysburg,	J. W. C. O'Neal.
Stewart, William T.,	Philadelphia,	J. William White.
Stites, Ellsmore,	Bridgeton, N. J.,	A. L. A. Toboldt & T. G. Davis.
Stites, John, K. T.,	Philadelphia,	W. Ziegler.
Stoeckle, Charles H.,	Philadelphia,	Jos. Hoffman.
Sulzer, Gustavus A.,	Philadelphia,	University.
Sweeny, Edward,	Summit Hill,	University.
Synan, William E., A.B.,	Fall River, Mass.,	Holy Cross College.
Talley, Leonard K.,	Philadelphia,	A. Nebeker.
Talley, James Ely, A.B. (Michigan),	Mendenhall,	Victor C. Vaughan.
Tate, George F., A.B. (Mt. St. Mary's),	Altoona,	F. T. Christy.
Taylor, Richard Powell,	Wilkes-Barre,	University.
Tinkler, Samuel E., Jr.,	West Conshohocken,	John A. Raub.
Thompson, Archibald G., Ph.B. (U of P.),	Philadelphia,	J. K. Mitchell.
Todd, John H.,	Boyerstown,	S. M. Todd.
Wade, William N.,	Santa Barbara, Cal.,	Wm. LeMoyné Wills.
Wentz, George L.,	Jeddo,	John B. Deaver & J. L. Wentz.
White, Reid,	Lexington, Va.,	Washington & Lee University.
Wildberger, Arthur,	Spokane Falls, Wash. Ter.,	Willamette University.
Wilson, Arthur R.,	Bethlehem,	Jno. H. Wilson.
Wilson, Alphonso S.,	Cambridgeborough,	A. D. Burchard & M. D. Gray.
Witmer, Albert Ferree,	Philadelphia,	University.
Yenney, Robert C., A.B. (Whitman),	Walla Walla, W.T.,	University.

Students of the First Year, 177.

SPECIAL STUDENTS.

Harding, Edward H.,	Salem, N. J.,	B. A. Waddington.
Harris, Harry B.,	Zanesville, O.,	L. D. Woodbridge.

TOTAL.

Students of the Fourth Year	6
Students of the Third Year	149
Students of the Second Year	151
Students of the First Year	177
Special Students	2

485

The total number of new matriculates the present session, including those admitted to advanced standing, is 205.

SUMMARY.

Alabama	1	Japan	1	Ohio	10
Brazil	1	Kansas	1	Ontario	1
California	2	Kentucky	4	Oregon	1
Canada	2	Maine	1	Pennsylvania	287
Connecticut	2	Manitoba	1	Persia	1
Costa Rica	2	Maryland	4	Prince Edward Island	7
Cuba	1	Massachusetts	8	Puerto Rico	1
Delaware	8	Mexico	3	Rhode Island	1
District Columbia	8	Michigan	4	South Carolina	3
Ecuador	1	Minnesota	8	Tennessee	4
Florida	1	Mississippi	3	Texas	9
Georgia	1	Missouri	3	U. S. of Columbia	1
Germany	1	Nevada	1	Virginia	3
Illinois	6	New Brunswick	3	Washington Terr.	4
Indiana	3	New Jersey	35	West Indies	1
Indian Ter.	1	New York	18	West Virginia	4
Iowa	2	Nicaragua	2	Wisconsin	2
Ireland	1	Nova Scotia	1		
				Total	485

ORGANIZATION OF THE MEDICAL SCHOOL.

This venerable Institution, the oldest of its class 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, JACK-

SON, GEORGE B. WOOD, HODGE, JAMES B. RODGERS, CARSON, the elder PEPPER, FRANCIS GURNEY SMITH and NEILL.

The number of its graduates is ten thousand and one hundred and twenty-one.

ADMISSION.

Candidates for admission are required: *First*, to write an *Essay*, of about three hundred words in length, as a test of Orthography and Grammar; *second*, to pass an examination in *Elementary Physics* (Part I. of Fowne's *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 5th, and Friday, September 26th, 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 looking toward the study of Medicine is particularly called to the unusual advantages of the Course in Philosophy in the College Department of the University. Students who have pursued satisfactorily the last two years of that course will be exempted from the preliminary examination.

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*, 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 satisfactorily an examination in *General and Medical Chemistry*, *Materia Medica* and *Pharmacy*, *Anatomy Physiology* and the elements of *General Pathology*.

* Examinations for admission will also be held annually during the last week in June in Boston, Mass., Rochester, N. Y., Meadville, Pa., Raleigh, N. C., Columbia, Tenn., Atlanta, Ga., Mobile, Ala., Cincinnati, O., Chicago, Ill., Detroit, Mich., St. Louis, Mo., St. Paul, Minn., San Francisco, Cal., Galveston, Tex., Auburn, N. Y., Danville, Va., Charlottetown, Prince Edward Island. The names of the examiners will be found on page 126.

Graduates of regular medical schools in good standing are admitted to the *third* or *fourth* year without an examination. The diplomas of graduates from other schools are not endorsed 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 graduates. The fee for such examination is thirty dollars.

Graduates of Colleges of Pharmacy and Dental Colleges in good standing are admitted to the *second* year upon passing the entrance examination only.

Examinations for admission to advanced standing for Session 1890-91 will be held Thursday, September 25th, at noon.*

COURSE OF STUDY.

The course of study earnestly recommended to students extends over four years, but the course is also arranged for three years, at the end of which the degree may be conferred. For the Fourth Year, almost wholly practical in character, a certificate is granted, in addition to the diploma, to those who pass a satisfactory examination in the studies of that year.

The FIRST YEAR is largely occupied with work in the various laboratories of Chemistry, Pharmacy, Osteology, Histology and in 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 and THIRD years the student is required to attend the general medical and surgical clinics at the University and Philadelphia Hospitals, and the clinics in special departments at the former. Special *bedside* instruction in Clinical Medicine, including Physical Diagnosis and Laryngology, in Surgery, and in Gynæcology, is given in the third year, as are also opportunities for the practical study of diseases of the eye,

* 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.

ear, throat and skin, and for acquiring proficiency with the various instruments employed. For this purpose, the third-year class is divided into sections, each of which receives direct personal instruction.

The course of instruction is so arranged as to permit mainly constant introduction of new material, while retaining the repetition of essential subjects aimed at by the old methods. 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.

The result of the adoption of the prolonged and graded course on the composition of the classes and on their proficiency has been most gratifying. A proportion of students, much larger than ever before, have had a good education, either in colleges or in academies, and their department has been characterized by increased earnestness and zeal. The annual examinations have steadily advanced in grade, while those for graduation have shown a degree of merit, and the Prize Theses an amount of scientific attainment and literary culture, higher than has heretofore been found.

Students of the University may attend, without additional charge, the lectures and recitations in all other departments, provided that the consent of the Dean of the department has first been obtained.

OUTLINE OF THE COURSE, SESSION 1889-90.

	FIRST YEAR.	Total hours per week.
Anatomy—3 lectures per week, 10 hours practical anatomy, including osteology (alternating with practical histology)*	13	13
Topographical Anatomy—2 lectures per week	2	2
Histology—1 lecture per week, 2 hours laboratory instruction	3	3
Materia Medica and Pharmacy—1 lecture per week, 2 hours laboratory	3	3
General Chemistry, including Chemical Physics—2 lectures per week, 4 hours laboratory	6	6

* 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 do not receive material until about December 1st. This also is consistent with their best interests, as dissection cannot be satisfactorily produced until the bones and ligaments have been treated by the Professor of Anatomy.

Physiology—3 lectures per week	3
General Pathology—1 lecture per week until March 1st	1
Hygiene—1 lecture per week	1
General Clinics, Medical and Surgical	4
Bandaging—1 hour lecture, 1 hour practice until Dec. 15	2

Final examinations at the end of the Course: General Chemistry, Osteology, Histology, Materia Medica and Pharmacy, Elements of General Pathology, and in Hygiene.

SECOND YEAR.

Anatomy—3 lectures per week, 10 hours evening dissection	13
Topographical Anatomy—2 lectures per week	2
Medical Chemistry—1 lecture per week, 4 hours laboratory	5
Physiology—3 lectures per week	3
General Pathology and Morbid Anatomy—2 lectures per week, 1½ hours laboratory	3½
Physical Diagnosis—1 hour demonstration	1
Therapeutics—2 lectures per week	2
Theory and Practice of Medicine—3 lectures per week	3
Surgery—3 lectures per week	3
Obstetrics—2 lectures per week	2
General Clinics, Medical and Surgical, including Philadelphia Hospital Clinics	8
Special Clinics (Nervous Diseases, Diseases of Skin, Eye, Ear, Gynæcology)	5

Final examinations at the end of the Course: Anatomy, including Topographical Anatomy, Medical Chemistry and Physiology.

THIRD YEAR.

General Pathology and Morbid Anatomy—2 lectures per week	2
Demonstrations in Morbid Anatomy, including autopsies—2 hours per week	2
Therapeutics—2 lectures per week	2
Theory and Practice of Medicine—3 lectures per week	3
Surgery—3 lectures per week	3
Operative Surgery and Minor Surgery—1 lecture per week, 2 hours' practice	3
Obstetrics*—3 lectures per week	3
Operative Obstetrics—1 hour practice for half the term	½
Gynæcology†—1 lecture per week, 1 hour bedside teaching	2
Bedside instruction in Practical Medicine†	1
Bedside instruction in Practical Surgery†	1
Dermatology—1 lecture per week until January 1st	½
Ophthalmology—1 lecture per week	1
Otology—1 lecture per week until January 1st	1

*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 receives direct personal instruction.

General Clinics, Medical and Surgical, including Philadelphia Hospital Clinics	8
Special Clinics (Nervous Diseases, Diseases of the Skin, Eye, Ear, Paediatrics, Gynæcology at both University and Philadelphia Hospitals)	8
Medical Jurisprudence and Toxicology	1

Final examinations at the end of the Course: General and Special Pathological Anatomy, Therapeutics, Theory and Practice of Medicine, Clinical Medicine, Surgery, Clinical Surgery, Gynæcology and Obstetrics. The examinations embrace questions on Diseases of the Skin, the Eye and the Ear from lists furnished by the Clinical Professors of these branches.

FOURTH YEAR.

Clinical Medicine and Physical Diagnosis, including Laryngology, 2 hours clinical lecture, 2½ hours practical instruction	4½
Clinical Surgery—2 hours clinical lecture, 1 hour practical instruction	3
Operative Surgery—1 hour practical instruction for half the term	½
Nervous Diseases and Electro-Therapeutics—1 hour clinical lecture, 1½ hours practical instruction	2½
Mental Diseases—1 hour lecture	1
Gynæcology—1 hour didactic lecture, 1 hour clinical lecture, 1 hour practical instruction	3
Paediatrics—1 hour clinical lecture for half the session	½
Dermatology—1 hour didactic lecture for half the session, 1 hour clinical lecture, 1 hour practical instruction	2½
Ophthalmology—1 hour didactic lecture, 1 hour clinical lecture, 1 hour practical instruction	3
Otology—1 hour didactic lecture for half the session, 1 hour clinical lecture, 1 hour practical instruction for half the session	2
Clinical and Operative Obstetrics—1 hour practical instruction for half the session	½
Orthopædic Surgery—1 hour didactic lecture for half the session, 1 hour practical instruction for half the session	1
Genito-Urinary Diseases—1 hour practical instruction, each for half the term	½
Medical Jurisprudence and Toxicology—1 hour lecture	1

To all students who pursue a four years' course, and who pass a satisfactory examination in the studies of the fourth year, will be awarded a certificate in addition to the diploma. The Degree of Doctor of Medicine will also be conferred on graduates of other medical schools in good standing who take the third year of the three years' curriculum, or who attend the fourth year, and who pass a satisfactory examination in Morbid Anatomy, Therapeutics, Practice of Medicine, Clinical Medicine, Surgery, Gynæcology and Obstetrics.

TEXT-BOOKS.

FIRST YEAR.

TEXT-BOOKS.

- Chemistry*: Marshall's First-Year Notes; Fownes's Chemistry; Muter's Analytical Chemistry.
Materia Medica: H. C. Wood; Mann on Prescription Writing.
Anatomy: Leidy; Schäffer's Practical Histology.
Physiology: Yeo.
General Pathology: Rindfleisch's Elements of Pathology, translated by Mercur; Tyson's Cell Doctrine, pp. 127-152.

COLLATERAL READING.

- Wurts's Elements of Modern Chemistry; Richter's Chemistry.
 Wood and Bache's Dispensatory.
 Gray; Quain; Allen; Stricker's Histology.
 Foster.

SECOND AND THIRD YEARS.

- Medical Chemistry*: Marshall's Second-Year Notes; Greene; Tyson's Practical Examination of Urine; Marshall & Smith's Analysis of Urine.
Anatomy: Leidy.
Physiology: Foster.
General Pathology and Morbid Anatomy: Rindfleisch's Elements; Coats's Manual of Pathology.
Therapeutics: H. C. Wood.
Practice of Medicine: Flint or Roberts; Bruen's Physical Diagnosis.

- Wormley's Micro-Chemistry of Poisons, 2d edition; Remsen's Organic Chemistry.

- Gray; Quain; Allen; Stricker.

- General Pathology and Morbid Anatomy*: Rindfleisch's Elements; Coats's Manual of Pathology.

- Payne, Pathology and Morbid Anatomy; Orth's Diagnosis in Pathological Anatomy.

- Therapeutics*: H. C. Wood.
Practice of Medicine: Flint or Roberts; Bruen's Physical Diagnosis.

- Wood and Bache's Dispensatory.
 Pepper's System of Practical Medicine; Stille's & Maisch's Dispensatory; Duhring on Diseases of the Skin; Tyson on Bright's Disease and Diabetes; Seiler, Diseases of Throat and Nose.

- Surgery*: Ashhurst's Principles and Practice of Surgery; Agnew's Surgery.

- Ashhurst's International Encyclopædia of Surgery.

- Obstetrics*: Lusk's Midwifery.

- Hirst's System of Obstetrics; Barnes's Obstetrics.

- Gynæcology*: Goodell's Lessons in Gynæcology.

- Thomas on Diseases of Women; Emmett's Gynæcology.

- Diseases of Children*: Starr.

- Meigs and Pepper; Keating, Cyclopædia of Diseases of Children.

- Medical Jurisprudence and Toxicology*: Reese.

- Reese's Manual of Toxicology; Taylor's Medical Jurisprudence, by Reese.

The cost of the necessary text-books is about \$50, distributed over the three years.

ORDER OF LECTURES, DAILY.—FIRST YEAR. 1889-90.

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<i>Hour.</i>	<i>Monday.</i>	<i>Tuesday.</i>	<i>Wednesday.</i>	<i>Thursday.</i>	<i>Friday.</i>	<i>Saturday.</i>
9 A.M.	General Chemistry.	General Chemistry.	Chemical Laboratory, two hours.		Dissection.	Dissection or Phila. or Penna. Hospital, Medical and Surgical Clinics, 10 to 12.
10 A.M.	Hygiene.	Chemical Laboratory, two hours.		Topographical Anatomy.		
11 A.M.	Topographical Anatomy.			Osteology.	General Pathology.	Materia Medica.
12 M.	Practical Normal Histology, one section two hours. Others Osteology or Dissection.	Practical Normal Histology, one section two hours. Others Osteology or Dissection.	Practical Normal Histology, one section two hours. Others dissect or attend Med. and Surg. Clinics, U. H.	Practical Normal Histology, one section two hours. Others Osteology or Dissection.	Practical Normal Histology, one section two hours. Others Osteology or Dissection.	Dissection or Medical and Surgical Clinics, U. H.
1 P.M.						
3½ P.M.		Anatomy.	Histology.	Anatomy.	Anatomy.	
4½ P.M.	Physiology.		Physiology.	Bandaging, Lecture, until Dec. 15th.	Physiology.	
7½ P.M.	Pharmacy, Laboratory. Half the class.	Bandaging, sections, until Dec. 15th.	Pharmacy, Laboratory. Half the class.	Bandaging, sections, until Dec. 15th.	Bandaging, Sections, until Dec. 15th.	

DEPARTMENT OF MEDICINE.

For the study of Histology, Osteology and Syndesmology, the class is divided into sections, one of which is occupied at a time. Students not thus engaged dissect *after* December 1st, or if not otherwise occupied may attend general Clinics.—See SPECIAL ROSTER.

ORDER OF LECTURES, DAILY.—SECOND YEAR. 1889-90.

<i>Hour.</i>	<i>Monday.</i>	<i>Tuesday.</i>	<i>Wednesday.</i>	<i>Thursday.</i>	<i>Friday.</i>	<i>Saturday.</i>
8½ A.M.						Medical Chemis- try, Laboratory two hours.
9 A.M.			Phila. Hospital, Gynæcol. Clinic.	Medical Chemistry.	Medical Chemis- try, Laboratory, two hours.	
10 A.M.	Physical Diag- nosis, Practice by Sections.	Physical Diag- nosis, Practice by Sections.	Phila. or Penna. Hospital, Medi- cal and Surgical Clinics.	Topographical Anatomy.		Phila. or Penna. Hospital, Medi- cal and Surgical Clinics.
11 A.M.	Topographical Anatomy.	Morbid Anatomy.		Surgery.	Morbid Anatomy.	
12 M.	Practice.	Surgery.	Practical Pathol. Histology, one section two hours. Others attend Gynæcol- ogical and Gen- eral Surgical Clinic, U. H.	Medical Clinic.	Surgery.	Practical Pathol. Histology, one section two hours. Others attend General Medical and Surgical Clinic, U. H.
1 P.M.	Practical Pathol. Histology, one section one hour. Others attend Clinic, Diseases of the Ear, U. H.	Practical Pathol. Histology, one section one hour. Others attend Clinic, Skin Diseases, U. H.		Practical Pathol. Histology, one section one hour. Others attend Clinic, Diseases of Eye, U. H.	Practical Pathol. Histology, one section one hour. Others attend Clinic, Nervous Dis- eases, U. H.	
3½ P.M.	Obstetrics, until Mar. 1. Embry- ology after Mar. 1	Anatomy.	Obstetrics, until Mar. 1. Embry- ology after Mar. 1	Anatomy.	Anatomy.	Physical Diag- nosis, Practice by Sections.
4½ P.M.	Physiology.	Phys. Diagnosis, Practice by Sec.	Physiology.	Therapeutics.	Physiology.	Therapeutics.
5½ P.M.		Practice.		Practice.		
7½ to 10 P.M.	Dissection.	Dissection.	Dissection.	Dissection.	Dissection.	

U. H. University Hospital.

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 engaged attend Clinics.

ORDER OF LECTURES, DAILY.—THIRD YEAR. 1889-90.

