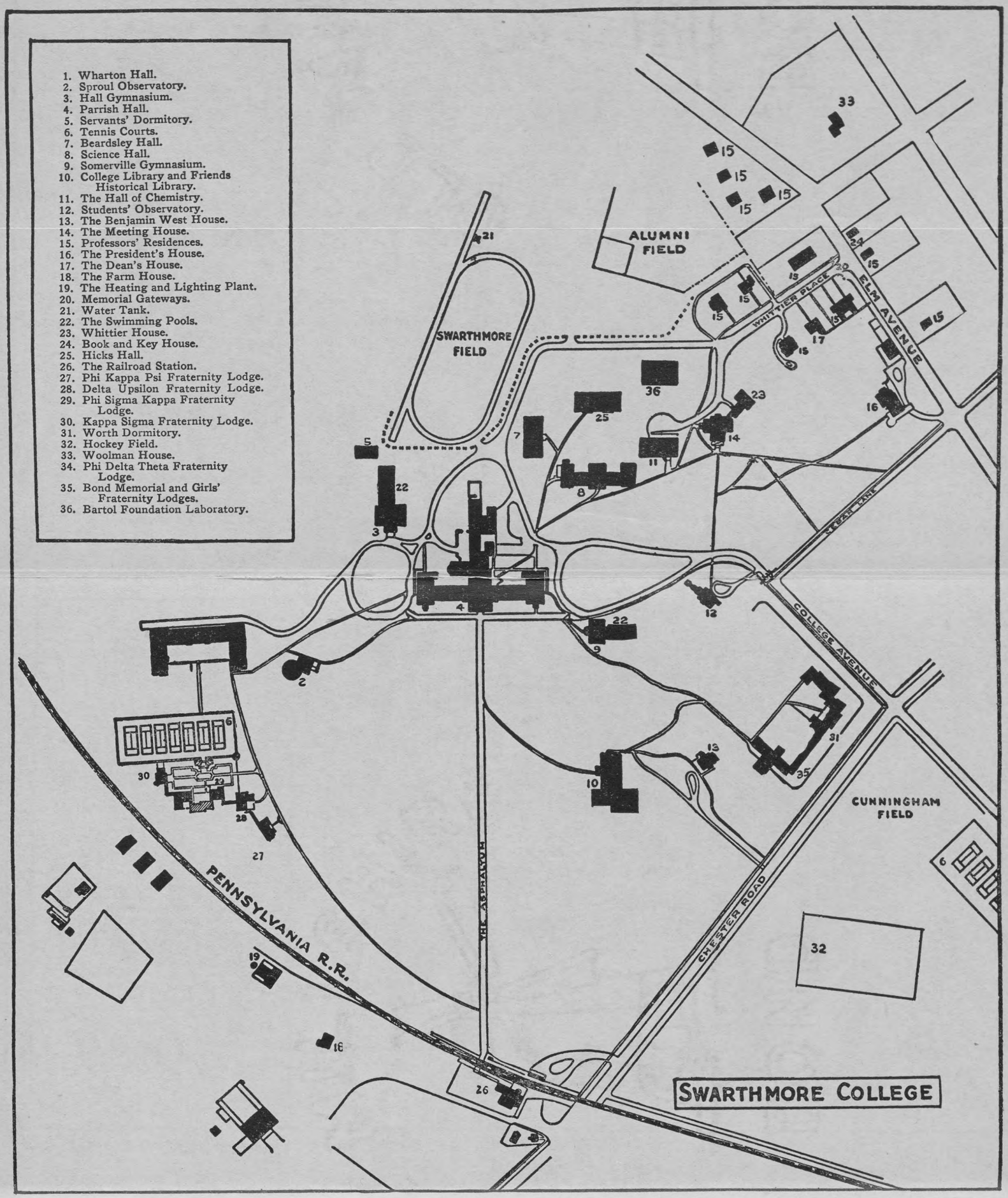
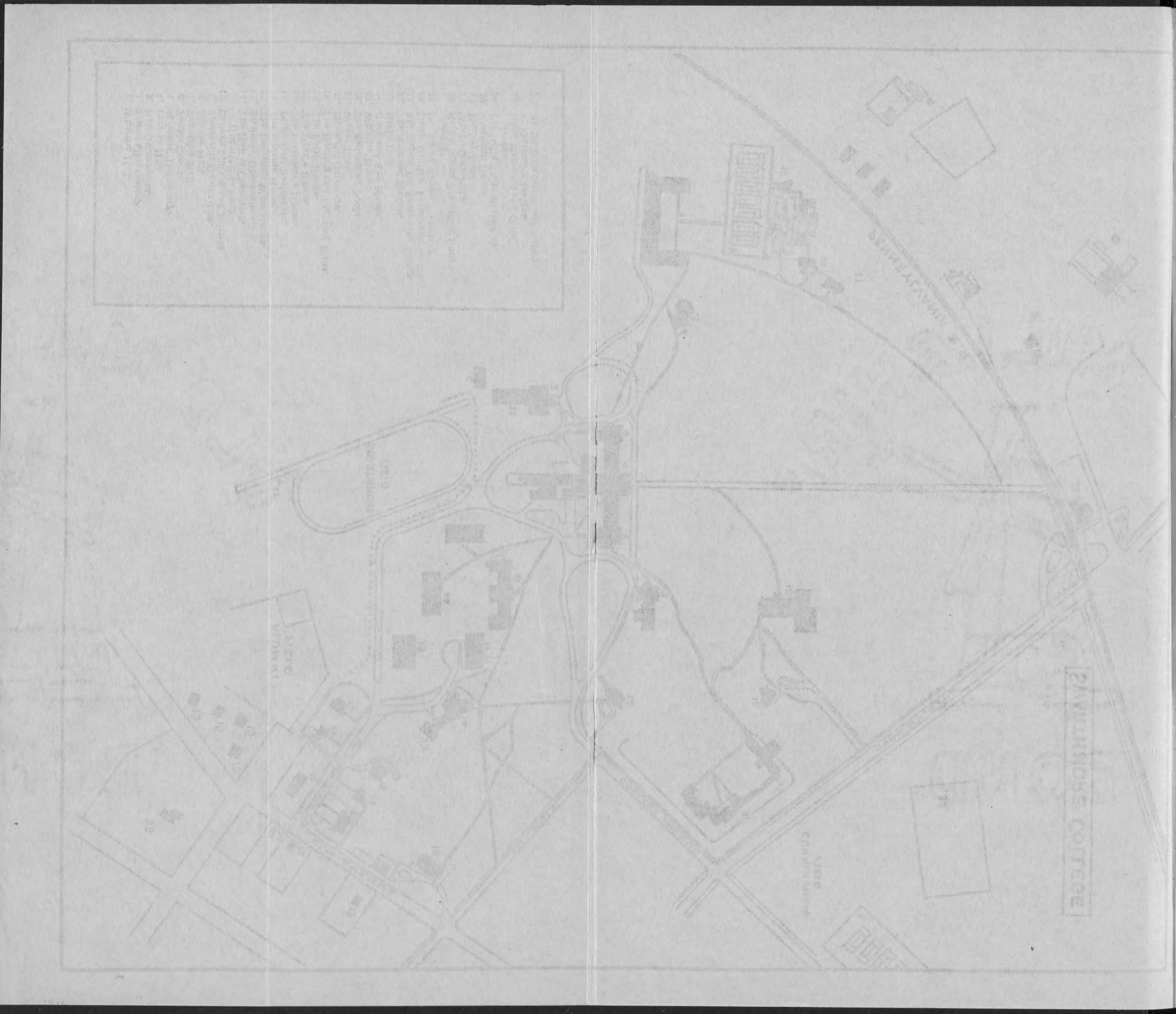

1. Wharton Hall.
2. Sproul Observatory.
3. Hall Gymnasium.
4. Parrish Hall.
5. Servants' Dormitory.
6. Tennis Courts.
7. Beardsley Hall.
8. Science Hall.
9. Somerville Gymnasium.
10. College Library and Friends Historical Library.
11. The Hall of Chemistry.
12. Students' Observatory.
13. The Benjamin West House.
14. The Meeting House.
15. Professors' Residences.
16. The President's House.
17. The Dean's House.
18. The Farm House.
19. The Heating and Lighting Plant.
20. Memorial Gateways.
21. Water Tank.
22. The Swimming Pools.
23. Whittier House.
24. Book and Key House.
25. Hicks Hall.
26. The Railroad Station.
27. Phi Kappa Psi Fraternity Lodge.
28. Delta Upsilon Fraternity Lodge.
29. Phi Sigma Kappa Fraternity Lodge.
30. Kappa Sigma Fraternity Lodge.
31. Worth Dormitory.
32. Hockey Field.
33. Woolman House.
34. Phi Delta Theta Fraternity Lodge.
35. Bond Memorial and Girls' Fraternity Lodges.
36. Bartol Foundation Laboratory.
ALUMNI FIELD
SWARTHMORE FIELD
WHITTIER PLACE
ELM AVENUE
MCCABE LANE
COLLEGE AVENUE
CUNNINGHAM FIELD
PENNSYLVANIA R.R.
THE ASPHALYUH
CHESTER ROAD
SWARTHMORE COLLEGE


PAVILION HOUSE COTTAGE

SWARTHMORE COLLEGE BULLETIN

CATALOGUE NUMBER

SIXTIETH YEAR

1928 - 1929

SWARTHMORE, PENNSYLVANIA

Printed for the College

Vol. XXVI, No. 3 Third Month, 1929

Entered at the Post-Office at Swarthmore, Pa., as second-class matter

1929

January

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COLLEGE CALENDAR

1929

First Month 3.....College re-opens at 8.00 A. M.
First Month 21.....Registration and Enrollment in Classes for the Second Semester, 9.00 A. M. to 12.00 M.
First Month 21.....Mid-Year examinations begin at 2.00 P. M.
First Month 29.....First Semester ends.
Second Month 1.....Second Semester begins.
Second Month 22.....College work suspended for the day.
Third Month 5.....Meeting of the Board of Managers.
Third Month 23.....College work ends at noon for the Spring Recess.
Fourth Month 2.....College work resumes at 8.00 A. M.
Fifth Month 2.....Registration and Enrollment in Classes for First Semester, 1929-30, 2.00 P. M.
Fifth Month 15.....Honors Examinations begin.
Fifth Month 20.....Senior Comprehensive Examinations begin.
Fifth Month 22.....Final Examinations begin.
Fifth Month 29.....Final Examinations end.
Fifth Month 31.....Meeting of Board of Managers.
Fifth Month 31.....Class Day.
Sixth Month 1.....Alumni Day.
Sixth Month 2.....Baccalaureate Day.
Sixth Month 3.....*Commencement.*
Sixth Month 3 to Ninth Month 19.Summer Recess.
Ninth Month 19.....Matriculation, Registration and Enrollment in Classes.
Ninth Month 20.....College work begins at 8.00 A. M.
Tenth Month 1.....Meeting of the Board of Managers.
Eleventh Month 27.....College work ends at 1.00 for the Thanksgiving Recess.
Twelfth Month 2.....College work resumes at 8.00 A. M.
Twelfth Month 3.....Annual Meeting of the Corporation.
Twelfth Month 18.....College work ends at noon for the Christmas recess.

1930

First Month 3.....College re-opens at 8.00 A. M.
First Month 22.....Registration and Enrollment in Classes for the Second Semester, 10.00 A. M. to 12.00 M.
First Month 30.....Mid-Year Examinations end.
Second Month 3.....Second Semester begins.
Second Month 22.....College work suspended for the day.
Third Month 4.....Meeting of the Board of Managers.
Third Month 29.....College work ends at noon for the Spring Recess.
Fourth Month 8.....College work resumes at 8.00 A. M.
Fifth Month 1.....Registration and Enrollment in Classes for First Semester, 1930-31, 2.00 P. M.
Fifth Month 21.....Honors Examinations begin.
Fifth Month 26.....Senior Comprehensive Examinations begin.
Fifth Month 28.....Final Examinations begin.
Sixth Month 4.....Final Examinations end.
Sixth Month 6.....Meeting of the Board of Managers.
Sixth Month 6.....Class Day.
Sixth Month 7.....Alumni Day.
Sixth Month 8.....Baccalaureate Day.
Sixth Month 9.....*Commencement.*

TABLE OF CONTENTS

THE CORPORATION

WILSON M. POWELL, *President*,
71 Broadway, New York.

CHARLES F. JENKINS, *Vice-President*,
232 South Seventh Street, Philadelphia.

HETTY LIPPINCOTT MILLER, *Secretary*,
Riverton, N. J.

CHARLES T. BROWN, *Treasurer*,
518 Ludlow Street, Philadelphia.

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Term expires Twelfth Month, 1929

JOANNA WHARTON LIPPINCOTT, 1712 Spruce Street, Philadelphia.
HOWARD COOPER JOHNSON, 801 Market Street, Philadelphia.
HETTY LIPPINCOTT MILLER, Riverton, N. J.
ELSIE PALMER BROWN, 1622 Twenty-ninth St., N. W., Washington, D. C.
HENRY C. TURNER, 420 Lexington Avenue, New York.
DANIEL UNDERHILL, 50 Court Street, Brooklyn, N. Y.
ESTHER H. CORNELL, 43 Willow Street, Brooklyn, N. Y.
ROBERT E. LAMB, 843 North Nineteenth Street, Philadelphia.

Term expires Twelfth Month, 1930

REBECCA C. LONGSTRETH, Haverford, Pa.
CAROLINE H. WORTH, Coatesville, Pa.
ROBERT PYLE, West Grove, Pa.
EDWARD B. TEMPLE, Swarthmore, Pa.
WALTER ROBERTS, M.D., 1732 Spruce Street, Philadelphia.
FRANCES M. WHITE, Walnut Lane, Swarthmore, Pa.
CLEMENT M. BIDDLE, P. O. Box 743, City Hall Station, New York.

Term expires Twelfth Month, 1931

EDWARD MARTIN, M.D., 135 South Eighteenth Street, Philadelphia.
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PHILIP M. SHARPLES, West Chester, Pa.
MARY HIBBARD THATCHER, Swarthmore, Pa.
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ISAAC H. CLOTHIER, JR., 801 Market Street, Philadelphia.

Term expires Twelfth Month, 1932

*EMMA C. BANCROFT, Wilmington, Del.
CHARLES F. JENKINS, 232 South Seventh Street, Philadelphia.
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T. STOCKTON MATTHEWS, South and Redwood Streets, Baltimore, Md.
MARY LIPPINCOTT GRISCOM, 314 East Central Avenue, Moorestown, N. J.
CHARLES T. BROWN, 518 Ludlow Street, Philadelphia.
ADA GRAHAM CLEMENT, Meeting House Road, Jenkintown.
LYDIA FOULKE TAYLOR, 17 Summitt Avenue, Larchmont, N. Y.

* Died Second Month 15th, 1929.

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ADA GRAHAM CLEMENT.

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FRANCES M. WHITE,
CHARLES F. JENKINS,
WILLIAM W. COCKS,
ROBERT H. WALKER,
MARY L. GRISCOM.

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WALTER ROBERTS.

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CAROLINE H. WORTH,
MARY HIBBARD THATCHER,
MARY LIPPINCOTT GRISCOM,
LYDIA FOULKE TAYLOR,

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JOANNA W. LIPPINCOTT,
ROBERT H. WALKER,
CAROLINE H. WORTH,
HENRY C. TURNER,
EDWARD B. TEMPLE.

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* Died Second Month 15th, 1929.

THE FACULTY

FRANK AYDELOTTE, B.Litt., L.H.D., D.Litt., LL.D., *President*, 324 Cedar Lane

[1]JOHN ANTHONY MILLER, Ph.D., F. R. A. S., *Vice-President, Edward H. Magill Professor of Mathematics and Astronomy, and Director of the Sproul Observatory* ..... Cunningham House

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FRANCES B. BLANSHARD, M.A., *Dean of Women* ..... 600 W. Elm Avenue

[2]DETLEV W. BRONK, M.S., Ph.D., *Dean of Men and Professor of Physiology and Bio-Physics* ..... Cunningham House

GEORGE ARTHUR HOADLEY, D.Sc., *Emeritus Professor of Physics* ..... 518 Walnut Lane

SPENCER TROTTER, M.D., *Emeritus Professor of Biology* ..... Darlington and Miner Streets, West Chester

†WILLIAM ISAAC HULL, Ph.D., F. R. Hist. S., *Howard M. Jenkins Professor of Quaker History* ..... 504 Walnut Lane

JESSE HERMAN HOLMES, Ph.D., *Professor of Philosophy*. 602 W. Elm Avenue

ISABELLE BRONK, Ph.D., *Emeritus Professor of the French Language and Literature* ..... Paris, France

†GELLERT ALLEMAN, Ph.D., *Professor of Chemistry* ..... Wallingford

HAROLD CLARKE GODDARD, Ph.D., *Alexander Griswold Cummins Professor of English* ..... 3 Whittier Place

ROBERT CLARKSON BROOKS, Ph.D., *Joseph Wharton Professor of Political Science* ..... 104 Cornell Avenue

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CLARA PRICE NEWPORT, Ph.D., *Professor of the German Language and Literature* ..... 609 W. Elm Avenue

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WESTON EARLE FULLER, C.E., *Professor of Civil Engineering* ..... 205 Elm Avenue

*FRANK P. DAY, M.A., LL.D., *Professor of English* .....

SAMUEL COPELAND PALMER, Ph.D., *Professor of Botany and Embryology*. . 712 Ogden Avenue

EVERETT L. HUNT, M.A., *Professor of Rhetoric and Oratory* ..... 604 W. Elm Avenue

---

[1] Absent on leave, Second Semester, 1928-29.

[2] Absent on leave, First Semester, 1928-29.

† Absent on leave, 1928-29.

* Resigned, December 1, 1928.

HENRY JERMAIN MAUDE CREIGHTON, M.A., M.Sc., D.Sc., *Professor of Chemistry* .....515 Elm Avenue

ETHEL HAMPSON BREWSTER, Ph.D., *Professor of Greek and Latin*..... West House

ARNOLD DRESDEN, Ph.D., *Professor of Mathematics*....606 W. Elm Avenue

*ROSS W. MARRIOTT, Ph.D., *Professor of Mathematics and Astronomy*..... 213 Lafayette Avenue

BRAND BLANSHARD, Ph.D., *Professor of Philosophy*....600 W. Elm Avenue

L. R. SHERO, Ph.D., *Professor of Greek* .....302 N. Chester Road

[2]MAURICE J. BABB, Ph.D., *Acting Professor of Mathematics*.....Ardmore

CHARLES B. SHAW, M.A., *Librarian* .....5 Whittier Place

JOHN RUSSELL HAYES, LL.B., *Librarian of Friends Historical Library*.... 517 Elm Avenue

WINTHROP R. WRIGHT, Ph.D., *Associate Professor of Physics*..... 4 Whittier Place

PHILIP MARSHALL HICKS, Ph.D., *Associate Professor of English* ..... 519 Walnut Lane

EUGENE LEROY MERCER, M.D., *Associate Professor of Physical Education*.. North Chester Road

HERBERT F. FRASER, M.A., F. R. Econ. S., *Associate Professor of Economics* 521 Elm Avenue

CHARLES GARRETT THATCHER, M.E., *Associate Professor of Mechanical Engineering (Chairman of the Division of Engineering)*..... 307 Lafayette Avenue

CHARLES R. BAGLEY, A.M., B.Litt., *Associate Professor of French*..... 211 College Avenue

FREDERICK J. MANNING, Ph.D., *Associate Professor of History*..... 215 Roberts Road, Bryn Mawr

JOHN HIMES PITMAN, A.M., *Associate Professor of Mathematics and Astronomy*.....328 Vassar Avenue

†ROY PETRAN LINGLE, A.M., Litt.B., *Assistant Professor of English*..... 108 Cornell Avenue

†ROBERT ERNEST SPILLER, Ph.D., *Assistant Professor of English*..... 2 Whittier Place

HOWARD MALCOM JENKINS, E.E., *Assistant Professor of Electrical Engineering* .....West House

†ANDREW SIMPSON, M.S., *Assistant Professor of Mechanical Engineering*.. 519 Walnut Lane

EDWARD H. COX, M.A., D.Sc., *Assistant Professor of Chemistry*..... 8 Whittier Place

FRANCES M. BURLINGAME, Ed.M., Ed.D., *Assistant Professor of Education*.. 508½ N. Chester Road

---

* On leave, Second Semester, 1928-29.

[2] Second Semester, 1928-29.

† Absent on leave, 1928-29.

G. F. THOMAS, A.B., *Assistant Professor of Philosophy*...2 Whittier Place
MARY ALBERTSON, M.A., Ph.D., *Assistant Professor of History*.....
730 Ogden Avenue
CLAIR WILCOX, Ph.D., *Assistant Professor of Economics*....16 Park Avenue
MICHEL KOVALENKO, Ph.D., *Assistant Professor of Mathematics and Astronomy*.....219 Swarthmore Avenue
MILAN W. GARRETT, D.Phil., *Assistant Professor of Physics*....Swarthmore
TROYER STEELE ANDERSON, M.A., *Assistant Professor of History*.....
8 Whittier Place
DUNCAN GRAHAM FOSTER, Ph.D., *Assistant Professor of Chemistry*.....
504 Walnut Lane
ALAN C. VALENTINE, B.A., *Assistant Professor of English*.....
611 W. Elm Avenue
MERCEDES C. IRIBAS, *Instructor in Spanish*.....
507 South 48th Street, Philadelphia
MARIE-EMMA BOURDIN BACHER, B.S., *Professor at-ès-Lettres, Instructor in French*.....102 Park Avenue
ELIZABETH F. LANNING, A.B., *Instructor in Physical Education and Director of Physical Education for Women*.....West House
ELIZABETH H. BROOKS, A.B., *Tutor in French and German*.....
104 Cornell Avenue
RICHMOND P. MILLER, A.B., *Instructor in Political Science*..2 Whittier Place
WALTER J. SCOTT, M.S., *Instructor in Physiology and Zoology*.....
207 Yale Avenue
RICHARD W. SLOCUM, A.B., LL.B., *Part-time Instructor in Law*.....
123 S. Broad Street, Philadelphia
GEORGE A. BOURDELAIS, *Instructor in Engineering*.....
903 E. 20th Street, Chester
LYDIA BAER, A.B., *Instructor in German*.....510 W. Elm Avenue
WILLIAM M. BLAISDELL, A.B., *Instructor in Economics*..519 Walnut Lane
FRANKLIN BREWSTER FOLSOM, A.B., *Part-time Instructor in English*.....
519 Walnut Lane
FREDRIC S. KLEES, A.B., *Instructor in English* .....519 Walnut Lane
WILLIAM S. LALONDE, JR., B.S., *Instructor in Civil Engineering*.....
501 Yale Avenue
MARGARET PITKIN, Ph.D., *Instructor in French*.....221 N. Princeton
ARTHUR J. RAWSON, A.B., *Instructor in Mechanical Engineering*.....
519 S. Orange Street, Media
DOROTHY F. TROY, A.B., *Instructor in English*.....12 Park Avenue
[1]LUCIA NORTON VALENTINE, A.B., *Part-time Instructor in French*.....
611 W. Elm Avenue
[2]JANE BEARDWOOD, Ph.D., *Part-time Instructor in French*.....
802 N. 24th Street, Philadelphia

[1] First Semester, 1928-29.
[2] Second Semester, 1928-29.

ALFRED J. SWAN, *Director of Music*.....Haverford, Pa.
PAUL M. PEARSON, Litt.D., *Honorary Lecturer in Public Speaking*.....
516 Walnut Lane
EDITH M. EVERETT, M.A., *Lecturer in Education*.....
1421 Race Street, Philadelphia
S. W. JOHNSON, *Lecturer in Accounting*.....Amherst Avenue
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LOUIS N. ROBINSON, Ph.D., *Lecturer in Economics*.....411 College Avenue
ELEANOR H. BALPH, M.D., *Lecturer in Hygiene*.....
2049 Chestnut Street, Philadelphia
P. F. GIROUD, Litt.D., *Lecturer in French*.....
901 69th Avenue, Philadelphia
CHARLOTTE R. D. YOUNG, M.A., *Rhodes Trust Traveling Fellow, Lecturer in English* .....Swarthmore College
WALTER ANTONIO MATOS, B.A., F. R. A. S., *Volunteer Observer in the Sproul Observatory*.....309 College Avenue
†FRANK FITTS, *Assistant in Physical Education of Men*.....
216 S. Chester Road
ROBERT DUNN, *Assistant in Physical Education of Men*.....
2217 N. Front Street, Philadelphia
ALICE M. ROGERS, A.B., *Research Assistant in Mathematics*.....
114 Rutgers Avenue
SAMUEL R. M. REYNOLDS, A.B., *Assistant in Physiology and Zoology*.....
211 College Avenue
VIRGINIA NEAL BROWN, B.A., *Assistant in Physical Education of Women*..
12 Park Avenue
HELEN B. CHAPIN, A.B., *Research Assistant in Fine Arts*.....
H. J. CURTIS, B.S., *Part-time Assistant in Physics*.....519 Walnut Lane
EILENE SLACK GALLOWAY, A.B., *Part-time Assistant in Political Science*
152 Park Avenue
WALTER B. KEIGHTON, A.B., *Part-time Assistant in Chemistry*.....
62 Penn Boulevard, East Lansdowne
ALBERT SMITH, *Part-time Assistant in French*.....Rutledge

† Absent on leave, 1928-29.