<i>Hour.</i>	<i>Monday.</i>	<i>Tuesday.</i>	<i>Wednesday.</i>	<i>Thursday.</i>	<i>Friday.</i>	<i>Saturday.</i>
10 A.M.	Clinic, Diseases of Children, U. H., until Jan. 1st.	Demonstrations in Morbid Anatomy, section.	Phila. or Penna. Hospital, Medical and Surgical Clinics.	Autopsies, 9 o'clock. Demonstrations in Morbid Anatomy, section.	Demonstrations in Morbid Anatomy, Section, 9 o'clock. Med. Jurisprudence.	Phila. or Penna. Hospital, Medical and Surgical Clinics.
11 A.M.	Orthopædics, U. H. Dem. in Morbid Anatomy, section.	Morbid Anatomy.		Surgery.	Morbid Anatomy.	
12 M.	Practice.	Surgery.	Gynæcological Clinic, U. H.	Medical Clinic.	Surgery.	Medical Clinic, U. H.
1 P.M.	Clinic, Diseases of the Ear, U. H. Ward Classes, U. H.	Clinic, Diseases of the Skin, U. H. Ward Classes, U. H.	Surgical Clinic, U. H.	Clinic, Diseases of the Eye, U. H. Ward Classes, U. H.	Clinic, Nervous Diseases, U. H. Ward Classes, U. H.	Surgical Clinic, U. H.
3½ P.M.	Obstetrics.		Obstetrics.	Didactic Gynæcology, U. H.	Didactic Dermatology, until Jan. 1st.	Obstetrics.
4½ P.M.	Operative Surgery and Fracture Dressing, Lecture.	Didactic Ophthalmology, U. H.	Didactic Otolaryngology until Jan. 1st, U. H. Operative Obstetrics, sections, after Jan. 1st.	Therapeutics.	Practical Surgery, two sections, two hours.	Therapeutics.
5½ P.M.	Practical Surgery, two sections.	Practice.		Practice.	Operat. Obstetrics, sections, after Jan. 1st.	

U. H. University Hospital.

For WARD CLASS instruction the Third Year class is divided into sections. See SPECIAL ROSTER. Students of the Third Year are practically instructed in sections in BACTERIOLOGY by Dr. FORMAD.

ORDER OF LECTURES, DAILY.—FOURTH YEAR. 1889-90.

<i>Hour.</i>	<i>Monday.</i>	<i>Tuesday.</i>	<i>Wednesday.</i>	<i>Thursday.</i>	<i>Friday.</i>	<i>Saturday.</i>
10 A.M.	Clinic, Diseases of Children, U. H., until Jan. 1st.			Autopsies. 9 o'clock.	Medical Jurisprudence.	
11 A.M.	Orthopædics, U. H.		Phila. or Penna. Hospital, Medical, Surgical and Gynæcological Clinics.	Practical Instruction, Orthopædics, until Jan. 1st, U. H. Practical Laryngology, after Jan. 1st, U. H.		Phila. or Penna. Hospital, Medical, Surgical and Gynæcological Clinics.
12 M.		Practical Gynæcology.	Gynæcological Clinic, U. H.	Medical Clinic.	Clinical Surgery, U. H.	Medical Clinic, U. H.
1 P.M.	Clinic, Diseases of the Ear, U. H.	Clinic, Diseases of the Skin, U. H.	Surgical Clinic, U. H.	Clinic, Diseases of the Eye, U. H.	Clinic on Nervous Diseases, U. H.	Surgical Clinic, U. H.
2 P.M.			Practical Ophthalmology, U. H.	Practical Dermatology, U. H.		
3½ P.M.	Mental Diseases.	Practical Instruction, Nervous Diseases, U. H.	Electro-Therapeutics, until Jan. 1st, U. H. Practical Instruction, Otolology, after Jan. 1st, U. H.	Didactic Gynæcology, U. H.	Didactic Dermatology, until Jan. 1st.	
4½ P.M.	Operat. Obstetrics, until Jan. 1st.	Didactic Ophthalmology, U. H.		Clinical Medicine. Ward Class.	Genito-Urinary Diseases, until Jan. 1st. Operat. Surgery, after Jan. 1st.	Clinical Medicine. Ward Class until Jan. 1st.

U. H. University Hospital.

ROSTER OF BEDSIDE INSTRUCTION AND SPECIAL
CLINICS FOR STUDENTS OF THE THIRD YEAR.
SESSION 1889-1890.

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 Thursday, Oct. 3d, to Friday, Nov. 15th, 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. 18th, to Friday, Jan. 10th, inclusive.

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. 13th, to Friday, Feb. 28th, 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, March 3d, to Tuesday, April 11th, incl.

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

This arrangement enables each section to attend, during an equal portion of the term, the clinical lectures on special subjects, as follows:—

1 P. M.

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

The entire Third Year Class attend the General Medical, Surgical, and Gynæcological Clinics, held on Wednesday and Saturday, from 12 to 2 o'clock, in the Upper Lecture Room; also Medical Clinic on Thursday, at 12 o'clock, and the Demonstrations in Morbid Anatomy, by Prof. Guitéras and Dr. Formad, at 10 and 11 o'clock according to following

ROSTER OF LABORATORY INSTRUCTION IN PATHOLOGY AND INSTRUCTION IN ORTHOPÆDICS,
FOR STUDENTS OF THE THIRD YEAR.
SESSION 1889-1890.

For attendance upon these courses, the Third Year Class is divided into four sections, A, B, C, and D, which attend as follows:—

1st Period. *From Thursday, Oct. 3d, to Friday, Nov. 15th, inclusive.*

	Monday.	Tuesday.	Thursday.	Friday.
Prof. Guitéras and Dr. Formad . . .	D	A	B	C
“ Willard	A B C	—	—	—

2d Period. *From Monday, Nov. 18th, to Friday, Jan. 10th, inclusive.*

Prof. Guitéras and Dr. Formad . . .	C	A	B	D
“ Willard	A B D	—	—	—

3d Period. *From Monday, January 13th, to Friday, Feb. 28th, inc.*

Prof. Guitéras and Dr. Formad . . .	B	A	C	D
“ Willard	A C D	—	—	—

4th Period. *From Monday, March 3d, to Friday, April 11th, inc.*

Prof. Guitéras and Dr. Formad . . .	A	B	C	D
“ Willard	B C D	—	—	—

The instruction in Orthopædics is given at the University Hospital at 11 o'clock; in Pathology, in the Pathological Laboratory.

SPECIAL ROSTER OF LABORATORY INSTRUCTION IN HISTOLOGY, OSTEOLOGY AND SYNDESMOLOGY,
FOR STUDENTS OF THE FIRST YEAR.
SESSION 1889-1890.

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	—	All.	E & A	—	—

All students not occupied during the above hours dissect from 12 to 2 daily, and from 9 to 11 Friday.

GRADUATION.

At the close of the third year, a student who has passed all examinations satisfactorily 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 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. (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 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.*

ADDITIONAL INSTRUCTION.

In addition to the required Course and to the voluntary fourth year, Clinics, both general and special, and Lectures, both Theoretical and Practical, are continued after Commencement until about June 10th. All subjects connected with the fundamental departments of medicine, or with its several subdivisions, as determined by usage, are thoroughly taught in one or other of these courses ; and it is strongly urged upon all students,

* The University of Pennsylvania, in common with the Jefferson Medical College of Philadelphia, the College of Physicians and Surgeons, the University of the City of New York and the Bellevue Hospital, Medical College of New York and the Harvard Medical School of Boston, is *recognized* by the Royal College of Physicians, Lond. and Royal College of Surgeons, England, to this extent, that its graduates are exempt from the first examination and admissible to the second and third examinations of the joint examining board on producing their Degree, together with evidence of having passed a preliminary examination in general education, and evidence of four years' study, without necessarily producing all the certificates required, 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.

especially those of the second and third years, to continue their studies during the spring and summer, and, by all means, to pursue the studies of the fourth year.

ARRANGEMENT OF SESSIONS.

The Academic Year is divided into two Sessions: 1st, the WINTER SESSION, on which alone attendance is required, and which is preceded by a short INTRODUCTORY COURSE, and, 2d, the SPRING SESSION.

The SPRING SESSION, 1890, begins Monday, May 5th, and continues until Commencement Day, in June.

The INTRODUCTORY COURSE for the Session of 1890-91 begins Monday, September 22d.

The WINTER SESSION, 1890-91, begins on Wednesday, October 1st, and ends at Commencement, early in May, 1891.

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

EXPENSES.

WINTER TERM.

First Year.

Matriculation Fee	\$5 00
For general ticket, admitting to all the lectures and laboratory work assigned to this year, including dissection	\$150 00
Dissecting material	\$1 a part.

Second Year.

For general ticket, admitting to all the lectures and laboratory work assigned to this year, including dissection	\$150 00
Dissecting material	\$1 a part.

Third Year.

For general ticket, admitting to all the lectures and practical work assigned to this year, including operating and bandaging (no graduation fee)	\$150 00
For the full third year course to graduates of other schools, including privilege of applying for graduation (no graduation fee)	150 00
Material for operating	\$1 a part.

Fourth Year. (Voluntary.)

For general ticket, including all the practical courses of this year (no graduation fee)	\$100 00
To graduates of other schools	150 00
To graduates of other schools, with the privilege of attending the didactic courses of the third year, and applying for graduation (no graduation fee)	200 00

The Tuition fee of \$150 each year is *on condition that it is paid before November 1st*. If a division of payments is desired the fee will be \$155 for the year. Eighty dollars to be paid before November 1st, and \$75 before February 1st. (For Session 1890-91.)

SPRING SESSION.

Matriculation fee (paid once only)	\$5 00
Tuition fee	30 00

This sum will be credited on account of the fee for the ensuing Winter Term.

FEES FOR SPECIAL COURSES.

(Students taking special or partial courses, if not graduates of the School, are required to pay the matriculation fee, in addition to the fees named below.)

For the full third Course, including bandaging and operating, to graduates of this school	\$75 00
For a single Course of Lectures, except Materia Medica	20 00
For Practical Course in the Chemical Laboratory	25 00
For the Course in Practical Gynæcology of the third 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 the practical courses.

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 is returned. 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 named below.

Board can be obtained in Philadelphia for \$4 per week and upwards.

SCHOLARSHIPS.

A competitive examination of candidates to fill four free scholarships is held annually. (In 1890, on Wednesday, September 24th, at 12 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 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 necessary certificate required by the first condition, to the Dean of the Faculty of Medicine, *before September 15th*, and appear without further notice.

FACILITIES FOR INSTRUCTION.

The instruction in the Medical Department is conducted in the MEDICAL HALL, the LABORATORY BUILDING, and the HOSPITAL OF THE UNIVERSITY.

The Medical Hall contains the Wistar and Horner Museum, the Histological, Osteological, Physiological, Pathological, and Pharmaceutical Laboratories.

THE STILLÉ MEDICAL LIBRARY, the judicious selection and generous gift of PROF. ALFRED STILLÉ, at its foundation in 1879, has received numerous additions, and now contains over six thousand volumes and five thousand pamphlets. It will be appropriately placed in the NEW LIBRARY BUILDING now being erected.

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. The Museum is open on Wednesdays and Saturdays, from 9 A.M. to 12 M., throughout the session, 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 Dr. Henry H. Smith, Emeritus Professor of Surgery, and of the late Emeritus Professor of Clinical Surgery, Dr. John Neill, the University has a further extensive and valuable gift of morbid specimens, models and drawings. Dr. D. Hayes Agnew, Emeritus Professor of Surgery and Honorary Professor of Clinical Surgery, has also presented his entire collection for the use of the surgical chair.

THE HISTOLOGICAL LABORATORY is under the supervision of the Professor of Histology. The laboratory is furnished with excellent microscopes, and all apparatus necessary to enable the first course 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 it is open for those who desire a course embracing those refinements and minutiae, 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. The first year student is required, in this Laboratory,

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 Demonstrator. 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 and who desire to pursue 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 Demonstrator, was opened in 1874, and attracts, from remote sections of the country, many physicians and students who desire special preparation in Microscopic Technology, Normal and Pathological Histology, Bacteriology and Experimental Pathology. It is furnished with microscopes and all 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 Urine.

Each student of the third year receives advanced practical instruction in Morbid Anatomy, and in the making of autopsies. Weekly demonstrations of the gross appearance of specimens, embracing all known morbid products, mostly in fresh condition, along with the microscopic sections, are features of this course.

The practical work, during the regular winter session, is obligatory on students of both the second and the third year.

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 Demonstrators of Pharmacy. It is furnished with tables and 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 apparatus and instruments necessary for the study of the physiological action of medicines.

THE DEPARTMENT OF PRACTICAL OBSTETRICS is under the care of the Professor of Obstetrics and the Demonstrator. It includes operations on the cadaver and with the manikin, while lying-in cases are given to advanced students. See also under MATERNITY PAVILION.

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., carefully adapted to the requirements of this department. The entrance is on Spruce Street.

The second and third floors are fitted up as chemical laboratories; on the second is the laboratory of General Chemistry, and on the third 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 Working Laboratories for Practical Chemistry are under the supervision of the Professor of Chemistry and the Demonstrator, with assistants. Students of the First Year devote four 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 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 four 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 can be kept perfectly clean. There are numerous washstands 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 the middle of September to the latter part of June, under the superintendence of the Professor of Anatomy and the Demonstrators.

PRACTICAL SURGERY.—The application of bandages is taught to students in their First Year, while the use of fracture-dressings and surgical operations on the cadaver are a part of the practical instruction to students of the Third Year, under the supervision of the Professor and Demonstrators of Surgery. Instruments and splints are supplied without expense to the student.

THE HOSPITAL OF THE UNIVERSITY OF PENNSYLVANIA.

The University Hospital, constructed according to the best established principles of hospital architecture, is provided with all the appliances pertaining to such institutions of the best class. It is adjacent to the new Medical Hall, and forms an integral portion of the Medical Department. In its various departments, during 1888, there were treated 8,889 cases, representing almost

all of the known medical, surgical, and gynæcological affections. Owing to its situation within a very short distance of numerous railroads, the hospital is pre-eminently the refuge of cases of severe injury and of acute surgery. 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 to the more advanced among them to gain a personal and practical acquaintance with Clinical Medicine, 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. This 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 every year selected by competitive examination from among the graduating class of the University. The next examination will be held Tuesday, April 29th, 1890, at 12 M.

MATERNITY PAVILION.

The Maternity Pavilion of the University Hospital, which will form one wing of the Maternity Hospital to be erected in the near future, was opened in the autumn of 1889. It has a maximum capacity of 15 confinement cases a month. Two students of the graduating class are assigned to each case four weeks before the expected delivery. Under the supervision of a demonstrator a thorough examination is made of the patient's history and present condition, with special reference to the urine, pelvis and abdomen. The labor is conducted by the students in charge of the case, under the instruction of a resident physician, and daily visits are made, during the puerperum, to the mother and child. The patient's safety is guarded by a strict system of antisepsis, and unnecessary exposure is avoided by giving to each woman a separate room for 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 beside 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 given, too, at the CHILDREN'S HOSPITAL. There are also weekly Clinics in Medicine and Surgery at the GERMAN HOSPITAL. 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. With one or two exceptions 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.

THE STILLÉ, H. C. WOOD, WILLIAM PEPPER AND D. HAYES AGNEW MEDICAL SOCIETIES.

These Societies are composed of Second and Third year students. Their meetings are held bi-weekly during the winter session for the reading and discussing of papers referring to the theory and practice of medicine and surgery.

PRIZES.

THE MEDICAL NEWS PRIZE of One Hundred Dollars is awarded to the member of the Graduating Class for the best Essay.

THE ALUMNI MEDAL is awarded 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.

A PRIZE OF A SURGICAL POCKET-CASE is also awarded by the Demonstrator of Anatomy to the member of the Graduating Class who shall present the best record of the anomalies found in the anatomical rooms.

TWO PRIZES are awarded 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 Twenty-five Dollars is annually awarded 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.

A PRIZE of a copy of Ashhurst's Surgery will be awarded by the Demonstrator of Osteology to the member of the first-year class passing the best examination in Osteology.

AN ALUMNUS offers a prize of \$100 to the graduate passing the best examination in Practical Pathology and Microscopy.

A second ALUMNUS offers a Prize of \$50 for the best thesis on any subject connected with Pathology.

The Professor of Obstetrics offers a Prize of a pair of 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 Clinical Professor of Orthopedic Surgery offers a Prize of an Antiseptic Minor Operating Case for the best essay upon "The Effect of Heredity upon Tuberculous Disease in Joints and Bones."

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* shall 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.

It is urgently requested that as many as possible of 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.

OFFICERS FOR 1889.

President—ALFRED STILLÉ, M.D., LL.D.

Vice-Presidents—MEREDITH CLYMER, M.D.

W. S. W. RUSCHENBERGER, M.D.

TRAILL GREEN, M.D.

D. HAYES AGNEW, M.D.

Secretary and Treasurer—THOMAS R. NEILSON, M.D., 223 South 17th St., Philadelphia.

Chairman of Executive Committee—S. D. RISLEY, M.D., 1722 Walnut St., Philadelphia.

The Alumni Society has just completed the catalogue of the graduates of the Medical Department by the publication of an appendix, covering the years 1878-87, inclusive. Catalogues may be obtained by addressing, or applying to Mr. Wm. H. Salvador, Clerk of the Medical Department, University.

Price: Catalogue, *complete*, \$1.25

Appendix alone,25

Alumni are requested to send 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.

AUXILIARY DEPARTMENT OF MEDICINE.

FACULTY.

WILLIAM PEPPER, M.D., LL.D., PROVOST, and *ex-officio* President.
 JOHN J. REESE, M.D., Professor of Medical Jurisprudence and
 Toxicology.
 JOSEPH T. ROTHROCK, B.S., M.D., Professor of Botany.
 JOSEPH LEIDY, M.D., LL.D., Professor of Comparative Anatomy
 and Zoölogy.
 SAMUEL G. DIXON, M.D., Professor of Hygiene.
 EDWARD D. COPE, Ph.D., Professor of Mineralogy and Geology.

SAMUEL G. DIXON, *Dean*.

MATRICULATES.

Boone, Emma V., M.D.,	Philadelphia.
Brecker, Wm. H., M.D.,	do.
Casselberry, W. E., M.D.,	Illinois.
Chidsey, Russel W.,	Easton.
Culin, Walter,	Philadelphia.
Doan, Henry H.,	do.
Eagleton, S. Potts,	do.
Galloway, Albert B., M.D.,	do.
Geist, Jas. Welker,	Bechtelsville.
Jamison, W. B., M.D.,	Philadelphia.
Leisher, Chas. A.,	McAlisterville.
Maison, Robert S., A.B.,	Philadelphia.
Morton, Samuel W., M.D.,	do.
Phillips, Horace,	do.
Price, Lucius G.,	New York.
Reynolds, Fred. P.,	do.
Samaniego, José A.,	Mexico.
Sanderlane, Henry,	Philadelphia.
Schneider, Louis T.,	do.
Strayer, Edgar,	Patterson, N. J.
Welty, Cevilin F.,	Canton, Ohio.
	Total, 21.

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 1890-91 will begin on Wednesday, October 1st, and continue until the early part of May.

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

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 required in the two years' course in the Biological School of this University, in the following branches,—Botany and Comparative Anatomy,—passed their examinations in Medical Jurisprudence and Toxicology, Hygiene and Mineralogy and Geology, presented to the Dean one month before examinations an original Thesis acceptable to the Faculty upon some subject connected with these studies, 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.

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, small-pox, 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. 94-96.

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. 1 and 2.
 Gray's *Manual of Botany*.
 Parkes' *Manual of Hygiene*.

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*.

The *Medical Staff* and *Officers* of the Hospital are given on pages 126, 127.

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 G. 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 twenty-four rooms for private patients. The wing adjoining has five wards, with a capacity of one hundred and ten patients, and four private rooms. The wing for Chronic Diseases has room for sixty-two patients in its six wards. There is therefore full accommodation for one hundred and eighty-six patients. In the basement are surgical and medical dispensaries for out-door patients. In connection with the Orthopædic Dispensary is a workshop, in which braces and other appliances are made.

The hall-ways 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 proportion 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-four, the prices range from \$12.00 to \$25.00 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 \$4.50 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 all times.

Visitors are admitted to the wards on week-days between 3 and 4 P.M. Under no circumstances are they admitted on Sunday, except in case of near relatives of patients whose condition is very critical.

There are elected annually from the graduating class of the Medical School six Resident Physicians, who come on duty for fifteen months at intervals of three months.

An Annual Report of the Hospital is published, giving minute 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 Locke, and not to the Dean or Secretary of the Medical Faculty.

DEPARTMENT OF DENTISTRY.

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.
JOSEPH LEIDY, M.D., LL.D., Professor of Anatomy.
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 Normal Histology.
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.

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|-----------------------|-----------------------|
| 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, | DR. H. C. LONGNECKER. |

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 Mechanical Dentistry.
- FREDERICK W. AMEND, JR., D.D.S., Assistant Demonstrator of Mechanical Dentistry.
- MILTON N. KEIM, Jr., D.D.S., Assistant Demonstrator of Mechanical Dentistry.
- HORACE McCANNA, 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.
- JOHN G. FULLER, D.D.S., Assistant Demonstrator of Mechanical Dentistry.
- LUTHER M. WEAVER, D.D.S., Assistant Demonstrator of Operative Dentistry.
- JOHN B. DEEVER, M.D., Demonstrator of Anatomy.

MATRICULATES.

SECOND YEAR.

Addicks, Hinrich,	Brake, Germany,	University of Leipzig, Berlin and Kiel.
Barnard, William E.,	Still Pond, Md.,	R. H. John.
Bowman, Ira C.,	Lebanon,	J. P. Bowman.
Burket, Frank S.,	Stormstown,	C. C. Walker.
Chemlin, Wilhelm,	Hamburg, Germany,	University of Berlin.
Clement, Frederick G.,	Oxford,	J. M. Clement.
Cohn, Alfred J.,	Milwaukee, Wis.,	B. G. Maercklein.
Compton, James D.,	Churchtown,	John B. Robinson.
Couto, Henrique S. do.,	Rio de Janeiro, Brazil,	Dental Dept., Med. Fac., Rio de Janeiro.
Crothers, J. Ernest,	Greenfield, Ohio,	Edwin J. Waddel.
Davenport, Kirk A.,	Union, N. Y.,	I. B. Davenport.
Davenport, William S.,	Union, N. Y.,	I. B. Davenport.
DeHaven, William W.,	Churchtown,	University.
Dilk, Justino S.,	Rio de Janeiro, Brazil,	Dental Dept., Med. Fac., Rio de Janeiro.
Doebbelin, Carl,	Berlin, Germany,	University of Berlin.
Drossel, Johann Otto,	Zurich, Switzerland,	University of Zurich.
Dunn, William C.,	Meadville,	D. C. Dunn.
Eagan, Owen J.,	Fall River, Mass.,	University.
Emerson, Charles A.,	Bellefontaine, Ohio,	University.
Evans, Milton H.,	Tremont,	University.

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| Fair, Delbert D., | Freeport, Ills., | J. Edw. DeWalt. |
| Faye, Clement de., | Geneva, Switzerland, | Univ. of Geneva. |
| Faye, Edward de., | Geneva, Switzerland, | Univ. of Geneva. |
| Finlayson, A. Kay, L.D.S., | Edinburgh, Scotland, | Royal Coll. of Surg. |
| Flotzinger, Aloysius, | Pittsburgh, | University. |
| Foster, A. Lee, | Philadelphia, | University. |
| Freeman, Stewart, | Milton, Nova Scotia, | University. |
| French, Arthur T., | Ocala, Fla., | University. |
| Geilfuss, Edwin A., | Milwaukee, Wis., | W. C. Wendel. |
| Girdwood, John, L.D.S., | Edinburgh, Scotland, | Royal Coll. of Surg. |
| Graves, Edwin D., | Philadelphia, | C. E. Graves. |
| Haupt, J. A. Jacob, | Pittsburgh, | H. L. Reinecke. |
| Heitmüller, Karl, | Goettingen, Germany, | University of Berlin. |
| Holly, Sabourin, | Port au Prince, Hayti, | University. |
| Hyatt, L. Stanford, | Connellsville, | University. |
| Hyndman, G. Edward, | Sherbrooke, Canada, | L. W. Dowlin. |
| Jackson, Harvey N., | Columbus, Wis., | Geo. C. Kollock. |
| Keener, George I., | Morgantown, W. Va., | Geo. B. Morris. |
| Knight, Thomas B. P., | Philadelphia, | Phila. Dental Coll. |
| Küsel, George C., | Philadelphia, | G. J. R. Miller. |
| Lane, James G., | Shirleysburg, | T. M. Rhodes. |
| Lankester, Frank J., | Leicester, England, | National Dental Hos- |
| L.R.C.P., L.D.S., | | pital, London, Eng. |
| Leard, Norman W., | Tryon, P. E. I., | University. |
| Leech, William W., | Philadelphia, | H. K. Leech. |
| Lohoff, Moritz, Zahnarzt, | Giessen, Germany, | University of Leipzig, |
| | | Berlin and Giessen. |
| Lombard, Rafael M., | Cienfuegos, Cuba, | University. |
| Ludwick, John G., | Honey Brook, | J. H. Sahler. |
| McCartney, Frank M., | Meadville, | University. |
| Matten, Harry D., | Port Clinton, | University. |
| Norton, David A., | Madison, Wis., | W. D. Stillman & E. |
| | | C. Weston. |
| O'Bourke, John M., | Trinidad, Cuba, | University. |
| O'Hara, Patrick J., | Parsons, | University. |
| Paynter, Geo. Janvier, | Philadelphia, | John C. Paynter. |
| Proctor, George S., | Pittsburgh, | S. S. Macfarlane. |
| Pugh, Abe L., | Pittston, | John McDougall. |
| Requa, Herbert D., | Rochester, N. Y., | Davis & Link. |
| Romig, E. Lincoln, | Philadelphia, | G. J. R. Miller. |
| Root, Clarence M., | Lockport, N. Y., | T. J. Campbell. |
| Rossbach, Edward E., | Coburg, Germany, | Phila. Dental Coll. |
| Sacaza, Santiago, | Granada, Nicaragua, | University. |
| Sayres, B. Franklin, | Philadelphia, | University. |
| Shennan, Lawson S., L.D.S. | Edinburgh, Scotland, | Royal Coll. of Surg. |
| Snyder, Charles L., | Freeport, Ills., | Allen & Sunderland. |
| Spencer, Walter A., | Pleasant Mount, | University. |
| Stevens, Frederick W., | Dartmouth, N. S., | University. |
| Stewart, Howard T., | Greenville, Miss., | W. B. Stewart. |
| Story, Horace B., | Greenfield, Ohio, | G. W. Hubbard. |
| Trout, Will H., | Lancaster, | Martin H. Musser. |
| Valiente, Francis P., | Santiago, Cuba, | University. |

Whitmarsh, Herbert D.,	Cortland, N. Y.,	Chas. W. McCall.
Williams, G. Frank,	Bridgeport, Conn.,	C. W. Strang.
Wood, Linneaus B.,	New Bedford, Mass.,	Joseph Head.

Students of the Second Year, 72.

FIRST YEAR.

Aaron, Joseph B.,	Buffalo, N. Y.,	Ellis & Payne.
Adamy, W. Lynn,	Union, N. Y.,	S. W. Adamy.
Archinard, Louis D.,	New Orleans, La.,	A. G. Friedrichs.
Arrington, Wm. T., Jr.,	Memphis, Tenn.,	University.
Baird, J. Free,	Adamsville,	M. H. Felzer.
Barlow, Myron,	Peru, Mass.,	University.
Barnard, George M. C.,	Ware, Mass.,	University.
Barnes, Charles H.,	Philadelphia,	University.
Boennecken, Henry, M.D.,	Berlin, Germany,	University.
Booker, Warren E.,	Worcester, Mass.,	University.
Borja, Arturo,	Mexico, Mexico,	University.
Brenizer, William I.,	Akron, Ohio,	J. H. Lancy.
Brown, Oswald M.,	Paris, Ills.,	J. E. Adams.
Burnett, James R.,	Paris, Ills.,	J. E. Adams.
Caldwell, Frank L.,	New York, N. Y.,	University.
Caldwell, Obe B.,	Danville, Ky.,	J. H. Letcher.
Carnill, Samuel,	Duncansville,	N. P. Duffy.
Carpenter, Elliott R.,	Grand Rapids, Mich.,	C. C. Chittenden.
* Chambers, Percy A.,	Pittsfield, Mass.,	University.
Chupein, Charles P.,	Philadelphia,	Theo. F. Chupein.
Clearwater, Herbert B.,	Scranton,	University.
Cregan, William H.,	Ware, Mass.,	University.
Darrach, James S.,	Philadelphia,	University.
Davis, Charles H.,	Tionesta,	W. W. Freeman.
Deuel, Ernest C.,	Sacramento, Cal.,	I. G. Shaw.
Dilts, Charles H.,	Trenton, N. J.,	D. N. Merrill.
Dreher, Augustus H.,	Mt. Pleasant, N. C.,	University.
Fogg, J. Milton,	Philadelphia,	Isaac S. Fogg.
Frey, George J.,	Buffalo, N. Y.,	University.
Gardiner, William H.,	Auburn, N. Y.,	F. E. Maine.
Green, Edson M.,	Scranton,	University.
Haines, Samuel S.,	Rancocas, N. J.,	University.
Haines, William H.,	Cambridge, Ohio,	Otto Arnold.
Herrera, Domingo,	Havana, Cuba,	University.
Hertz, Charles D.,	Milton,	G. E. Hertz.
Hicks, Edward H.,	Philadelphia,	University.
* Hill, Joseph M.,	Philadelphia,	University.
Horter, William B.,	Philadelphia,	University.
Howe, Fred. B.,	Ithaca, N. Y.,	F. S. & J. B. Howe.
Jacobi, Sydney F.,	Evansville, Ind.,	G. W. Entsminger.
Joy, Fred. D.,	Ilion, N. Y.,	C. Cutler Smith.
Larkins, Edward V.,	Philadelphia,	University.
Laros, Henry M.,	Allentown,	University.
Lawton, Burtis E.,	Omaha, Neb.,	Whinnery & Keim.
Lawton, George A.,	New Haven, Conn.,	D. L. Church.

Levkowicz, Marcus W.,	San José, Costa Rica,	University.
McCarthy, Thomas A.,	Nashua, N. H.,	University.
McKee, Josiah A., Jr.,	Philadelphia,	University.
Macdonald, Robert,	Brisbane, Australia,	University.
MaGuire, Michael,	Tidioute,	R. H. Stillson.
Mayer, J. Fred.,	Mauch Chunk,	J. A. Mayer.
Miller, Archibald,	Pittston,	John McDougall.
Moré, Louis Anthony,	Holyoke, Mass.,	G. A. Maxfield and A. De Couagne.
Müller, Heinrich,	Schaffhausen, Switz.,	Gschwend and Billeter.
Naramore, Frank L.,	Rochester, N. Y.,	E. G. Link.
O'Conner, Patrick J.,	Pittsburgh,	H. L. Reinecke.
Ossa, Louis E. de la,	Panama, U. S. of Col.,	University.
* Patterson, Joseph H.,	Philadelphia,	University.
Perry, Edward H., Jr.,	Dorchester, Mass.,	University.
Putnam, Leon E.,	Towanda,	P. J. & G. H. Smith.
Rauch, Louis E.,	Philadelphia,	University.
Ridgway, Shessie,	Coatesville,	Wm. H. Shannon.
Root, Frederick W.,	Pittsfield, Mass.,	S. S. Stowell.
Rounds, Louie J.,	Vestal, N. Y.,	University.
* Runge, William,	St. Charles, Mo.,	University.
Sallada, Earl Jay.,	Ashland,	University.
Schwacke, Joseph W.,	Charleston, S. C.,	University.
Siddall, William A.,	Oberlin, Ohio,	J. F. Siddall.
Smith, Fred. A.,	Frankfort, N. Y.,	C. Cutler Smith.
* Smith, Harry D.,	Vineand, N. J.,	University.
Smith, Julian,	Union, N. Y.,	University.
Speakman, William C.,	Wilmington, Del.,	R. H. John & J. M. Winner.
Stephan, Louis,	Milwaukee, Wis.,	W. C. Wendel.
Tillotson, Charles H.,	Mattoon, Ills.,	S. A. Campbell.
Tinkham, Charles J., Jr.,	Homer, Ills.,	C. P. Howard.
Townsend, William B.,	Beatty,	University.
Ulrich, George R.,	Selinsgrove,	University.
Volk, Robert W.,	Pittsfield, Mass.,	University.
Watts, Clarence V.,	Des Moines, Iowa,	J. Watts.
Waugaman, William H.,	Harrison City,	University.
Wells, Claude E.,	Lamar, Mo.,	H. P. Wells.
Wells, John I.,	Carthage, Mo.,	M. J. McClurg.
Whitbeck, Theodore H.,	Alcove, N. Y.,	H. L. Whitbeck.
White, Elmer B.,	Ithaca, N. Y.,	G. W. Melotte.
Wilson, C. Herbert,	Philadelphia,	University.
Wiltbank, John C.,	Milton, Del.,	University.
Woodcock, Robert P.,	Fall River, Mass.,	A. DeCouagne and Z. V. Carvill.

Students of the First Year, 87.

* Not in attendance.

Students of the Second Year 72
 Students of the First Year 87

Total 159

The total number of new matriculates the present session, including those admitted to advanced standing, is 104.

SUMMARY.

Australia	1	Michigan	1
Brazil	2	Mississippi	1
California	1	Missouri	3
Canada	1	Nebraska	1
Connecticut	2	New Hampshire	1
Costa Rica	1	New Jersey	3
Cuba	4	New York	18
Delaware	2	Nicaragua, C. A.	1
England	1	North Carolina	1
Florida	1	Nova Scotia	2
Germany	7	Ohio	6
Hayti	1	Pennsylvania	56
Illinois	6	Prince Edward Island	1
Indiana	1	Scotland	3
Iowa	1	South Carolina	1
Kentucky	1	Switzerland	4
Louisiana	1	Tennessee	1
Massachusetts	12	U. S. of Colombia	1
Maryland	1	West Virginia	1
Mexico	1	Wisconsin	5
		Total	159

COURSE OF STUDY.

The Course extends over two years, and in each year there are two Sessions, the Winter and the Spring. By this arrangement, students are spared the necessity of securing a preceptor during their stay in the city; the Faculty deem attendance during the spring and summer months equivalent to private instruction. *Such attendance, however, is not to be considered in any way a substitute for the Winter Session.*

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

FIRST 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.	General Chemistry.	General Chemistry.				
10 A.M.	Mechanical Clinic.			Mechanical Clinic.	Mechanical Clinic.	
11 A.M.		Chemical Laboratory.	Chemical Laboratory.			
12 M.						Dental Materia Medica.
1 P.M.	Operative Clinic.	Operative Clinic.	Operative Clinic.	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.		Metallurgy.		Dental Pathology and Therapeutics.	

The curriculum of the first year is identical for Medical and Dental students as far as Anatomy, Chemistry, and Physiology are concerned.

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.	Laboratory of Mechanical Dentistry, or Operative Clinic.	Laboratory of Mechanical Dentistry, or Operative Clinic.	Laboratory of Mechanical Dentistry, or Operative Clinic.	Laboratory of Mechanical Dentistry, or Operative Clinic.	Laboratory of Mechanical Dentistry, or Operative Clinic.	Laboratory of Mechanical Dentistry, or Operative Clinic.
10 A.M.						
11 A.M.						
12 M. to 2 P.M.	Practical Histology.	Practical Histology.	Practical Histology.	Practical Histology.	Practical Histology.	
2 P.M.	Operative Clinic.	Operative Clinic.	Operative Clinic.	Operative Clinic.	Operative Clinic.	
3½ P.M.		Anatomy.	Histology.	Anatomy.	Anatomy.	
4½ P.M.	Physiology.	Operative Dentistry.	Physiology.	Operative Dentistry.	Physiology.	
5½ P.M.	Mechanical Dentistry.		Metallurgy.		Dental Pathology and Therapeutics.	

For the study of Practical Histology the class is divided into five sections, one of which is occupied in the histological laboratory during the hours named. Those of the Senior Year, not thus engaged, attend the Operative and Mechanical Clinics.

In order to facilitate work in the practical departments, and to give full employment to the student, the morning hours of the first year are devoted equally to dental and chemical laboratory work.

During the second year 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 Junior year are divided into sections, thus devoting the morning hours not otherwise engaged to practice in the operative and mechanical rooms.

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 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 in 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 manipulation, the study of the chemical properties of the principal metals, and 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 medicine. 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.

Instruction in General and Special Histology will be given in the histological laboratory to the students of the Senior year, the class being divided into sections. Each student is furnished with a microscope. Lectures will be given by the Professor of this Department, who will also have direct supervision of the class work.

CLINICAL INSTRUCTION.

Seven hours daily (except Saturday) are spent in actual practice under the supervision of the Demonstrators. 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 provided with a place in which they can be locked when not in use. In the operating room, wires are arranged to a number of the chairs for the use of electric pluggers.

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 STILLÉ MEDICAL LIBRARY.

This library, founded by Professor Alfred Stillé, for the purpose of promoting scientific research and literary culture, contains upwards of six thousand bound volumes and as many unbound volumes and pamphlets. During the Winter and Spring Sessions it is open to students and graduates of the Dental Department under appropriate regulations.

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, which are used in illustrating the course of lectures. It is open every Wednesday and Saturday from 9 A.M. to 12 M., throughout the sessions. The matriculation fee in this Department confers admission to the Museum.

SESSIONS.

The *Spring Session*, 1890, begins on Monday, May 5th, and ends the last of June. The work of this session is entirely practical; no lectures are delivered.

The *Introductory Session* begins on Monday, September 22d, and is free to those who enter for the Winter Session.

The *Winter Session*, 1890-91, begins on Wednesday, October 1st, 1890, and ends on May 1st, 1891.

EXAMINATIONS.

At the close of the first year, examinations are held in Chemistry and Materia Medica. If the student fail to pass, a second examination is afforded him at the beginning of the next Winter Session.

The final examination is in Anatomy, Physiology, Operative Dentistry, Mechanical Dentistry and Metallurgy, and Dental Pathology and Therapeutics.

Students who have attended one full term in another dental school recognized by the Faculty will be admitted to the graduating class upon presentation of the required certificate.

Students holding a medical diploma will be admitted to the Senior Class without examination, but will be required to spend a year in the study of practical Dentistry in the Operative and Mechanical Departments, including the regular winters' course of lectures.

Students who have attended but one course in a medical college will be required to take two winter courses in this Department.

An examination is required for entrance to the Junior year. The requirements of this examination are a good English education. Students who have certificates properly attested from colleges, or schools of reputable character, will be accepted without examination.