ADMINISTRATIVE OFFICERS AND ASSISTANTS

FRANK AYDELOTTE, B. Litt., L.H.D., D. Litt., LL.D., *President.*
JOHN ANTHONY MILLER*, Ph.D., *Vice-President.*
RAYMOND WALTERS, M.A., *Dean of the College.*
FRANCES B. BLANSHARD, M.A., *Dean of Women.*
DETLEV W. BRONK†, Ph.D., *Dean of Men.*
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JOHN RUSSELL HAYES, LL.B., *Librarian of Friends Historical Library.*
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MARY GOCHER, A.B., B.S., *Library Periodical and Binding Assistant.*
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ANNE H. PHILIPS, A.B., *Secretary to the Dean of Men.*
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EMELINE H. NICKLES, A.B., *Head of Stenographic Bureau.*
WILHELMYNA M. POOLE, *Stenographer to the Dean of the College.*
ELIZABETH R. HIRST, *Bookkeeper.*
GRACE E. REDHEFFER, *Assistant Bookkeeper.*
EDNA B. CORSON, *Assistant Bookkeeper.*
ANNA DENNISON, *Matron of Worth Hall.*
ANNA G. MEANS, *Matron of Wharton Hall.*
MARTHA BAER, *Assistant Matron of Parrish Hall.*
G. J. CRONE, *Director of the Laundry.*
DOLLIE B. COLEMAN, *Graduate Nurse in Parrish Hall.*
SUSAN S. HAINES, *Graduate Nurse in Wharton Hall.*

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* Absent on leave, Second Semester, 1928-29.
† Absent on leave, First Semester, 1928-29.

SWARTHMORE COLLEGE

Swarthmore College is situated in the Borough of Swarthmore, eleven miles southwest of Philadelphia on the Octoraro branch of the Pennsylvania Railroad. Swarthmore is connected with Broad Street Station by twenty inbound and twenty-two outbound trains daily, the running time of which varies from twenty-one minutes on express schedule to thirty-six minutes on the local schedule. Three trolley lines, running cars at fifteen- to thirty-minute intervals, also connect with Philadelphia elevated and surface lines.

The College buildings and campus occupy a commanding position upon a wooded hill not far from the center of the town. The Delaware River is about four miles distant. Two hundred and thirty-seven acres are contained in the College property, including a large tract of woodland and the beautiful rocky valley of Crum Creek.

There are over twenty College buildings.

The enrollment of the College is limited to five hundred students.

The total of the College endowment is three and one-half million dollars.

The College was founded in 1864 through the efforts of members of the Religious Society of Friends, for the purpose of securing to the youth of the Society an opportunity for higher educational training under the guarded supervision and care of those of their own religious faith. Other applicants are admitted on the same terms as Friends, and nothing of a sectarian character exists in the instruction or in the management of the College. According to its first charter, membership on the Board of Managers of the College was limited to persons belonging to the Society of Friends. The purpose of this restriction was not to establish sectarian control, but to prevent forever the possibility of such control by any sectarian element which might otherwise have come to be represented on the Board. This restriction is now believed to be no longer needed and is omitted

from the revised charter. The intention of its founders was to make the promotion of Christian character the first consideration, and to provide opportunities for liberal culture while maintaining a high standard of scholarship. These aims have been followed in the administration of the institution.

BUILDINGS

Parrish Hall is a massive stone structure, with its central portion separated from the two wings by fireproof compartments. The central building, 348 feet long and five stories high, furnishes assembly room, lecture rooms, museum, parlors, dining hall, and offices. The wings are four stories high. The ground floor of each wing is used for lecture and recitation rooms; the remaining floors contain the dormitories of the women students. The House Director and several matrons reside in the building.

Wharton Hall, the main dormitory for men students, is named in honor of its donor, Joseph Wharton, late President of the Board of Managers. The capacity of the hall is about two hundred. It stands in the west campus on the same ridge as Parrish Hall, and commands a view of the Delaware River valley.

Worth Hall, a dormitory for seventy women students, is an attractive building of native stone, with mottled slate roofs, including six cottages, contiguous but distinctive in design. It is situated on the east side of the campus, near Chester Road and College Avenue. The building and its equipment were the gift of the late William P. Worth, '76, and the late J. Sharpless Worth, ex-'73 as a memorial to their parents.

Woolman House, at Elm Avenue and Walnut Lane, is a smaller dormitory for men students. The house and grounds were given to the College by Emma C. Bancroft.

The *Science Hall* is a two-story stone building devoted chiefly to the departments of Physics, Biology and Education. It contains physical and biological laboratories. The east wing of this building includes a new biological laboratory named in honor of Professor Spencer Trotter, commemorating the thirtieth anniversary of the graduation of the class of 1890.

The *Hall of Chemistry* is a red brick building, two stories high, with a finished basement. The basement has an assay

laboratory furnished with wind and muffled furnaces, a fireproof combustion room, a laboratory for advanced organic chemistry, a laboratory for gas analysis, a research laboratory, a photometric dark room, a small lecture room seating fifteen persons, stock rooms, and cloak rooms. On the first floor, are offices, the laboratory for physical and electro chemistry, the laboratory for general chemistry, stock rooms, and a balance room which contains balances mounted on a column built independently of the foundations and floors of the building. The amphitheatre lecture room, seating one hundred persons and extending to the basement, is reached from this floor. On the second floor are offices, the laboratories for organic chemistry, qualitative analysis and quantitative analysis, two small research laboratories, two balance rooms, and the library. The chemical library has an excellent collection of books pertaining to chemistry and files of twenty-six leading chemical journals, many of which are complete. Through the generosity of Mrs. Peter T. Berdan, the library has received a complete set of the publications of the London *Chemical Society* and a set of the *Journal of the Society of Chemical Industry,* presented by Mrs. Berdan as a memorial to her son, Frederick T. Berdan, a member of the class of 1890.

The *Sproul Astronomical Observatory,* equipped by former Governor William Cameron Sproul, '91, contains nine rooms. On the first floor are offices, a departmental library, a computation room, class room, and a measuring room. On the second floor are a lecture room seating seventy-five persons, a dark room, and the dome room. Practically all the classes of the department of Mathematics and Astronomy, and some classes of other departments are held in the Observatory.

The chief instrument of the equipment is an equatorial refractor of twenty-four inches aperture, and thirty-six feet focal length, the mounting and optical parts of which were made by the John A. Brashear Co., Ltd. The mounting is modern and convenient, motors being provided for winding the clock and moving the telescope. The driving clock is electrically controlled. A disc driven by a sidereal clock situated on the north side of the pier reads right ascensions directly. The telescope is mounted in a dome room forty-five feet in diameter. The

dome is a steel structure covered with copper and is revolved by an electric motor. The telescope is provided with the usual oculars, helioscope, position micrometer, double-slide plateholder, and two ray filters.

There is a photographic telescope of nine inches aperture and forty-five inches focal length, mounted after the design of the Bruce telescope at Yerkes Observatory. The instrument is provided with a heavy mounting, a heavy driving clock, coarse and fine position circles, a guide telescope, and such other accessories as make it an effective and convenient instrument. There are two measuring engines for measuring five-by-seven photographic plates. One of these was built by Brashear, the other by Gaertner. During the year 1928-29 there has been added a heavy screw measuring engine for the measurement of photographic plates, 18 inches square, built by Dr. H. D. Curtis, of the Allegheny Observatory. There is also a blink microscope.

Stephen Loines has given to the observatory a Polar Equatorial, a new type of telescope, designed and built by the Alvan Clark and Sons' Corporation. With this type of telescope the observer is enabled to make his observations while seated in a warm room.

The Observatory possesses equipment used for solar eclipse observations. There is a twin camera consisting of two photographic quadruple lenses of six and three-quarter-inch aperture and fifteen feet focal length. With this instrument it is possible to make simultaneously two photographs, each eighteen inches square. There are three driving clocks, one a very heavy clock made by Klages Brothers of Pittsburgh, Pa., and two lighter ones made by Dr. H. D. Curtis, of the Allegheny Observatory. A number of lenses of various apertures and focal lengths, including one six-inch portrait lens, and one three-inch portrait lens, are used for special problems.

The members of the Observatory staff have conducted four eclipse expeditions:

Brandon, Colorado, 1918.
Yerbanis, Mexico, 1920.
New Haven, Connecticut, 1925.
Benkoelen, Sumatra, 1926.

The fifth eclipse expedition of the observatory is at work in Northern Sumatra during the second semester of 1928-9; a total eclipse is observable there on May 9, 1929.

The *Students Astronomical Observatory,* situated on the campus a short distance southeast of Parrish Hall, is equipped for the purposes of instruction. It contains a refracting telescope of six inches aperture, mounted equatorially, fitted with the usual accessories, including a position micrometer and a spectroscope. The observatory also contains a transit instrument of three inches aperture, a sidereal clock and a chronograph. Mounted in a room adjoining the transit room is a Milne seismograph, presented by the late Joseph Wharton, which records photographically the E-W components of vibrations of the crust of the earth. The latest addition to this observatory building contains the photographic telescope referred to above.

The *Library Building.* On the lower east campus, near the Benjamin West House, stands the Library, a fine specimen of the English Scholastic Gothic style. The Library was built and furnished through a gift to the College from the late Andrew Carnegie and is maintained from the income on a sum subscribed by several friends of the College. The building is constructed of local granite, with terra cotta and Indiana limestone trimmings and was erected under the supervision of Edward L. Tilton, of New York. In the third story, are placed the Westminster chimes of four bells and the Seth Thomas Clock, presented to the College in June, 1910, by Morris L. Clothier, '90, in commemoration of the twentieth anniversary of the graduation of the Class of 1890. The first floor of the main building contains a stack room and a large reading room finished in dark oak. The reading room is two stories high, with a gallery round three sides. On this gallery open the seminar rooms; below are alcoves containing reference books and other books in common use.

The *Friends Historical Library* was founded in 1871 by the gift of the late Anson Lapham, a Friend. For some forty years this collection of books by and about Friends, their faith and their history, was built up by the late Arthur Beardsley, professor of engineering.

In memory of the late Clement M. Biddle, a prominent philanthropist of the Society of Friends, his son, Clement M. Biddle, Jr., of the Class of 1896, has given to the college a new wing, added to the south end of the college library. Here, in a substantial fire-proof building of stone and steel, there will be ample quarters for the preservation and display of our growing collection of books on Quaker history, religion, and literature, together with such allied ethical and humanitarian subjects as anti-slavery, care of Negroes and Indians, woman suffrage, and also local history.

It is hoped that Friends Meetings will deposit here their manuscript records for permanent safe-keeping and for consultation.

An interesting feature will be the Friends museum, on the mezzanine floor of the large reading room. Here will be exhibited such antiques as old furniture, costumes and portraits which will serve to review the family life of the old-time American Quaker. Already, many Friends have contributed old letters, journals, family histories, marriage certificates, samplers, daguerreotypes, personal relics, wills, deeds, and the like. Equipped as it is, the new structure will offer an ample and pleasant place to study Quakerism in all its branches and Friends are invited to make the library and museum a depository for every sort of material illustrating the religion and home-life of members of the Society in its various eras.

Beardsley Hall is a three-story building of concrete block construction, with interior work all of reinforced concrete. It represents a modern type of factory building. The ground floor contains the forge and foundry, the second floor the machine shop and the third floor the woodworking department.

Hicks Hall, a three-story stone building, is the headquarters of the Division of Engineering. This building was erected in 1920 and was given by Frederick C. Hicks, Swarthmore, class of 1893, and dedicated to the memory of the Hicks family of Long Island, Isaac Hicks, Elias Hicks, Benjamin D. Hicks and Alice A. Hicks. The first floor is largely taken up by the mechanical laboratory, and contains, in addition, instrument rooms, research laboratory, class room, office and lavatory. The second floor con-

tains the electrical laboratory, electrical research and instrument rooms, offices and class rooms. The third floor has drawing rooms, an auditorium capable of seating 175 students, a library containing over 2,000 volumes, a class room and offices.

The *Wm. J. Hall Gymnasium* for men is a two-story stone building. On the first floor are offices, examining room, and the main exercise hall, a room 50 by 80 feet, equipped with apparatus for individual and class work and a court for basketball. A trophy room and running track are on the second floor. In the basement are lockers, shower baths, a dressing room for visiting teams, and handball courts.

Somerville Hall, erected in 1893 through the efforts of the Somerville Literary Society, is used as a gymnasium for women students. It is furnished with apparatus adapted to the Swedish system of gymnastics. In the basement are dressing rooms, showers, and lockers for the use of day students.

There are two *Swimming Pools* in separate stone buildings, one for the women and another for the men. These pools were presented to the College by Philip M. Sharples. The building which houses the women's swimming pool is connected by a corridor with Somerville Hall, and the men's pool is connected with the William J. Hall Gymnasium.

The *Heating and Lighting Plant.* A central heat, light, and power plant is housed in a single-story brick structure, situated south of the Pennsylvania Railroad tracks.

Other buildings upon the campus are the *Meeting-house,* the *Benjamin West House* (birthplace of Benjamin West, P. R. A., erected in 1724), the *President's House,* the *Dean's House, Cunningham House* (the residence of the Professor of Astronomy and Mathematics), residences for members of the Faculty, a laundry building, a lodging house for the domestic servants, and farm building.

The Cloisters, a new development, is the group of lodges for the men's fraternities and the Wharton Club, now in course of erection on the west campus facing Wharton Hall. These buildings, of native stone, are to be connected by cloisters.

The Bond Memorial Building. The Bond Memorial Building and the women's fraternity lodges form an integral part of the

Worth Dormitory group in design, construction and spirit. Bond Memorial, named in honor of the late Dean Elizabeth Powell Bond, is a social center for fraternity and non-fraternity girls alike. It contains a large living room on the first floor, committee rooms on the second floor, and locker rooms, showers and kitchen in the basement. The tower of the building is situated at the main entrance to the Worth Quadrangle; it has guest rooms in its upper floors.

The Clothier Auditorium. Plans have been drawn for the erection on the campus of an auditorium in memory of the late Isaac H. Clothier, for 48 years a member of the Board of Managers and President of the Board for seven years. The building will be the gift of Mrs. Isaac H. Clothier, of Wynnewood, who was a member of the Board for 25 years, and other members of her family.

Swarthmore Field and *Alumni Field* provide facilities for outdoor athletics of the men. Swarthmore Field comprises the football and lacrosse grounds, and a quarter-mile cinder track with a two hundred and twenty yards straight-away. There is a permanent grandstand, seating 1,800 persons, the gift of Morris L. Clothier, '90. Alumni Field, contiguous with Swarthmore Field, provides a baseball ground and an auxiliary football field. The men's tennis courts are in front of Wharton Hall. The front campus affords additional playing fields for lacrosse, soccer and girls' hockey.

Cunningham Field, the women's athletic ground, includes a part of the east campus across Chester Road. This, and an area west of Worth Dormitory, furnish space for English field hockey, tennis and basketball. Cunningham Field was given by students, alumnæ, and friends of the College as a tribute to the late Susan J. Cunningham, who was for many years Professor of Mathematics and Astronomy.

SOCIAL LIFE

Swarthmore, as a coeducational institution, undertakes to provide college life in a home setting; to supply an atmosphere in which manly and womanly character may develop naturally and completely. The intercourse of the students is under the care

of the Dean of Women and her assistants, who aim to make it a means of social culture.

RELIGIOUS LIFE

There is a daily assembly of the College at 9.00 A. M. from Monday to Friday, inclusive. The "Collection" on Tuesday and Thursday is held in Collection Hall, Parrish Hall; attendance of students is required. This program, which ordinarily lasts fifteen minutes, is devoted to addresses or musical renditions, preceded by a period of silence, according to the Friendly tradition. On Monday, Wednesday and Friday there is a meeting in the Friends' Meeting House, on the campus, at which attendance is voluntary.

Students under twenty-one years of age are expected to attend either Friends' Meeting, held every First-day morning in the Meeting House, or, at the request of their parents, the church in the borough of the religious denomination to which they belong. A class to which all students are invited is held at 10.00 on First-day mornings for the consideration of religious subjects.

STUDENTS' SOCIETIES

The following are departmental societies of undergraduates of the College who held monthly meetings during the academic year:

The Cercle Français
The Chemistry Club
The Classical Club
The Engineers Club
The English Club
The German Club
The Philosophy Club
The Trotter Biological Society.

The programs of these clubs include the presentation of papers and addresses by undergraduates and frequently by visiting scholars and scientists. The William J. Cooper Foundation regularly makes financial appropriation toward the travel expenses of these outside speakers.

The *Somerville Forum* is an outgrowth of the Somerville Literary Society, which was established in 1871. All women students are active members. There is one meeting a month, for the discussion of problems of vital interest to women. The final meeting in April, known as Somerville Day, is a gathering of alumnæ and active members.

The Little Theatre Club is an organization designed to promote interest in dramatics and to encourage the production of the best modern plays by the talent of the student body. Membership in the club is based on worthy performance in major rôles of at least two college productions or ability in stage management and lighting effects.

The *Forum* is an organization of students of the College who meet for the study and discussion of social and political problems.

The *Athletic Association* is an organization of the men for the maintenance of physical training and athletic sports.

The *Women's Athletic Association* is a similar organization of the women students.

Musical Organizations. The Swarthmore College Orchestra and Mixed Chorus exist for the purpose of musical and dramatic productions in the College and outside. An opera is produced once a year, and in addition there may be various concerts. The Swarthmore College Glee Club, for men only, gives concerts in various cities under alumni auspices.

Christian Associations. The religious life among the students is furthered by the Young Men's and Young Women's Christian Associations. Formal and informal receptions and other social functions are given with the object of promoting fellowship and a democratic spirit. Public meetings for worship are held every Sunday evening, the young men meeting in Wharton Hall and the young women in Parrish Hall.

No student organization of the College may incur any financial obligation, or make any contract involving a monetary consideration, without first obtaining the sanction of the President of the College, or of the proper faculty committee under whose supervision the organization is placed. Students contemplating a new organization must first consult the President of the College.

COLLEGE PUBLICATIONS

Two periodicals are published by the students under the supervision of the faculty: The *Swarthmore Phœnix* is the weekly newspaper of the undergraduates; *The Portfolio,* a literary magazine of the undergraduates, is published quarterly; the *Halcyon* is published annually by the Junior Class.

The *Swarthmore College Bulletin* is published quarterly and contains a record of the matters of permanent importance in the progress of the College.

HONORARY SCHOLARSHIP SOCIETIES

The Swarthmore chapter of *Phi Beta Kappa,* the national society for the recognition of scholarship, was organized in 1896. Each year a certain number of students in the senior class, or the junior class, having the highest standing are elected to membership.

The Swarthmore chapter of *Sigma Tau,* the national society standing for scholastic attainment in engineering, was established in 1917. Members are chosen from among senior or junior students majoring in civil, electrical, mechanical, general or chemical engineering.

The Swarthmore chapter of *Sigma Xi,* the national scientific society for the promotion of research, was granted a charter in 1922. Students may become associate members after two and one-half years in college provided that, in the opinion of the members of the society, they evidence promise of research ability, and may become members after they have produced a piece of research worthy of publication.

LIBRARIES AND READING ROOMS

The libraries of the College collectively contain about seventy thousand volumes.

The chief sources of income for increasing the collection in the college library are these: the Edgar Allen Brown Fund, the Alumni Fund, the General Library Fund, the Carnegie Library Fund, the George Taber Fund, the Elizabeth Powell Bond Fund and the Friends Historical Library Fund.

Residents of the borough of Swarthmore are free to use the library.

The Friends Historical Library, founded by the late Anson Lapham, of Skaneateles, N. Y., contains a valuable and growing collection of Friends' books, tracts, and early writings (many very rare), photographs of representative Friends, other objects of personal and historic interest, and manuscripts relating to the Society and its history. This collection is carefully stored in the Library, and it is hoped that Friends and others will deem it a secure place in which to deposit books and other material in their possession which may be of interest in connection with the history of the Society. Such contributions are solicited, and should be addressed to the Friends Historical Library, Swarthmore, Pa. The library is accessible to all persons interested in the doctrines and history of Friends, and ample arrangements are provided for its use for consultation and for reference.

Moreover, the great collections of books in the library of the University of Pennsylvania, the Philadelphia Library and its Ridgway Branch, the Mercantile Library, the Free Library of Philadelphia, as well as those in the special and technical libraries of the city, are open to the use of students under proper regulations. The Philadelphia library resources, which are of special utility in connection with the various departments of the College, are referred to in the departmental statements.

The Library and the departmental reading rooms are supplied with reference books and the leading literary, scientific, and technical journals.

The Library hours are 8.00 A.M. to 10.00 P.M. Monday to Friday and 8.00 A.M. to 5.00 P.M. on Saturday.

Public Debate and Discussion

Students enrolling for Public Debate may receive from one to three hours' credit at the discretion of the Instructor according to the work done.

The debates are held under the supervision of the Debate Board, an undergraduate body including all students who have represented the College in public debate, and the faculty ad-

viser of debating. In addition to the intercollegiate debates, usually held on the campus, student speakers appear before various clubs and discussion groups in Philadelphia and vicinity.

The Swarthmore Chapter of Delta Sigma Rho, the national honorary forensic society, elects to membership each spring students who have done outstanding work in debate and other public speaking contests. To be eligible, students must have engaged in forensic activities for two years and must have represented the College in an intercollegiate contest.

The public speaking contests, which are conducted by the Debate Board, are designed to bring out the ability of the students and to stimulate interest in forensic events.

The *Delta Upsilon Prize Speaking Contest* provides a prize of $25 for the winner. The sum of $500 has been given to the College by Owen Moon, Jr., Class of 1894, the interest from which is to be used for this purpose.

The *Ella Frances Bunting Prizes for the Extemporaneous Speaking Contests* are provided by a gift of $1,000 from E. M. Bunting, of New York. Two prizes of $25 are offered, one contested for by the men and one by the women students.

The Peace Association of Friends in America offers a first prize of $25, and a second prize of $10 for the best orations on Peace written by students and delivered in a public contest in which there shall be not less than five competitors.

The *Potter Prize Contest* for Debate is open to all students and a prize of $25 is offered for the best individual speech. This contest was founded by the late Justice Wm. P. Potter, and is continued as a memorial to him.

The *Sophomore-Freshman Debate* is open to all members of the two classes. The medals for the members of the winning team are provided by the Potter Fund for the Encouragement of Public Speaking.

THE POTTER FUND

The Potter Fund for the Encouragement of Public Speaking consists of five thousand dollars bequeathed to the college by the late Jessie Bacon Potter in memory of her husband, Justice William Plumer Potter. This fund maintains the Potter Prize

Contest; its other uses are determined from time to time by the President of the College and the professor in charge of public speaking.

THE WILLIAM J. COOPER FOUNDATION

The William J. Cooper Foundation was established by William J. Cooper, a devoted friend of the College, whose wife, Emma McIlvain Cooper, served as a member of the Board of Managers from 1882 to 1923. Mr. Cooper bequeathed to the College the sum of $100,000 and provided that the income should be used "in bringing to the College from time to time eminent citizens of this and other countries who are leaders in statesmanship, education, the arts, sciences, learned professions and business, in order that the faculty, students and the College community may be broadened by a closer acquaintance with matters of world interest." The Faculty, Staff and students are admitted without charge.

EXPENSES

The charge for tuition is $400 a year, payable in advance. For students matriculated in the College before February, 1928, the tuition charge will be $350 a year. No reduction of the tuition charge can be made on account of absence, illness, dismissal during the year, or for any other reason whatever, and no refunding will be made on account of any said causes.

The charge for board and residence is $500, of which at least half is payable in advance. The remainder is due on the first of January. Of this charge $300 is the charge for board; $200 is room-rent.

If any student for any reason whatsoever shall withdraw or be withdrawn from College, no portion of the payment for room-rent shall be refunded or remitted.

In case of illness and absence from the College extending over a continuous period of six weeks or more or withdrawal from the College for a continuous period of six weeks or more, there will be a special proportionate reduction in the charge for board provided that written notice be given to the Superintendent at the time of withdrawal, or, in case the student is ill at home, as

soon as possible after the illness is proven. Oral notice will not be sufficient to secure this allowance.

Bills for the first payment are mailed before the opening of the College year and bills for the second payment are mailed before the first of January following. Payments shall be made by check or draft to the order of SWARTHMORE COLLEGE, SWARTHMORE, PA. Every student is responsible for prompt payment when due.

In case bills for the first semester are not paid by November 1st, and bills for the second semester by March 1st, students owing such bills may be excluded from all college exercises.

Students withdrawing or dismissed from College on or before the end of the first semester receive no benefit from scholarships, as scholarships are credited at the beginning of the second semester.

All students except upper class women choose rooms according to date of application for admission. After the Freshman year women choose rooms by lot.

A deposit of $50 will be required of each student, payable with the regular September bill, to cover incidental bills including books, laundry, telephone and room breakage. When this deposit has been exhausted a new deposit will be required immediately. Any unused balance will be returned at the end of each year.

Special students who enroll for less than the prescribed number of hours will be charged according to the number of hours at $15 per semester hour.

Faculty rates for the dining room are: Per college year, $300; per month, $40; per week, $9.50; single breakfast, 30 cents; single lunch, 45 cents; single dinner, 65 cents.

The College is closed during the Christmas recess. Students who desire to remain in Swarthmore or its vicinity at that time may secure board at moderate charge in homes recommended by the faculty. Students who desire to remain at the College during the spring recess will be charged a proportionate sum for board. Students leaving property in any college building during the summer recess do so at their own risk.

All Freshmen students will leave the College immediately after

their last examination is over in the spring in order that their rooms may be used by Commencement visitors.

Students purchase their own books, stationery and drawing instruments, which may be obtained at the College Bookstore at low rates. A reasonable rate is charged for laundry work done at the College.

A fee of $10 a semester is charged in every laboratory science, except in Chemistry.

The fees in the department of Chemistry and Chemical Engineering are as follows: For the course in Assaying, no fee, but students pay for all breakage and all materials used; for the course in Mineralogy $3 a semester; for all other courses in this department $15 a semester. In addition to the above-named fees every student graduating in the department of Chemistry and Chemical Engineering is charged $25, in lieu of fees, for apparatus and chemicals used, in connection with his thesis. This last named fee is payable at the beginning of the second semester of the Senior year.

A fee of $10 for each semester will be charged for each course in surveying, mechanical laboratory, electrical laboratory or illumination.

Students are charged a fee of $1 a semester for the use of gymnasium and swimming pools. This amount includes locker rental.

The expenses of a student at Swarthmore, beyond the payments made directly to the College, vary according to the individual. Budgets reported by present students show that total expenditures for tuition, board, books, clothing, and recreation range from $1,100 to $1,500 for the academic year.

INFIRMARY REGULATIONS

1. Students suffering from any of the communicable diseases (contagious or infectious) must reside in the infirmaries for the period of their illness.

2. Students suffering from illness which makes it necessary for them to remain in bed must reside in the infirmaries for the period of their illness. It is the duty of the College to protect as far as possible the health of students, this applying to those who are in good health as well as those who are ill.

3. FEES.—A fee of $1.50 per day shall be paid by those occupying the infirmaries. A fee of twenty-five cents shall be charged to those not occupying the infirmaries for each meal served outside the dining room.

4. ABSENCE FROM CLASSES.—*When illness demands absence from classes the student in question should report at once his or her case to the nurses or resident physician. Excuses will not be granted to those failing to comply with this rule.*

5. Students shall have the opportunity to select their own physician. The resident physician, E. LeRoy Mercer, M.D., in charge of both infirmaries, is available by appointment for examination or advice on matters of health. No charge is made for this service.

FELLOWSHIPS AND SCHOLARSHIPS

FELLOWSHIPS

The JOSHUA LIPPINCOTT FELLOWSHIP of $600, founded by the late HOWARD W. LIPPINCOTT, of the Class of 1875, in memory of his father, is awarded annually by the faculty, with the concurrence of the Instruction Committee, to a graduate of the College of at least one year's standing for the pursuit of graduate study under the direction of the faculty or with their approval. Applications for the Joshua Lippincott Fellowship for the year 1930-31 must be received by the faculty before February 16, 1930.

The LUCRETIA MOTT FELLOWSHIP, founded by the Somerville Literary Society and sustained by the contributions of its life members, has yielded an annual income since its foundation of $525. It is awarded each year by a committee of the faculty (selected by the society), with the concurrence of the life members of the society, to a young woman graduate of that year who is to pursue advanced study at some other institution approved by this committee.

The JOHN LOCKWOOD MEMORIAL FELLOWSHIP of $600 was founded by the bequest of Lydia A. Lockwood, of New York, in memory of her brother, John Lockwood. It was the wish of the donor that the fellowship be awarded to a member of the Society of Friends. It is to be awarded annually by the faculty, with the consent of the Instruction Committee, to a graduate of the College of at least one year's standing, for the pursuit of graduate studies under the direction of the faculty or with their approval. Applications for this fellowship for 1930-31 must be received by the faculty by February 16, 1930.

The HANNAH A. LEEDOM FELLOWSHIP of $500 was founded by the bequest of Hannah A. Leedom. It is awarded annually by the faculty, with the consent of the Instruction Committee, to a graduate of the College of at least one year's standing for the pursuit of graduate studies under the direction of

the faculty or with their approval. Applications for this fellowship for 1930-31 must be received by the faculty by February 16, 1930.

The MARTHA E. TYSON FELLOWSHIP of $450, founded by the Somerville Literary Society in 1913, is sustained by the contributions of life members of the society. It is awarded annually by a joint committee of the faculty and the society (elected by the society) with the concurrence of the life members of the society to a woman graduate of Swarthmore Collge, who has taught successfully for two years after her graduation, and expects to continue teaching. The recipient of the award is to pursue a course of study fitting her for more efficient work in an institution approved by the Committee of Award. Applications for this fellowship for 1930-31 must be received by the Committee of Award not later than February 1, 1930.

SCHOLARSHIPS

1. The WESTBURY QUARTERLY MEETING, N. Y., SCHOLARSHIP is awarded annually by a committee of that Quarterly Meeting.

2. Each of the following funds yields annually about $250 and is awarded at the discretion of the College to students needing pecuniary aid, whose previous work has demonstrated their earnestness and ability:

(*a*) The REBECCA M. ATKINSON SCHOLARSHIP FUND.
(*b*) The BARCLAY G. ATKINSON SCHOLARSHIP FUND.
(*c*) The THOMAS L. LEEDOM SCHOLARSHIP FUND.
(*d*) The MARK E. REEVES SCHOLARSHIP FUND.
(*e*) The THOMAS WOODNUT SCHOLARSHIP FUND.
(*f*) The SARAH E. LIPPINCOTT SCHOLARSHIP FUND.
(*g*) The WILLIAM DORSEY SCHOLARSHIP FUND
(*h*) The JOSEPH T. SULLIVAN SCHOLARSHIP FUND.
(*i*) The DEBORAH F. WHARTON SCHOLARSHIP FUND.

3. The ANNIE SHOEMAKER SCHOLARSHIP, a free scholarship of $500 for the first college year, is awarded annually to a young woman graduate of Friends' Central School, Philadelphia.

4. The HARRIET W. PAISTE FUND is limited by the following words from the donor's will: "the interest to be applied annually to the education of female members of our Society of Friends (holding their Yearly Meeting at Fifteenth and Race Streets, Philadelphia) whose limited means would exclude them from enjoying the advantages of an education at the College."

5. The MARY WOOD FUND is limited by the following words from the donor's will: "the income thereof to be, by the proper officers thereof, applied to the maintenance and education at said college of one female student therein, one preparing for the avocation of a teacher to be preferred as the beneficiary, but in all other respects the application of the income of said Fund to be in the absolute discretion of the college."

6. The HILDA CLARKE MEMORIAL SCHOLARSHIP of $100 is awarded annually to a woman undergraduate of the College.

7. The following scholarships were offered for work done in the College in 1927-28. They are of the value of $200 each of resident, and $100 each for day students, and are awarded in each instance to that member of each of the respective classes who shall be promoted without conditions, and shall have the best record of scholarship upon the regular work of the year:

(*a*) The SAMUEL J. UNDERHILL SCHOLARSHIP will be awarded to a member of the Sophomore Class.

(*b*) The ANSON LAPHAM SCHOLARSHIP will be awarded to a member of the Freshman Class.

8. The SAMUEL WILLETS FUND provides several scholarships for resident students needing pecuniary aid, whose previous work has demonstrated their earnestness and ability. They will be awarded at the discretion of the Committee on Trusts. Application should be made to the President of the College.

9. In addition to the above fund, Samuel Willets gave four scholarships in the name of his children, FREDERICK WILLETS, EDWARD WILLETS, WALTER WILLETS, and CAROLINE M. FRAME. These scholarships are awarded by the respective parties, their heirs or assigns, and are of the value of $250 each.

10. The I. V. WILLIAMSON SCHOLARSHIP FOR PREPARATORY SCHOOLS. Ten scholarships of the value of $150 each for resi-

dent students, and $75 each for day students, are offered to members of classes graduating in 1929 in the following schools:

1 to Friends' Central School (Boys' Department)	Philadelphia.
1 to Friends' Central School (Girls' Department)	Philadelphia.
1 to Friends' Seminary	New York, N. Y.
1 to Friends' School	Baltimore, Md.
1 to Friends' School	Wilmington, Del.
1 to Friends' High School	Moorestown, N. J.
1 to Friends' Academy	Locust Valley, N. Y.
1 to Friends' Select School	Washington, D. C.
1 to Brooklyn Friends' School	Brooklyn, N. Y.
1 to George School (Boys' Department)	George School, Pa.
1 to George School (Girls' Department)	George School, Pa.

These scholarships are awarded under the following conditions:

(*a*) The candidates will be required to take the examinations of the College Entrance Examination Board in Senior English, Algebra A and one foreign language. The scholarship will be awarded only to that candidate who makes a passing grade of 60 per cent in each subject required for admission and who makes the highest average grade.

(*b*) Examinations must be completed before July 1 preceding the year of admission to College. A candidate may take any examination for which his preparation is complete in any year of the college preparatory course.

(*c*) No scholarship will be awarded to applicants who fail to be admitted without conditions.

(*d*) Every holder of such scholarship must pursue in College the studies leading regularly to the degree of Bachelor of Arts.

11. The HELEN E. W. SQUIER SCHOLARSHIP, originally one of the Anson Lapham Scholarships, is awarded annually by Mrs. Chester Roberts, of Swarthmore, to a student in need of financial aid. The scholarship has the value of $250.

12. THE PHEBE ANNA THORNE FUND provides several scholarships for students needing pecuniary assistance whose previous

work has demonstrated their earnestness and their ability. This gift includes a clause of preference to those students who are members of the New York Monthly Meeting of Friends. These scholarships are awarded by the College under the regulations fixed by the Board. Application should be made to the President of the College.

13. The WESTERN SWARTHMORE CLUB offers in conjunction with the College one scholarship of $700 open for competition to all high and preparatory school graduates west of the Allegheny Mountains. Students interested are requested to apply to the President of the Club.

14. The MARY COATES PRESTON SCHOLARSHIP FUND. A sum of money has been left by will of Elizabeth Coates to Josephine Beistle, of Swarthmore, as trustee, the annual interest of which will be about $350. This amount is given by the trustee as a scholarship to a young woman student in Swarthmore College, preferably to a relative of the donor.

15. The JOSEPH E. GILLINGHAM FUND, with an annual income of $2,500 was bequeathed to the College in 1907 with the stipulation, "I request but I do not direct that part of the income of this legacy may be used for free scholarships for meritorious students."

16. The JONATHAN K. TAYLOR SCHOLARSHIP, in accordance with the donor's will, is awarded by the Board of Trustees of the Baltimore Monthly Meeting of Friends. This scholarship is first open to descendants of the late Jonathan K. Taylor. Then, while preference is to be given to members of the Baltimore Yearly Meeting of Friends, it is not to be confined to them when suitable persons in membership cannot be found.

17. The T. H. DUDLEY PERKINS MEMORIAL SCHOLARSHIP of $600 is given for the academic year 1929-30 to the best young man candidate as judged by a committee of the faculty appointed by the President of the College for the purpose. The award will be made and the following points determined by the credentials of the secondary school from which the successful candidate is a graduate. *First.* Qualities of manhood, force of character and leadership, 50 points. *Second.* Literary and scholastic ability and attainments, 30 points. *Third.* Physical vigor as

shown by participation in out-of-door sports or in other ways, 20 points.

These requirements are similar to the conditions of the Rhodes Scholarship. This scholarship is founded in honor of T. H. Dudley Perkins, Swarthmore, 1906, who died in the service of his country in 1918. The qualifications required of the holder of this scholarship are such as Dudley Perkins possessed in a marked degree. The donors of this scholarship are his wife, Alice Sullivan Perkins, '04; his sister, Marion Perkins Jessup, '94; and his brother, E. Russell Perkins, '11.

18. The SARAH KAIGHN COOPER SCHOLARSHIP, founded by Sallie K. Johnson in memory of her grandparents, Sarah Kaighn and Sarah Cooper, is awarded by the faculty to the member of the Junior Class who shall have, since entering College, the best record for scholarship, character, and influence. The value of this scholarship for the year 1929-30 is $250.

19. SWARTHMORE COLLEGE OPEN SCHOLARSHIPS. Swarthmore College in 1922 established experimentally five annual open competitive scholarships for men, not confined to any particular school, locality, subject of study, or religious denomination. These scholarships are based upon the general plan of the Rhodes Scholarships and are given to candidates who show greatest promise in:

(1) Qualities of manhood, force of character and leadership.

(2) Literary and scholastic ability and attainments.

(3) Physical vigor, as shown by interest in outdoor sports or in other ways.

The regulations under which these scholarships will be awarded in 1929 are as follows:

The stipend of a Swarthmore College Open Scholarship will be five hundred dollars ($500) a year, which will cover the greater part of a man's college expenses.

Each scholarship is tenable for four consecutive years, subject to the maintenance of a high standing in the College.

A candidate to be eligible must:

(*a*) Be between the ages of 16 and 21 on September 1st of the year for which he is elected.

(*b*) Be qualified to enter Swarthmore College on certificate with fifteen units of credit as prescribed in the college catalogue.

(*c*) Not have attended another college or university.

Each candidate must secure the endorsement of the principal of his preparatory school and not more than two candidates may be selected to represent a particular school in the competition for any one year.

Scholars will be selected without written examination on the basis (1) of their school record as shown by the material called for in the application blank and (2) of a personal interview with some representative of the college. It is expected that these interviews can be arranged in practically any part of the United States so as to make it unnecessary for candidates to travel any considerable distance. Application blanks duly filled out and accompanied by the material specified must reach the Dean of Swarthmore College on or before April 16, 1929. References will be followed up, interviews arranged in various parts of the country, and the awards announced early in June.

The awards for 1928-32 are:

WILLIAM RAOUL ALTSTAETTER, *The Loomis Institute,* Windsor, Conn.
JOHN WAINWRIGHT EVANS, JR., *George School,* George School, Pa.
ROBERT E. HADELER, *Oakwood High School,* Dayton, Ohio.
RALPH BURDETTE HEAD, *McClain High School,* Greenfield, Ohio.
THOMAS A. WILSON, *Tower Hill School,* Wilmington, Del.
CARL K. DELLMUTH, of the Class of 1931, was awarded a vacant Open Scholarship.

The T. H. Dudley Perkins Memorial Scholarship, awarded on the same basis as the Open Scholarships, went to H. Frank Brown, of the Las Cruces, New Mexico, High School, for 1928-29.

This year there were 110 candidates from 19 states. Candidates were interviewed in various parts of the country by representatives of the committee of selection, including Swarthmore alumni and former Rhodes scholars. The committee of selection comprised Acting President John A. Miller, Dean Raymond Walters, Dr. Robert C. Brooks and Dr. E. L. Mercer, of the Swarthmore Faculty, E. M. Bassett, '05, and J. Archer Turner, '05, of the Swarthmore Alumni and Carroll A. Wilson, of New York, an ex-Rhodes Scholar.

20. The JAMES E. MILLER SCHOLARSHIP. Under the will of Arabella M. Miller, the sum of $5,986 was awarded to the Cambridge Trust Company, Trustee under the will of James E. Miller, to be applied to scholarships in Swarthmore College. An annual income of approximately $340 is available and may be applied toward the payment of board and tuition of students of Delaware County (preference to be given to residents of Nether Providence Township) to be selected by Swarthmore College and approved by the Trustee.

21. SWARTHMORE COLLEGE OPEN SCHOLARSHIPS FOR WOMEN. Mr. and Mrs. Daniel S. White, of the Class of 1875, on the occasion of the Fiftieth Reunion of that class, established three open competitive scholarships for women, founded in the names of Howard White, Jr., Serena B. White, and Walter W. Green. Each scholarship is tenable for three years and one appointment will be made each year. These scholarships are not confined to any particular school, locality, subject or study, or religious denomination. They are based upon the general plan of the Rhodes Scholarships, and will be given to candidates who show greatest promise in:

(1) Qualities of womanhood, force of character and leadership.

(2) Literary and scholastic ability and attainments.

(3) Physical vigor, as shown by interest in outdoor sports or in other ways.

The regulations under which these scholarships will be awarded are as follows:

The stipend of each scholarship will be five hundred dollars ($500) a year, which will cover the greater part of a woman's college expenses.

Each scholarship is tenable for three consecutive years, subject to the maintenance of high standing in college. Holders of these scholarships will in their Senior year be eligible for other scholarship appointments available in the college.

In case any appointment has to be forfeited for scholastic or others reasons, the scholarship will be awarded competitively for the unexpired term; preference in making the award will be given to original competitors for the scholarship who may be in college.

A candidate to be eligible must:

(*a*) Be between the ages of 16 and 21 on September 1st of the year for which she is elected.

(*b*) Be qualified to enter Swarthmore College with fifteen units of credit as prescribed in the college catalogue, pages 39-43.

(*c*) Not have attended another college or university.

Each candidate must secure the endorsement of the principal of her preparatory school and not more than two candidates may be selected to represent a particular school in the competition for any one year.

Scholars will be selected without written examination on the basis (1) of their school record as shown by the material called for in the application blank printed on the reverse side of this sheet, and (2) of a personal interview with some representative of the college. It is expected that these interviews can be arranged in practically any part of the United States so as to make it unnecessary for candidates to travel any considerable distance. Application blanks duly filled out and accompanied by the material specified must reach the Dean of Women of Swarthmore College on or before November 15, 1929. References will be followed up, interviews arranged in various parts of the country, and the awards announced about February 1, 1930.

There were 110 candidates for the Swarthmore College Open Scholarships for Women for 1928-29, representing 21 states and the District of Columbia. Interviews with the leading candidates were conducted in various parts of the country by representatives of the Committee of Award and by Swarthmore alumni. The Committee of Award comprised Acting President John A. Miller, Dean Raymond Walters, Dean Ethel H. Brewster, Dean Frances Blanshard, Lucy Biddle Lewis, of the Swarthmore Board of Managers, and three alumnæ of the College, Hannah Clothier Hull, '91, of Swarthmore, Alice Smedley Palmer, '89, and Anna Michener, '16, of New York City.

Two scholarships were awarded for 1928-29:

DOROTHY KELLER, *Deerfield-Shields High School*, Highland Park, Ill.
WINIFRED MARVIN, *New Haven High School*, New Haven, Conn.

22. The SWARTHMORE ALUMNAE SCHOLARSHIP established by the Philadelphia and New York Alumnæ Clubs, awarded on the same basis as the Open Scholarships went to Frances Reinhold, of Overbrook High School, Philadelphia, for 1928-29.

23. The EDWARD CLARKSON WILSON SCHOLARSHIP. A scholarship with a capital fund of $2,500 has been established at Swarthmore by friends of Edward Clarkson Wilson, '91, formerly Principal of the Baltimore Friends School. The annual value of this scholarship is $125. It will be awarded each year to a former student of the Baltimore Friends School, who has been approved by the faculty of the School, on the basis of (1) high character; (2) high standing in scholarship. The scholarship is open to Freshmen at Swarthmore, to members of all religious denominations. In any year when there is no outstanding candidate from the students of the Baltimore Friends School, the scholarship will be awarded to another young man or woman who shall meet the required standards and who is approved by the School faculty and the College.

24. The Ivy Medal is placed in the hands of the faculty by a friend of the College, to be awarded on Commencement Day to a male member of the graduating class. The regulations governing the award are as follows:

(1) The idea behind the Ivy Medal is in general the Rhodes Scholarship qualifications including (*a*) qualities of manhood, force of character, and leadership; (*b*) literary and scholastic ability and attainments. This has been phrased by the donor in the words "leadership based upon character and scholarship."

(2) It is the wish of the donor that the medal should not be awarded on a mere basis of averages. Instead, it is desired that the winner should be a man who gives promise of distinction either in character or in intellectual attainments, as opposed to a man who has merely made the most of mediocre abilities.

(3) On the other hand, it is the wish of the donor that the medal should not go to a man who, while showing excellence in some one respect, has fallen seriously below the standard in others.

25. The Oak Leaf Medal is placed in the hands of the faculty by a friend of the College, to be awarded on Commencement Day to a young woman member of the graduating class for loyalty, scholarship, and service.

ADMISSION

Admission to Swarthmore College is competitive, the basis of selection being evidences of sound scholarship and of high character.

In the determination of scholarship the factors considered are:

(1) Success in school studies, as shown by the school record. Ranking in the highest quarter of the candidate's class at school is, in general, the minimum for consideration. Good ratings in examinations of the College Entrance Examination Board will be considered as evidence of sound scholarship.

(2) Outside reading and activity which demonstrate genuine interest in literary or scientific matters.

(3) The Scholastic Aptitude Test of the College Entrance Examination Board.
*Candidates for September, 1930, may take the Scholastic Aptitude Test in June, 1929.**

As to character, the qualities sought are the simplicity, moral earnestness and idealism which have been traditionally associated with the Society of Friends and with Swarthmore College.

Preference is given to candidates who are children of Friends or of Alumni of the College, provided they meet in all respects the standards set by the College for admission. If such candidates do not rank in the highest quarter of their school class, they may be given opportunity to qualify by passing certain examinations of the College Entrance Examination Board, including the Scholastic Aptitude Test.

The size of the Freshman class each year is determined by the resolution of the Board of Managers which limits the total enrollment of the College to 500 students, 250 men and 250 women.

Candidates for admission should make early application. Record of their school work for the first three years, signed by the school Principal, should be submitted one year prior to admission. Application blanks and certificate blanks are furnished

* The application for the Test should be addressed to the College Entrance Examination Board, 431 West 117 Street, New York City.

by the Dean of the College upon request. Certificates are returned to the school principals in the spring for the Record of the Senior year.

Applicants whose school records are good are invited to call at Swarthmore College at suitable times during the year for interviews. Persons living too far from Swarthmore to make this possible are interviewed by representatives of the College in any part of the United States.

The applications of women applicants must be filed by December 15 and of men applicants by April 15.

The names of the women applicants accepted for admission are announced as soon as possible after March 1, and the names of the men applicants as soon as possible after May 1, of the year of admission.

Subject Requirements and Procedure of the Admissions Committee

Requirements may be met

(1) By passing examinations of the College Entrance Examination Board or
(2) By satisfactory certificates from accredited schools.

The basis for admission is the twofold one of scholarship and character. The Admissions Committee's procedure for determining these is

(1) To inspect the applicant's examination record or school record and
(2) To interview the applicant and to consider personal letters of recommendation.

The subjects required for entrance to Swarthmore College are as follows:

Elementary Algebra	1½	units
Plane Geometry	1	unit
English	3	units
†Foreign Language	4	units
History	1	unit

Required subjects, *ten and one half units.*

Advanced Algebra	½	unit
*Solid Geometry	½	unit
*Plane Trigonometry	½	unit
Latin	2, 3 or 4	units
Greek	2, 3 or 4	units
French	2, 3 or 4	units
German	2, 3 or 4	units
Spanish	2, 3 or 4	units
Ancient History	1	unit
Medieval and Modern History	1	unit
Modern History	1	unit
English History	1	unit
American History	1	unit
Civil Government	½	unit
Physics	1	unit
Chemistry	1	unit
Botany	½ or 1	unit
Zoology	½ or 1	unit
Physical Geography	½ or 1	unit
Freehand Drawing	½ or 1	unit
Mechanical Drawing	½ or 1	unit
Satisfactory Free Electives	3	units

Optional subjects *four and one half units.*

† Two units are acceptable for admission of engineering students.
* Required for admission for engineering students.

Detailed definitions of the requirements in all subjects listed above, including lists of experiments in the natural sciences are given in a special circular of information published annually by the College Entrance Examination Board. Copies of this document may be obtained from the Secretary of the Board, 431 West 117th Street, New York, N. Y. Upon request to the Board a single copy will be sent to any teacher without charge. In general a charge of twenty cents, which may be remitted in postage stamps, will be made.