DEGREES.

At the close of the second year, after passing satisfactorily all examinations, the student will receive the Degree of Doctor of Dental Surgery (D.D.S.), under the following regulations:—

I. The candidate must be of age and of good moral character, and must have attended two full winter sessions—the second, in this institution.

II. 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.

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

SPECIAL NOTICE.

The Board of Trustees of the University of Pennsylvania having adopted the rule of the National Association of Dental Faculties requiring a three years' course in all Dental Colleges and Departments under its jurisdiction, notice is hereby given that matriculates entering this Department at the session of 1891-92 will be required to remain three winter sessions before they are entitled to an examination for the degree of Doctor of Dental Surgery.

TEXT-BOOKS AND WORKS OF REFERENCE.

- On Operative Dentistry and Dental Histology:* Harris's *Principles and Practice*; Tomes's *Dental Surgery*; Taft's *Operative Dentistry*; Tomes's *Dental Anatomy*; Guilford's *Orthodontia*.
- 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*; Klein's *Histology*.
- Dental Follicle:* Legros and Magitot, translated by M. S. Dean.
- On Chemistry:* Fownes's or Wurtz's *Chemistry*; Wormley's *Micro-Chemistry of Poisons*; Muter's *Analytical Chemistry*; 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*; Geo. B. Wood's *Therapeutics*; Wood and Bache's *Dispensatory*.
- On Surgery:* Agnew's *Surgery*; Ashhurst's *Surgery*; Billroth's *Surgical Pathology*.

EXPENSES.

WINTER TERM.

Matriculation Fee	\$5 00
<i>First Year.</i>	
Tuition Fee	\$100 00

Second Year.

Tuition Fee	\$100 00
Fee for Dissection	10 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.

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 upwards. Further information may be obtained from

JAMES TRUMAN, Dean,
3249 Chestnut Street, Philadelphia, Pa.

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 5,162 gold fillings can be appreciated only by the experienced operator.

The number of patients (5,062) 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 1888-9.

Number of Patients 5,062.

Gold Fillings	5,162
Tin Fillings	1,025
Cement Fillings	1,261
Amalgam "	508
Gutta Percha Fillings	795
Canal "	320

MECHANICAL DEPARTMENT.

187

Pulps capped	236
“ devitalized	257
“ extracted	231
Artificial Crowns	151
Pulpitis	411
Treatment Pulp Canals	1,048
Pericementitis	133
Alveolar Abscess	161
Inflammation of Gums	120
Pyorrhœa Alveolaris	118
Irregularities Corrected	91
Salivary Calculi	471
Teeth and Roots extracted	4,287
Total	16,786

Amount of gold used for fillings, and exclusive of that used for plate and crown work in Laboratory, 67 ounces (5 lbs. 7 oz.).

MECHANICAL DEPARTMENT.

Session of 1888-9.

Number of patients 684.

Full cases	336
Partial cases	171
Pivot teeth, Bridge and Crown Work	101
Repairing cases	23
Regulating “	81
Total	712

DEPARTMENT OF VETERINARY MEDICINE.

FACULTY.

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

JOSEPH LEIDY, M.D., LL.D., Professor of Zoölogy.

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 GUITERAS, 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., Assistant Professor of Veterinary
Anatomy.

CHARLES S. DOLLEY, M.D., Professor of General Biology.

———, Professor of Internal Pathology and Zoötechnics.

DEMONSTRATORS.

ALEXANDER GLASS, V.S., Demonstrator of Therapeutics, Materia
Medica, and Pharmacy.

HENRY F. FORMAD, M.D., Demonstrator of Pathology and Morbid
Anatomy.

LOUIS OLRV LUSSON, V.M.D., Demonstrator of Internal Pathology
and Zoötechnics.

GULDIN R. HARTMAN, V.M.D., Demonstrator of Veterinary
Anatomy.

CHALKLEY H. MAGILL, V.M.D., Demonstrator of Veterinary Surgery.

ROBERT FORMAD, V.M.D., Demonstrator of Normal Histology.

GARRETT EDWARDS, Farrier, Demonstrator of Forging and Horseshoeing.

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

MATRICULATES, 1889-90.

THIRD YEAR.

Baer, Benjamin S. J.,	Mount Joy.
Bannister, Harry,	Philadelphia.
Batten, Eugene C.,	Philadelphia.
Cohen, Nathan A.,	Philadelphia.
Dohan, Charles A.,	Philadelphia.
Eddy, Harry L.,	Minneapolis, Minn.
Eshleman, John M.,	Fagg's Manor.
Harrigan, John W.,	Philadelphia.
Jolly, Charles Rudolph,	Philadelphia.
Kean, Thomas J.,	Lock Haven.
Landes, Edgar H.,	Philadelphia.
Larzelere, Samuel D.,	Willow Grove.
Maher, John J.,	Philadelphia.
Meisner, Harry A.,	Baltimore, Md.
Michener, Mayhew,	Colmar.
Millar, Harry C.,	Hatboro'.
Muir, Edwin S.,	Philadelphia.
Oat, Charles F.,	West Chester.
Pearson, Leonard,	Ithaca, N. Y.
Raynor, Thomas,	Philadelphia.
Seitter, Joseph B.,	Philadelphia.
Smith, Frank L.,	Philadelphia.
Tully, Edgar,	Philadelphia.
Turner, John P.,	West Chester.
Zuill, Jeremiah P.,	Bermuda, W. I.

SECOND YEAR.

Bartholomew, J. Cleaver,	Philadelphia.
Bickel, Samuel D.,	Philadelphia.
Bunting, Elwood B.,	Burlington, N. J.
Conard, Milton E.,	West Grove.
Conrow, Abraham E.,	Moorestown, N. J.
Edwards, Warren,	Philadelphia.
Entrikin, Harry D.,	Kennett Square.
Geary, Alfred W.,	Philadelphia.
Herbert, Chas. O.,	Philadelphia.
Jefferis, Joseph R.,	Wilmington, Del.
Moran, Francis A.,	Penlyyn.
Records, John H.,	Lewes, Del.

Senseman, B. Frank,
Tag, William, Ph.G.,
Wheeler, Arthur S.,

Mechanicsburg.
Philadelphia.
New Orleans, La.

FIRST YEAR.

Adams, John William,	Lake City, Minn.
Angney, James R.,	Philadelphia.
Black, Horace P.,	Hammonton, N. J.
Buckingham, D. Eastburne,	Wilmington, Del.
Budd, T. Earl,	Woodbury, N. J.
Earnest, Charles M.,	Philadelphia.
Fennimore, Henry D.,	Rancocas, N. J.
Ferley, John T.,	Philadelphia.
Flood, Edward H.,	Philadelphia.
Graham, Christopher,	Rochester, Minn.
Hazlett, William J.,	Philadelphia.
Houldsworth, James D.,	Philadelphia.
Keely, Horace P.,	Schwenksville.
Munce, Edward A.,	Philadelphia.
Nicholson, Samuel J.,	Philadelphia.
Printz, Charles W.,	Philadelphia.
Sharp, Benjamin F.,	Marlton, N. J.
Smith, George A.,	Philadelphia.
Turnbull, W. A. Wilfrid,	Penistone, England.
Walker, Albert G.,	Walker, Mass.
Walter, Harry,	Scranton.
Wertz, William T. S.,	Philadelphia.

SPECIAL STUDENTS.

Cox, Harry, Ph.G.,	Philadelphia.
Hart, John R.,	Philadelphia.

STUDENTS.

Students of the Third Year	25
Students of the Second Year	15
Students of the First Year	22
Special Students	2
	—
	64

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 exten-

sive 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 and steam 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 fifty horses, dogs, or other animals.

ADMISSION.

Candidates who have received a college degree, or have passed the matriculate examination of a recognized college, or who have 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.

Other candidates for admission are required, *first*, to write an essay (not exceeding a page of foolscap), which may serve as a test in orthography and grammar; *second*, to pass an examination in Elementary physics (Part I. of Fownes's *Chemistry*).

Graduates of recognized Medical Schools, or of recognized Veterinary Schools which require three years' attendance, may enter the second 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.

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, six 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 from the first of October until 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, and Internal Pathology and the Contagious Diseases.*

THIRD YEAR.—*Therapeutics, General Pathology and Morbid Anatomy, Veterinary Surgery and Operative Surgery, Internal Pathology and the Contagious Diseases, Sanitary Police, 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 regular 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 required to do resident duty in the Hospital. 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 dissect-

ing 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 four hours each week to the study of General Chemistry. The course includes chemical manipulations and the detailed study of the chemical re-actions 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 re-actions involved in his work.

Students of the Second Year devote four 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 and Pharmacy are taught in a series of about sixty-four lectures and practical demonstrations by the Veterinary Assistant of the Professor of Therapeutics. This course includes 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 serve one week in rotation 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 Demonstra-

tions 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 the Food Stuffs, the Analysis of Milk, the Action of the Digestive Juices, etc.

A series of Review examinations are held by the Professor, to ensure 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 everyone 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 sup-

posed 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 receives 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 Demonstrator. A detail is made each week 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 serve as dissecting-tables, with movable posts, allowing the animals to be placed in any required position.

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 the 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.

INTERNAL PATHOLOGY AND 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 one entire day 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, and 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, HORSESHOEING.

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, Carcinomas, Inflammation of the Sinus.
- CASTRATION.—Normal, Cryptorchia, Female, Other Animals.
- PATHOLOGICAL, SHOEING.

OBSTETRICS.

A full course of instruction is given in this branch to Senior students, about fifty 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 for 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.

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 the Pennsylvania 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, are required to keep the Clinical Records and to administer the medicines, and are allowed, under the supervision of the Clinical Professors, to perform whatever operations regard for the safety of the animal permits. Students from the Third Year class are assigned duty in the Hospital for one week in rotation, receive

the animals which enter the Hospital, give the required care at night, and perform the duties usually assigned to a "resident."

A detail from the Second Year class compounds all medicines used in the Hospital.

A large number of animals from the private practice of the Professors, as also from the Dispensary practice of the department, are treated at the clinic daily, from 8.30 to 10 A.M., giving abundant material for clinical lectures and practical instruction.

FARRIERY.

The student removes the shoes of the animals under his charge, examines the feet, and assists at the shoeing. In addition to shoeing for lameness, a large amount of ordinary shoeing is done at the forges of the Department, 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 the reading and discussing of papers pertaining to Veterinary Science.

FEES.

Matriculation Fee (paid once only), five dollars. Tuition Fee, annually, one hundred dollars in advance; or, if division of payments is desired, sixty dollars before 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.

VETERINARY HOSPITAL OF THE UNIVERSITY OF
PENNSYLVANIA.

Thirty-sixth and Pine Streets, Philadelphia.

BOARD OF MANAGERS:

JOSEPH E. GILLINGHAM, *President.*

J. BERTRAM LIPPINCOTT, *Secretary and Treasurer.*

S. WEIR MITCHELL, M.D.,	ARCHIBALD MONTGOMERY,
RICHARD WOOD,	WALTER R. FURNESS,
WILLIAM HUNT, M.D.,	CHARLEMAGNE TOWER, JR.
H. PRATT MCKEAN, JR.,	WILLIAM L. ZUILL, M.D., D.V.S.

W. W. DOWELL, 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 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 travelled.

Animals are received into the Hospital at any time, DAY or NIGHT.

OUT-PATIENTS and OPERATIONS from 8 to 10 A. M.

The following Rates of Board, including Medicine and Surgical Shoeing, are charged:—

Horses and Mules	per day, \$1.00
Donkeys and Dogs	“ .50
Cattle, Sheep, Cats, Birds, and small pet animals	“ .25

PROFESSIONAL CHARGES will depend upon the nature of the service rendered.

Animals belonging to indigent and deserving persons are treated without charge, and, when taken into the Hospital, pay board only. The owners of these animals must apply at the Superintendent's office on entering the Hospital.

The animals are under the professional care of the Hospital staff of Veterinarians.

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 Medical Staff.

CHARGES.

ORDINARY SHOEING.

Work Horses	\$2.00
Coach and Carriage Horses	2.50
Special Shoeing	3.00

PATHOLOGICAL SHOEING.

Bar or Defy's Shoe	each, \$1.00
Resetting for Lameness	“ .25

Other Shoes according to nature of work required.

The VETERINARY DEPARTMENT and HOSPITAL are open for inspection by visitors on Tuesday and Saturday afternoons, from two until five o'clock.

TEXT AND REFERENCE BOOKS.

FIRST YEAR.

- Chemistry*.—Marshall's First-Year Notes; Fownes; Muter's Analytical.
Materia Medica and Therapeutics.—H. C. Wood; Finlay Dun's Veterinary Medicine.
Anatomy.—Chauveau's Comparative.
Histology.—Klein.

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

Zoölogy.—Nicholson's Manual.

Horse-shoeing.—Fleming.

SECOND YEAR.

General and Internal Pathology.—Robertson's Practice of Equine Medicine; Williams's 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's 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, 1889-90.—FIRST YEAR.

<i>Hour.</i>	<i>Sunday.</i>	<i>Monday.</i>	<i>Tuesday.</i>	<i>Wednesday.</i>	<i>Thursday.</i>	<i>Friday.</i>	<i>Saturday.</i>
8½ A.M.					Roll Call.	Roll Call.	
9 A.M.		Chemistry.	Chemistry.	Chemical Laboratory.	Farriery and Dissections.	Farriery and Dissection.	General Biology.
10 A.M.		Roll Call.	Chemical Laboratory.				
11 A.M.		Farriery and Dissection.	Physiology.	Dissection.			
12 M.					Physiology.	Physiology.	
2 P.M.		Histological Laboratory.	General Biology.	Zoölogy.			
3 P.M.					Roll Call.	General Biology.	Practical Pharmacy.
3½ P.M.		Materia Medica.		Dissection.			
4 P.M.							
4½ P.M.		Anatomy.		Anatomy.		Anatomy.	
5 P.M.							
7 to 9½		Roll Call. Repetition, Anatomy. Dissection.	Roll Call. Dissection.	Roll Call. Dissection.	Roll Call. Dissection.	Roll Call. Repetition, Anatomy. Dissection.	

ROSTER, 1889-90.—SECOND YEAR.

<i>Hour.</i>	<i>Sunday.</i>	<i>Monday.</i>	<i>Tuesday.</i>	<i>Wednesday.</i>	<i>Thursday.</i>	<i>Friday.</i>	<i>Saturday.</i>
8½ A.M.	Hospital Visit.	Clinic.	Clinic.	Clinic.	Clinic.	Clinic.	Clinic.
9 A.M.					Medical Chemistry.	Chemical Laboratory.	Chemical Laboratory.
10 A.M.		Surgery.	General Pathology.	Surgery.	Surgery.		
11 A.M.		Internal Pathology.	Morbid Anatomy.	Internal Pathology.	Internal Pathology.	Morbid Anatomy.	Roll Call.
12 M.		Repetition, Internal Pathology.	Physiology.		Physiology.	Physiology.	Dissection.
2 P.M.		Roll Call.	Structural Botany.	Zoölogy.	Structural Botany.	Roll Call.	Roll Call.
3 P.M.				Roll Call.			
		Dissection.	Systematic Botany.	Dissection.	Systematic Botany.	Dissection.	Dissection.
4½ P.M.		Anatomy.	Repetition, Therapeutics.	Anatomy.	Therapeutics.	Anatomy.	Therapeutics.
5 P.M.		Hospital Visit.	Hospital Visit.	Hospital Visit.	Hospital Visit.	Hospital Visit.	Hospital Visit.
7 to 9½		Roll Call, Repetition, Anatomy, Dissection.	Roll Call, Dissection.	Roll Call, Dissection.	Roll Call, Dissection.	Roll Call, Repetition, Anatomy, Dissection.	

ROSTER, 1889-90.—THIRD YEAR.

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DEPARTMENT OF VETERINARY MEDICINE.

<i>Hour.</i>	<i>Sunday.</i>	<i>Monday.</i>	<i>Tuesday.</i>	<i>Wednesday.</i>	<i>Thursday.</i>	<i>Friday.</i>	<i>Saturday.</i>
8½ A.M.		Clinic.	Clinic.	Clinic.	Clinic.	Clinic.	Clinic.
9 A.M.	Hospital Visit.					Bacteriology.	
10 A.M.		Surgery.	Pathological Laboratory.	Surgery.	Surgery.	Zoötechnics.	Obstetrics.
11 A.M.		Internal Pathology.	Morbid Anatomy.	Internal Pathology.	Internal Pathology.	Morbid Anatomy.	
12 M.		Repetition, Int. Pathology				Repetition, Int. Pathology	
2 P.M.		Roll Call.	Roll Call.	Roll Call.	Roll Call.	Roll Call.	Roll Call.
		Pathological Farriery.	Foot Operations.	Foot Operations.	Pathological Farriery.	Foot Operations.	Foot Operations.
4 P.M.							
4½ P.M.			Repetition, Therapeutics.	Repetition, Surgical Pathology.	Therapeutics.	Repetition, Surgical Pathology.	Therapeutics.
5 P.M.		Hospital Visit.	Hospital Visit.	Hospital Visit.	Hospital Visit.	Hospital Visit.	

DEPARTMENT OF LAW.

FACULTY.

- WILLIAM PEPPER, M.D., LL.D., PROVOST, and *ex-officio* President.
HON. J. I. CLARK HARE, LL.D., *Emeritus* Professor of *Constitutional Law*.
C. STUART PATTERSON, A.M., DEAN OF THE FACULTY, Professor of *Constitutional Law* and of the *Law of Real Property and Conveyancing*.
JAMES PARSONS, A.M., Professor of *Commercial Law, Contracts, and Decedents' Estates*.
GEO. TUCKER BISPHAM, A.M., Professor of *Equity Jurisprudence*, including the *Principles of and Pleading and Practice in Equity, and Orphans' Court Practice*.
A. SYDNEY BIDDLE, A.M., Professor of the *Law of Torts, Evidence, and Practice at Law*, and Secretary of the Faculty.
SAMUEL S. HOLLINGSWORTH, A.M., Professor of the *Law of Contracts and Corporations, and Pleading at Law*.
GEORGE S. GRAHAM, LL.D., Professor of *Criminal Law*.

STAFF.

- GEORGE WHARTON PEPPER, A.B., LL.B., Fellow of the Department of Law.
S. STANGER ISZARD, A.B., LL.B., Librarian.
DE REYNOLDS OWENS, } Assistant Librarians.
GEORGE JACKSON, }

MATRICULATES.

SECOND YEAR.