COLLEGE ENTRANCE EXAMINATION BOARD

EXAMINATIONS OF JUNE 17-22, 1929

Examinations will be held in nearly 400 towns and cities in the United States and abroad.

Blank forms for the "Application for Examination" and the "Teacher's Recommendation" may be obtained from the Secretary of the College Entrance Examination Board upon request by mail. The application should be returned to the College Entrance Examination Board, 431 West 117 Street, New York City. The Teacher's Recommendation should be sent directly to the Committee on Admission of the college concerned.

Applications for examination must be received by the Secretary of the Board on or before the dates specified below: For candidates who wish to be examined in the United States at points east of the Mississippi River or on the Mississippi, May 27. For candidates who wish to be examined in the United States at points west of the Mississippi River or in Canada, May 20. For candidates who wish to be examined in centers outside of the United States, Canada, or Asia, May 6. For candidates who wish to be examined in Asia, April 22.

Every application for examination must be accompanied by the examination fee, which is $10 for all candidates. This fee should be remitted by postal order, express order, or draft on New York, payable to the College Entrance Examination Board.

When a candidate has failed to obtain the required blank form of application for examination the usual examination fee will be accepted if the fee arrive not later than the specified date accompanied by a memorandum containing the name and address of the candidate, the exact examination center selected, and a list of the subjects in which the candidate expects to take the Board examinations.

An application for examination received later than the date specified above will be accepted when it is possible to arrange for the examination of the candidate concerned, but only upon payment of an additional fee of five dollars.

The designation of the center to which the candidate will go for examination is regarded as an indispensable part of the

application for examination. A list of places at which examinations will be held in June, 1929, will be published about March 1. Requests that the examinations be held at particular points should be transmitted to the Secretary of the College Entrance Examination Board not later than February 1.

Candidates should report for a morning examination at 8.45 and for an afternoon examination at 1.45, Standard or Daylight Saving Time, according to the usage of the local public schools. Under no circumstances will a candidate be admitted to the Scholastic Aptitude Test after 9.00 A.M.

Detailed definitions of the requirements in all examination subjects are given in a circular of information published annually about December 1 by the College Entrance Examination Board. Upon request a single copy of this document will be sent to any teacher without charge. In general a charge of twenty-five cents, which may be remitted in postage, will be made.

ADVANCED STANDING

For favorable consideration, applicants for advanced standing must have had a high scholastic record in the institution from which they desire to transfer, and must present full credentials for both college and preparatory work and a letter of honorable dismissal. In general, students are not admitted to advanced standing later than the beginning of the Junior year.

REQUIREMENTS FOR GRADUATION

Swarthmore College offers (1) General courses leading to the degree of Bachelor of Arts and to the degree of Bachelor of Science, and (2) Honors courses leading to these same degrees with Honors.

The General course requirement for the Bachelor of Arts degree calls for 120 semester hours in prescribed and elective subjects, with a like number of quality points. The requirement for the Classes of 1929, '30 and '31 remains 124 semester hours and 124 quality points. The Bachelor of Science requirements for the Departments of Engineering and of Chemistry range from 132 to 140 semester hours, with 120 quality points. The

prescribed number of hours for General students in liberal arts is 15 for each semester and for General students in engineering and in chemistry ranges from 17 to 20 for each semester. Each candidate for graduation in the General courses is required to select some one department as his major and is held for comprehensive examination in his major at the close of his senior year.

For the first two years under the Honors plan, students take regular courses and meet the usual requirements as to prescribed subjects and semester-hour and quality-point regulations. Then, if they have shown ability and promise in some one of ten fields of knowledge, they may be admitted to that field for independent study and weekly group discussions under the Swarthmore Honors plan. Honors students are relieved from class recitations and specific hour requirements during their junior and senior years and instead prepare for a series of comprehensive examinations at the end of their senior year, drawn up by external examiners. The scope and details of the Honors plan are given on pages 50-66.

In addition to scholastic credits for graduation, all students are held for physical training as set forth on pages 122-125, and for attendance at Collection exercises of the College, as stated on page 21.

Definition of Terms. A semester hour, as used in the foregoing statement, signifies one recitation or lecture (or its equivalent) a week throughout one semester of 15 weeks, exclusive of the week or more devoted to final examinations. A recitation or lecture is regularly 55 minutes long, and the preparation of the student is estimated at an average of two hours for each class exercise. In the Departments of Engineering, Biology, and Chemistry a laboratory period is three hours in length. In other departments, where additional work is required outside of the laboratory, the laboratory period is two hours in length.

The meaning of the term quality point is as follows: A numerical value called a point is given to the grade letters on this basis: for grade A, three points for each semester hour of course in which the grade is received; for grade B, two points; for grade C, one point; for grade D, no point. The grade D is suf-

ficient to pass a course, but does not count any point. In accordance with this valuation, the requirements in points for graduation of students in General courses both in liberal arts and in engineering and chemistry, is 120. This is a requirement for liberal arts students of an average grade of C.

Extra or Less Hours.—Students are not allowed to carry more nor less than the prescribed amount of work except in special cases approved by the Committee on Prescribed and Extra Work. It is sometimes difficult to make out a course of study for the exact number of hours, and for this reason a variation of one hour more or less than the prescribed number of hours may be allowed by the course adviser. In such cases the endorsement of the course adviser must be secured in writing on the Enrollment Card.

Students desiring to carry more than one hour in excess of the prescribed number, or more than one hour below the prescribed number, must make application to the Committee on Prescribed and Extra Work on a regular form provided for the purpose by the Dean. No student whose marks have fallen below C in any subject or below B in more than one department during the preceding semester shall be permitted to enroll for more than one hour in excess of the prescribed number. No application of a student to enroll for more or less than the prescribed number of hours shall be considered by the committee unless accompanied by the written endorsement of the course adviser.

PRESCRIBED SUBJECTS

Following a long study by the Committee on Instruction, the Faculty in 1926-27 made important modifications in the curriculum prescribed for the A.B. degree, effective with the class entering Swarthmore in September, 1927. In place of a quantitative requirement of hours there is substituted a qualitative standard of attainment in subjects considered essential to a liberal education. Students who pass examinations set to test proficiency in prescribed subjects are excused from specifically required courses and allowed to devote the hours thus released to more advanced work.

The effect of the changes is to afford greater flexibility to the work of the first two years in order to meet individual needs of students, especially of those who have done superior work in good schools.

I. *Prescribed Studies.*—These studies are to be taken by all students for graduation, except in cases where unusually well qualified students gain exemption by examination. The whole of the first year is normally devoted to five of the prescribed studies with one elective.

The time and order in which the remaining studies are taken may vary according to the requirements of each department.

Group 1. English.—Six hours of reading and writing known as Freshman English, or, for students who pass at entrance to College an examination set to test proficiency in English, six hours of free electives in English or foreign literature or the Fine Arts.

Group 2. Foreign Languages.—(a) proficiency in one foreign language (Greek or Latin or French or German) or (b) a reading knowledge of two foreign languages, one of which must be Greek or Latin or French or German. Spanish or Italian may be presented as the second language.

(a) *Proficiency.*

The degree of proficiency required is the ability to read and translate with facility average works of reference; to write simple prose and (in the case of modern languages) to understand and reply to questions in the language. Such proficiency would ordinarily be gained by students

(1) Who have had a thorough training in the language in a good secondary school for four years or more and who give evidence of this by passing creditably an examination set upon entrance to College: or

(2) Who pass examinations of equivalent difficulty after one or more years of College work.

(b) *Reading Knowledge.*

By a reading knowledge is meant ability to read and translate simple stories and to consult effectively works of reference in the two foreign languages offered. The measure of reading knowledge required would ordinarily be gained by students

(1) Who have had a thorough training in the language in a good secondary school for two years or more, and who give evidence of this by passing creditably an examination set upon entrance to College: or

(2) Who pass creditably in College examinations set to test their reading knowledge as defined above.

Group 3. Twelve hours in the following departments: History, History of Religion and Philosophy, Economics, Political Science, Education and Fine Arts. (The requirement is nine hours for students in engineering and in chemistry.)

Group 4. Biology, Chemistry, Physics.—Six hours, to be taken in any one of the three departments, and to include at least one credit-hour of laboratory work throughout a year.

Group 5. Mathematics, Astronomy.—Six hours, to be taken in either one of the two studies; or, no requirement of hours for students who pass at entrance to College an examination designed to test:

a. Ability to understand a reading problem of moderate difficulty.
b. A moderate degree of manipulative skill in Algebra, including factoring and the solving of simple simultaneous equations and quadratic equations of moderate difficulty.
c. Ability to make and to understand graphs.
d. Ability to read definitions and to understand exactly what they mean.
e. Ability to solve originals of moderate difficulty in Plane Geometry.

Group 6. Physical Education.—For the prescribed amount of work in this department, see the statements under the Department of Physical Education.

Students who fail in the required courses of the freshman year shall enroll in these courses during the sophomore year. No deviation from this rule will be allowed except on the written endorsement of the course adviser, and after notification to the professor in charge of the subject in which the student failed.

All prescribed studies must be completed or in actual process of completion at the beginning of the senior year except in cases

where such prescribed work is not offered until the second semester of the senior year.

No substitution of elective for prescribed work where more than one semester is involved shall be permitted after the beginning of the senior year, nor in any case after the beginning of the second semester of the senior year.

Application for permission to substitute an elective for a prescribed study must be made to the Committee on Prescribed and Extra Work on a regular form provided by the Dean for the purpose.

II. *Elective Studies.*—The remaining work required for graduation may be elected from any department or departments of the College.

The following subjects are open to election, in so far as the exigencies of the College program will permit:

Accounting,	Fine Arts,	Mathematics,
Astronomy,	French,	Philosophy,
Bible Study,	Geology,	Physics,
Botany,	German,	Physiology,
Business Law,	Greek,	Political Science,
Chemistry,	History,	Psychology,
Economics,	History of the Quakers,	Public Speaking,
Education,	History of Religion,	Spanish,
Engineering,	History of Science,	Zoology.
English,	Latin,	

III. *Major Subject.*—Every candidate for graduation is required to select the work of some one department as his major. In most cases the selection may well be postponed until the beginning of the second year. In the department thus chosen the student must complete 18 hours as a minimum (the prescribed work done in the major study to be included in this minimum), and the professor in charge may, at his option, determine the work of 36 hours, provided six hours shall not be in his own department. If the major study is one of the languages, at least six hours of the prescribed work must be taken in another language.

Seniors in the General courses of the college are held for final, comprehensive examination in the field covered by the departments in which they have majored; they are exempt from the

ordinary final examinations in their major subject. The final comprehensive examinations are given preceding the ordinary final examinations in May.

If the major study is changed from any branch of Engineering to a department in Arts, the number of credit hours then on record will be adjusted to the basis of 120 hours.

HONORS COURSES

Students who are capable of doing more independent work than that required to fulfill the ordinary requirements for the A.B. degree are allowed to volunteer at the end of the Sophomore year to read for the A.B. degree with honors.* Admission to the status of an honors student depends upon the quality of the applicant's work in the first two years. In the consideration of this record, special aptitude is regarded as of more importance than a mere high average of grades all round. Honors students are excused from the ordinary examinations and course requirements. Instead, they are expected to spend two years in master-

* The theory underlying this honors work was outlined by President Aydelotte in his inaugural address at Swarthmore College on October 22, 1921, in the following words:

"Perhaps the most fundamentally wasteful feature of our educational institutions is the lack of a higher standard of intellectual attainment. We are educating more students up to a fair average than any country in the world, but we are wastefully allowing the capacity of the average to prevent us from bringing the best up to the standards they could reach. Our most important task at the present is to check this waste.

"The method of doing it seems clear: to give to those students who are really interested in the intellectual life harder and more independent work than could profitably be given to those whose devotion to matters of the intellect is less keen, to demand of the former, in the course of their four years' work, a standard of attainment for the A.B. degree distinctly higher than we require of them at present and comparable, perhaps, with that which is now reached for the A.M.

"I do not believe that we should deny to the average, or below average, student the benefit of a college education. He needs this training, and we need his humanizing presence in the colleges, but we should not allow him to hold back in his more brilliant companions from doing that high quality of work which will in the end best justify the time and money which we spend in education.

"With these abler students it would be possible to do things which we dare not attempt with the average. We could allow them to specialize more because their own alertness of mind would of itself be sufficient to widen their intellectual range and give them that acquaintance with other studies necessary for a liberal point of view.

"We could give these better students greater independence in their work, avoiding the spoon-feeding which makes much of our college instruction of the present day of secondary school character. Our examinations should be less frequent and more comprehensive, and the task of the student should be to prepare himself for these tests through his own reading and through the instruction offered by the college."

ing a certain definitely outlined field of knowledge over which they are examind at the end of their two years' work. A large part of their work is done independently by their own reading. Honors students attend several group meetings a week, variously arranged as to subjects in the different divisions. They may attend as many or as few of the regular classes of the College as they desire, though they are guided in this respect by the advice of the Chairman of the division in which they are reading. The comprehensive examinations at the end of their course consist of from ten to twelve three-hour papers followed by an oral examination. These tests are conducted not by the persons who have had charge of the preparation of the candidates but by professors from other institutions. On the basis of these examinations, Honors students are given the degree of Bachelor of Arts with Honors, with High Honors, or with Highest Honors, as their merits may deserve. Candidates whose work is not of a high enough quality to entitle them to any of these classes may be given the ordinary A.B. degree without Honors.

Division of English Literature, Modern History, Philosophy, and Fine Arts

The Honors work in this division is conducted jointly by the Departments of English, History, Philosophy, and Fine Arts.

The following combinations of semester seminars in the different subjects are possible:

1.	English Literature	4	2	2	3	3	2
	Philosophy	2	4	2	3	2	3
	History	2	2	4	2	3	3
2.	English Literature	4	2	3			
	Philosophy	2	4	3			
	Fine Arts	2	2	2			

ENGLISH LITERATURE

The seminars in English literature proceed from general studies of the work of major writers to the study of a selected period and finally of a special topic.

1. An intensive study of the more important work of Chaucer and Shakespeare with special reference to their lives and times.

2. A continuation of the purposes and plans of the preceding semester, based on the work of three or four major writers of centuries after Shakespeare, representative, as far as possible, of different periods, forms, and movements. For 1928-29 the writers selected were: Milton, Fielding, Keats, Hardy.

3. Studies of the forms, movements, and principal writers of a limited period, as, The Elizabethan Era, The Restoration and Eighteenth Century, The Romantic Revival, The Modern Period (1832 to the present).

4. The study of a special topic. The work of this semester offers an opportunity to carry further interests developed during earlier parts of the course. It will include, usually, the preparation of a critical paper or thesis.

Students attending three semester seminars in English Literature will take 1, 2, and 3. Those attending two such seminars will take 1 in their Junior year and either 2 or 3 in their Senior year.

PHILOSOPHY

1. Moral Philosophy. A study, historical and critical, of the chief systems of ethical thought.

2. History of Modern Philosophy. A study of the development of European thought from Bacon and Descartes to the present day.

3. The Classic Problems of Philosophy. An intensive study of selected problems in metaphysics and the theory of knowledge.

For students who attend two semester seminars in philosophy, 1 and 2 are recommended. Those attending four such seminars will consult the department staff regarding their selection of a fourth.

(For details as to these Honors seminars, see succeeding pages.)

FINE ARTS

1. Medieval English Architecture from the Conqueror to and including Henry VII, 1509.

2. English Landscape Painting to the death of Turner.

Prerequisites for students reading for honors in this division are (1) Course 4, Survey of English Literature, (2) two three-hour courses in Philosophy, (3) The History of Europe, Course No. 1, and at least the second semester of The History of Great Britain, Course No. 2.

HISTORY

1. Tudor England.
2. Stuart England; the Rebellion, the Commonwealth, and the Restoration.
3. Great Britain in the Nineteenth Century.
4. The Origins of the World War.
5. Special Problems.

(For details as to these Honors seminars, see succeeding pages.)

Seniors who secure special permission in advance can devote their third or fourth unit of history to a thesis based on the sources for a topic growing out of one of their other seminars. All Seniors doing this will meet together for preliminary discussions of historical method and bibliography; groups of two or more students writing theses on related topics may meet for occasional discussion of books bearing on those topics and for mutual discussion of the theses. Theses may be written around any of the following topics:

(a) Any topic growing out of one of the seminars in English History for which printed sources are available in the Library, preferably topics connected with the work of seminars in other departments, such as the department of English Literature.

(b) Topics based on the sources for the Origins of the World War. After or together with the seminar in that subject.

(c) Topics based on the sources available in the Friends' Historical Library.

Students in this division taking two units of history must take the seminar in Tudor England in Junior year, and either the second or third seminar in Senior year. Students who plan to take three units of history, or to write a thesis in history, should take two of the first three seminars in their Junior year. History No. 1 is prerequisite to any Honors seminar in history. History No. 2, the History of Great Britain, is essential for any seminar

in British history and at least the second semester is required of students who take two units of British History. History No. 5, the Renaissance, is valuable for all work in English Literature as well as for the seminar on Tudor England; History No. 6 is valuable for the seminars on British History in the Nineteenth Century and the Origins of the World War, and History No. 7 is prerequisite for the latter seminar. Lectures in these courses are always open to Honors students.

Division of the Social Sciences

The Honors work in the Division of the Social Sciences is conducted jointly by the Departments of Political Science, Economics, History and Philosophy. Students are permitted to do an equal amount of work, *i.e.*, two semester seminars, in each of the four subjects named above; or they may devote themselves to any three of them. In the latter event they may elect either (1) to take four semester seminars in one subject and two each in two others; or (2) to take three semester seminars in each of two subjects and two in one other. (Details as to this work are given on succeeding pages.)

Students who wish to read for honors in this division should take the following courses during the first two years of their college work, preferably in the Sophomore year: The History of Europe; either American Political Parties, and American Federal Government, or Governments and Parties; Principles of Economics; and either Logic, or Scientific Methods, and either Introduction to Philosophy, or a course equivalent to the latter.

POLITICAL SCIENCE

1. History of Political Philosophy.

It is the purpose of the readings in the History of Political Philosophy to acquaint students with the ideas which have been expressed by the most original thinkers regarding the origin, nature, and purposes of the state, and the obligations of citizens. In addition to these inclusive headings they are expected to note and make comparisons on the following: nature and uses of political philosophy, of political science; the status of women; slavery and labor systems; business, money, interest (usury), foreign trade, property, communism, and other economic problems in their political aspects; military training and war; classification of forms of government; theory of revolutions; contract theories of the state; sovereignty; separation of powers, checks and balances; definitions of law; materialistic conception of history; and the guild

state. Particular attention is to be given to the philosophical doctrines which have influenced the constitutions of England and the United States, thus interrelating the study of political theories with the study of political institutions.

2. Political Institutions of the United States and England.

Readings in the Political Institutions of the United States and England are designed to introduce the student to the present structures and functions of these two governments in considerable detail, to enable him to compare them in their broader outlines, to understand the principal problems which confront them and the principal solutions which are offered to these problems. While the primary organs and functions of the two governments are to receive a major share of attention, supplementary assignments deal with the civil service, state and local government, party organizations, public opinion, the church, and certain typical social and economic organizations. No attempt is made to deal with the historical development of the Constitution of the United States or of England, the student being expected to prepare himself in this field by his own reading or by the readings offered in history and in the history of political philosophy. Similarly he must develop the economic or ethical aspects of American and English political problems on his own account or with the aid of readings offered in these fields.

3. Contemporary Democracies and Dictatorships.

Readings in Contemporary Democracies and Dictatorships are designed to develop the nature of democracy as contrasted with other forms of government, to familiarize the student with the general structure and functions of the principal democratic governments of the world today, and more particularly with the criticisms which are made with greatest force against these governments. Ancient and Medieval democracies are not considered, but the student is expected to have familiarized himself somewhat with them in his readings in history and in the history of political philosophy. Among dictatorships attention is centered in Fascism in Italy and Sovietism in Russia with the purpose of ascertaining how far their practice has succeeded in remedying defects ascribed to democracy.

4. A Special Topic in Political Science.

Students who wish to present a fourth subject in political science should make application to do so before the end of their Junior year. If granted, a theme will be selected and reading assigned to be accomplished during the ensuing summer vacation and, as far as other honors obligations permit, during the first semester of the Senior year. The writing of the thesis will be carried on during the second semester of the Senior year, weekly meetings with the instructor being arranged for consultation regarding further reading and the work of composition. Theses must be completed and typed for submission to outside examiners one week before the beginning of the written examination period.

5. Social Theory.

The topics assigned in this course of reading will be based on a critical and historical study of the works of nineteenth and twentieth century social theorists. Saint-Simon, Auguste Comte, Herbert Spencer, Lester Ward, Gabriel Tarde, Franklin Giddings, C. H. Cooley, W. G. Summer, and Pitirim Sorokin are among the writers to be considered in detail. The general nature of social institutions and social control will be discussed in relation to the place of sociology in the hierarchy of sciences, also the possibilities and limitations of a science of society, and the evolutionary, ethical, and positivistic interpretation of man in society.

ECONOMICS

1. The Economic History of the United States.

This course of reading will deal with the chief topics of American economic history. The Colonial economy will be first studied briefly, and the student will then proceed to the national period. The economic causes of the Revolution and the economic influences in the formation of the Constitution will be traced. The rise of manufacturing, the western movement and agriculture, slavery and the Civil War will be studied in some detail. Transportation, the growth of big business and governmental regulation, the tariff, banking and currency, national finance, and the labor movement will, because of their present-day significance, receive a larger proportionate share of attention.

2. Economic Problems.

It is the purpose of this seminar to acquaint the student with the factors which must be taken into consideration in attempting to solve a number of contemporary economic problems. Topics covered will include the development of consumer credit, modern methods of corporate finance, public policy with reference to industrial combination, the control of cyclical fluctuations in business, the shaping of Federal tax policy, the protective tariff, international indebtedness, trade unionism and the settlement of industrial disputes.

3. The Development of Economic Thought.

This is a critical and historical study of the writings of the most eminent economists from the Mercantilists to the present day. The selections from the Mercantilists and the Physiocrats given by Monroe in "Early Economic Thought" will be read first, to be followed by selected readings from the writings of Adam Smith, Malthus, Ricardo, J. S. Mill, Karl Marx, Henry George, W. S. Jevons, J. B. Clark, Alfred Marshall, Thorstein Veblen, and Gustav Cassel. In addition every student will be required to read "The History of Economic Doctrines," by Gide and Rist.

4. Social Economics.

This seminar covers in greater detail the ground covered in the course in Economics No. 7, Social Economics, investigating the sources of waste and inefficiency in modern industry, attempting to discover the extent to which business contributes to human welfare, examining conflicting interpretations of the economic system presented by a number of contemporary writers and concluding with a critical analysis of various proposals for economic reform.

HISTORY

1. Tudor England.

The political, economic, constitutional, and intellectual developments of the English people and the English state, 1450-1603; the transition from medieval and feudal to modern and national ideas and institutions.

2. Stuart England; the Rebellion, the Commonwealth, the Restoration.

The political, economic, constitutional, and intellectual development of the English people and the English state, 1603-1714; the Rebellion, the Commonwealth, and Protectorate, the Restoration and the Revolution of 1688.

3. Great Britain in the Nineteenth Century.

The political, constitutional, economic, and diplomatic history of Great Britain, 1815-1886; the lives and letters of the statesmen, reformers, etc., for this period; the problems and the issues involved in the readjustment of the British state to the conditions of life in the industrial era.

4. The Supreme Court and American Industrial Society.

American constitutional history with special emphasis on recent Supreme Court decisions involving economic concepts and affecting the social and economic organization of American life. Most of the work is done in the cases themselves; some knowledge of economic and political theory is taken for granted; an acquaintance with the principles of logic is valuable. After the seminar on Tudor England, or Stuart England.

5. The Origins of the World War.

An intensive, critical study of the documents and the controversial literature of this problem. A reading knowledge of French is essential; a reading knowledge of German is valuable. This seminar is strictly limited to students who have completed History No. 7 or the History of Europe in the Twentieth Century.

6. Special Problems.

Seniors who secure special permission in advance can devote their third or fourth unit of history to a thesis based on the sources for a topic growing out of one of their other seminars. All Seniors doing this will meet together for a few preliminary discussions of historical method and bibliography; groups of two or more students writing theses on related topics may meet for occasional discussion of books bearing on those topics and for mutual discussion of the theses. Theses may be written around any of the following topics:

(*a*) Any topic growing out of one of the seminars in English History for which printed sources are available in the Library, preferably topics connected with the work of seminars in other departments, such as the department of English Literature.

(*b*) Topics based on the sources for the Origins of the World War. After or together with the seminar in that subject.

(*c*) Topics based on the sources for the development of the Common Law or English or American Constitutional History. Students who write theses in this field, and who plan to study law, will meet for occasional and informal discussions of the history of the Common Law system.

(*d*) Topics based on the sources available in the Friends Historical Library.

Students taking two units of history must take one of the seminars in English History and either the seminar on the Supreme Court or that on the Origins of the World War. History No. 1, is prerequisite to any Honors seminar in History. History No. 2, the History of England, is essential for any of the seminars in English History and required for students taking two seminars in English History. History No. 6 is valuable for the seminar on Tudor England; History No. 3 and No. 4 are valuable for the seminar on the Supreme Court and for the seminar on the Economic History of the United States. History No. 6 is valuable for the seminars in British History in the Nineteenth Century and the Origins of the World War, and History No. 7 is prerequisite for the latter seminar. Lectures in these courses are always open to Honors students; it should be noted that the course in English History covers the narrative of the three seminars offered in that subject.

PHILOSOPHY

Honors study in philosophy may be pursued in combination with many different subjects. Honors students in the Social Sciences, English Literature, Mathematics, Classics, French, German, Biology and Chemistry are all allowed, subject to the approval of their divisional staff, to offer philosophy as one subject for their final Honors examination. Students who so elect are expected (1) to have completed before entry into Honors study at least two semester courses of three hours each in philosophy, and (2) to take not less than two nor more than four of their eight examination papers in this field.

Papers for which the department of philosophy is already undertaking to prepare Honors students are as follows:

1. Moral Philosophy.

Honors instruction in moral philosophy is given in the first semester of each year, the staff of the department co-operating in giving it. The work is of a much more advanced character than is expected in courses. An extended syllabus of reading has been prepared and may be secured on application to a member of the staff.

2. History of Modern Philosophy.

Honors instruction in this field is given in the second semester of each year by all members of the department. Extended syllabus of readings, paper-topics and review questions to be had on application.

3. The Classic Problems of Philosophy.

Preparation in this subject consists of a semester of reading and discussion in metaphysics and the theory of knowledge. Typical topics of study are: the nature of truth, the issue between realism and idealism, the problem of body and mind, causation and the question of freedom, the nature of the self, problems of space and time.

4. Logic and Scientific Method.

This subject is approached at about the level of difficulty offered by Joseph's *Introduction to Logic*. It is designed primarily for students in the scientific divisions, though both deductive and inductive types of reasoning are reviewed. Given as called for.

Students who offer two subjects in philosophy at their final examination will ordinarily be expected to offer 1 and 2 above, though with the approval of the divisional staff other subjects may be offered instead.

Division of Mathematics, Astronomy, and Physics

The Honors work in the Division of Mathematics, Astronomy and Physics is under the direction of a committee consisting of Professors Miller, Dresden, Marriott and Wright.

Students who expect to do Honors work in the Division of Mathematics, Astronomy and Physics, should arrange their work during the first two years in such a way as to have completed before the beginning of the Junior year the introductory courses in Algebra, Trigonometry, Plane Analytical Geometry and Calculus, the introductory course in Physics and should have a reading knowledge of German. It is strongly recommended that all required work be completed by the end of the Sophomore year.

Their work during the Junior and Senior years should be designed to perfect and extend their knowledge of the introductory subjects and to give them a fair measure of mastery in a number of more advanced subjects. They will normally be expected to take eight examinations at the end of their Senior year. The fields to be covered by the examinations are to be selected, in consultation with the committee in charge, from the following list:

1. Mathematics.

Advanced Calculus, Differential Equations, Analytic Geometry, Projective Geometry, Theory of Equations, Modern Algebraic Theories, Analytic Mechanics, Vector Analysis, Theory of Probabilities, Theory of Functions of a Complex Variable, Philosophical Aspects of Mathematics.

2. Astronomy.

General Survey, Practical Astronomy including Measurement and Reduction of Photographic Plates, Theory and Practice of Stellar Parallax, Theory of Orbits, Celestial Mechanics.

3. Physics.

Electricity, Light, Heat, and Atomic Physics.

The distribution of the fields for examination over the three departments represented in this Division, and the particular fields in these departments to be selected will be determined each year in accordance with the special interests of the students concerned. It will, however, be expected that, in general, at least one field be selected from each of the three departments and that more concentrated study, covering at least four fields, be carried on in one of the departments.

PHYSICS

Honors courses which include Physics may be pursued in the following combinations. The subjects in each group are in alpha-

betic order and the division of time between them is dependent upon the major interest of the student.

I. Astronomy, Mathematics, Physics
II. Chemistry, Mathematics, Physics
III. Chemistry, Physics, Physiology and Zoology

The following branches of physics are available for Honors work: Electricity, light, heat, and atomic physics. Any one of these branches is expected to occupy about one-half of a student's time for one semester. Laboratory practice and the reading of theoretical physics are arranged to supplement each other. Two years of college mathematics and one year of college physics are prerequisite.

A student who desires to pursue physics primarily will be expected to prepare himself for four papers in physics, two in mathematics, and two in chemistry. A paper in astronomy or in scientific method may be substituted for one of the chemistry units where it seems desirable. General inorganic chemistry is prerequisite for Honors work in chemistry. The language requirement is to be met by a reading knowledge of ordinary and scientific German.

Honors students in physiology and zoology read in general physics during the first semester of 1928-29. No previous training in physics is presupposed but the group is limited to students with considerable experience in other sciences.

Division of French

The Honors Course in French aims to give students a good understanding of the various forms of French civilization through extensive and intensive study in four main fields: *history, language, ideas, literature.* The amount of time devoted to these different phases of civilization may be shown by the ratio of 1, 3, 1, 3. In addition, each student is required to do special work on some restricted subject in one of these four fields.

Students who plan to work in this field should arrange to take the following elective courses during their Freshman and Sophomore years: History 1, Philosophy 6 (b), and Latin 1, (unless they have had four years of Latin in High School).

This course runs through the Junior and Senior years of

undergraduate work. At the end of the Senior year, students who are candidates for the degree of B.A., with Honors in French will be examined by outside examiners in the following subjects (nine examinations, maximum duration of each examination: three hours):

A. History.

1. Political development of France. Society and art in relation to literature.

B. Language.

2. Outline history of the French language as given in Nyrop's *Grammaire historique de la langue française*, Vol. I, Part 1; and in the introduction of the *Chrestomathie du Moyen Age*, by Langlois and Paris. This means a general knowledge of the development of the language from classical Latin to modern French; a knowledge of the simpler rules of historical grammar, and the ability to read extracts from the *Chrestomathie* mentioned above. The *Chanson de Roland* will be read in the original (Jenkins' edition).

3. Practical phonetics. A detailed knowledge of the sounds of modern French; ability to pronounce correctly, to converse fluently, and to transcribe sounds of modern French in the international phonetic alphabet.

4. Spanish or Italian. The ability to read and translate either Spanish or Italian prose of ordinary difficulty; also the ability to understand and reply to simple questions in one of these languages.

C. Ideas.

5. History of ideas in France from the Middle Ages to Bergson.

D. Literature.

6. French Literature, I. A general knowledge of French literature from the beginnings to the end of the seventeenth century, with special study of certain texts.

7. French Literature, II. A general knowledge of French literature of the eighteenth and the first half of the nineteenth centuries, with special study of certain texts.

8. French Literature, III. A general knowledge of French literature from 1850-1925, with special study of certain texts.

Special Subject.

9. An intensive study of an approved subject dealing with language, history, or literature, to be carried on independently by each student under the supervision of the tutor in charge.

All papers, with the exception of number 4, will be set in French. Candidates will be required to use French exclusively in the seminar meetings and in the final examinations, written and oral.

Paper number 4 is usually handled by the local department. At the discretion of the examiners, however, it may be included in the final examinations.

Numbers 6, 7, 9, 10, 11, 12, 13, 14, 15 and 16 of the regular college courses in French (see Swarthmore College catalogue for

1929, pp. 134-135) are recommended as part preparation for papers 3, 5, 6, 7 and 8.

A list of the texts which have been used for special study in preparation for papers 6, 7 and 8 will be furnished the examiners each year before the examination papers are set.

Division of the Classics

The work of students reading for Classical Honors is directed by the Professors of the Department of Greek and Latin. The course includes, as stated subjects, either the Greek or the Latin language, Greek moral and political philosophy, the histories of ancient Greece and Rome, and, as optional subject, Greek and Roman art. Students follow one or the other of the following programs according to whether they elect Greek or Latin as a major language.

(*a*). For Classical Honors with Greek as Major.

Seven prescribed studies as follows: Greek History, Greek Tragic Drama, Greek Philosophy, Greek Epic, Greek Prose Composition and Unseen Translation, Roman Satire, and Roman History.

One elective study from the following: Greek Orators and Historians, Greek Comedy, Greek Lyric, Greek and Roman Archæology.

(*b*) For Classical Honors with Latin as Major.

Seven prescribed studies as follows: Roman History, Roman Epic, Roman Satire, Roman Orators and Historians, Latin Prose Composition and Unseen Translation, Greek Philosophy, and Greek History.

One elective study from the following: Roman Epistolary and Biographical Literature, Roman Novel, Roman Lyric, Greek and Roman Archæology, and Greek Tragic Drama.

Division of German

The work of students reading for honors in German is directed by Professor Newport.

The requirements are as follows:

(a) The power to write and speak German fluently and correctly.

(b) A thorough acquaintance with German literature from the beginnings. The monuments written in Old High German may be read in translation into modern German. Those in Middle High German must be read in the original.

(c) Two elective studies from the following: The Development of the German Language; Philosophy with special stress on German Philosophy; History of Germany from the Earliest Times; Economics and Political Science with special reference to the achievements of the Germans in these fields.

Division of Chemistry

Honors instruction in Chemistry, conducted in seminars, lectures, and in the laboratory, is provided in Inorganic Chemistry, Organic Chemistry, Theoretical Chemistry, and in special branches of organic and theoretical chemistry. In both organic and theoretical chemistry students are prepared for either *one* or *two* papers (an *elementary* paper and an *advanced* paper); in other subjects for *one* paper only. In organic and theoretical chemistry Honors instruction is given throughout the year; in the other subjects in one semester of each year. An extended program of study, paper-topics and review questions is in the course of preparation and when ready may be obtained on application to the Professor of Chemistry.

Honors students in the divisions of Mathematics, Astronomy and Physics, Physiology-Zoology, and Engineering are permitted, subject to the approval of the staff of their division, to offer Chemistry as one subject for their final examination, provided they have completed at least six hours in Chemistry before starting to read for Honors.

Students *majoring in Chemistry* who propose to read for Honors in this division should have taken, prior to entering upon this work, the courses prescribed on page 75 or page 76. Those majoring in Chemistry, in *Arts,* may be admitted to Honors work at the beginning of their Junior year, and, in *Applied Science,* at the beginning of their Senior year, provided they have shown satisfactory proficiency in their work of the preceding years. In addition to their Honors study, students majoring in Chemistry, in *Arts,* are required to take a course in quantitative analysis and to complete their language requirement during their Junior year.

Honors students in Chemistry, in *Arts,* are required to take at the end of their Senior year *eight* examination papers, of which

I. *Five* papers must be in Chemistry, distributed as follows: Inorganic Chemistry (one paper), Organic Chemistry (two papers), Theoretical Chemistry (two papers);

II. *One* paper must be in Physics;

III. *Two* papers must be in either one or two subjects selected from the following: Mathematics, Philosophy, Physics, Physiology-Zoology, Biochemistry, Organic Chemistry (special branches), Electrochemistry, Catalysis, Colloid Chemistry, Sub-atomic Chemistry, and Chemical Thermodynamics and Equilibrium.

Records of laboratory work are to be ready for submission to the external examiners at least a week before the beginning of the written examination period.

Honors students in Chemistry, in *Applied Science,* are required to take at the end of their Senior year *four* examination papers. All of these papers may be taken in Chemistry or in the subjects of any of the following combinations:

I. Chemistry and Engineering.

II. Chemistry and Mathematics.

III. Chemistry and Physics.

Records of laboratory work are to be ready for submission to the external examiners at least a week before the beginning of the written examination period.

Division of Education

Honors work in education was established in the fall of 1926. It covers four separate fields, spread over two years as follows:

First Semester, 1928-29. Philosophy of Education

Second Semester, 1928-29. Educational Sociology

First Semester, 1929-30. Educational Psychology

Second Semester, 1929-30. History of Education.

The Honors Course in education is planned to occupy approximately three-fifths of the student's time in the Junior and Senior years, the remaining time to be devoted to elective subjects.

Prerequisites for Honors work in education are the Introduction to Education (Education No. 1) and Educational Psychology (Education No. 2). The readings and conferences are supplemented by a systematic program of school visits.

Division of Engineering

The Honors work of the Division of Engineering is conducted jointly by the Departments of Civil, Electrical and Mechanical Engineering. At the end of the Sophomore year those exceptional students who are qualified may make application for permission to read for Honors in engineering. This means that each student, with the aid of the Engineering faculty, designs his own regime so as to advance his technology or to cover more economic or industrial subjects than the rigid engineering program permits. Laboratories for research are available for students in Honors.

Division of Physiology-Zoology

Three combinations of Honors Courses are available for students in this division: Physiology, General Zoology and Biophysics. In each case the work extends throughout the Junior and Senior years but it is so arranged as to permit every student to carry the equivalent of three hours of non-scientific course work during that period.

A. Physiology. The work in this group is designed to meet the needs of pre-medical students and those primarily interested in the physiological aspects of zoology. The Honors Courses required in this combination are Physics, Bio-physics, Physiology of Muscle and Nerve, Physiology of Circulation and Respiration, Organic Chemistry, Comparative Anatomy, Cytology (including Histology and Embryology), Scientific Method and Logic.

B. General Zoology. This combination of courses offers a broader training in the general field of zoology than is possible under A. The Honors units include Comparative Anatomy, Anthropology, Organic Evolution, Physiology of Muscle and Nerve, Physiology of Circulation and Respiration, Cytology (including Histology and Embryology), Organic Chemistry, Scientific Method and Logic.

C. Bio-physics. The Departments of Physics and Physiology—Zoology jointly offer this group of courses for those students who have interests and ability in both the physical and natural sciences. The combination is designed to train students for research in one of the most promising fields of scientific investigation. Eight units of Honors work are taken and must be so selected as to include two in Physics, two in Physiology, one in Mathematics, one in Chemistry, one in Bio-physics and one in Cytology.

FOREIGN LANGUAGE REQUIREMENTS FOR HONORS STUDENTS

Beginning with September, 1929, the foreign language requirements of Honors students will be the same as of all students of the College. (See page 47.)

RULE COVERING CASES OF STUDENTS DROPPING HONORS WORK

It is, of course, expected that Honors students will continue normally in Honors work for two years, being examined only at the end of that time, except for a reading knowledg of languages as provided in the regulations dealing with that subject. Only reasons of a grave character justify a student in giving up Honors work, or the faculty of the group in dropping a student, prior to the end of the two-year period. Whenever necessary such action should be decided upon immediately prior to the end of a semester. In all such cases the student involved shall take an examination in each of the subjects covered during his continuance in Honors work, and be given hours of credit equivalent to the total number of hours he would have earned in ordinary courses during the same period, with grades determined by the degree of success attained in the said examinations. The number of hours of credit to be assigned the student in each subject he has pursued in Honors work shall be determined by the head of the Honors group concerned in consultation with his colleagues of the same group.

UNIFORM CURRICULUM FOR THE FRESHMAN YEAR IN THE COURSES IN ARTS

FRESHMAN YEAR

COURSE IN ARTS

First Semester		Hours per Week		
		Class	Lab'y	Credits
Major Study or Elective		—	—	3
English	Literature and Composition	3	—	3
Mathematics	Algebra	3	—	3
or				
Astronomy	Descriptive Astronomy	—	—	—
Foreign Language		3	—	3
Elective		—	—	3
Physical Education		2	—	—
	Totals	—	—	15
Second Semester				
Major Study or Elective		—	—	3
English	Literature and Composition	3	—	3
Mathematics	Trigonometry	3	—	3
or				
Astronomy	Descriptive Astronomy	—	—	—
Foreign Language		3	—	3
Elective		—	—	3
Physical Education		2	—	—
	Totals	—	—	15

COURSE ADVISERS

The course advisers of Freshmen and Sophomores are the Dean of the College, the Dean of Men and the Dean of Women. For General students in the Junior and Senior classes, the advisers are the professors in charge of the subjects they have selected as majors; and for Honors students the advisers are the heads of their Honors divisions.

EXTRA WORK DONE OUTSIDE OF CLASSES

No student will be granted credit for work in excess of that regularly listed on the enrollment card unless permission to do so is granted by the Committee on Prescribed and Extra Work at the written request of the course adviser. All students except those desiring credit for intercollegiate debating must gain permission of the Committee on Prescribed and Extra Work before the work is entered upon.

SUMMER SCHOOL WORK

Students desiring to transfer credit in a prescribed subject from a university summer school are required to obtain the endorsement of the head of the department concerned before entering upon the work.

REMOVAL OF CONDITIONS

Members of the graduating class must make up all outstanding conditions and deficiencies by the end of the first semester of the Senior year, and no student whose record is not then clear shall be considered a candidate for graduation in that year.

All conditions must be made up in the semester immediately following that in which the work reported as conditioned was done, and as early in the semester as possible; except that by special permission of the professor concerned the time for making up the condition may be extended to the second semester following in case (1) the course for which the condition was imposed was not repeated until said second semester, and (2) it is considered necessary by the professor that the student should make up part or all of the class or laboratory work involved at the time the course is repeated. Any condition not made up within a year from the time it is imposed shall thereafter have the effect upon the records of an E, *i. e.,* complete failure, which cannot be made up.

SYSTEM OF GRADES

Reports of students' work are received at the Dean's office four time a year; at the end of each semester and at each mid-semester. All grades are mailed to parents at the end of each semester, and are also given out to students at each mid-semester and at the end of the first semester.

The following system of marking is used by instructors: A (excellent, 100-90 per cent.); B (good, 89-80 per cent.); C (fair, 79-70 per cent.); D (poor, 69-60 per cent.); E (failed); W (withdrawn); Cond. (Conditioned).

The mark "conditioned" shall be reported for only two reasons: (1) for unsatisfactory work in a semester course in which the condition may be removed by doing satisfactory work either

in another semester course which involves the subject-matter of the first course or in the second semester of a year's course; (2) when the work of a course is complete; that is, when the work done in the course is satisfactory with the exception of a small, definite part of it; for example, the writing of a theme, the reading of an assignment, or the taking of a final examination. The mark "conditioned" shall not be given to a student whose work in a course has been below the passing grade. Such a student shall be reported E (failed).

When the reports of grades are filed at the Dean's office, the exact character of the conditions imposed will be defined, and the nature of the work required to remove conditions reported in writing. The student will then be notified by the Dean of the terms of the conditions.

ABSENCES FROM EXAMINATION

Any student who is absent from an examination, announcement of which was made in advance of the date of the examination, shall be given an examination at another than the scheduled hour only after presentation by the student to the instructor in charge of the course (1) of a certificate from the Committee on Absences that the student has submitted a written statement satisfactorily explaining the cause making the absence from examination imperatively necessary, and (2) of a receipt from the office of the superintendent for a fee of $2. This fee shall be remitted only in the case of duly certified quarantine. In case of continuous illness the maximum fee shall be $5.

No examinations *in absentia* shall be permitted. This rule shall be interpreted to mean that instructors shall give examinations only at the college and under direct departmental supervision.

ABSENCES FROM CLASSES

Each instructor shall make on the form provided for the purpose daily reports of student absences to the offices of the Dean.

All powers of supervision and discipline over student absences are vested in a Committee on Absences to be composed of the Dean of the College, the Dean of Men, the Dean of Women, *ex*

Officio, and other faculty members appointed annually by the President of the College, who shall designate the Chairman of the Committee from among its members.

The absence regulations for 1929-1930 are as follows:

1. The following allowances must cover absences for all causes, including short periods of illness, except that one-half absences shall be counted for each hour of absence due to representing the College away from home on athletic and debate teams.

2. Each stutent shall be allowed as many absences from class *in each course* per semester as there are hours in that course, *i. e.,* three absences for a three-hour per week course, two absences for a two-hour per week course.

3. Any student with an average of 2.3 or above shall be allowed double this number of absences; this ruling is to become effective the semester following the recording of the grades in the Dean's Office.

4. At its discretion the Absence Committee may excuse absences in excess of two-thirds the allowed number, when such absences are due to prolonged illness.

5. A student absent from his last scheduled class before any holiday or vacation, or absent from his first scheduled class after any holiday or vacation, shall be required to make one hour credit for graduation in addition to the requirements as stated in the College Bulletin.

6. Each unexcused absence in excess of the number alloted for each course under the proposed system shall be penalized by the loss of one hour's credit toward graduation.

7. All excuses for absence shall be acted upon exclusively by the Absence Committee.

EXCLUSION FROM COLLEGE

The College reserves the right to exclude at any time students whose conduct or academic standing it regards as undesirable, and without assigning any further reason therefor; in such cases the fees due or which may have been paid in advance to the College will not be refunded or remitted, in whole or in part, and neither the College nor any of its officers shall be under any liability whatsoever for such exclusion.

DEGREES

BACHELOR OF ARTS
BACHELOR OF SCIENCE

The degrees of Bachelor of Arts and Bachelor of Science are conferred upon students who have complied with the requirements for graduation as stated on pages 44-49.

MASTER OF ARTS
MASTER OF SCIENCE

1. The degrees of Master of Arts and Master of Science may be conferred upon graduates of Swarthmore College or of other institutions of satisfactory standing who spend at least a year in residence at this College, pursuing a course of study approved by the faculty. Each candidate for the Master's degree must prepare a satisfactory thesis on a subject assigned by the professor in charge of the major subject, and must pass a final oral examination before a committee of the faculty. In recent years comparatively few students have been accepted for work for the Master's degree. Terms for admission and for fulfillment of the faculty requirements will be supplied upon application to the Dean.

ADVANCED ENGINEERING DEGREES

The advanced degrees of Mechanical Engineer (M.E.), Electrical Engineer (E.E.), and Civil Engineer (C.E.), may be obtained by graduates who have received their Bachelor's degree in engineering upon the fulfilling of the requirements given below:

1. The candidate must have been connected with practical engineering work for three years since receiving his first degree.
2. He must have had charge of engineering work and must be in a position of responsibility and trust at the time of application.
3. He must make application and submit an outline of the thesis he expects to present, one full year before the advanced

degree is to be conferred. After this application is made he will receive an outlined course of study to pursue during the year.

4. The thesis must be submitted for approval, and satisfactory evidence given that the reading requirement has been met one calendar month before the time of granting the degree.

5. Every candidate shall pay a registration fee of $5 and an additional fee of $20 when the degree is conferred.

DEPARTMENTS AND COURSES OF INSTRUCTION

Botany

Professor Samuel Copeland Palmer is in charge of the work of this Department. The purpose of this Department is to give an opportunity to the student to secure a broad knowledge of the fundamentals of biology as based on the botanical sciences. Besides the courses in botany a course is given in geology, which is useful to the student in understanding the principles of evolution, earth contours, soils, and problems in distribution. The course in genetics covers not only the principles of good breeding of plants and animals generally, but includes the application of these to man and race betterment. Attention is given also to forestry, which is destined to become a question of ever increasing importance to mankind.

Numerous libraries, museums and parks in and around Philadelphia offer unusual opportunities to students to carry on investigations in the botanical sciences.

1. General Botany. Professor Palmer.

Three hours a week throughout the year. Offered annually.

This course is designed to give the student a broad view of the general field of Botany. Ability to use a microscope is a necessary part of this course.

2. Embryology. Professor Palmer.

Three hours a week throughout the year. Offered annually.

The work of this course consists of one hour per week for lectures and six hours for laboratory. Special attention is given to the study of the evolution of the chick. The students are taught histological methods and much time is given to the production of careful and accurate drawings.

3. Evolution, Genetics, and Eugenics. Professor Palmer.

Two hours a week throughout the year. Offered annually.

The first part of this course is designed to give the student an insight into the theories of Evolution and closely related subjects. The greater part of the course deals with the fundamental principles of Genetics. Some time is given toward the end of the course to the application of the principles of Genetics to Eugenics.

9. Special Topics. Professor Palmer.

Open to Seniors who wish to do special advanced work. Hours to be arranged with the professor.

10. Geology. Professor Palmer.

Three hours a week second semester.

A lecture course in general geology designed to acquaint the student with the forces at work fashioning the earth into its present form. Some time will be given to the study of Historical Geology, with special reference to the problem of evolution.