- | | | |
|--|-------------------|---|
| Ammerman, Robert Scott, | Danville, Pa., | James Scarlett. |
| Aull, Charles Edward, | Philadelphia, | C. Stuart Patterson. |
| Barrington, Boyd Cummings, | do. | Aubrey H. Smith. |
| Bean, William Heebner, | Norristown, Pa., | Theodore W. Bean. |
| Birck, Henry, A.B. (C.H.S.), | Philadelphia, | Daniel Dougherty and D.
Webster Dougherty. |
| Bolles, Cortlandt Kimball, | do. | Biddle & Ward. |
| Bowie, Richard Henry Bayard, A.B. (Univ. Penn.), | do. | R. L. Ashhurst. |
| Bowman, Lin Light, Ph.G., | Schuylkill Haven, | |
| (Phila. Col. of Pharmacy), | Pa. | |

Bowman, Sumner Sallade,	Millersburg, Pa.,	Simon S. Bowman.
Brinton, Joseph Hill, Jr.,	Oakbourne,	A. Lewis Smith.
Brown, Charles Lincoln,	Philadelphia,	Moses Stevenson.
Brown, William Alexander,	do.	C. Stuart Patterson.
Byron, Robert Jonathan,	do.	Clark & Denniston.
Chapman, Francis,		
Cochran, Edwin Rouse, Jr.,	Middletown, Del.,	Bradford & Vandegrift.
Craig, Samuel Singer,	Shippensburg, Pa.,	John Scollay.
Dillingham, William Henry,	Philadelphia,	Francis T. Chambers.
A. B. (Univ. Penn.),		
Duane, Russell, A. B.	do.	Biddle & Ward.
(Harvard),		
Fitzpatrick, Joseph William,	do.	Thos. F. McMahon.
Graham, Thomas Reynolds,		
Greene, Charles S.,	do.	C. Stuart Patterson.
Grier, Jay Rich,	do.	Biddle & Ward.
Haffelfinger, William Bartine,	do.	A. U. Bannard.
Haig, Alfred Roland,	do.	Albert A. Outerbridge.
Hartshorne, Francis Cope,	Merion,	R. C. McMurtrie.
A. B. (Haverford),		
Harvey, Richard Wister,	Philadelphia,	C. Stuart Patterson.
Hayes, Robert Priestley,	do.	Edw. A. Anderson.
Heberling, Robert Anderson,	Mauch Chunk, Pa.	C. W. McKeehan.
Ph. B. (Dickinson),		
Herzberg, Max,	Philadelphia,	Biddle & Ward.
Jackson, Tatlow,	do.	William Gorman.
Krause, Thaddeus Stevens,	Plumsteadville, Pa.	MacVeagh & Bispham.
B. S. (Ursinus Coll.),		
Leser, Oscar, A. B. (C. H. S.),	Philadelphia,	George Tucker Bispham.
Lewis, William Draper,	Germantown,	R. C. McMurtrie.
B. S. (Haverford),		
List, Charles Murheid,	Philadelphia,	Francis S. Cantrell.
McGeorge, Percy, B. S.,	Merion, Pa.,	Wm. McGeorge, Jr.
E. M. (Univ. Penn.),		
Maher, John Francis, B. S.,	Philadelphia,	John S. Gerhard.
M. S. (Univ. Penn.),		
Messemer, William Sands,	do.	J. S. McKinlay.
Neukumet, Philip Daniel,	do.	Thos. A. Fahy.
Oliver, James Hall,	do.	Henry K. Fox.
Patterson, George Stuart,	Chestnut Hill,	C. Stuart Patterson.
Patton, James Lee, A. B.	Philadelphia,	Samuel B. Huey.
(C. H. S.),		
Pile, Frederick Morgan,	do.	Jos. M. Pile.
Rennyson, Charles Edward,	Norristown, Pa.,	Dwight M. Lowry.
Schofield, Everett Anderson,	Roxborough, Pa.,	Albert R. Schofield.
Schuck, Louis Frand,	Philadelphia,	
Simon, David Emanuel, A. B.	do.	Leon H. Folz.
(C. H. S.), Ph. B. (Univ.		
Penn.),		
Smaltz, Henry Naglee, A. B.	do.	MacVeagh & Bispham.
(Univ. Penn.),		
Smith, Howard Wayne,		
Snyder, John Michael,	do.	John F. Lewis.

Townsend, Charles Cooper, A.B. (Univ. Penn.),	Overbrook, Pa.,	Jos. B. Townsend.
Turner, William Jay,	Germantown, Pa.,	Hughes & Eyre.
Wessel, Henry Nathan,	Nebraska City, Neb.	C. Stuart Patterson.
White, Elias Henley, A.B. (Haverford),	Philadelphia,	
Wilcox, Charles Percy, Ph.B. (Yale),	do.	Hampton L. Carson.
Wood, Charles Sturgis, A.B. (C.H.S.), Ph.B. (Univ. Penn.),	do.	Alfred Frank Curtis.
Young, Norton Buel, Ph.B. (Univ. Penn.),	Chestnut Hill,	George Junkin.

FIRST YEAR.

Abbott, Charles Yarnall,	Philadelphia,	
Ashbridge, Samuel H.,	do.	P. F. Rothermel.
Baker, Frederick Robeson, A.B. (Univ. Penn.),	do.	Jones, Carson & Phillips.
Bowker, George Clay,	Manayunk,	C. Stuart Patterson.
Beitler, Lewis Eugene,	Philadelphia,	Abraham M. Beitler.
Belknap, Maurice Guz,	do.	N. Dubois Miller.
Blair, Horace Colfax, B.S. (Pa. St. Col.),	Tyrone, Pa.,	
Bohlen, Francis Herman,	Philadelphia,	R. C. McMurtrie.
Bracken, Francis Bernard,	Gallitzin, Pa.,	
Bradford, Robert P.,	Wilmington,	Geo. T. Bispham.
Calver, Curtis Pennington,	Philadelphia,	Joseph R. Rhoads.
Clayton, Henry,	do.	
Clevenger, Samuel Francis,	do.	Samuel B. Huey.
Crankshaw, Frederick Wier,	Norristown, Pa.,	Wm. J. Smith.
Crawford, George Dallas,	Merion, Pa.,	Crawford & Dallas.
Delaplaine, Louis Springer, Jr.,	Wheeling, W. Va.,	N. Dubois Miller.
Dillingham, Conway, B.A. (Univ. Penn.),	Philadelphia,	MacVeagh & Bispham.
Edwards, Homer Walton,	do.	Hampton L. Carson.
Ellis, Thomas Biddle,	do.	Robt. J. Williams.
Ellis, William Struthers, A.B. (Haverford),	Bryn Mawr, Pa.,	John G. Johnson.
Ewing, Samuel Blaine, A.B. (Washington and Jeffer- son),	Canonsburg, Pa.,	J. Bayard Henry.
Fell, Edward Laurence, A.B. (Swarthmore),	Philadelphia,	Alfred Moore.
Gross, Joseph,	Shamokin, Pa.,	Biddell & Ward.
Hayes, John Russell, A.B. (Swarthmore and Har- vard),	West Chester, Pa.,	Wm. M. Hayes.
Heisman, John William,	Titusville, Pa.,	
Henderson, George, Ph.B. (Univ. Penn.),	Philadelphia,	Rufus E. Shapley.

Hunsicker, George Thorne,	Philadelphia,	Joseph W. Hunsicker.
A.B. (C.H.S.),		
Jopson, Thomas William,	do.	Henry C. Thompson.
Keck, Harry Loutzewhiser,	Granville, Pa.,	
A.B. (Thiel Col.),		
Masters, George,	Philadelphia,	Lincoln L. Eyre.
McCarthy, John Aloysius,	do.	Biddle & Ward.
A.B. (C.H.S.),		
MacFarland, Leo,	Monroeville, N. J.,	Hon. E. A. Armstrong.
Myers, Samuel Horace, B.S.,	Philadelphia,	Lewis Stover.
(Lafayette),		
Owens, DeReynolds,	Birmingham, Pa.,	Stevens & Owens.
Patterson, Joseph G., Jr.,	Philadelphia.	
Penrose, Philip Thomas,	do.	Page, Allison & Penrose.
Powell, William Howell,	do.	
Quigley, Albert Burneister,	Frankford,	Geo. N. Shoemaker.
Rotan, Samuel Pennington,	Philadelphia,	C. Stuart Patterson.
A.B. (C.H.S.),		
Shoemaker, William Ander-	do.	Barlow & Chase.
son,		
Sherer, Hervay James,	New London, Pa.,	
Shern, Daniel Joseph,	Philadelphia,	Gardiner & Conely.
Sloan, Maurice Morrell,	Claymont, Del.,	S. B. Huey.
Smith, Lloyd J.,	Philadelphia,	
Stafford, William Harrison,	do.	
Stewart, Daniel Messick,	do.	
Sypher, Howard Hungerford,	do.	J. R. Sypher.
Thomas, Joseph Baylis,	do.	Biddle & Ward.
Valentine, John Reed,	do.	John K. Valentine.
Wagenhurst, Ellwood O.,	Clifton, Pa.,	John E. Reyburn.
A.B. (Princeton),		
Waters, Henry Jackson,	Princess Ann, Md.,	Biddle & Ward.
Woodruff, Clinton Rogers,	Philadelphia,	John A. Bickel.
A.B. (C.H.S.), Ph.B.		
(Univ. Penn.),		

SPECIAL STUDENTS.

Benton, Maurice Erickson,	Philadelphia,	
Bierer, Irving Webster,		
Boswell, Russell Thomas,	do.	
A.M. (Dickinson),		
Crenshaw, Nathaniel Bacon,	do.	
Dewey, George Chauncey,	do.	
Harrington, Avery Draper,	do.	Geo. Tucker Bispham.
Henning, Crawford D.,	do.	Charles Biddle.
Jackson, George,	Freehold, N. J.,	John W. Swartz.
List, John Frederick,	Philadelphia,	
MacLean, Hew Brydon,	do.	
Miller, Emlen Hare, A.B.	do.	E. Spencer Miller.
(Univ. Penn.),		
Quick, Edward Payson,		
Ridgely, Henry, Jr.,	Wilmington, Del.,	

Simmons, John Wesley,		
Stark, Edgar Ward,	Pittston, Pa.,	S. B. Price.
Todd, Henry Clair, LL.B.	Philadelphia,	
(Univ. Penn.),		
Wright, Samuel Megargee,		David W. Sellers.
A.B. (Univ. Penn.),		
Wiener, Henry, Jr.,	Philadelphia,	Biddle & Ward.
Ziegler, Irving Elmer,		

RECAPITULATION.

Second year	55
First year	51
Special	19
Total	<hr/> 125

With the session of 1889-90 the Law Department began a new departure. The University has leased the sixth floor of the building of the Girard Life Insurance, Annuity and Trust Company, at Broad and Chestnut Streets, Philadelphia; and in that building are located the lecture-rooms and library of the Law Department, and the offices of the Dean. The students of the Department have the use of a complete working library now containing 5,661 volumes, including every regular English and American report, which has been presented to the University by the family of George Biddle, Esq., as a memorial of that distinguished lawyer, and which is largely increased every year. Effingham B. Morris, Esq., has also deposited with the school 965 volumes, bequeathed by the late Professor Morris to the school, subject to the life interest of Mr. Morris. The scope of instruction in the Department has also been enlarged by the extension of the course to three years.

ADMISSION.

Students may be admitted to the Law Department upon producing—

- (1) A satisfactory diploma as Bachelor of Arts or Bachelor of Science; or—
- (2) 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 the history of England and America, spelling, etymology, and geography; or—
- (3) A certificate from two or more examiners appointed by the Faculty of Law, 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."

ADVANCED STANDING.

Admission to the Second Year's class will be allowed upon passing a satisfactory examination on the subjects of instruction in the First Year. The examination for admission to the Second Year's class will be held at the Law Department on Wednesday, October 1st, 1890, at 10 A.M.

SPECIAL STUDENTS.

Those persons who are not candidates for a degree may enter the Department as special students at any time. Each professor will issue tickets for his own lectures to such students, and he will fix the fee in his discretion.

COURSE OF INSTRUCTION.

FIRST YEAR.

PROFESSOR BISPHAM	Elementary Equity.
" PATTERSON	Real Property.
" BIDDLE	Torts.
" HOLLINGSWORTH, .	Contracts, Pleading.

SECOND YEAR.

PROFESSOR PARSONS	Partnership.
" BISPHAM	Principles of Equity.
" PATTERSON	Real Property.
" BIDDLE	Evidence.
" HOLLINGSWORTH, .	Contracts.
" GRAHAM	Criminal Law.

THIRD YEAR.

PROFESSOR PARSONS	Personal Relations, Wills and Administration, Commercial Law.
" BISPHAM	Practice and Pleading in Equity.
" PATTERSON	Constitutional Law.
" BIDDLE	Practice at Law.
" HOLLINGSWORTH, .	Corporations.
" GRAHAM	Criminal Procedure.

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.

Moot courts are held, at which questions prepared by the professors 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, to which not only students but many practicing lawyers belong, also gives opportunity for debate and argument that has been found of the greatest practical advantage.

The Supreme Court of Pennsylvania, the County Courts, and the Federal Courts are in session in Philadelphia during a great part of the year, so that students can have ample facilities for observing judicial proceedings.

The students of this Department are also permitted to attend free of charge 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 an opportunity is thus afforded to those whose scholastic training has been limited. The students of this Department have also the free use of the General Library of the University.

DEGREES.

Under the statutes of the University, the degree of Bachelor of Laws is granted to candidates who, having attended upon the full course of instruction in the Law Department, and having 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, shall have passed satisfactory examinations upon the subjects of instruction.

The degree of Bachelor of Laws *cum honore* is granted to such

candidates of the Law Department as shall be certified by the Faculty to have passed the final examination 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 of the Faculty on or before the first Monday of October, in the third year of the course. It must be printed or type-written on sheets not larger than octavo size, with a clear margin of at least one inch.

Essays must not disclose the name of the author, and must be accompanied by a sealed envelope endorsed with a distinguishing motto and containing the name of the author.

EXAMINATIONS.

The examinations required by the statute are both written and oral, and are held during the last weeks in May.

The questions of the written examination of 1889 were as follows:—

PROFESSOR HARE.

1. Who are the parties to the Constitution, historically and according to the preamble?
2. Have the United States power to coerce a State, and by what means?
3. Are the powers of the government of the United States limited, or is it limited as to its power?
4. State the doctrine of implied powers and its limitations.
5. When and how far do the grants of power to the United States operate as a restraint on the States?
6. Does the prohibition of laws impairing the obligation of contracts apply to the government of the United States, and how far may that government impair contractual rights?
7. What contracts are within the prohibition?
8. Is the charter of a municipal corporation such a contract, and what is the rule as to the contracts of municipalities?
9. Is a State bankrupt or insolvent law valid as regards past

or future contracts, and what effect will the enactment of a bankrupt act under the authority conferred on Congress have on such a State law?

10. What are the express powers of the United States for the punishment of crime, and how far do their implied powers extend?

PROFESSOR PARSONS.

1. State the difference between a wife's equity to a settlement and the separate use of a married woman; how far are both doctrines part of the law of Pennsylvania?

2. Can a marriage contracted in due form, but with the understanding that the parties shall cohabit, be set aside as a fraud on third persons, whose property rights are affected?

3. How far are the parent and the infant, respectively, liable for the infant's torts?

4. How did the requisitions arise which the law made for the validity of an oral will?

5. If a testator gives the legatee power to select an article, would this be a specific legacy?

6. Distinguish a vested from a contingent legacy, and state what is meant by a vesting *quodam modo*.

7. Explain the nature of a class legacy, and trace the changes which have modified its character.

8. Is non-residence a disqualification for the appointment of an administrator?

9. Describe the function and accountability of an ancillary administrator.

10. In what different aspects has the lien of a decedent's debts been regarded in Pennsylvania?

PROFESSOR BISPHAM.

Equitable Principles.

1. Give the definition of Equity. Explain the difference between "Equity" as thus defined and "Equity" in its popular acceptation.

2. What is the general division of the subject, made in the Text Book?

3. What is meant by the maxim, "Equity follows the law"? Give illustrations.
4. In commenting upon the maxim, "He who comes into equity must do so with clean hands," reference was made, in the lectures, to the cases of *Brooks v. Martin* and *Wheeler v. Sage*. Explain the distinction between these cases; and the reasons for its existence.
5. What was decided by *Penn v. Lord Baltimore*; and of what equitable maxim is it an illustration?
6. Define a Trust.
7. What was the effect of the Statute of Uses? When was that statute passed?
8. When a use was limited upon a use, the second use was not executed. Why was this?
9. Explain the operation of a deed of bargain and sale in effecting a transfer of the legal title from the bargainor to the bargainee.
10. What are the different kinds of Resulting Trusts?

PROFESSOR BISPHAM.

Practice and Pleading in Equity.

1. Is the distinction between Common Law and Equity recognized in the Constitution and Laws of the United States? Give instances illustrative of your answer.
2. Give the different classes into which bills in equity are divided.
3. What are bills to perpetuate testimony? Under which class of bills do they fall? Give instances of such bills.
4. What was the *process* used in the English High Court of Chancery? What is that used in the Federal Courts, when sitting as courts of Equity? What in Pennsylvania courts when sitting in Equity?
5. What is a speaking demurrer?
6. Suppose a bill prays discovery of a fact, the admission of which will expose the defendant to a criminal prosecution, can the defendant demur specially to the discovery, although he does not demur to the relief? Explain your answer.
7. Mention some cases in which a plea must be supported by an answer.

8. What is the effect of an answer in Equity as regards the evidence in a cause?
9. Suppose the bill filed showed a cause of action in which the complainant had a full, adequate, and complete remedy at law, what rule of Equity pleading would be violated?
10. Explain the practice in obtaining a preliminary injunction in this State.

PROFESSOR PATTERSON.

First Class.

1. Deed, A to B and his issue. What estate does B take?
2. A will, executed in 1820 by a testator who died in 1825, contains this clause: "I devise Whiteacre to D, he paying to C \$10,000." What estate did D take?
3. P died in 1860, having, by will dated the day of his death, devised as follows: "I devise all my land to my friend C, and if he shall die without issue, then I devise the land to B." What estates do C and B take?
4. S died, leaving an only son, T. The will of S contained this clause: "I devise Blackacre to T from and after the death of my friend R." In whom does the land vest, and for what estate?
5. A will contained this clause: "I devise my land to B and his heirs, and if D shall marry C in the lifetime of B, then I devise the land to C and her issue forever." To whom and for what estates does the land go?
6. A will contained this clause: "I devise my land to my niece N for life, and from and after her death I give the land to P and his heirs, but if N shall marry, then from and after the time of her marriage I give the land to S and his heirs." What interests do N, P, and S take?
7. A will contained this clause: "I devise all my estate real and personal to my wife B, or so much thereof as she may need for her support and maintenance, and from and after her death I give my estate to my son C." What estate does C take?
8. A will contains this clause: "I devise my land to M until my son N attains the age of 21 years, and when N attains that age, then I give my whole estate to N." What estates do M and N take?

9. Limitations: (1) "To B for life, with remainder, if C survive B, to C and his heirs;" (2) "To B for life, with remainder, if C survive B, to C for life." Is C's remainder in each case vested or contingent?

10. Limitation "to the use of B for life, with remainder to the use of the children of B and C living at the death of the survivor of B and C." C survives. What interest do the children take?

PROFESSOR PATTERSON.

Second Class.

1. Ejectment by F against G. F offered in evidence a deed duly executed by G, conveying to F and his heirs a tract therein described, and proved (1) payment to G of the consideration stated in the deed, and (2) demand upon, and refusal by, G to surrender possession. G proved that he was insane when the deed was executed, that he had received the consideration from F, and had never returned it nor offered to return it to F. The facts being admitted, the Judge directed a verdict for F. Was, or was not, this direction right?