Chemistry

The instruction in this department is under the direction of Professor H. Jermain Creighton. Dr. Edward H. Cox and Dr. Duncan G. Foster are Assistant Professors of Chemistry; Walter B. Keighton, Jr. is Assistant.

This department does not aim to develop specialists in any particular branch of chemistry, but to present opportunities for comprehensive training in the fundamental principles of the science. Upon successful completion of the courses given by the department, a student is prepared to take up graduate work in chemistry at any leading university or to secure a position in one of the many industries employing chemists. Those who possess ability for advanced study and research are strongly urged to take one or more years of graduate work, since in this way they will do much to increase their proficiency in their careers as chemists.

Students intending to prepare for the medical profession will find it to their advantage to take as many as possible of the following courses in Chemistry: Nos. 1, 2, 3, 6, 7, 9. Of these, Courses Nos. 1, 2, 6 and 7 are the more important for the pre-medical student.

Students majoring in Chemistry may follow either one of two courses of study: (1) A course leading to the degree of A.B., requiring 120 semester hours in prescribed and elective subjects with a like number of quality points; (2) A course leading to the degree of S.B., requiring 140 semester hours in prescribed and elective subjects, with 120 hours of quality points. Both of these degrees may be taken with honors. A statement of the Honors courses in the Division of Chemistry is given on pages 63-64.

Students proposing to take the degree of A.B. in Chemistry are advised to select in their Freshman and Sophomore years the courses given in the accompanying table. It is essential that these courses be selected by all students who expect to enter the Honors Division of Chemistry, *in Arts,* in their Junior year.

FIRST YEAR

First Semester		Hours per Week
Chemistry 1	General Inorganic	3
English 1	Literature and Composition	3
Mathematics 1	Algebra	3
Mathematics 3	Trigonometry	2
Group 2	German	3
Group 3	History of Science	
	or	
	History of Ethics	2
	Total Hours	16

Second Semester		
Chemistry 1	General Inorganic	3
English 1	Literature and Composition	3
Mathematics 1	Algebra	2
Mathematics 4	Analytic Geometry	3
Group 2	German	3
Elective	Group 3	2
	Total Hours	16

SECOND YEAR

First Semester		Hours per Week
Chemistry 2	Qualitative Analysis	3
Mathematics 11	Differential Calculus	3
Physics 1	General Physics	4
Group 2	German	3
Group 3	Philosophy 130 (Logic)	3
	Total Hours	16

Second Semester		
Chemistry 2	Quantitative Analysis I	3
Mathematics 12	Integral Calculus	3
Physics 1	General Physics	4
Group 2	German	3
Chemistry 6 (a)	Physical Chemistry	2
	Total Hours	15

The course in Chemistry *in Applied Science,* leading to the degree of B.S., includes all the prescribed work in chemistry required for the degree of A.B. as well as training in certain engineering subjects which will be of great value to the student who wishes, after graduation, to secure a position in certain industries or to enter upon the study of chemical engineering at some graduate school. The course in Chemistry in Applied Science is prescribed for four years as follows:

FRESHMAN YEAR

COURSE IN APPLIED SCIENCE

First Semester		Hours per Week		
		Class	Lab'y	Credits
Mathematics 1	Algebra	3	—	3
Mathematics 3	Trigonometry	2	—	2
Group 2	German	3	—	3
English 1	Literature and Composition	3	—	3
Chemistry 1	General Inorganic	2	3	3
Engineering 1	Engineering Problems	—	6	2
Engineering 2	Surveying	1	3	2
Physical Education		2	—	—
	Totals	16	12	18
Second Semester				
Mathematics 1	Algebra	2	—	
Mathematics 4	Analytic Geometry	3	—	3
Group 2	German	3	—	3
English 1	Literature and Composition	3	—	3
Chemistry 1	General Inorganic	2	3	3
Engineering 1	Engineering Problems	—	6	2
Engineering 3	Drawing and Shop Practice	—	6	2
Physical Education		2	—	—
	Totals	15	15	18

SOPHOMORE YEAR

COURSE IN APPLIED SCIENCE

First Semester		Hours per Week		
		Class	Lab'y	Credits
Mathematics 11	Differential Calculus	3	—	3
Group 2	German	3	—	3
Chemistry 2	Qualitative Analysis	1	6	3
Physics 1	General Physics	3	3	4
Engineering 5	Drawing and Shop Practice	—	6	2
Engineering 4	Materials	2	—	2
Physical Education		2	—	—
	Totals	14	15	17
Second Semester				
Mathematics 12	Integral Calculus	3	—	3
Mathematics 13	Analytic Mechanics	3	—	3
Group 2	German	3	—	3
Chemistry 3	Quantitative Analysis I	1	6	3
Physics 1	General Physics	3	3	4
Engineering 6	Elements of Electrical Engineering	2	—	2
Physical Education		2	—	—
	Totals	17	9	18

JUNIOR YEAR

COURSE IN APPLIED SCIENCE

First Semester		Hours per Week		
		Class	Lab'y	Credits
Physics 2	Advanced Physics	2	—	2
German		3	—	3
Chemistry 4	Quantitative Analysis II	—	9	3
Chemistry 7	Organic Chemistry	2	3	3
Chemistry 10	Physical Chemistry	2	3	3
Engineering 11	General Design	1	6	3
	Totals	10	21	17
Second Semester				
Engineering 14	Heat Engines	2	—	2
German		3	—	3
Chemistry 5	Quantitative Analysis III	—	9	3
Chemistry 7	Organic Chemistry	2	3	3
Chemistry 10	Physical Chemistry	2	1	3
Chemistry 12 or	Sub-Atomic Chemistry			
Chemistry 14	Chemical Thermodynamics and Equilibrium	2	—	2
	Totals	11	13	16

SENIOR YEAR

COURSE IN APPLIED SCIENCE

First Semester		Hours per Week		
		Class	Lab'y	Credits
Economics or History or Political Science		3	—	3
Elective		3	—	3
Chemistry 8	Adv. Organic Chemistry	2	3	3
Chemistry 11	Adv. Inorganic Chemistry	2	—	2
Chemistry 13	Electro Chemistry	2	3	3
Engineering 19	Power Plants	2	—	2
Engineering 20	Experimental Laboratory	—	3	2
	Totals	14	9	18
Second Semester				
Economics or History or Political Science		6	—	6
Chemistry 8	Adv. Organic Chemistry	2	3	3
Chemistry 12 or	Sub-Atomic Chemistry	—	—	—
Chemistry 14	Chemical Thermodynamics and Equilibrium	2	—	2
Electives		3	—	3
Thesis (Chemical)	Laboratory Research	—	12	4
	Totals	13	15	18

1. General Inorganic Chemistry. Professor Creighton, Assistant Professors Cox and Foster.

Three hours a week throughout the year. Offered annually.

Lectures, demonstrations, written exercises, individual laboratory practice, and weekly conferences on the general principles involved in elementary chemistry. This course includes work similar to that outlined in Deming, *General Chemistry.*

In the laboratory each student performs experiments which are selected from Deming and Arenson's *Exercises in General Chemistry.* Credit in this course is not assigned until the completion of the entire course at the end of the year.

2. Qualitative Analysis. Assistant Professor Foster.

Three hours a week during the first semester. Offered annually.

The theory and practice involved in the detection of the commoner chemical elements and radicles. Lectures, problems and laboratory work. The text-book used is A. A. Noyes, *Qualitative Analysis.* One hour lecture and six hours of laboratory work per week for one semester, carrying a credit of three hours. Prerequisite, General Inorganic Chemistry.

3. Quantitative Analysis I. Assistant Professor Foster.

Three hours a week during the second semester. Offered annually.

The principles involved in the elementary gravimetric estimation of the commoner chemical elements, with laboratory work illustrating these methods and including the complete analysis of a number of compounds, such as sodium chloride, copper sulphate, apatite, etc. One hour lecture and six hours of laboratory work per week for one semester. Credit: three hours. The text-book used is Talbot's *Quantitative Chemical Analysis.* H. A. Fales' *Inorganic Quantitative Analysis* is also recommended. Prerequisite, Qualitative Analysis.

4. Quantitative Analysis II. Assistant Professor Foster.

Three hours a week during the first semester. Offered annually.

A laboratory course in the principles of volumetric analysis. Nine hours of laboratory work per week for one semester, with occasional lectures and conferences. Credit: three hours. The text-books used are the same as in Course 3. Treadwell-Hall's *Analytical Chemistry* is used as a supplementary reference. Prerequisite, Quantitative Analysis I.

5. Quantitative Analysis III. Assistant Professor Foster.

Three hours a week during the second semester. Offered annually.

A laboratory course in combustion and gas analysis. The determination of carbon and hydrogen, nitrogen, sulphur and the halogens in organic compounds; the analysis of steel and the analysis of illuminating gas. Nine hours of laboratory work per week with conferences when necessary. Credit: three hours. Text-book: Gattermann's *Praxis des organischen Chemikers,* with Treadwell-Hall's *Analytical Chemistry* as a reference. Prerequisite, Quantitative Analysis II.

6. Introduction to Physical Chemistry. Professor Creighton.

Three hours a week during the second semester. Offered annually.

Lectures and laboratory work. An elementary course which is given primarily for students taking Physiology-Zoology as their major subject. The following text-books are used: Senter, *Outlines of Physical Chemistry;* Findlay, *Practical Physical Chemistry;* Findlay's *Physical Chemistry for Students of Medicine* is recommended as a supplementary text. Prerequisite, General Inorganic Chemistry.

6*a*. Introduction to Physical Chemistry. Professor Creighton.

Two hours a week during the second semester. Offered annually.

This course is the same as Course 6, without laboratory work. It is given primarily

for major students in chemistry, as preparation for Course 10, but is open to all students who have completed General Inorganic Chemistry. Text-book: Senter, *Outlines of Physical Chemistry.*

7. Elementary Organic Chemistry. Assistant Professor Cox.

Three hours a week throughout the year. Offered annually.

Lectures, demonstrations, written exercises, and laboratory work. This course includes the work as outlined in Conant, *Organic Chemistry,* and Worrall, *Principles of Organic Chemistry.* In the laboratory, students make and study the various organic preparations as given in Adams and Johnson, *Laboratory Experiments in Organic Chemistry.* Prerequisite, General Inorganic Chemistry. Required of all students who select Chemistry as their major subject.

8. Organic Chemistry (Advanced Course). Assistant Professor Cox.

Three hours a week throughout the year. Offered annually.

A continuation of Elementary Organic Chemistry. Lectures, laboratory work, and training in library reference search. In the laboratory, students carry out the synthesis of more difficult compounds than in Course 7. Frequently the original papers must be consulted in order to carry out these syntheses. The lectures follow texts of the type of Schmidt-Rule's *Organic Chemistry.* Prerequisite, Elementary Organic Chemistry. Required of all students who select Chemistry as their major subject.

9. Biochemistry. Assistant Professor Cox.

Two hours a week during the first semester. Offered annually.

This course is given primarily for students taking Physiology-Zoology or Biology as their major subject. The lectures cover the subject-matter as outlined in Sumner, *Biological Chemistry,* and Bordansky, *Introduction to Physiological Chemistry.* Laboratory experiments are taken from Hawk and Bergeim, *Practical Physiological Chemistry.* Prerequisite, Elementary Organic Chemistry.

10. Physical Chemistry. Professor Creighton.

Three hours a week throughout the year. Offered annually.

Lectures and laboratory work. The work covered in the lecture course includes the thermodynamic laws; the gaseous, liquid, and solid states of matter; physical mixtures; the theory of dilute solutions; modern theory of the structure of matter; the kinetic theory of gases; the relation between chemical structure and physical properties; chemical statics and dynamics; and thermo-chemistry. Stress is laid on the applications of thermodynamics to chemical processes. In the laboratory students make observations on the behavior of solutions, determine molecular weights by physical methods, measure velocities of reactions and familiarize themselves with the use of the refractometer, the spectroscope; and the polariscope. The following books are recommended: Getman, *Outlines of Theoretical Chemistry;* Findlay, *Practical Physical Chemistry.* Lewis, *A System of Physical Chemistry,* is used as a reference.

Two lectures and three hours per week of laboratory work. Required of students who select chemistry as their major study. Prerequisites, Courses in Qualitative Analysis and General Physics.

11. Advanced Inorganic Chemistry. Professor Creighton.

Two hours a week during the first semester. Offered annually.

A lecture course on advanced inorganic chemistry. Open to all students who have completed General Inorganic Chemistry.

12. Sub-Atomic Chemistry. Professor Creighton.

Two hours a week during the second semester. Offered alternate years.

A lecture course which deals largely with the principles of valency and molecular constitution from the standpoint of the present-day concept of the structure of the

atom. Among the topics discussed are the following: atomic theories, periodic classification of the elements, the nuclear atom and atomic number, atomic structure and periodic classification, elementary principles of valency, electro and co-valency, co-ordination, co-valency maxima, stable valence groups, and a detailed consideration of the periodic groups. Prerequisite, Course 1. Given 1930-31.

13. Electrochemistry. Professor Creighton.

Three hours a week during the first semester. Offered annually.

Lectures and laboratory work. The lecture course includes the study of electrolysis; the theory of electrolytic dissociation; conductivity of electrolytes; mobility of the ions; application of the law of mass action to electrolytic dissociation; relation between the chemical structure and the dissociation constant; homogenous equilibria; ionic product and the heat of dissociation of water; hydrolysis; theory of neutralization indicators; amphoteric electrolytes; heterogeneous equilibria; electrolytic dissociation in non-aqueous solutions; electromotive force of concentration cells; polarization and decomposition voltage; industrial electro-chemical process. The laboratory work in this course is arranged so that the student may obtain exact practical information regarding the application of electricity to chemical manufacture, and become proficent in the measurement of electrical conductivities and electromotive forces, and in making electrochemical analyses. The laboratory course also includes the testing of Faraday's laws and the measurement of transport numbers, the absolute migration velocity of ions, decomposition voltage and heat of neutralization. The following text-books are recommended: Creighton and Fink, *Principles and Applications of Electrochemistry;* Fisher, *Praktikum der Elektrochemie;* Allmand and Ellingham, *Applied Electrochemistry.* Required of all students who select Chemistry as their major subject; open as an elective to all other students who have a sufficient knowledge of chemistry and of physics to follow the course. Prerequisites, Quantitative Analysis I and Introduction to Physical Chemistry. The number of students in this course is limited to six.

14. Chemical Thermodynamics and Equilibrium. Professor Creighton.

Two hours a week during the second semester. Offered alternate years.

Prerequisite, Physical Chemistry. Given 1929-30.

15. Engineering Chemistry. Assistant Professor Foster.

Three hours a week throughout the year. Offered annually.

A course in elementary qualitative and gravimetric quantitative analysis and the study of engineering materials. It coincides with Qualitative Analysis during the first semester and with the laboratory work of Quantitative Analysis during the second semester, but meets separately for conferences or lectures during the second semester. Text-books: A. A. Noyes, *Qualitative Analysis;* Leighou, *Chemistry of Engineering Materials.* Credit, six hours for the entire year. Prerequisite, General Inorganic Chemistry.

Economics

The instruction in this department is under the direction of Associate Professor Herbert F. Fraser. Dr. Clair Wilcox is Assistant Professor, William M. Blaisdell is Instructor, and Richard W. Slocum is Instructor in Business Law. Dr. Louis N. Robinson is Lecturer in Criminology.

The courses in economics are designed to give the student a general view of the way in which the economic activity of

modern times is carried on, and are not intended to offer training in the technique of any particular occupation. It is the view of the department that its main purpose is to develop an attitude of mind which will promote intelligent citizenship. Collateral work in political science, history, and philosophy is recommended to those who intend to devote a major portion of their time to economics. Course No. 1, Introduction to Economics, is a prerequisite for a major in economics and for Social Science Honors.

The courses in economics may be classified as (A) regular courses offered by the members of the department, (B) supplementary courses offered by other instructors in co-operation with the department and (C) Honors Seminars in Economics.

A. COURSES IN ECONOMICS

1. Introduction to Economics. Associate Professor Fraser, Dr. Wilcox, and Mr. Blaisdell.

Three hours a week throughout the year. Offered annually.

This course describes the way in which goods are produced, marketed and consumed. Brief consideration is given to the principles of value and distribution. The various forms of economic activity are outlined, and the nature of the institutions and associations through which this activity takes place is explained. Incidental consideration is given to specific problems such as corporation finance, money and banking, taxation, trade unionism, the tariff, etc.

2. Financial Organization of Society. Mr. Blaisdell.

Three hours a week during the first semester. Offered annually.

A study of the development of the modern system of money, credit, and banking, and of the relation of this development to the growth of large scale production and exchange. Special attention will be given to the problems of investment banking, to the stock exchange, commercial banks, savings banks, consumptive credit institutions, and the Federal Reserve System. The quantity theory of money and the business cycle will be discussed. Some comparisons will be drawn between American and European credit and banking practice.

Prerequisite, Course No. 1.

3. Public Finance. Dr. Wilcox.

Two hours a week throughout the year. Offered annually.

The nature and purposes of public expenditures; financial administration and the budget; public borrowing; federal, state and local tax systems; the shifting of taxes and the distribution of the tax burden.

Prerequisite, Course No. 1.

4. Economic Theory.

Three hours a week throughout the year. Not offered in 1928-29.

The evolution of economic thought from the writings of the Mercantilists and the Physiocrats down to the present day. Special attention will be given to the study of the neo-classical theory of value and distribution. Required of senior majors.

Prerequisite, Course No. 1.

5. Labor Problems. Associate Professor Fraser.

Three hours a week throughout the year. Offered annually.

The course deals with a large group of problems growing out of the relations of capital to labor. After a thorough analysis of the theory of wages, the class will study labor organizations, industrial warfare, conciliation and arbitration, minimum wage, and labor legislation.

6. International Trade and Policy. Associate Professor Fraser.

Two hours a week throughout the first semester. Offered annually.

The first part of the course deals with the economic aspects of foreign trade. After an analysis of the theory of international trade the class will consider the practical problems, financing, marketing, transportation, etc. The second part of the course deals with the relation of governments to trade, and attention is directed to protective tariffs, reparations, inter-ally debts and economic imperialism.

Prerequisite, Course No. 1.

7. Social Economics. Dr. Wilcox.

Three hours a week throughout the year. Offered annually.

This course investigates the sources of waste and inefficiency in modern industry, attempts to discover the extent to which business contributes to human welfare, examines conflicting interpretations of the economic system presented by a number of contemporary writers and concludes with a critical analysis of various proposals for economic reform.

8. Business Law. Mr. Slocum.

Three hours a week throughout the year. Offered annually.

Principles of law and practical problems, primarily for the guidance of business men and women: contracts, negotiable instruments, sales of real estate and personal property, bailments, bankruptcy, decedents' estates, partnerships, corporations. Not open to students intending to enter law school.

Prerequisite, Junior standing.

B. COURSES OFFERED IN CO-OPERATION WITH THE DEPARTMENT

1. Criminology. Dr. Louis N. Robinson.

Two hours a week during the second semester. Not offered in 1929.

This course deals with the causes of crime, criminal law and procedure, penology, prison reform and the repression of crime.

Engineering. Accounting. S. W. Johnson.

Three hours a week throughout the year.

See under Department of Engineering.

Engineering. Industrial Management. Assistant Professor Jenkins.

Three hours a week throughout the year.

See under Department of Engineering.

Engineering. Engineering Economics. Professor Fuller.

Two hours a week during the second semester.

See under Department of Engineering.

A statement of the Honors Courses in the Division of Social Sciences is given on pages 54-58.

Education

The instruction in the Department of Education is under the direction of Professor W. Carson Ryan, Jr. The staff includes Professor Ryan, Assistant Professor Frances M. Burlingame, and Edith M. Everett and Dr. Arthur W. Ferguson, Lecturers.

Courses in this department are designed to meet the need of two groups of students: (1) Those who, while not intending to teach, desire, as citizens and workers in other fields, to know something of the current conditions and problems of American education; (2) those who wish to prepare for teaching.

Course No. 1, the introductory course in education, is intended to meet the needs of both groups by furnishing a general survey of the field from the social and civic point of view. Course No. 2 supplements this with a study of the scientific approach in educational psychology. The remaining courses are designed mainly for those who plan a teaching career, but they are open to students interested in education, regardless of whether they expect to teach or not. The courses are arranged to meet the requirements for the Pennsylvania Provisional College Certificate, which are representative of requirements in the more progressive States. Eighteen hours in education are required for this certificate, twelve prescribed and six elective. The twelve prescribed hours are covered by the following Swarthmore courses: Introduction (No. 1), 3 hours; Educational Psychology (No. 2), 3 hours; Laboratory Teaching (No. 17), 6 hours. The six hours of electives may be taken from any other education courses offered in Swarthmore College, including certain courses given by other departments. Students planning to teach in elementary grades are expected to take six hours in this field and to supplement the practice teaching requirement accordingly. Students in Honors Courses planning to teach should have taken Education No. 1 and No. 2 in the Freshman or Sophomore year and should plan for Education No. 17 in the Junior or Senior year with the remaining six hours to be arranged.

Placement of graduates of the College in teaching positions is carried on by the Department of Education in co-operation with the College Appointment Office, the Pennsylvania State Teacher

Bureau, and other agencies. This service is available for previous graduates of the College as well as for Seniors.

COURSES OF INSTRUCTION

1. Edueation, Introductory Course. Professor Ryan.

Three hours a week during the first semester.

This is a general course covering the field of education from the point of view of the citizen. For students intending to teach or attempting to choose a vocation, it furnishes an introduction to the career of teaching. For the student who does not intend to teach it offers a survey of current educational conditions and problems in their relation to present world situations. National, state and local provision for education; public and private schools; health education; vocational education and guidance; the junior high school; rural education; adult education; educational finance; school surveys; progressive education; religious education; international relations in education, are among the topics treated.

Chapman and Counts' *Principles of Education* is used as a basic text, but is supplemented by numerous required books and pamphets.

2. Educational Psychology. Assistant Professor Burlingame.

Three hours a week during the second semester.

This course treats of psychology in its application to education. The students are asked to read a wide variety of source material in this field. Class discussions, lectures, experiments, and demonstrations are based on this reading, which covers the general fields of intelligence, measurement, learning, individual differences, transference of training, and the psychology of the various school subjects. The practical application of theoretical psychology to the educative process is stressed throughout the course. Skinner, Gast and Skinner, *Readings in Educational Psychology,* is used as a basic text.

3. General Psychology. Dr. Burlingame.

Three hours a week during the first semester.

This course includes an elementary treatment of the various phases of psychological theory which are of the greatest use to human beings, as well as a comparative and critical survey of the major tenets of the chief schools of psychology in existence today. Gates, *Elementary Psychology,* is used as a basic text, in connection with selected readings from many sources.

4. Mental Hygiene. Assistant Professor Burlingame.

Two or three hours a week during the second semester.

An attempt is made in this course to present the best existing knowledge concerning the achievement and maintenance of mental health. The course includes a treatment of the interrelations of physical and mental health, the management of environment so as best to secure mental health, conditions facilitating the formation of good study habits, and a description of normal psychological development of boys and girls from birth to maturity. In addition to its present value to students in self-direction, it presents material which is of major importance to prospective teachers, as well as to prospective parents.

5. Elementary Education. Miss Everett.

Two hours a week during the first semester.

The principles of progressive education as demonstrated in the nursery school, the kindergarten, and the country day school. Problems of adapting these principles and methods to the limitations of the public school system.

6. Secondary Education. Miss Everett.

Two hours a week during the second semester.

The aims and organization of secondary education and the new adjustments necessary to make the best use of the junior high school. Special emphasis will be placed on the necessity for understanding adolescent personality and the influence of the teacher's attitude on its successful development.

7. History of Modern Education. Dr. Ferguson.

Two hours a week during the first semester.

The general topics include the beginnings of national education in France, Germany, England, and the United States; the American battle for free schools; new theory and subject-matter of education; current tendencies and expansions.

8. History of Education, Earlier Period. Dr. Ferguson.

Two hours a week during the second semester.

Greek and Roman education, the contribution of Christianity, education in the medieval world; the revival of learning, the reformation and education, scientific method and the schools. (Alternates with Education 10; not given in 1928-29.)

9. Educational Measurement. Assistant Professor Burlingame.

Two hours a week during the first semester.

A study of the measurement movement, including tests of intelligence and achievement in common use, together with attempts to measure in other fields—attitudes, character, will-temperament. Consideration of statistical treatment of test results is included.

10. Problems of Secondary Teaching. Dr. Ferguson.

Two hours a week during the second semester.

Rise of the American high school; aims and objectives of American secondary education; problems of organization, administration, supervision, instruction and community relationships in high school teachings.

(Alternates with Education 8; given in 1928-29.)

11. Social Work and the School. Miss Everett.

Two to four hours a week throughout the year.