2. K contracted in writing to sell Whiteacre to L, for \$10,000. L paid \$100 on account, but afterwards declined to fulfil the contract. K filed a bill in equity for specific performance, and L demurred on the ground of an adequate remedy at law. Should, or should not, the demurrer be sustained?

3. B, a widow, tenant for life under her husband's will, let the land to C for one year and died during the term, timothy hay and clover grass then standing uncut on the land. The remaindermen under the will entered, cut, and carried away the hay and grass, and C brought trespass against them. Was he, or was he not, entitled to recover?

4. P, seised in fee of a lot of ground in Philadelphia, conveyed the same, in 1860, to B and his heirs, by deed, reserving a yearly rent of \$36, and stipulating that "if B, his heirs or assigns, shall within ten years from the date hereof pay to the said A, or his heirs, the sum of \$600 lawful money, etc., then the said rent shall forever thereafter cease and be extinguished, and the covenant for payment therefor shall become void." Is

the ground rent so reserved redeemable or irredeemable after 1870?

5. B, the wife of C, being seised in fee of land, contracted by agreement in writing, not signed by her husband, to convey the land to D. D paid the purchase money, entered into possession and built a house on the land. B and C afterwards brought an ejectment against D. Was she, or was she not, entitled to recover?

6. S contracted in writing to sell to R a lot of ground for \$500. R paid \$10 on account. S remained in possession, and R took no steps to enforce performance. Two years afterwards S began the construction of a building on the lot, which obstructed the view from the windows of a building on an adjoining lot owned by X. X then bought from R, for \$100, his rights under the contract with S, and brought an ejectment against S. The facts being admitted, the Judge at the trial directed a verdict for S. Was he, or was he not, right?

7. B represented himself to be seised in fee of a certain tract of land, having in fact neither possession of nor title thereto, and he contracted in writing with C to sell him the land for \$10,000. C paid \$1,000 on account. C, ignorant of B's want of title, entered into a contract to sell the land to D for \$15,000. C brought an action against B to recover the \$1,000, with interest and the \$5,000 profit on the re-sale to D. What, if anything, is C entitled to recover?

8. A will contained the following clause: "I devise White-acre to B and his heirs in trust to hold the same and from time to time to collect and pay over the rents, issue and profits thereof to my nephew M, for and during the term of his natural life, and from and after M's death to convey the said land to such person as M shall appoint by his last will, signed, sealed with his own proper seal, and acknowledged in the presence of two witnesses, and in default of any such appointment then to convey the said estate to my son D and his heirs." M married and had issue one son E and died. After his death there was found among his papers a written memorandum, signed by him, but not sealed or acknowledged, declaring that he appointed the estate to his son E. Is E, or is D, entitled to have a conveyance of that estate?

9. X, the owner in fee of two lots of ground, the one in Philadelphia and the other in Washington, D.C., each worth \$5,000, borrows from Y \$5,000, payable on demand, and conveys to him the two lots by one deed, Y agreeing, verbally, to hold the lots as security for the payment of the loan. Subsequently X tenders to Y the amount of the loan, with interest, and demands a re-conveyance. Y refuses to re-convey. X brings actions of ejectment in the District of Columbia and in Philadelphia County. These facts having been proven in each action, what direction should be given by the Judge to the jury, at the trial of each case?

10. M, tenant in fee of land in Philadelphia, mortgages it to B for \$5,000. B does not record his mortgage. C, with actual notice of B's mortgage, loans \$4,000 to M, and takes a second mortgage, which he records. D, having no notice of B's mortgage, afterwards loans \$3,000 to M, and records his mortgage. C sues out his mortgage, and the land is sold for \$8,000. Who are entitled to share in the distribution of the fund, and in what proportions?

PROFESSOR BIDDLE.

Pleading at Common Law.

1. *Assumpsit* by endorsee of note against maker. *Plea* that the defendant had made the note to the order of A, in consideration of A's agreeing to advance money to the defendant at a time named; that no money was ever advanced, and the transaction was a fraud; that the note was subsequently endorsed by A, without consideration, to the plaintiff, who had full notice of the fraud and was privy to it. *Replication de injuria*, and special demurrer. Judgment for whom?

2. The declaration in case for libel averred that the defendant had published that the plaintiff had stolen at the same time a piece of cloth and a piece of velvet, by which his neighbors were led to believe that he was a common thief. *Plea*: That he had stolen a piece of cloth. On demurrer, judgment for whom?

3. *Plea* of set-off to an action of debt. *Replication* to the set-off: (a) Infancy; (b) a release; demurrer. Judgment for whom?

4. *Case* for slander, that defendant maliciously spoke words of plaintiff, who was a banker, imputing insolvency to him by which he was injured in business, and a customer withdrew his account. Plea in abatement, that plaintiff carried on the business with A and B, who were still living, and that all the damages alleged accrued to A and B, jointly with the plaintiff. Demurrer. Judgment for whom?

5. *Assumpsit* on a contract, by which plaintiff agrees to deliver, and defendant to take, 20 tons of coal for a fixed price, and averment of tender, and refusal by defendant to receive. Plea, that by the contract the coal was to be Lehigh coal, and that the coal tendered was not Lehigh coal. On demurrer, judgment for whom?

6. *Declaration in covenant* sets forth the legal effect of the deed. Defendant craves *Oyer*. The deed, when produced, is inconsistent with the statement of its effect in the declaration. How should the defendant plead, so as to raise the point?

7. Declaration in *debt* for price of goods sold, avers that they were for necessities. Plea of infancy, and demurrer. Judgment for whom?

8. (a) Action of *covenant* on a deed agreeing to arbitrate. The declaration set forth the agreement by the defendant, a *feme sole*, to arbitrate, and a covenant to perform the award; *breach* that after the agreement was executed the defendant had married, whereby the authority to the arbitrators was revoked, and that subsequently an award was made, directing defendant to pay a certain sum to the plaintiff, which defendant refused to do. Demurrer. Judgment for whom?

(b) Vary the pleadings, while stating the same facts, so as to produce a different result.

9. *Replevin* for taking goods, viz., a lime kiln. *Avowry* for rent in arrear. Plea, that the lime kiln was affixed to the freehold, and so exempt by law from any distress for rent. On demurrer, judgment for whom? Give all the reasons of the demurrer, and all the rules illustrated by the judgment.

10. *Debt* for \$50 wages. Plea, that plaintiff had agreed that if he became drunk he should forfeit all wages then due; that he had gotten drunk, &c. *Replication*, that after plaintiff had been

drunk, defendant, knowing the fact, excused him from the forfeiture incurred, and agreed to pay him the wages accrued, and continued to employ him. *New assignment*, that only \$20 were due before plaintiff became drunk, and that \$30 accrued after defendant had notice thereof, and had excused plaintiff. Demurrer for duplicity, and because the replication stated no consideration for the exoneration. Judgment for whom? Explain fully why plaintiff new assigned, and the grounds of demurrer.

PROFESSOR BIDDLE.

Practice at Law.

1 & 2. The Act of Congress of 1887 provides that: "No civil suit shall be brought [before any U. S. Court] against any person by any original process of proceeding in any other district than that whereof he is an inhabitant; but where the jurisdiction is founded only on the fact that the action is between citizens of different States, suit shall be brought only in the district of the residence of either the plaintiff or the defendant."

(a) A citizen of Pennsylvania sues a citizen of Delaware, in assumpsit, in the U. S. Court in the Eastern district of Pennsylvania. The latter objects that the Court has no jurisdiction. Give the pleadings and the decision. (b) If the defendant were a citizen of Pennsylvania, how could he object [pleadings] to the jurisdiction? (c) Could he do so after pleading non-assumpsit?

3 & 4. B gives A, for a sum due, a promissory note, of which the makers' name is forged, which A takes upon the faith of the genuineness of the signature, and, on discovering the forgery, sues B by writ of foreign attachment, before the note falls due. C, *the garnishee*, owes B a debt on a note not due when the suit is begun. Under what conditions, if at all, is the attachment good? (b) Does foreign attachment fall under the practice act of 1887? (c) Give all other remedies. (d) Could a warrant of arrest issue in any stage of the case?

5. The Sheriff's return stated that he had "served the defendant by giving him notice of the contents of the writ and a true copy thereof." (a) Is the return good? (b) Assuming a

return of service to be good on its face, but the facts to be false, what is the defendant's remedy? (c) Can he prove the falsity of the return at the trial?

6. *Covenant* on a policy of life insurance. *Plea*, that the defendant committed suicide, which, it was agreed by the policy, should avoid it. Who has the right to begin and conclude? Upon what does the right depend? If the policy had been a simple contract, would the result be the same?

7 & 8. Give a short account (not exceeding $\frac{3}{4}$ of a page of foolscap) of (a) the origin and development of ejectment at common law, and (b) the nature of equitable ejectment in Pennsylvania?

9. Give a short account (not exceeding half a page) of the origin of the affidavit of defence law, and how judgment may be obtained under it?

10. A brings an action of *assumpsit* to recover a precious stone, which he alleges in his statement was taken by B, the defendant, a jeweller, out of a ring which A had found and taken to B to ascertain the value. Can A have judgment for want of an affidavit of defence under the Practice act? What other remedies has A?

SCHOLARSHIPS.

1. THE FACULTY SCHOLARSHIPS.—Three free scholarships in each class are granted by the Faculty of this Department to deserving and needy students. These will be open to competitive examination. Each candidate must present to the Dean of the Faculty, 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. 3 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 1890 will be held at the Law Department on Monday, September 29th, at 10 A.M.

2. THE PUBLIC SCHOOL PRIZE SCHOLARSHIPS.—Under a contract with the city of Philadelphia, two free scholarships 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 upon those who reach the highest grade in their examination.

FELLOWSHIPS.

From each graduating class a Fellow is selected by the Faculty, who shall 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 of the Faculty, such duties of instruction as may be assigned to him.

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.

A FACULTY PRIZE of fifty dollars is given annually to the student in any of the classes 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 for the best examination in Evidence, Pleading, and Practice at Law and in Equity is annually awarded to a member of the graduating class.

The names of such students in each class as shall hereafter pass the annual examination with distinction will be printed in the annual catalogue.

ADMISSION TO THE BAR.

Graduates of this department are admitted to practice in the Courts of Common Pleas and Orphans' Court in Philadelphia,

upon compliance with the rules of court as to registration. These provide that the student must be registered for one year in the office of the Prothonotary of the Courts of Common Pleas for Philadelphia County as a student of law in the Law Department, by the Dean of the Faculty. This registration can be made only by passing the examination before the Board of Examiners, as required in No. 2 of the requirements for admission.

The Supreme Court of Pennsylvania has adopted the following rule: "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."

FEES.

Each student pays a matriculation fee of five dollars, and in addition thereto a term fee of fifty dollars, payable in advance. No other charge is made. The total cost to a student of taking a three years' course of instruction and receiving a degree of Bachelor of Laws is, therefore, \$305. The term fee of fifty dollars must be paid within the first week of each term.

1890-1891.

The next scholastic year begins on Monday, 6th October, 1890, at 4 P.M., when the annual address will be delivered.

The first lecture in course will be delivered by the Dean, on Tuesday, 7th October, 1890, at 9 A.M., to the three classes.

Application for admission to the classes should be made to Prof. C. Stuart Patterson, Dean of the Faculty, at his office, in the building of the Girard Trust Company, N. E. corner of Broad and Chestnut Streets, Philadelphia.

Any further information that may be desired will be given by the Dean, or by Prof. A. Sydney Biddle, the Secretary of the Faculty, at his office, 208 South Fifth St., Philadelphia.

POST-GRADUATE COURSE IN LAW.

MATRICULATES.

SENIORS.

J. Claude Bedford,	Lost Creek, Pa.,	92 Bullitt Building.
Harrier H. Brace,	St. Paul, Minn.	
Walter W. Calmore,	Philadelphia,	501 Chestnut St.
W. Roger Fronefield,	Media.	
Philip H. Goepp,	Philadelphia,	1430 S. Penn Square.
Harry F. Stitzell,	Philadelphia,	1430 S. Penn Square.

JUNIORS.

Louis A. Biddle,	Philadelphia,	712 Walnut St.
Horace Lincoln Cheyney,	Media, Pa.	
Charles C. Coutler,	Camden, N. J.,	3d and Market Sts.
John Frederick Hartmann,	Philadelphia,	711 Walnut St.
Samuel Carman Kintzing,	Philadelphia,	713 Drexel Building.
William G. Littleton,	Philadelphia.	
Ziba T. Moore,	Philadelphia,	608 Chestnut St.
George Herbert Taylor,	Camden, N. J.,	312 Market St.
Joseph T. Taylor,	Philadelphia,	608 Chestnut St.
		Total, 15.

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 1st.

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 treat-

ises 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 *Die 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. 119-121.

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 Prof. James Parsons, 1534 Locust Street, Philadelphia.

UNIVERSITY LECTURE ASSOCIATION.

WILLIAM PEPPER, M.D., LL.D., *President.*
MRS. WILLIAM HUNT, *Secretary.*

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. Plans are in preparation greatly to extend its usefulness by a system of University extension, under which similar courses will be given in cities and towns not too far distant from Philadelphia, especially where local Alumni associations are in existence. For the winter of 1889-90 the following courses are announced :—

1. The Decline and Fall of the Greek and Roman Religions. Two lectures by Prof. Paul Shorey, Ph.D., of Bryn Mawr College.
2. The Indian and the Negro. Two lectures by Gen. S. C. Armstrong, U.S.A., of Hampton, Va.
3. The French Revolution. Twelve lectures by Hon. Andrew D. White, LL.D., of Cornell University.
4. American Antiquities. Three lectures by Prof. Daniel G. Brinton, M.D., of the University.
5. Development of the Constitution of the United States. Two lectures by Prof. C. Stuart Patterson, A.M., of the University.
6. The Modern Novel. Six lectures by Prof. Hjalmar Hjorth Boyesen, of Columbia College.
7. The Talmud. Three lectures by Prof. Morris Jastrow, Jr., Ph.D., of the University.
8. Mental Measurements. Three lectures by Prof. James McKeen Cattell, of the University.
9. The Mechano-Physiological Philosophy of Biology. Six lectures by Prof. John Ryder, Ph.D., of the University.

For information as to courses of lectures, or membership in the Association, address Mrs. William Hunt, Secretary, 1300 Spruce Street.

THE MUSEUM OF ARCHÆOLOGY AND PALÆONTOLOGY.

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

JOSEPH LEIDY, M.D., LL.D., DEAN.

REV. JOHN P. PETERS, PH.D., Director of Babylonian Exploration.

DANIEL G. BRINTON, M.D., Director of American Exploration.

REV. HERMANN HILPRECHT, PH.D., Curator of Babylonian
Collections.

CHARLES C. ABBOTT, M.D., Curator of American Collections.

EDWARD D. COPE, PH.D., Curator of Palæontological Collections.

—— ———, Director of Egyptian Exploration.

—— ———, Curator of Egyptian Collections.

This Department was organized in 1889 to provide for instruction and original research in Archæology and Palæontology, and the incidental formation of collections for their illustration. For two years an expedition under Prof. Peters has been prosecuting work in Babylonia, and already the nucleus of a valuable collection of Assyrian antiquities has been secured, and is now being critically studied by Prof. Hilprecht. A collection of North American antiquities is being rapidly accumulated under the care of Dr. Abbott, and arrangements have been made for explorations in Western and Southern fields, as well as for participation in the results of the Egyptian Exploration Fund. An extremely valuable collection of Talismans and Engraved Gems has been loaned to the Museum by its collector and owner, Mr. Maxwell Sommerville, and his example has been followed by others, who have thus made accessible for study their collections in various fields.

The Museum is governed by a Board of Managers, annually elected, of whom ten are Trustees of the University, and ten elected by the University Archæological Association.

For inspection of the Museum, or for the prosecution therein of special studies, application may be made to one of the curators above named.

THE UNIVERSITY ARCHÆOLOGICAL ASSOCIATION.

President.—JOSEPH LEIDY.

Vice-Presidents.—GEORGE W. CHILDS, CLARENCE H. CLARK,
CLARENCE S. BEMENT, FRANCIS C. MACAULEY,
HENRY C. GIBSON, MAXWELL SOMMERVILLE,
EDWARD W. CLARK, ROBERT H. LAMBORN,
STUART WOOD, EDWARD H. COATES.

Chairman of the Babylonian Exploration Fund, EDWARD W. CLARK.

Chairman of the American Exploration Fund, EDWARD H. COATES.

Chairman of the Egyptian Exploration Fund, THOMAS HOCKLEY.

Treasurer, JOSEPH H. COATES, 116 Chestnut Street, Phila.

Secretary, HORACE JAYNE, M.D.

This Association has been formed to co-operate with the Museum in securing funds for explorations and the acquisition of archæological material, to promote and encourage research and publication in this department, and to share in the general management of the Museum. For its practical work, the Association is divided into Exploration Funds—Babylonian, Egyptian, American, etc., each having its special officers and associating members whose interests are similar. The annual membership fee is ten dollars, payable in January of each year, and funds are administered with strict reference to the purpose of the subscription. For admission to membership or other information, application may be made to Horace Jayne, M.D., Secretary, University.

LIBRARY.

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 over 60,000 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 7,000 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 3,000 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 5,000 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 1,000 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., comprehends 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 1,000 volumes on a great variety of subjects, literary, scientific and historical.

THE HAYDEN LIBRARY comprises works on geology, palæontology, zoölogy, and botany, presented to the University by the widow of the late Professor F. V. Hayden, M.D.

THE STILLÉ MEDICAL LIBRARY, founded by Professor Alfred Stillé, M.D., embraces 6,000 bound volumes and as many unbound volumes and pamphlets.

Besides the books on Natural History contained in the general Library, there is a special collection of about 4,000 volumes relating to that subject in the Biological Laboratory.

THE BIDDLE LAW LIBRARY comprises the noted collection of American, English, Scotch, and Irish Reports, numbering 4,200 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. 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, recently purchased by private subscription, embraces the philological library of the late Professor F. A. Pott, of the University of Halle, as well as many valuable additions to Professor Pott's collection. It contains about 4,000 works, and represents 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 has been considerably increased during the past year, notably by the addition of a very fine Arabic collection numbering about 1,000 volumes, and a collection on Semitic Epigraphy (Phœnician, Palmyrene, Moabitish, Himiaritic), aggregating 125 volumes. It also contains an Assyrian collection previously obtained, besides several hundred volumes on Hebrew, both of the classical and Rabbinical period, Biblical commentaries, etc. The nucleus of a manuscript collection has also been formed through the purchase during the past year of Arabic and Ethiopic manuscripts.

Mr. Joseph Wharton has during the past year given twenty-five thousand dollars as an endowment fund for the perpetual increase of the library of Economic Science.

The Library is open every day during the session, except Saturday and Sunday, from 9 A.M. to 5 P.M., and both professors and students are permitted to take books out. The use of the Library for consultation is accorded graduates and other persons properly introduced to Gregory B. Keen, A.M., Librarian.

DEPARTMENT OF PHYSICAL EDUCATION.

This department carries into practical operation the conviction that during the period of growth the body needs quite as much training as the mind, and that 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 its students.

The means are supplied in the Athletic Grounds, lying next to and partly surrounded by the College buildings, and comprising four acres, which have been fenced, graded and improved, a fine quarter-mile track laid, the middle of the lot prepared for baseball, foot-ball, tennis, etc., a grandstand erected, and a competent person engaged to supervise and restrict the use of the grounds, and to see that the intentions of the Trustees that they are to serve 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 all 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 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. An extract from this record is sent to his parent or guardian as follows :

DEAR SIR:

The following extract from the University Records represents the general physical condition of
of the Class of

Development	Average Development
Strength	Average Strength
Condition, viz.: Relation of Strength to development	Average Condition
Chest Capacity	Average Capacity
Muscles especially requiring development	
Exercise recommended	
General Advice	

It is hoped that he will follow the line of physical work thus indicated with sufficient persistence to effect some permanent improvement.

[Signed] *Director of Physical Education.*

This examination is repeated at stated intervals, certainly twice every year of his college life, 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 must be administered or recommended by an experienced

teacher. Merely competitive sports do not of themselves supply these 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 our competitive sports the greatest care is exercised in recommending training for athletic contests. Only such students are advised to train for special events as 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.

The earnest co-operation of parents or guardians is very necessary in the attainment of the best results in this Department. Parents need have no fears that the health of those entrusted to the care of the Department will suffer from overwork, for the greatest care is constantly exercised to prevent it. Experience has shown that those students who conscientiously follow the instructions received from the Department increase in mental vigor with the improvement in bodily strength.

Plotting charts based upon all the measurements and strength tests previously made at the University of Pennsylvania are used to indicate at a glance the relative standing of any particular student compared with all previous examinations. The advantage of these charts is that they show the changes noted at different examinations, in addition to the individual's standing as compared with that of all preceding students.

A SUMMER COURSE OF PHYSICAL EDUCATION.

A Summer Course was instituted at the close of the last College year beginning on July 8th, 1889, and continuing five weeks, under the direction of Dr. Leuf, assisted by Mr. W. M. Howland.

The Summer Session of 1890 will begin on Monday, June 23d, and continue five weeks, ending July 26th.

The instruction will be theoretical and practical. The didactic and theoretical Course will comprise lectures on anatomy, phys-

iology, hygiene, physical diagnosis, first aid to the injured, out-door work, body building, and apparatus. The practical Course will consist of actual dissections, clinical instruction in physical diagnosis, field work, out-door games, measurements, gymnasium work, boxing, fencing and broad-sword exercise. Provision has also been made for instruction in rowing and swimming and on apparatus, rope splicing, repairing, etc. In-door work will be done in the University Gymnasium, which is thoroughly equipped with modern appliances, and out-door work on the University Athletic Grounds.

The Course of Instruction will be under the direction of Dr. Leuf, who will be assisted by a corps of thoroughly competent specialists.

A satisfactory entrance examination will be required of all those who have no documentary evidence of having been grounded in the preliminary studies necessary to a good understanding of any part of the Course that may be selected.

FEES.—For the full Course of general instruction lasting five weeks, the fee is fifty dollars in advance; and for arrangements for special instruction in any of the branches, during any part of the Summer, apply to A. H. P. Leuf, M.D., 129 South 36th Street.

CENTRAL COMMITTEE OF THE ALUMNI.

This organization, the result of a growing desire amongst the Alumni at large for a definite influence in the affairs of the University, was established by the Board of Trustees, March 7th, 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 elected, 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.

1890.*

George C. Harlan, M.D.,	1515 Walnut St., Philada.
Theodore H. Seyfert, M.D.,	1709 Mt. Vernon St., Philada.
John Leighton McKim, A.M.,	Milford, Del.
William R. Philler, A.M., LL.B.,	1340 Chestnut St., Philada.
Hampton L. Carson, A.M., LL.B.,	Drexel Building, do.

1891.

Henry Budd, A.M.,	727 Walnut St., Philadelphia.
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.
Walter George Smith, A.M., LL.B.,	524 Walnut St., do.

1892.

James W. Robins, D.D.,	1821 De Lancey Place, Phila.
H. Laussat Geyelin, A.M., LL.B.,	Girard Building, Philada.
J. Levering Jones, LL.B.,	Drexel Building, do.
Alfred Whelen, M.D.,	123 S. Twentieth St., do.
B. Alexander Randall, M.D.,	1806 Chestnut St., do.
John Marshall Gest, A.M., LL.B.,	129 S. Fifth St., do.

1893.

John H. Packard, A.M., M.D.,	1926 Spruce St., Philada.
George F. Martin, A.M.,	3903 Locust St., do.
Joseph G. Rosengarten, A.M.,	532 Walnut St., do.
Charles Claxton, A.M., M.D.,	2114 Pine St., do.
James T. Mitchell, LL.B.,	1722 Walnut St., do.
William M. Stewart, Jr., A.M., LL.B.,	Drexel Building, do.

1894.

R. Dale Benson, A.M.,	510 Walnut St., Philada.
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., Philada.
Effingham B. Morris, A.M., LL.B.,	Girard Building, do.

<i>President.</i> J. Sergeant Price,	709 Walnut St., Philada.
<i>Secretary.</i> John Marshall Gest,	129 S. Fifth St., do.
<i>Treasurer.</i> William H. Klapp, M.D.,	2132 Pine St., do.

*The term expires, in each case, on Commencement Day of the year indicated.

DEGREES, HONORS, AND PRIZES,
1888-1889.

HONORARY DEGREES.

JUNE 5, 1889.

Doctor of Science—PROF. GEORGE DAVIDSON.

CHARLES ALBERT ASHBURNER.

Doctor of Laws—THE REV. GEORGE DANA BOARDMAN, D.D.
THE REV. BISHOP CYRUS FOSS, D.D., LL.D.

JOHN FOSTER KIRK.

PROF. ALFRED STILLÉ, M.D., LL.D.

DEGREES IN COURSE.—CERTIFICATES.

JUNE 5, 1889.

Bachelor of Arts—

Frederic Robeson Baker,
Charles Newton Clement Brown,
Leon Symonety Dexter,
Conway Dillingham,
Sherborne William Dougherty,
Rev. William Du Hamel, A.B.,
William Innes Forbes,
Charles Harrison Frazier,
Dallett Fuguet,

Robert Carmer Hill,
Matthew James Hyndman,
Edward Isaac Hyneman,
Joseph Reynolds McCance,
James Clayton Mitchell,
Charles Peabody,
Elliston Joseph Perot,
Lloyd Mifflin Scott,
Walter Scott.

Bachelor of Philosophy—

Herbert Hart Boyd,
George Brooke, Jr.,
Benjamin Wilfrid Fleischer,
Milton Jay Greenman,
Rodman Ellison Griscom,
Tamio Hayashi,
George Henderson,
Charles Peter Beauchamp Jefferys, Jr.,
Samuel McCune Lindsay,

Howard Mellor,
Edward Warloch Mumford,
Ellis Paxson Oberholtzer,
John Lamme Stewart,
Archibald Graham Thomson,
Clarence Burns White,
Clinton Rogers Woodruff,
Nathan Young Worrall.

Bachelor of Science—

Franklin Bache,	Edward Christman Knight,
Timothy Raymond Beyer,	Benjamin Franklin Lacy,
Oscar Pearl Chamberlain,	George Whitfield Taylor Miller,
Francis Macomb Cresson,	Edward Asa Partridge,
Christian Frederic Fisher,	Walter Phillips,
Thomas Willis Fleming,	David Bowen Salter,
George Hammeken Hill,	Alfred Newlin Seal,
Oliver Hough,	Daniel Bussier Shumway,
Thomas Wilkins Hulme,	Robert Stulb,
Henry Martin Justi,	Joseph Fithian Tatem.
Charles Barton Keen,	

Bachelor of Laws—

Francis Cope Adler, A.B.,	Samuel Carman Kintzing,
William Harrison Allen,	Frederick Jacob Knaus, Ph.G.,
David Werner Amram, A.B.,	Irvin Poley Knipe, A.B.,
Forrest Murrell Anderson, Ph.B.,	Alexander Durbin Lauer,
Arthur Straus Arnold,	David Lavis,
George Wellington Beale,	Francis Scoffin Laws,
Stacy Barcroft Beebe,	Joseph Siegmund Levin, A.B.,
George Hinson Berkheiser,	Edward Fell Lukens,
Meylert Bruner,	Hew Brydon MacLean, Ph.B.,
Walter Eveland Buckley,	Frank Kellar McCance, A.B.,
William Michael Byrne, A.B.,	Henry Aloysius McCarthy,
Malcolm Graeme Campbell,	Christopher Magee, Jr., A.B.,
Horace Lincoln Cheyney,	William Morgan Montgomery,
Edward Joseph Coll, A.B.,	Joseph Edward Murray,
William Elliot Dudley,	Harvey Klapp Newitt, Jr.,
Horace Durbin,	George Wharton Pepper, A.B.,
William Embery,	Joseph Snowdon Rhoads,
Charles Black Evans, A.B.,	Frank Brown Rhodes,
Joseph Rosenbaum Fahy,	Alexander Harvey Scott, A.B.,
Jay Gates,	Edwin Jaquett Sellers, A.B.,
Nathan Clarence Horton,	Jacob Martin Shindel,
Thomas Paull Howell,	Frederick Joseph Shoyer,
Solomon Stanger Iszard, A.B.,	John William Speckman,
Francis Fisher Kane, A.B.,	Henry Wiener, Jr., A.B.

Master of Arts—

John Chester Hyde, A.B.,	Albert William Manifold, A.B.,
Irvin Poley Knipe, A.B.,	Edwin Jaquett Sellers, A.B.
Rev. Charles Wadsworth Nevin, A.B.,	

Bachelor of Sciences Auxiliary to Medicine—

Walter Myers Gill, M.D.

Bachelor of Divinity—

Edward Miller Jefferys, A.B.

Practical Chemist—

Oliver Hough, B.S.

Mechanical Engineer—

Edwin Robert Keller, B.S.,
Edgar Kidwell, A.M.,

Charles Everett Ross, B.S.

Civil Engineer—

Eugene Delano Cleaver, B.S.,
William George Houston, B.S.,
George Brodhead Harris, B.S.,
Manton Eckfeldt Hibbs, B.S.,

Frederick Merwin Ives, B.S.,
John Richard Savage, B.S.,
William James Smith, B.S.

Doctor of Veterinary Medicine—

Simon Davis Brimhall,
George Frank Harker,
Frank Harman Mackie,
Chalkley Harvey Magill,

William Henry Mattson,
James Caldwell McNeil,
Samuel Bailey Willard.

Doctor of Dental Surgery—

Samuel S. Lowry,
Domingos P. Ribas,

Jesus Ruiz,
Frederick Sauers.

Doctor of Medicine—

Frederick East,
Charles L. Leonard,

Charles G. Scott,
Charles N. Wolf.

Master of Laws—

Alexander Renshaw De Witt, LL.B.

Doctor of Philosophy—

Arthur W. Goodspeed, A.B.

CERTIFICATES.

Department of Science—

Gurney Fairfax Coleman,
Alexander Brown Coxe,
Emlan Trenchard Hall,
George Washington Hyde, Jr.,

Thomas Canning McBride,
Walter Raiguel Stroud,
Hubert Alexander Bonzano.

Department of Finance and Economy—

John Eugene Carbutt,

Joseph Somers Jaffa.

Department of Biology—

Rodman Barker,
Samuel H. Barker,
Jessie L. Colson,
Alexander H. Davisson,
John H. Girvin,
Henry S. Kiersted,
Thomas M. Lightfoot,

George W. McCafferty,
William T. Marshall,
George D. Morton,
Frank R. Packard,
Addison M. Rothrock,
William T. Stewart.

Department of Music—

Anna Jackson,

William Forrest Paul.

DEGREES IN COURSE.

MAY 1, 1889.

Doctor of Medicine—

NAME.	POST-OFFICE.	STATE.
Adams, J. Howe,	Philadelphia,	Pennsylvania.
Alrich, William M.,	Philadelphia,	Pennsylvania.
Anderson, Willis S.,	Shelby,	Ohio.
Appelbach, Harry E.,	Sellersville,	Pennsylvania.
Bacon, John,	Greenwich,	New Jersey.
Baker, Nathan M., B.S. (Univ. Minn.),	St. Peter,	Minnesota.
Banks, William H.,	Mifflintown,	Pennsylvania.
Bashore, Harvey B., A.B. (Yale),	West Fairview,	Pennsylvania.
Benedict, Arthur L., A.B. (Univ. Mich.), M.D.,	Buffalo,	New York.
Birney, Herman H., M.D.,	Washington,	District Columbia.
Boger, John A., A.B. (C.H.S.),	Philadelphia,	Pennsylvania.
Bolling, Robert H.,	Chestnut Hill,	Pennsylvania.
Brooke, Benjamin,	Fortress Monroe,	Virginia.
Brown, James G.,	Peola Mills,	Virginia.
Bryan, J. Roberts, A.B. (C.H.S.),	Philadelphia,	Pennsylvania.
Burd, William J.,	Belvidere,	New Jersey.
Burger, Francis J.,	Lancaster,	Pennsylvania.
Butler, Clarence A., A.B. (W.U.P.),	Allegheny,	Pennsylvania.
Canby, Edmund,	Wilmington,	Delaware.
Carpenter, Herbert B.,	Philadelphia,	Pennsylvania.
Carpenter, John T., Jr.,	Pottsville,	Pennsylvania.
Cashman, Nathaniel A., Ph.G.,	Philadelphia,	Pennsylvania.
Clarke, J. Frederick, B.S. (Iowa State Univ.),	Fairfield,	Iowa.
Cleveland, Arthur H., B.S. (Lafayette),	Philadelphia,	Pennsylvania.
Cross, George D.,	Chester,	Pennsylvania.
Crothers, S. Ross, Ph.G.,	Zion,	Maryland.
Curry, Edw. A., A.B. (Dickinson),	Danville,	Pennsylvania.
Davis, Charles N.,	Bryn Mawr,	Pennsylvania.
Davis, William J.,	Pottstown,	Pennsylvania.
Deekens, A. Hamilton,	Philadelphia,	Pennsylvania.
Dieffenderfer, Walter B., M.E.,	Auburn,	Pennsylvania.
Dimm, Charles H.,	Selins Grove,	Pennsylvania.
Dongion, Giragos,	Dearbecker,	Armenia.
Downes, Randolph H.,	Templesville,	Maryland.
Dunn, Walter, Ph.G.,	Clifton Heights,	Pennsylvania.
Ferguson, Albert D.,	Philadelphia,	Pennsylvania.
Fowler, Charles C., A.B. (Emory Coll.),	Spartanburg,	South Carolina.
French, Edward M.,	Bethlehem,	Pennsylvania.
Gallagher, George W.,	Dawson,	Pennsylvania.
Gallagher, Thomas J., Jr.,	Pittsburgh,	Pennsylvania.

Galloway, Albert M., A.B. (C.H.S.),	Philadelphia,	Pennsylvania.
Gerlach, E. Rudolph,	Trenton,	New Jersey.
Gillespie, Frank,	Principio,	Maryland.
Grebe, William, Ph.G.,	Philadelphia,	Pennsylvania.
Greene, William C., A.B.,	Beaufort,	South Carolina.
Guerrero, José B.,	Managua,	Nicaragua.
Hall, William D. W., A.B. (Prince- ton),	Lewes,	Delaware.
Hamme, John M., B.S. (Lafayette),	York,	Pennsylvania.
Harris, Thomas J., A.B. (Dart- mouth),	Claremont,	New Hampshire.
Hekimian, Gabriel, M.D.,	Erzeroom,	Turkey.
Heil, Ulysses S. Grant,	Easton,	Pennsylvania.
Hileman, John S.,	Pittston,	Pennsylvania.
Horning, Frank L.,	Landingville,	Pennsylvania.
Howerter, Emanuel L., B.E.,	Stony Run,	Pennsylvania.
Hull, Waldo W.,	Williamsport,	Pennsylvania.
Humphrey, Glennis E.,	Union City,	Pennsylvania.
Hunsberger, J. Newton,	Skippack,	Pennsylvania.
Johnston, William G.,	Titusville,	Pennsylvania.
Jones, Charles J.,	Philadelphia,	Pennsylvania.
Keefe, Frank R., Ph.B. (Dickin- son),	Sprague,	Washington Ter.
Keiser, Elmer E., A.B. (Bucknell Univ.),	Lewisburg,	Pennsylvania.
Ketcham, Stephen R.,	Philadelphia,	Pennsylvania.
Kneass, Samuel S., A.B. (Univ. Penn.),	Philadelphia,	Pennsylvania.
Kulp, John Stewart,	Wilkesbarre,	Pennsylvania.
La Motte, Harry,	Fort Wingate,	New Mexico.
Leaman, William G.,	Philadelphia,	Pennsylvania.
Lear, John, A.M. (Lafayette),	Allentown,	Pennsylvania.
Lederman, Moses D.,	Lancaster,	Pennsylvania.
McFarland, Joseph,	Philadelphia,	Pennsylvania.
McGalliard, Benjamin W., Ph.B. (Lafayette),	Bridgeton,	New Jersey.
McGill, Will. B.,	Marionville,	Missouri.
McKelway, George I., Ph.G.,	Philadelphia,	Pennsylvania.
McNaugher, Samuel N., A.B. (Westminster),	Allegheny,	Pennsylvania.
Michel, Bernard, Ph.G.,	Dubuque,	Iowa.
Miller, Charles L.,	Lebanon,	Pennsylvania.
Miller, Horace W.,	Urbana,	Illinois.
Miller, Morris Booth,	Media,	Pennsylvania.
Milnor, William S., A.B. (C.H.S.),	Philadelphia,	Pennsylvania.
Moore, Cyrus Chester,	Moore's Salt Works,	Ohio.
Moore, J. Demuth, Ph.G.,	Wrightsville,	Pennsylvania.
Naylor, Walter W.,	New Hope,	Pennsylvania.
Neuber, George G. E., A.B. (Univ. of Penna.),	Philadelphia,	Pennsylvania.
Patrick, William S.,	Quinton,	New Jersey.
Phillips, Horace,	Philadelphia,	Pennsylvania.