This course is given in co-operation with the Department of School Counseling and Training of The White-Williams Foundation of Philadelphia. It consists of at least one half-day each week of supervised field work with the counselors in the public schools; and a fortnightly conference with the Supervisor of the Department for discussion of particular problems and interpretation of the work. The aim of the course is (1) to enable those who intend to be teachers to enter teaching with an understanding of some of the social causes of school difficulties, and some knowledge of social resources, and (2) to give those students who are interested in social work as a profession an opportunity to get a brief practical contact with one kind of social case work.

Open to students who have taken Elementary or Secondary Education or Mental Hygiene. A few others may be accepted after conference with the instructor.

12. School Administration. Professor Ryan.

Two hours a week during the second semester.

Organization and administration of education is dealt with in this course from the point of view of the citizen, school board member, or student of political affairs, as well as of the teacher and future school administrator.

13. Extra-Curricular Activities. Assistant Professor Burlingame.

Three hours a week during the first semester.

An introduction to the philosophy and psychology of play and a survey of extra-

curricular activities in elementary and secondary schools, with special reference to the junior high school. Each member of the course is expected to make a special study of one type of extracurricular activity or of some particular phase of the whole field.

14. Vocational Guidance. Professor Ryan.

Three hours a week during the second semester.

A survey of the fields of vocational education and vocational guidance. Methods and content of vocational training programs; visits to Smith-Hughes' work in public high schools; studies of occupations; counseling, placement, follow-up. (Not given in 1928-29.)

15. Special Topics in Education. Professor Ryan.

Two or three hours a week throughout the year.

An opportunity will be offered for advanced students to carry on investigation of special topics in the field of education. Some of the topics studied in recent years have been: the teaching of modern languages; English in the high schools; the teaching of social studies; rural schools; modern methods in the elementary school; kindergarten and pre-school education; legal education; the place of mathematics in education; dramatics in high school; biology and education; international relations; religious education; education in the American dependencies; athletics in school and college; the new education in Europe; the visiting teacher movement.

16. Comparative Education. Professor Ryan.

Three hours a week during the second semester.

An attempt is made in this course to survey the educational situation in the different nations of the world in respect to national and international policy, educational programs present and future, extent and scope of provision of different types of education.

17. Laboratory Teaching. Dr. Burlingame.

Three hours a week throughout the year.

Visits, intensive observation, and teaching, with one weekly conference hour. This is the Senior course for teachers. Emphasis in observation and participation in the case of each member of the course will depend upon the type of teaching which the student expects to enter. Students planning to teach elementary grades will have opportunity to observe and teach in this field, but will be required to do additional work sufficient to satisfy state requirements for elementary teaching.

Teachers' Courses in Other Departments.

Credit in education is given for certain courses in other departments, especially "Teachers' Course in Latin" (12); "History Teachers' Course" (9, 10, 11); and the English Speech Seminar. For detailed descriptions of these courses see the announcements under the appropriate department.

A statement of the Honors Course in Education is given on page 64.

ENGINEERING

The Division of Engineering includes the three Departments of Civil, Electrical, and Mechanical Engineering. The teaching staff for 1928-29 is as follows: Charles G. Thatcher, Associate

Professor of Mechanical Engineering, Chairman of Division; Lewis Fussell, Professor of Electrical Engineering; Weston E. Fuller, Professor of Civil Engineering; Howard M. Jenkins, Assistant Professor of Electrical Engineering; Andrew Simpson, Assistant Professor of Mechanical Engineering (absent on leave); Arthur J. Rawson, Instructor in Mechanical Engineering; William S. LaLonde, Jr., Instructor in Civil Engineering; S. W. Johnson, Lecturer in Accounting; George A. Bourdelais, Superintendent of Shops.

The courses in Engineering are designed to train men in the fundamental principles that underlie all branches of engineering science, and to offer such advanced courses in Civil, Electrical, and Mechanical Engineering and Industrial Management as time and equipment will permit.

The location of the College near Philadelphia and the important manufacturing centers in its vicinity enables students to visit a great variety of industrial and engineering works.

Basic Requirements for Engineering Degrees

All candidates for the engineering degree are required to pass the prescribed courses shown on pages 88 to 90, the "Course in Engineering," and to complete 136 credit hours with 120 quality points (see page 44).

The degree awarded to graduates of the Engineering Division is Bachelor of Science (B.S.). All candidates for this degree must pass 9 hours in one or more of the following subjects: History, history of religion and philosophy, economics, political science, education and fine arts, or industrial management.

Engineering students may elect but are not required to take courses in foreign languages.

Additional Requirements for General Engineering

The candidate for the B.S. in General Engineering must fulfill the above requirements, but may use his elective hours as he sees fit. He may elect but is not required to take any advanced engineering courses.

Additional Requirements for Civil, Electrical and Mechanical Engineering Degrees

The candidate for B.S. in Civil, Electrical or Mechanical Engineering must fulfill all the above requirements and in addition must pass not less than 12 hours of such advanced engineering courses as may be prescribed by the faculty of the division.

Honors Work in Engineering

A statement in regard to reading for honors in engineering appears on page 65.

COURSE IN ENGINEERING

FRESHMAN YEAR

First Semester		Hours per Week		
		Class	Lab'y	Credits
Mathematics 1	Algebra	3	—	3
Mathematics 3	Trigonometry	2	—	2
English 1	Freshman English	3	—	3
Chemistry 1	General Inorganic	2	3	3
Engineering 1	Engineering Problems	—	6	2
Engineering 2	Surveying	1	3	2
Elective		—	—	2
Physical Education		2	—	—
	Totals	13	12	17
Second Semester				
Mathematics 1	Algebra	2	—	2
Mathematics 4	Analytic Geometry	3	—	3
English 1	Freshman English	3	—	3
Chemistry 1	General Inorganic	2	3	3
Engineering 1	Engineering Problems	—	6	2
Engineering 3	Drawing and Shop Practice	—	6	2
Elective		—	—	2
Physical Education		2	—	—
	Totals	12	15	17

COURSE IN ENGINEERING

SOPHOMORE YEAR

First Semester		Hours per Week		
		Class	Lab'y	Credits
Mathematics 15	Differential Calculus	3	—	3
Chemistry 11	Engineering Chemistry	1	6	3
Physics 1	Engineering Physics	3	3	4
Engineering 4	Materials of Engineering	2	—	2
Engineering 5	Drawing and Shop Practice	—	6	2
Elective		—	—	3
Physical Education		2	—	—
	Totals	11	15	17
Second Semester				
Mathematics 12	Integral Calculus	3	—	3
Chemistry 15	Engineering Chemistry	1	6	3
Physics 2	Engineering Physics	3	3	4
Engineering 6	Elements of Electrical Engineering	2	—	2
Engineering 7	Drawing and Shop Practice	—	6	2
Elective		—	—	3
Physical Education		2	—	—
	Totals	11	15	17

COURSE IN ENGINEERING

JUNIOR YEAR

First Semester		Hours per Week		
		Class	Lab'y	Credits
Mathematics 13	Analytic Mechanics	3	—	3
Physics 2	Engineering Physics	2	—	2
Engineering 8	Mechanics Problems	—	3	1
Engineering 9	Electrical Machinery	3	—	3
Engineering 10	Electrical Machinery Laboratory	—	3	2
Engineering 11	General Design	1	6	3
Elective		—	—	3
	Totals	9	12	17
Second Semester				
Engineering 12	Mechanics of Materials	4	—	4
Engineering 13	Mechanics Problems	—	3	1
Engineering 9	Electrical Machinery	3	—	3
Engineering 10	Electrical Machinery Laboratory	—	3	2
Engineering 14	Heat Engines	2	—	2
Engineering 15	Experimental Laboratory	—	3	2
Elective		—	—	3
	Totals	9	9	17

COURSE IN ENGINEERING

SENIOR YEAR

First Semester		Hours per Week		
		Class	Lab'y	Credits
Engineering 16	Hydraulics	4	—	4
Engineering 17	Hydraulics Problems	—	3	1
Engineering 18	Accounting	3	—	3
Engineering 19	Power Plants	2	—	2
Engineering 20	Experimental Laboratory	—	3	2
Elective		—	—	5
	Totals	9	6	17
Second Semester				
Engineering 21	Engineering Economics	2	—	2
Engineering 22	Plant Design	1	6	3
Engineering 18	Accounting	3	—	3
Engineering 19	Power Plants	2	—	2
Engineering 20	Experimental Laboratory	—	3	2
Elective		—	—	5
	Totals	8	9	17

1. Engineering Problems.

Six hours a week throughout the year. Two hours credit each semester.

Problems of elementary nature designed to teach the student a scientific method of attack, theory and use of slide rule.

2. Surveying.

Four hours a week, first semester. Two hours credit.

Surveying instruments and their adjustment. Practice in chaining, leveling, triangulation, running traverse, taking topography, stadia work, preparation of profiles and maps from field notes.

3. Drawing and Shop Practice.

Six hours a week, second semester. Two hours credit.

4. Materials of Engineering.

Two hours a week, first semester. Two hours credit.

This course consists of a study of the physical properties and methods of manufacture of the various materials used in engineering construction. Several trips are made to nearby industrial plants.

5. Drawing and Shop Practice.

Six hours a week, first semester. Two hours credit.

NOTE.—Courses 3, 5, 7 introduce the student to modern shop and drawing room practice. Pattern making, foundry, forge and machine tool operations are carried on in the shop, in close relationship to the drawing room. In the three semesters each student learns the principles of the shop processes as well as the making and checking of working drawings.

6. Elements of Electrical Engineering.

Two hours lecture, second semester, Sophomore year. Two hours credit.

This is an introductory theory course for direct and alternating currents, and includes a conception and manipulation of the fundamental electrical quantities, solution of circuits, and is a foundation for the study of dynamo-electric machinery. Required of all those majoring in engineering.

7. Drawing and Shop Practice.

Six hours a week, second semester. Two hours credit.

8. Mechanics Problems.

Three hours a week, first semester. One hour credit.

Problems in motion, work and energy, friction, etc. This course is taken with the course in Analytic Mechanics and supplements it.

9. Electrical Machinery.

Three hours lecture throughout the Junior year. Three hours credit.

A comprehensive course supplementing 234 for all those majoring in Engineering. Consists of a study of the electrical and mechanical design, characteristics and applications of the more usual types of alternating and direct-current machines.

Prerequisite, Course 6.

10. Electrical Machinery Laboratory.

Three hours a week throughout the Junior year. Two hours credit.

This laboratory work consists of a series of jobs or problems of a practical nature intended to give a working knowledge of the operation and testing of electrical machinery, including direct current motors and generators, batteries and transmission, alternating current generators, motors, transformers and converters, etc.

Prerequisite, Course 6, and must accompany Course 9.

11. General Design.

Seven hours a week, first semester. Three hours credit.

Practical problems of actual plant, shop and electrical layout.

Prerequisites, Courses 3, 5, 23.

12. Mechanics of Materials.

Four hours a week, second semester. Four hours credit.

Properties of materials; their action under stress; mechanics of riveted joints; beams and plates in flexure; columns; shafts in torsion; spheres and rollers under compression; combined stresses; stresses and deflections due to sudden loads and impact; internal friction and fatigue of materials. Practical applications of the principles discussed.

Prerequisites, Courses Engineering 4, Mathematics 13, and Physics 2.

13. Mechanics Problems.

Three hours a week, second semester. One hour credit.

Computations for stresses and design of beams, columns, shafts, etc. This course is taken with and is supplementary to Course 12, Mechanics of Materials.

14. Heat Engines.

Two hours a week, second semester. Two hours credit.

Elementary thermodynamics of steam and gas engines. Properties of the working substances. The course is sufficiently complete to explain the economic and technical considerations of power generation.

Prerequisites, Courses Physics 2, Chemistry 1, and Mathematics 13.

15. Experimental Laboratory.

Three hours a week, second semester. Two hours credit.

Testing of strength of engineering materials and studies of different types of loading.

Prerequisites, Courses 4 and 12.

16. Hydraulics.

Four hours a week, first semester. Four hours credit.

Hydrostatic pressures; flow from orifices and tubes, through pipes and flumes, over weirs, in channels and rivers.

Dynamic pressures; water wheels, turbines.

Prerequisite, Course 12.

17. Hydraulics Problems.

Three hours a week, first semester. One hour credit.

Computations dealing with hydrostatics and hydrokinetics. This course is taken with and is supplementary to Course 16, Hydraulics.

18. Accounting.

Three hours a week, each semester. Three hours credit.

An introduction to the theory and practice of accounting.

19. Power Plants.

Two hours a week each semester. Two hours credit.

Theoretical and practical consideration of steam power plants.

Prerequisite, Course 14.

20. Experimental Laboratory.

Three hours a week, each semester. Two hours credit.

This course covers laboratory work, recitations and written reports. The course covers calibration of instruments, test of engines, boilers, pumps and hydraulic equipment, testing of fuels and lubricants. This course is taken at the same time as and coordinates with Course 19.

21. Engineering Economics.

Two hours a week, second semester. Two hours credit.

Contracts, specifications, valuation, rate making. Economics of construction and operation.

22. Plant Design.

Seven hours a week, second semester. Three hours credit.

Lectures, drawing-board work and computations involved in design of hydro-electric and steam power plants.

23. Drawing and Descriptive Geometry.

Four hours a week during the first semester. Two hours credit.

Elements of descriptive geometry, Isometric drawing and practical problems for the development of visualizing and imagination.

24. Structural Design.

Six hours a week, second semester. Two hours credit.

Problems in design of structures, dams, plate girders, reinforced concrete, etc.

25. Bridge Stresses.

Two hours a week, second semester. Two hours credit.

Theory of the design of steel bridges.

26. Railroads.

Four hours a week, first semester. Two hours credit.

Theory of location and construction. Field work on preliminary and final surveys. Prerequisites, Courses 2 and 30. Offered alternate years.

27. Municipal Engineering.

Two hours a week, second semester. Two hours credit.

Water supplies; design, construction and operation of waterworks; pumping filtration; modern sewage practice.

Prerequisite, Course 16. Offered alternate years.

28. Concrete.

Two hours a week, second semester. Two hours credit.

Properties of materials; methods of construction; theory of reinforced concrete design. Tests and formulas; use of diagrams and tables; design of buildings, bridges, arches, dams.

Prerequisite, Course 12. Offered alternate years.

29. Highway Engineering.

Two hours a week, second semester. Two hours credit.

Lectures and recitations. A study of present types of pavements and their economy under various conditions. Offered alternate years.

30. The Annual Survey.

One week during the summer following either the Freshman or Sophomore year. One hour credit.

One week of continuous work in surveying and mapping, including the running of levels and of a topographical survey by the stadia method. Required for all engineering students.

31. Plane Table Surveying.

Three hours a week, second semester. One hour credit.

Practice in mapping and taking topography by plane table methods.

32. Electrodynamics.

Two hours a week, second semester. Two hours credit.

This course is a study in considerable detail of the properties of electric circuits of different types. Sequences and effects which follow from given initial conditions are predicted by applying fundamental laws.

33. Illumination.

One hour lecture and three hours laboratory a week for the first semester. Two hours credit.

The theory of light distribution, together with a study of illuminants. Design of lighting systems for particular installations.

34. Alternating Current Theory.

Three hours a week, first semester, Senior year. Three hours credit.

The theory of alternating currents, with especial references to generators, motors, and transformers.

Prerequisite, Course 9.

35. Alternating Current Laboratory.

Three hours a week, first semester, Senior year. One hour credit.

A laboratory course consisting of the testing of instruments, generators, motors, transformers, etc.

Prerequisite, Course 10, and must accompany Course 34.

36. Central Stations.

Two hours a week for the first semester. Two hours credit.

A study of the electrical design, installation, equipment and economic operation of central stations.

Prerequisites, Courses 6 and 9.

37. Electric Railways.

Two hours a week for the second semester. Two hours credit.

A study of the equipment and operation of trolley lines and the electrification of steam roads.

Prerequisites, Courses 34 and 35.

38. Conference and Seminar.

One hour a week for the second semester. One hour credit.

This period will be devoted to the presentation and discussion of papers of research or investigation, and will in many instances be devoted to inspection trips or other methods of information assimilation from outside sources.

39. Electric Transmission.

Two hours a week during the second semester. Two hours credit.

Theory and practical considerations of transmission of electric energy.

40. Communication.

Two hours a week during the second semester. Two hours credit.

This course covers laboratory work, recitations, written reports and problems dealing with modern electric methods of communications. It includes a comprehensive study of systems and apparatus for telegraph and radio, and a more detailed investigation of the principles, apparatus, systems and economics of telephonic communication.

Prerequisites, Course 6 and one semester of 9.

41. Electrical Transients.

One hour lecture, second semester, three hours laboratory. Two hours credit.

A lecture and laboratory course in elemental transient phenomena and the application of their principles to commercial quantitative problems. It is based on laboratory work with actual circuits and electrical conditions, utilizing an oscilligraph for the permanent record.

Prerequisites, Courses 9 and 34.

42. Special Electrical Laboratory.

Hours as arranged.

The above number and title cover such courses in the Department of Electrical Engineering for which an individual demand may arise. These special courses are open to students majoring in Electrical Engineering who are properly qualified in the judgment of the instructor. The number of hours of actual work, the number of hours or credit and the time are arranged with each student personally. The student should become familiar with as much of the literature on the subject on which he is working as possible, and may or may not be required to submit a thesis.

43. Advanced Shop.

Six hours a week, first semester. Two hours credit.

Acetylene welding. Soldering. Pipe fitting. Short-cut shop methods.

44. Fuels and Combustion.

Four hours a week, second semester. Two hours credit.

Study of solid, gaseous and liquid fuels. Carbonization of coal. Studies in combustion.

Prerequisite, Course Chemistry 2 or 15.

45. Internal Combustion Engines.

Five hours a week, first semester. Three hours credit.

A study of the thermodynamic theory and mechanical design and construction of modern Diesel and automotive engines.

46. Aerodynamics.

Five hours a week, second semester. Three hours credit.

An introductory study of aerodynamic theory and experimental methods.

47. Industrial Management.

Three hours a week throughout the year. Three hours credit.

A survey study of the organization and administration of industrial activities, including also the history and growth of manufacturing, modern industrial characteristics, production control methods, standards, and employee relations.

48. Factory Management.

One hour lecture, one three-hour period, second semester. Two hours credit.

This includes manufacturing methods with particular reference to: choice of machines, methods and materials, production planning and control, factory layouts, costs and job studies. The facilities of the engineering shops will be available for this course.

Engineering Equipment

The equipment for surveying is complete and up to date, including compasses, transits, solar attachments, dumpy and wye levels.

The equipment for experimental work in the materials testing laboratory includes the following main units:

100,000 lbs. Olsen Tension Machine; 15,000 lbs. Olsen Tension Machine; 50,000 in. lb. Olsen Torsion Machine; Upton-Lewis Fatigue Testing Machine; Fairbanks Cement Testing Machine; Shore Scleroscope; Brinnell Hardness Testing Machine; Stewart Heat Treatment Furnace.

There is also a complete set of accurate instruments for measuring sizes and deformation of test pieces.

The hydraulic laboratory contains:

Worthington, Nash and d'Olier Centrifugal Pumps varying in capacity from 125 to 900 gallons per minute. One of the pumps is driven by an electric dynamometer and another through a torsion dynamometer. There

is also a Gould Triplex Pump. A variety of weirs, nozzles, venturi tubes and water meters is available for testing these pumps and for other hydraulic measurements. Two small modern, commercial, hydraulic turbines, both impulse and reaction, are arranged for complete tests.

In the steam engine laboratory there are:

Three engines: Corliss, Tandem Compound and Simple Slide Valve, all of which are connected for testing. Two steam turbines: one, a G. E. Curtis single-stage, and the other a two-stage, especially designed for laboratory use. For the testing of these engines and turbines there are Republic, Brown and Bailey Flow Meters, a Wheeler Surface Condenser and a Schutte Koerting Jet Condenser. This laboratory has also a very complete selection of gauges, indicators, injectors, steam traps, etc.

The internal combustion engine laboratory contains:

Several modern engines, including Liberty, Wright, Packard and Lawrence Aeroplane and Dirigible Engines. A Union Aeroplane Engine and an Essex six-cylinder Automobile Engine are connected to a Sprague Electric Dynamometer. Somewhat older engines are: Twin-cylinder Vertical Bruce Macbeth Gas Engine; two Otto Gas Engines; Quincy Gasoline Engine, Mietz and Weiss Solid Injection Oil Engine. A complete set of testing instruments, including a Bureau of Standards Balanced Diaphragm Indicator, is available.

Particular attention is paid to the testing of fuels and lubricants. The following apparatus is used for the purpose:

Junker Gas Calorimeter; Parr Coal Calorimeter; Thurston and Saybolt Viscometers; Thurston Friction Testing Machine; several Orsat Flue Gas Analyzers; Electric Furnaces and Chemical Balances for Coal and Ash Analysis.

For the study of refrigeration the laboratory contains two refrigeration machines. Close by, on the campus, a four-ton York Ice Plant is in daily operation.

Not only laboratory apparatus, but all the college mechanical equipment as well, is used for test. In the college heating plant there are:

A modern stoker fired Babcock and Wilcox Boiler completely arranged for testing, with coal scales, water and steam flow meters, draft gauges and automatic combustion control apparatus; Permutit Water Softener; two 75 K.W. and one 50 K.W. Harrisburg Engine Generators, and three Return Tubular Boilers.

The college water works contains:

Roberts and Continental Jewel Gravity Filters; a Wallace and Tiernan Chlorinator and a two-stage De Laval Pump, as well as complete apparatus for water analysis, control and testing.

Students have free access to this equipment at all times. The privilege of operating this equipment is available on request.

The Electrical Engineering Laboratory occupies the major portion of the second floor of Hicks Hall, and contains equipment for performing experimental work both in alternating and direct currents.

At the western end is a sub-station, for the conversion of alternating current to direct, which supplies the needs of the nearby buildings and furnishes an example of modern practice. There is available 100 K.W. of direct current and 60 K.W. of alternating at a large number of different voltages. The motors, generators, transformers, etc., are set on low platforms, so arranged as to make easy the connection of apparatus for use. Each table has wires, which run through floor ducts to a plug-type switchboard, where the individual circuits may readily be connected in series, in parallel or to power.

The following are available for test:

One motor generator set, 50 K.W., 125 volt D.C., from 220 volt, 3-phase, 60-cycle; 2 motor generator sets, 25 K.W., 125 volt D.C., from 220 volt, 3-phase, 60-cycle A.C.; one motor generator set, 2.5 K.W., 10 volts D.C., from 125 volts D.C.; one motor generator set, 7.5 K.W., 110 volts A.C., 1, 2, or 3-phase, 20 to 70 cycles from 125 volts D.C.; two rotary converters, synchronous, 7.5 K.W., 125 volts D.C., from A.C., 1, 2, or 3-phase, 60 cycles; one Rotary Converter, synchronous, 5 K.W., 125 volts D.C., from 2-phase, 60-cycle; one double current generator, 10 K.W., A.C. or D.C.; one sine wave set composed of 7.5 H.P., D.C. motor and 2 alternating current generators, 2 or 5 K.W. rotable stators; one motor generator set, 1 K.W., A.C. or D.C., A.C. frequency 170 to 250.

INDUCTION MOTORS

One 25 H.P., 220 volt, 3-phase, 60-cycle, variable speed; one 5 H.P., 110 volt, 3-phase, 60-cycle, variable speed; one 5 H.P., 110 volt, 3-phase, 60-cycle, constant speed; one 2 H.P., 110 volt, single phase, 60 cycle, constant speed; one 2 H.P., 110 volt, 3-phase, 60-cycle, constant speed; one 5 H.P., double squirrel cage, 2 voltage, 3-phase, 60-cycle; one 3 H.P., repulsion start, single phase, 60-cycle; one induction Potential Regulator

110 volts input, 20 to 200 volts output; one Synchronous Generator, 25 H.P., 220 volt, 3-phase, 60-cycle; Induction Potential Regulator 2200 volts, 60-cycle, giving 2020 or 2380 volts output. Synchronous motor, 25 H.P., 220 volt, 3-phase, 60-cycle.

TRANSFORMERS

Three 25 KVA, 2200 volts to 220 volts; three 20 KVA, 2200 volts to 220-110-77 volts; one 15 KVA, 220 volts to 220-110 volts; two 5 KVA, 2200 volts to 220-110 volts; three 7.5 KVA, 2200 volts to 220-110 volts; two 8 KVA, 110 volts, 2-phase to 110 volts, 3-phase, Scott; two 4 KVA, 110 volts, 2-phase to 110 volts, 3-phase, Scott; one 2 KVA, 110 volts to 40,000 volts; one 3 KVA, street lighting, 6.6 amp.; six 5 KVA, 2200 to 110-220 volts; one saturated iron core reactor regulator; one 3 KVA, street lighting, 6.6 amp.