Posey, William C., A.B. (Univ. Philadelphia, of Penna.),		Pennsylvania.
Price, William H., A.B. (C.H.S.),	Philadelphia,	Pennsylvania.
Rawlins, Benjamin L.,	Dallas,	Texas.
Reisert, William, Ph.G.,	Bridesburg,	Pennsylvania.
Rhodes, Oreon S.,	E. Stroudsburg,	Pennsylvania.
Riegel, William, A.B. (Penna. Coll.),	Catasauqua,	Pennsylvania.
Rodgers, Robert, Jr.,	Philadelphia,	Pennsylvania.
Roth, Emil,	Philadelphia,	Pennsylvania.
Rosenau, Milton J., A.B. (C.H.S.),	Philadelphia,	Pennsylvania.
Rothermel, Pius,	Molltown,	Pennsylvania.
Schaeffer, Charles D., A.B. (F. & M. Coll.),	Kutztown,	Pennsylvania.
Schroeder, Charles B., A.M. (La-fayette),	Lock Haven,	Pennsylvania.
Scott, J. Allison, A.B. (Univ. of Penna.),	Philadelphia,	Pennsylvania.
Shissler, Alfred G.,	Shamokin,	Pennsylvania.
Silva, Manuel C. da,	Rio de Janeiro,	Brazil.
Sinnamon, George,	Philadelphia,	Pennsylvania.
Small, J. Frank,	York,	Pennsylvania.
Smith, A. Donaldson,	Philadelphia,	Pennsylvania.
Smith, Rolla L.,	Oakville,	Pennsylvania.
Snyder, Elmer R.,	Hilltown,	Pennsylvania.
Speers, Albert C.,	Belle Vernon,	Pennsylvania.
Stengel, Alfred,	Pittsburgh,	Pennsylvania.
Stichter, Henry Deischer, Ph.G.,	East Greenville,	Pennsylvania.
Stitt, Edward R., A.B., Ph.G.,	Rock Hill,	South Carolina.
Swaving, J. Harry,	Pottsville,	Pennsylvania.
Swift, Elisha P., A.B. (Lafayette),	Allegheny,	Pennsylvania.
Taylor, Harry B.,	Philadelphia,	Pennsylvania.
Toulmin, Harry, Ph.B. (Lehigh),	Philadelphia,	Pennsylvania.
Tunis, Joseph P., A.B. (Univ. of Penna.),	Philadelphia,	Pennsylvania.
Tyson, T. Mellor,	Philadelphia,	Pennsylvania.
Umsted, William M.,	Coatesville,	Pennsylvania.
Van Buskirk, Frederic W.,	Pottstown,	Pennsylvania.
Vanmeter, Seymour D.,	San Antonio,	Texas.
Weiss, George L.,	Lebanon,	Pennsylvania.
Weiszgerber, John, Ph.B. (Univ. of Penna.),	Philadelphia,	Pennsylvania.
Whaley, Benton H.,	Whaleyville,	Maryland.
Williams, Charles B., A.B. (Univ. of Penna.),	Philadelphia,	Pennsylvania.
Wilson, E. Ellsworth, Ph.G.,	Philadelphia,	Pennsylvania.
Wilson, Henry Delano,	Washington,	District Columbia.
Wilson, Samuel M., B.A. (C.H.S.),	Philadelphia,	Pennsylvania.
JUNE 5, 1889.		
East, Frederick,	Brockport,	New York.
Leonard, Charles L.,	Philadelphia,	Pennsylvania.
Scott, Charles G.,	Roarkee,	North India.
Wolf, Charles N.,	Hellam,	Pennsylvania.

Of the foregoing there were from :

Armenia	1	New Mexico	1
Brazil	1	New York	2
Delaware	2	Nicaragua	1
District of Columbia	2	North India	1
Illinois	1	Ohio	2
Iowa	2	Pennsylvania	91
Maryland	4	South Carolina	3
Minnesota	1	Texas	2
Missouri	1	Turkey	1
New Hampshire	1	Virginia	2
New Jersey	5	Washington Ter.	1
		Total,	128

MAY 1, 1889.

Doctor of Dental Surgery—

Albury, Robert W.,	Nassau,	Bahamas.
Ayala, Victor M.,	Matanzas,	Cuba.
Barnett, George E.,	Walla Walla,	Washington T.
Bruce, James A.,	Melbourne,	Australia.
Calves, Antonio D.,	Havana,	Cuba.
Cheney, Lucius W.,	Lee,	Massachusetts.
Cooney, Edward J. M.,	Providence,	Rhode Island.
Cooper, Arthur W.,	Omaha,	Nebraska.
Culpeper, Wm. A., M.D.,	Barbados,	West Indies.
Darby, George D. B.,	Lansdowne,	Pennsylvania.
DeLacy, William P.,	Scranton,	Pennsylvania.
DeWalt, J. Edward,	Freeport,	Illinois.
Diehl, Walter R.,	Pittsburgh,	Pennsylvania.
Dunbar, Henry T.,	N. Hartland,	Vermont.
Eaton, Horace E.,	Parrsboro,	Nova Scotia.
Essig, Norman S.,	Philadelphia,	Pennsylvania.
Faust, William F.,	Womelsdorf,	Pennsylvania.
Focht, Frank D.,	Philadelphia,	Pennsylvania.
Fordham, J. Merritt,	Scranton,	Pennsylvania.
Fuller, John G.,	Philadelphia,	Pennsylvania.
Gerhards, Georg,	Düsseldorf,	Germany.
Goldsmith, Adin, A.	Chester,	New Hampshire.
Goldsmith, Samuel L.,	Philadelphia,	Pennsylvania.
Gray, George R.,	Worcester,	Massachusetts.
Grotefend, George A.,	Shasta,	California.
Guiteras, Albert F.,	Matanzas,	Cuba.
Hart, Frank T.,	Pennington,	New Jersey.
Horgan, Cornelius F.,	Philadelphia,	Pennsylvania.
Keyes, Charles,	Rio de Janeiro,	Brazil.
Lamson, Frank E.,	Worcester,	Massachusetts.
Lamson, William F.,	New York.	New York.
Leake, Walter J.,	Lockport,	New York.
Littig, Henry A.,	Davenport,	Iowa.

Luxemburger, George,	Scranton,	Pennsylvania.
Mayer, George H.,	Mauch Chunk,	Pennsylvania.
Miro, José Luis,	Havana,	Cuba.
Mogel, Peter S.,	Bernville,	Pennsylvania.
Nunez, Emilio,	Sagua,	Cuba.
Oser, William,	Basel,	Switzerland.
Parry, Ira W.,	Utica,	New York.
Peeso, Frederic A.,	Syracuse,	New York.
Reap, Joseph C.,	Pittston,	Pennsylvania.
Rees, Frank W.,	Walla Walla,	Washington T.
ReQua, Leroy,	Rochester,	New York.
Rhone, Charles E.,	Bellefonte,	Pennsylvania.
Robinson, John Best,	Philadelphia,	Pennsylvania.
Root, George S.,	Lockport,	New York.
Roys, Frank E.,	Bridgeport,	Connecticut.
Seebold, Frank P.,	Millersburg,	Pennsylvania.
Stiles, William E., M.D.,	Pittston,	Pennsylvania.
Stine, Frederick M.,	Walla Walla,	Washington T.
Sweetnam, Robert W.,	Manistee,	Michigan.
Trogon, Rosecrans,	Paris,	Illinois.
Velazquez, Miguel A.,	St. Jose,	Costa Rica.
White, Leonard,	Sumter,	South Carolina.
Wix, William H.,	Wilmington,	Delaware.
Woodward, Wilber S.,	Cincinnati,	Ohio.
Woolsey, Charles G.,	Girard,	Pennsylvania.

JUNE 5, 1889.

Lowry, Samuel S.,	Brookville,	Pennsylvania.
Ribas, Domingos P.,	Pelotas,	Brazil.
Ruiz, Jesus,	Bogota,	U. S. of Colombia.
Sauers, Frederick,	Philadelphia,	Pennsylvania.

SUMMARY.

Australia	1	Nebraska	1
Bahamas	1	New Hampshire	1
Barbados, W. I.	1	New Jersey	1
Brazil	2	New York	6
California	1	Nova Scotia	1
Connecticut	1	Ohio	1
Costa Rica	1	Pennsylvania	21
Cuba	5	Rhode Island	1
Delaware	1	South Carolina	1
Germany	1	Switzerland	1
Illinois	2	U. S. of Colombia	1
Iowa	1	Vermont	1
Massachusetts	3	Washington Territory	3
Michigan	1		

HONORS.

IN THE COLLEGE FACULTY.

At the Examination for Degrees, Honors were awarded as follows:—

In the Course in Arts—

Of the *First Class*, to Charles Peabody.

Of the *Second Class*, to Daniel Bussier Shumway, Benjamin Franklin Lacy, Conway Dillingham, Matthew James Hyndman.

Of the *Third Class*, to Dallett Fuguet, Elliston Joseph Perot, Frederick Robeson Baker, Joseph Reynolds McCance, Charles Newton Clement Brown.

In the Towne Scientific School—

Of the *Third Class*, to George Whitfield Taylor Miller, David Bowen Salter, Alfred Newlin Seal, Charles Barton Keen, Oscar Pearl Chamberlain, Edward Asa Partridge.

In the Wharton School of Finance and Economy—

Of the *Second Class*, to John Lammey Stewart, Clinton Rogers Woodruff, Ellis Paxson Oberholzer, Clarence Burns White.

Of the *Third Class*, to Walter Scott, Charles Peter Beauchamp Jefferys, Joseph Fithian Tatem.

At the Annual Examination, Distinctions of the *First Class*,

In the Course in Arts—

To Josiah Harmer Penniman, Robert Bealle Burke.

Thesis mentioned as worthy of high commendation,

In the Towne Scientific School—

The Thesis, the joint work of Messrs. Keller and Kidwell, of the Mechanical Engineering Section, Post-Senior Class.

Theses mentioned as worthy of commendation,

In the Towne Scientific School—

The Thesis of Mr. Ives and the joint Thesis of Messrs. Hyde and Smith, Civil Engineering Section of the Post-Senior Class.

The Thesis of Mr. G. W. T. Miller, Civil Engineering Section of the Senior Class.

IN THE FACULTY OF DENTISTRY.

At the Examination for Degrees, Honorable Mention for averages, exceeding 90, to

Samuel L. Goldsmith,	Pennsylvania.
J. Merritt Fordham,	Pennsylvania.
Walter R. Diehl,	Pennsylvania.
Robert W. Sweetnam,	Michigan.
Horace E. Eaton,	Nova Scotia.
Frederick W. Stine,	Washington.
Walter J. Leake,	New York.
Frank W. Rees,	Washington.

PRIZES.

JUNE 5, 1889.

I. IN THE COLLEGE FACULTY—

1. For the best Essay in Intellectual and Moral Philosophy by a member of the Senior Class,—subject, "*Spinoza*,"—to Charles Peabody, with honorable mention of J. Clayton Mitchell.

2. For the best examination on the "*Oration of Demosthenes on The Crown*," by the members of the Junior Class, to Hugh Walker Ogden and Josiah Harmar Penniman, equally.

3. For the best examination by a member of the Freshman Class on Greek Prose Composition with the accents, to Ulysses Simpson Schaul, with honorable mention of Arthur Conover Thompson.

4. For the best examination on the "*Lectures on Quaternions*," given to the Voluntary Junior Class, equally to Josiah Harmar Penniman and Robert Belle Burke.

5. For the best Essay in History and English Literature by a member of the Senior Class,—subject, "*The Share of Pennsylvania in the Measures that led to the War of Independence*,"—to Elliston Joseph Perot.

6. For the best Essay in History and English Literature by a member of the Junior Class,—subject, "*The Imaginary Conversations of Walter Savage Landor*,"—to William Henry Loyd, Jr., with honorable mention of Hugh Walker Ogden.

7. For the best Declamation by a member of the Sophomore Class, to Edward Adams Shumway, with honorable mention of Samuel Rackestraw Colladay, Philip Eugene Howard, William McAdoo, Jr., James DeWolfe Perry, Jr., and John Reed Valentine.

8. For the best special examination in the Elements of Latin Prose Composition by Freshmen on entering College. First rank: John Henry Lafferty; second rank: Francis Thibault Cross.

9. For the best special examination in Greek Prose Composition by Freshmen on entering College. First rank: William Duane; second rank: Arthur Conover Thompson.

10. To a member of the Scientific Classes for improvement in Drawing, and general good conduct and application, equally to Henry Simons Shillingford and Joseph Wood Wagner, with honorable mention of Francis Thibault Cross and Faustino Apolonio Perez, of the Freshman Class.

11. The HENRY REED Prize to Joseph Reynolds McCance, for his Essay, "*The Names of Persons and Places in Thackeray's Novels*."

12. The SOCIETY OF THE ALUMNI Prize for the best Latin Essay by a member of the Graduating Class, to Charles Peabody, for his Essay entitled, "*De Divino Cultu Liturgico*."

13. The SOCIETY OF THE ALUMNI Prize for the best Original Declamation by a member of the Junior Class, to Hugh Walker Ogden, with honorable mention of Chester N. Farr, Jr.

14. The HENRY LABARRE JAYNE Prize for the best English Composition by a member of the Freshman Class, to George Edmunds Lawrence, with honorable mention of Clarence Russell Williams and Arthur Conover Thomson, for their Essays on the "*Rise, Progress and Decay of Slavery in the United States.*"

15. The VAN NOSTRAND Prize for the member of the Junior Class in Civil Engineering who attains the highest general average of scholarship, to

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, equally to Francis Churchill Williams and Edward Adams Shumway.

II. IN THE FACULTY OF BIOLOGY—

The Junior Prize for the best anatomical preparations, to Kathleen Carter.

III. IN THE FACULTY OF LAW—

1. The SHARSWOOD Prize, to George Wharton Pepper, for his Essay, "*The Borderland of Federal and State Decisions.*"

2. The MEREDITH Prize, to Samuel Carman Kintzing, "*The Conflict of Laws relating to Negotiable Papers taken as Collateral Security for Antecedent Indebtedness.*"

3. The Faculty Prize for the best written examination with all the Professors, to Charles Cooper Townsend, with honorable mention of Russell Duane and George Stuart Patterson.

4. The PEMBERTON MORRIS Prize to George Wharton Pepper, with honorable mention of Joseph Siegmund Levin.

Honorable mention is made of the following members of the Graduating Class for essays of more than ordinary merit:—

Francis Fisher Kane for his essay entitled, "*The Recovery of Money paid under Protest.*"

Joseph Snowden Rhoads for his essay entitled, "*The Law of Equitable Conversion.*"

Joseph Rosenbaum Fahy for his essay entitled, "*The Doctrine of Consideration as applied to Bills of Exchange and Promissory Notes.*"

Solomon Stenger Iszard for his essay entitled, "*The Criterion of Fellow Service.*"

Christopher Magee, Jr., for his essay entitled, "*The Liability of Railroads for the Baggage of Passengers.*"

Joseph Siegmund Levin for his essay entitled, "*Pooling Trusts.*"

Edward Joseph Coll for his essay entitled, "*The Law of Pennsylvania on the Responsibility of Common Carriers as Restricted and Qualified by Notice and Special Contract.*"

The following members of the Graduating Class have passed the examinations with distinguished honor:—

Arthur Straus Arnold,	Alexander Durbin Lauer,
William Michael Byrne,	Joseph Siegmund Levin,
Horace Lincoln Cheyney,	Harvey Klapp Newitt, Jr.,
Francis Fisher Kane,	George Wharton Pepper.
Frederick Jacob Knaus,	

The following members of the Junior Class have passed the examinations with distinguished honor:—

Russell Duane,	Charles Cooper Townsend.
George Stuart Patterson,	

Mr. George Wharton Pepper of the Graduating Class has been appointed a Fellow of the Department of Law.

IV. IN THE FACULTY OF MEDICINE—

MAY 1, 1888.

The "*Alumni Medal*," to the member of the Graduating Class who attained the highest general average in examination, to Thomas J. Harris.

The "*Medical News Prize*," of One Hundred Dollars, for the best thesis, to E. Rudolph Gerlach for his thesis on *Some Observations upon the Change of the Muscle-cells of the Gravid Uterus*.

The award of Distinguished Merit was given to Thomas Mellor Tyson for his thesis, *Influence of Certain Mineral Waters on the Composition of Urine*, and to William H. Price for his thesis on the *Action of Cocaine upon the Circulation*.

A prize of a Pocket-Case, by Dr. John B. Deaver, Demonstrator of Anatomy, for the best record of Anomalies found in the Dissecting-Room, to William C. Posey, with Honorable Mention of J. Harry Swaving.

The following prizes were awarded by Dr. J. Wm. White, Demonstrator of Surgery: First Year prize, Proficiency in Bandaging—1st, L. M. Powell, one copy Agnew's Surgery; 2d, G. S. Woodward, one copy of Jacobson's Surgery, with Honorable Mention of W. M. Hinkle, Charles M. Burk, Wm. E. Bruner, Robert A. Work, Edward C. Ellett, P. W. Willis and N. L. Johnson. Third Year prizes, for

proficiency in Bandaging and in Operative Surgery—1st prize, one copy of Agnew's Surgery, to William M. Alrich; 2d, one White's pocket-case of Surgical Instruments, to John Bacon, with Honorable Mention of Wm. C. Posey, Frank R. Keefer, Joseph Tunis, S. S. Kneass, C. C. Moore, J. D. Moore and Harry Toulmin.

The following graduates of the Medical Department, Class of 1889, were appointed to Hospitals on competitive examinations. They are alphabetically arranged:

To the University Hospital—

William M. Alrich,
John Bacon,

Samuel S. Kneass,
William H. Price.

To the Philadelphia Hospital—

Benjamin Brooke,
J. Frederick Clarke,
Thomas J. Harris,
Glenn E. Humphrey,
Frank D. Keefer,
Stephen R. Ketcham,
Joseph McFarland,

Wm. S. Milnor,
Wm. H. Price,
Milton J. Rosenau,
J. Frank Small,
Alfred Stengel,
Seymour D. Vanmeter.

To the Presbyterian Hospital—

John T. Carpenter, Jr.,
Benjamin W. McGalliard,

William C. Posey,
Seymour D. Vanmeter.

To the German Hospital—

Albert D. Ferguson,
E. Rudolph Gerlach,

Bernard Michel,
J. Harry Swaving.

To St. Mary's Hospital—

A. Hamilton Deekens,

Cyrus C. Moore.

To St. Joseph's Hospital—

Harry La Motte,

Herbert B. Carpenter.

To St. Agnes Hospital—

Charles C. Fowler.

To the Children's Hospital—

Albert B. Galloway,
Herbert B. Carpenter,

Joseph P. Tunis.

To City Hospital, Wilkes-Barre—

Edward A. Curry,

John Stewart Kulp.

To Mercy Hospital, Pittsburgh—

Albert C. Speers.

To Hospitals the appointment to which is not based upon competitive examination;

To the University Hospital—
Harry La Motte.

To the Pennsylvania Hospital—
Norton Downs (1888), Joseph Leidy, Jr. (1887),
Frank B. Gunmev (1888), William T. Sharpless (1888).

To the Episcopal Hospital—
Lewis H. Adler, Jr. (1888), A. L. Staveiy (1888),
Wilbur P. Klapp (1888),

To Howard Hospital—
Walter W. Naylor.

To Wills' Eye Hospital—
George D. Cross.

To St. Luke's Hospital, Bethlehem—
Edmund Canby.

To Reading Hospital—
William S. Gillam (1888).

To St. Joseph's Hospital, Reading—
S. Ross Crothers.

To Wilmington Hospital, Delaware—
Frank Gillespie.

SUMMARY.

PROFESSORS, LECTURERS AND INSTRUCTORS.

College Department,	57	
Department of Medicine, including Hospital Service, . .	70	
" " " (Auxiliary Faculty),	6	
" " Dentistry,	37	
" " Veterinary Medicine,	19	
" " Law,	9	
" " Philosophy,	26	
Emeritus Professors,	7	
		231
Repeated,		53
		178

STUDENTS.

College Department,	429	
Department of Medicine,	485	
" " " (Auxiliary Faculty),	21	
" " Dentistry,	159	
" " Veterinary Medicine,	64	
" " Law,	125	
" " Philosophy,	43	
Post-Graduate Course in Law,	15	
		1,341
Repeated,		16
		1,325

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 the Rev. Jesse Y. Burk, Secretary of the Board of Trustees, 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
	\$260 00	\$460 00

* The session in some of the Departments is from five to nine weeks longer.

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