DIRECT CURRENT GENERATORS

One 10 K.W., 125 volts compound; one 5 K.W., 125 volts compound; one 18 K.W., 125 volts compound, with interpoles; one 4 K.W., 125 volts compound.

DIRECT CURRENT MOTORS

One 7.5 H.P., 125 volts compound; one 3 H.P., 125 volts series; one 1 H.P., 110 volts interpole; one 3 H.P., series wound, 125 volts.

VARIABLE SPEED D.C. MOTORS

One 2 H.P., 110 volt, 525-2625 rpm, Lincoln type; one 30 H.P., 220 volt, 950 rpm, shunt wound.

FLOODLIGHTING EQUIPMENT

Three 500 watt, outdoor floodlights; twelve 1000 watt, modern outdoor floodlights.

The equipment includes high-grade ammeters, voltmeters and wattmeters which make it possible to read closely any current from .001 to 1,500 amperes and any pressure from .001 to 3,000 volts. A vibrating reed frequency meter, a synchroscope, a contactor for wave form, a power factor meter, recording and integrating meters are available. A General Electric oscillograph is used to show wave shape and phase relations.

Condensers, inductances, lamps of many types, and the necessary lamp banks, water barrels, rheostats and starting boxes are provided. The department owns and operates a complete radio station, with experimental and amateur licenses known as 3YJ and 3AJ.

For the work in illumination there are a Bunsen photometer of semi-portable type, a three-meter Queen photometer with Lummer-Brodhun screen, revolving head, etc., and two portable illuminometers. Many types of lamps and types of glassware are at hand, and a study is made of the various types of lighting around the College to determine where each would be best applied for interior or outdoor work.

SHOP WORK

All engineering students are required to obtain experience in shop work. Students who so desire may do a portion or all of the required work outside of the College. Such work shall be of a nature to be approved by the faculty of the Engineering Division, and shall be general enough to be equivalent to the work required in the College shops. Students desiring to substitute shop work in factories shall submit their plan to the faculty for approval prior to doing the work, and shall obtain from a responsible official of the company, in whose factory they have been employed, a certificate of satisfactory work done in such detail as may be required by the faculty. The amount of time devoted to shop work in the factory shall be at least twice that required in the College shop, and a greater amount of time may be required unless the work is well divided among different branches of shop practice. If the work done outside the College is deemed sufficiently complete to be a satisfactory substitute for a part but not for all of the College course, then the student will be required to take only that portion of the work in College in which his outside experience is considered deficient.

The work in the College shop will be conducted during the College year and also during a period of two weeks immediately preceding or following the College year. The required work will be equivalent to a period of four weeks of forty-four hours per week.

The machine shop occupies a large portion of the second floor of Beardsley Hall. A large tool room is centrally located and is in charge of an assistant who supplies individual tools on a check system, as is done in commercial shops.

The machine shop contains an assortment of tools including

screw-cutting engine lathes; speed lathes, simple and back-geared; planers; universal milling machines; shaper; twist-drill grinder; vertical drill presses; lathe-center grinder; surface plates; cutter and surface grinder; automatic and plain turret lathes; power saw; acetylene welding outfit; standard gauges and a complete equipment of small tools.

The woodworking shop extends through the entire length of the third floor of Beardsley Hall. All the woodworking machinery is of the latest design, and each unit has a direct motor drive and is equipped with approved safety devices. The equipment includes the following machines:

36-inch Oliver Single Surfaces; 38-inch Oliver Band Saw; Oliver Universal Wood Trimmer; Colburn Universal Circular Saw; Mummert, Wolf and Dixon Oil Tool Grinder; 6-inch Bench type Oliver Hand Jointer; Post Drill Press and Boring Machine; 24-inch Oliver Wood Turning Lathe; eight 12-inch Oliver Motor Head Wood Turning Lathes.

The tool room is equipped with all small tools and necessary stock for a complete course in elementary pattern making and woodworking.

The forge shop, on the ground floor of the building, consists of ten fires and one additional master fire. The forges are operated on the down-draft principle, and were made by the Buffalo Forge Company.

The foundry is also located on the first floor, and has a gas-heated cupola or furnace for melting metals in crucibles. The additional equipment consists of moulding benches, flasks and other accessory apparatus.

FEES

A fee of $10 for each semester is charged for each course in surveying, mechanical laboratory, electrical laboratory or illumination, and a fee of $5 per credit hour for shop work, and proportionate charge for shorter periods of required work.

TRIPS

Trips taken by groups of students to nearby plants and factories constitute a valuable feature of the engineering course. Some of the plants frequently visited are:

Bethlehem Steel Company
Victor Talking Machine Company
Philadelphia Electric Company
Naval Aircraft Factory
Conowingo Hydro-Power Development
Atlantic Steel Company
Delaware River Steel Company
Sun Shipbuilding Company
Westinghouse Electric and Manufacturing Company
Aberdeen Proving Grounds

A whole-hearted spirit of co-operation between the industries and the College has been found at all points of contact.

English

The instruction in this department is under the direction of Professor Harold C. Goddard. Professor Everett L. Hunt has charge of the work in Public Speaking. The instructing staff includes Dr. Goddard, Professor Hunt, Associate Professor Philip M. Hicks, Assistant Professor Robert E. Spiller, Assistant Professor Alan Valentine, Charlotte R. D. Young, Lecturer; Dorothy F. Troy, Instructor; Franklin B. Folsom, Part-time Instructor, and Dean Raymond Walters.

The purpose of the work in English is to encourage the writing of clear, forceful, idiomatic English, and to arouse and foster love of good literature. A special effort is made to keep in view, at all times, the application of the works studied to the life and problems of the present day.

Of the courses listed below, Freshman English, six hours, is required of all students except those exempted in the placement examinations, who may substitute for it an equal number of hours of elective work in English. In addition to this at least four hours in English, other literatures, or Fine Arts, must be presented by all students for graduation. Course 4, Survey of English Literature, is required of all English majors for graduation and is prerequisite to Honors work in English. Exemption from this requirement will be allowed by an examination given at the close of each year and covering the entire field of the

course. Reading lists for this purpose will be supplied upon request.

1. Freshman English. Dean Walters, Associate Professor Hicks, Mr. Folsom, Mr. Klees, Miss Troy, and Miss Young.

Three hours a week throughout the year. Offered annually.

A general introduction to literature and composition.

2. Practice Course in Writing. Miss Troy.

Two hours a week throughout the year. Offered annually.

A course in creative writing without specific assignments, except occasionally in individual cases. The work is conducted through reading of original work, conference, criticism and self-assignment. Open to those who have completed or been exempted from Course I and who are not taking any other writing courses at the same time, but primarily intended for those who look upon writing at least as an avocation. Enrollment must be accompanied by some writing done within the preceding six months. The class is divided into two sections, the more advanced of which is conducted as a weekly seminar.

3. Narrative Writing. Miss Young.

Two hours a week throughout the year. Offered annually.

The chief emphasis of this course is on the short story; the analysis of its structure and practice in writing it.

4. Survey of English Literature. Associate Professor Hicks, Assistant Professor Valentine, and Miss Young.

Three hours a week throughout the year. Offered annually.

A review of the history of English thought and literature from Anglo-Saxon times to the present. Required of English majors and prerequisite to Honors work in English; elective for all others.

6. Chaucer. Professor Goddard.

Two hours a week during the second semester. Not offered in 1928-29.

A study of a number of the *Canterbury Tales,* several of the Minor Poems, and the *Troilus and Criseyde.*

7. The English Drama.

Three hours a week throughout the year. Not offered in 1928-29.

Course 7 deals with a selected period or aspect of the English drama.

Course 7 must be continued throughout the year.

8. Shakespeare. Miss Young.

Three hours a week throughout the year. Offered annually.

A critical study of several selected plays of Shakespeare and more rapid reading of the rest of his works.

Course 8 must be continued throughout the year.

9. The English Novel. Associate Professor Hicks.

Three hours a week throughout the year. Offered annually.

A study of the development of the English novel from its beginnings to the present day.

10. Poetry. Professor Goddard and Miss Troy.

Two hours a week throughout the year. Offered annually.

The work of this course is devoted to a selected period or aspect of English poetry.

In 1928-29 two courses in Poetry are offered: 10 (a), An Introduction to Poetry, by Professor Goddard; 10 (b), Nineteenth Century Poetry, by Miss Troy.

11. English Prose. Professor Goddard and Mr. Klees.

Three hours a week throughout the year. Offered annually.

The purpose of Course 11 is to present the development of English thought and of the religious, social, and political ideas of the English people, as embodied in the prose literature of a selected period. In 1928-29 two courses in English Prose are offered: 11 (a), Social Ideals in Contemporary Prose, by Professor Goddard, and 11 (b), Eighteenth Century Prose, by Mr. Klees.

Course 11 must be continued throughout the year.

12. American Literature. Mr. Klees.

Three hours a week throughout the year. Offered annually.

A study of American writers from the Revolutionary period to the present time, with emphasis on the literary expression of American ideals.

14. Special Topics. Professor Goddard.

Two hours a week throughout the year. Offered in 1928-29.

The purpose of Course 14 is to cover periods and topics not fully treated in the other courses of the department, and to offer, also, opportunity for the detailed study of selected authors.

Course 14 is intended primarily for Seniors majoring in English; it is open to others only by special permission.

15 (*a*). Public Speaking. Professor Hunt.

Three hours a week throughout the year. Offered annually.

A course intended to develop knowledge of and proficiency in effective public speaking. Assigned readings in the field of public discussion, analysis of persuasive speeches, and constant practice in speaking before the class.

15 (*b*). Interpretative Reading. Professor Hunt.

Three hours a week throughout the year. Offered annually.

Oral interpretation of prose and poetry, with special attention to the Bible and Shakespeare. Course 15 (*b*) should be taken by students who expect to elect Course 16 (b), The One-Act Play.

16 (*a*). Play Production. Associate Professor Hicks.

Three hours a week throughout the year. Offered in 1929-30.

This course aims to familiarize students with the problems of dramatic production through the presentation of several public performances during the year. The development of English drama is studied through representative plays of various periods.

16 (*b*). The One-Act Play. Associate Professor Hicks.

Three hours a week throughout the year. Offered in 1928-29.

The aim of this course is similar to that of 16 (a), with which it alternates; the material differs in being drawn from modern drama. The course includes a study of the Little Theater movement and of the One-Act Play as a literary form.

17. Extempore Speaking. Professor Hunt and Mr. Folsom.

One hour a week throughout the year. Offered annually.

A course designed to help students to think clearly and speak effectively before an audience. Speeches before the class each week.

18. Debating. Professor Hunt.

Two hours a week throughout the year. Offered annually.

A study of brief-drawing, rules of evidence, types of argument, detection of fallacies, and dialectical method in connection with the public discussion of persistent social, economic, and political questions.

20. Seminar in Speech and Dramatic Training. Associate Professor Hicks.

This course provides opportunity for advanced study under individual instruction to students who have completed scheduled courses in either field. From one to three hours' credit may be given, depending upon the work assigned.

A statement of the Honors Course in the Division of English is given on page 51.

Dante. Professor A. M. Brooks.

Three hours a week throughout the year.

Study of the Divine Comedy as a work of consummate literature. Special attention is given to the life and art of the century that produced it.

Greek 11. Greek Drama in English. Professor Shero.

Three hours a week during the second semester. Offered in 1929-30.

In addition to the study of the Greek plays themselves, the influence of Greek drama on later Literature will be studied. No knowledge of Greek is required.

Latin 14. Roman Drama in English. Professor Brewster.

Three hours a week during the second semester. Offered in 1930-31.

In addition to the study of Latin plays themselves, the interrelation of Greek and Roman Drama will be studied, and the influence of Roman Drama on later Literature. No knowledge of Latin is required.

Fine Arts

PROFESSOR ALFRED M. BROOKS AND MISS STILZ

The purpose of the courses in the Fine Arts is critical and appreciative rather than practical. The work consists of illustrated lectures on the plastic and graphic arts: architecture, sculpture, painting, and the allied arts, together with collateral reading and first-hand examination of objects of art. The principles of art and their application in masterpieces are studied not only with reference to the intrinsic value of the masterpieces but with a view of developing good taste, for it is by knowledge and memory of fine things only that power can be acquired to fix standards by which to form such taste.

1. *Graphic Arts.* Study of drawing as the foundation of all the pictorial arts, together with special consideration of painting,

engraving and etching. Three hours a week throughout the year. Not open to Freshmen.

2. *Art Survey.* A general course on the significance and history of Art, covering architecture, sculpture painting and the allied arts. Three hours a week throughout the year.

3. *Greek and Roman Architecture.* Study of classic architecture. Three hours a week, first semester.

4. *Mediæval and Renaissance Architecture.* Study of the influence of and changes wrought on classic architecture throughout the middle ages and Renaissance down to the present time. Three hours a week, second semester.

5. *Dante.* Study of the Divine Comedy as a work of consummate literature. Special attention is given to the life and art of the Italian thirteenth century that produced it. Three hours a week throughout the year.

6. *Interior Decoration.* Principles of color and design as applied to the planning and furnishing of houses. Three hours a week.

German Language and Literature

The instruction in this department is under the direction of Professor Clara Price Newport. Lydia Baer is Instructor.

The elementary courses of study in this department aim to give students a reading knowledge of German, so that it may be used as a tool in reading books and periodicals in history, science, philosophy or literature. The ability to speak and write the language is here used as a method of attaining greater accuracy. The more advanced courses are intended to add knowledge and appreciation of literature and the power to speak and to write German.

In the classroom, translation into English is discontinued as soon as possible and expressive reading of the German text is substituted, and German is made the classroom language as nearly as possible. The idiomatic sentence and modern colloquial language form the basis of the work in composition. Reading and translation at sight are cultivated.

Other texts may at times be substituted for some of those indicated.

The first semester's work in Courses 1, 2, 3 and 5 will not be accepted toward a degree unless followed by the work of the second semester.

Students who desire it are given an opportunity to carry on, under direction, correspondence with students in Germany.

Facilities in Philadelphia and vicinity of especial value to work in the department of German are as follows: the general and special libraries of Swarthmore College, University of Pennsylvania, Haverford, Bryn Mawr, Drexel Institute, Philadelphia Public Library; Germanic collections of the museums in Memorial Hall, Drexel Institute, University of Pennsylvania Museum; services in German at several churches; several daily and weekly newspapers; lectures at the German Society.

1. Elementary German. Professor Newport and Miss Baer.

Three hours a week throughout the year. Offered annually.

Hagboldt and Kaufmann, *Grammar and Inductive Readings;* Storm, *Immensee;* Baumbach, *Der Schwiegersohn.* Persistent training in composition, conversation, and expressive reading.

2. Advanced German. Professor Newport and Miss Baer.

Three hours a week throughout the year. Offered annually.

Review of grammar, practice in composition, conversation, and expressive reading, and, principally, reading of some recent short stories, of a representative modern play, of lyrics and ballads, and other suitable material.

Prerequisite, Course 1 or equivalent.

3. Lessing—Schiller. Professor Newport.

Three hours a week throughout the year. Offered annually.

A survey of the lives and works of these authors with special attention to Lessing's *Minna von Barnhelm, Emilia Galotti,* and *Nathan der Weise, Laokoon,* and to Schiller's ballads and poems, selected prose writings, and five of the dramas.

Prerequisite, Course 2 or equivalent.

4. Goethe. Professor Newport.

Three hours a week throughout the year. Offered in 1929-30.

Goethe's *Werke, Goldene Klassiker-Bibliothek.* A careful study of Goethe's life and works. Conducted in German.

Prerequisite, Course 3 or equivalent.

5. Scientific German. Miss Baer.

Three hours a week throughout the year. Offered annually.

Wallentin, *Grundzüge der Naturlehre,* and independent reading adapted to individual needs. For students majoring in pure and applied science. This course prepares the student to read the new material along scientific lines which is continually coming out in German books and periodicals.

Prerequisite, Course 2 or equivalent.

6. Recent German Literature. Professor Newport.

Three hours a week, second semester. Offered in 1930-31.

A rapid reading course in important modern authors.

Only open to students who have taken Course 4.

7. German Conversation and Composition. Professor Newport.

Two hours a week throughout the year. Offered in 1930-31.

Constant practice in the use of idiomatic German both orally and in writing.

Prerequisite, Course 2 or equivalent.

8. The German Drama in the Nineteenth Century. Professor Newport.

Three hours a week, first semester. Offered in 1930-31.

The development of the drama in Germany since the plays of Goethe and Schiller, with special attention to Kleist, Grillparzer, Hebbel, Ludwig, Anzengruber, Hauptmann, Sudermann, Hoffmansthal, Wedekind and Schnitzler.

Prerequisite, fluency in reading and speaking German.

9. Outline Course in German Literature. Professor Newport.

Three hours a week, second semester. Offered in 1929-30.

A survey of the literature of Germany from the earliest times, with copious readings from the most important authors.

Prerequisite, Course 4 or equivalent.

A statement of the Honors Course in the Division of German is given on page 62.

Greek and Latin

The instruction in this department is under the direction of Professor Ethel Hampson Brewster. Dr. L. R. Shero is Professor of Greek. Fine Arts Course No. 3 is conducted by Professor Alfred Mansfield Brooks.

The aim of the department is primarily to create an appreciation of the masterpieces of Greek and Latin literature and to trace their influence upon modern thought and letters; attention is given to the political institutions of both Greece and Rome and their survival in present times, to philosophy and religion, to private and social life, and to art and architecture as exemplified by existing remains in sculpture and painting and in private and public buildings. Use is made of illustrative material belonging to the College.

Students who enter College with three or four years of Latin will elect Course No. 2; those who enter with two or three years of Greek will elect Course No. 3.

A Teachers' Course in Latin (12) is offered for Seniors and Juniors who expect to take positions as teachers of Latin in pub-

lic and preparatory schools. Those who elect this course must before the end of the Senior year have pursued at least Courses Nos. 2, 3, 4, 5 and 10; the directors of the department will recommend as teachers of Latin only those who have completed these courses satisfactorily, or, in the case of Honors students, those who have completed satisfactorily Courses Nos. 2, 3 and 10. Students majoring in Latin are required to take Courses 1 and 2 in Greek.

GREEK

1. Elementary Greek: Grammar, selected readings, collateral study of the Greek character and genius. Professor Shero.

Three hours a week throughout the year. Offered annually.

Courses 1 and 2 are provided for those who have not had an opportunity of studying Greek in the preparatory school. No credit is allowed unless the language begun in college is pursued for two years. Full credit for the two years is given upon the completion of Course 2.

2. Intermediate Greek: Readings from Greek masterpieces (prose authors, Homer, Euripides.) Professor Brewster.

Three hours a week throughout the year. Offered annually.

3. Homer: Rapid reading of several books of the *Iliad* and the *Odyssey*, with study of the two epics in their entirety. Professor Shero.

Two hours a week during the first semester. Offered annually.

4. Lysias and Demosthenes: Selected speeches. Professor Shero.

Two hours a week during the second semester. Offered annually.

5. Plato: Selected dialogues. Professor Shero.

Two hours a week during the first semester. Offered as required.

6. Æschylus and Sophocles: Selected plays. Professor Shero.

Two hours a week during the second semester. Offered as required.

7. Historical Prose: Selected books of Herodotus and Thucydides. Professor Shero.

Two hours a week during the first semester. Offered as required.

8. Greek Language and Prose Composition. Professor Shero.

Two hours a week throughout the year. Offered as required.

9. New Testament Greek: *The Acts of the Apostles* and the *Epistle to the Galatians.* Professor Shero.

Two hours a week during the first semester. Offered as required.

10. The History of Greece. Professor Shero.

Three hours a week during the first semester. Offered in 1929-30.

A study of Greek civilization in its most significant aspects to the time of the Hellenistic Kingdoms, preceded by a brief survey of the Oriental civilizations by which the Greeks were influenced. Special attention will be given to the 6th and 5th centuries B.C.

11. Greek Drama in English. Professor Shero.

Three hours a week during the second semester. Offered in 1929-30.

This course is supplementary to Course 10 (The History of Greece) and will be offered in the same years as that course. In addition to the study of the Greek plays themselves, the influence of Greek drama on later literatures will be studied. No knowledge of Greek is required.

Fine Arts. 3. Greek and Roman Architecture. Professor A. M. Brooks.

Three hours a week during the first semester. Offered as required.

LATIN

1. Sub-Freshman Latin.

Three hours a week throughout the year. Offered as required.

This course is arranged for those who are not prepared to take the regular Freshman elective. It includes a study of grammar and selective readings from Cæsar, Cicero, Virgil, Ovid and other authors. No credit unless the language begun in college is pursued for two years.

2. Livy, Selections. Professor Brewster.

Three hours a week during the first semester. Offered annually.

See note under Course 3.

3. Horace, *Odes* and *Epodes*. Professor Brewster.

Three hours a week during the second semester. Offered annually.

Courses 2 and 3 form the regular Freshman elective.

4. Letters of Cicero and Pliny. Professor Shero.

Three hours a week during the first semester. Offered annually.

See note under Course 5.

5. Catullus and Virgil, *Eclogues* and *Georgics*. Professor Shero.

Three hours a week during the second semester. Offered annually.

Courses 4 and 5 form the regular Sophomore elective.

6. Tacitus, *Agricola* and *Germania*. Professor Brewster.

Two hours a week during the first semester. Not offered in 1929-30.

7. Roman Satire. Professor Brewster.

Two hours a week during the second semester. Offered in 1928-29.

8. Plautus, Terence, and Martial. Professor Brewster.

Two hours a week during the first semester. Offered in 1928-29.

9. Lucretius, *De Rerum Natura*. Professor Brewster.

Two hours a week during the second semester. Not offered in 1929-30.

10. Latin Language and Prose Composition. Professor Shero.

Two hours a week throughout the year. Offered in 1928-29.

This course includes a review of forms and syntax, the translation of Latin at sight, and practice in reading and writing Latin.

11. Latin Sight Reading. Professor Brewster.

Two hours a week throughout the year. One hour credit. Offered as required.

The work of this course is almost exclusively confined to the classroom and requires

no outside preparation except for an occasional report upon the life and works of the author studied. Selections from a variety of prose and verse writers will be read.

12. Teachers' Course. Professor Brewster.

Two hours a week throughout the year. Offered in 1929-30.

Lectures and reports upon Cæsar, Cicero, Virgil, and other Latin authors commonly read in the preparatory schools. For admission to the course see the introductory announcement on pages 107-108.

13. The History of Rome. Professor Brewster.

Three hours a week during the first semester. Offered in 1930-31.

The history of Rome from the earliest times to the beginning of the Barbaric invasions. The course stresses the Roman genius for organization and administration.

14. Roman Drama in English. Professor Brewster.

Three hours a week during the second semester. Offered in 1930-31.

This course is supplementary to Course 13 (The History of Rome) and will be offered in the same years as that course. In addition to the study of Latin plays themselves, the interrelation of Greek and Roman Drama will be studied, and the influence of Roman Drama on later literature. No knowledge of Latin is required.

A statement of the Honors Course in the Division of the Classics is given on page 62.

History and International Relations

The instruction in this department is under the direction of Professor William I. Hull. The staff includes Professor Hull, Associate Professor Frederick J. Manning, Assistant Professor Mary Albertson and Assistant Professor Troyer S. Anderson.

Requirements for students who major in history do not turn on any particular total of credit-hours, but rather upon the completion of such courses in history, together with related courses in the social sciences, literature, philosophy, the fine arts, etc., as, in the opinion of the department will facilitate the most intelligent, well-rounded, and worth-while preparation for the Comprehensive Examinations in history. A reading knowledge of French and some acquaintance with the principles of economic theory are essential for an intelligent appreciation of history. Most graduate schools require a reading knowledge of French, German, and Latin for a graduate degree in history.

The Comprehensive Examination for major students at the end of their Senior year include questions on the following topics: (1) European History (2) British History (3) The History of the United States (4) The Origins of Civilization and Ancient

History. Major students are expected to answer general questions in each of these fields, and more specific questions in at least two of the fields. They should know something of the principles of historical method, bibliography, and the development of historical thinking and writing. A seminar is offered in Senior year in which these last topics are considered, in connection with special individual work in the source-materials for some one historical problem.

The survey-course in European History, the only course open to Freshmen (except by special permission from the department) is a prerequisite for any of the other courses in European or English History, and for any Honors seminars in history.

1. The History of Europe; A General Survey. Assistant Professor Albertson, Assistant Professor Anderson, Associate Professor Manning.

Three hours a week throughout the year. Offered annually.

A general survey of the origins and development of European civilization and institutions from the decline of the Roman Empire to the present day. Given in as small sections as possible. Especially designed for Freshmen; a prerequisite to the other courses in European or English history and to any Honors work in history.

2. The History of Great Britain. Assistant Professor Albertson and Associate Professor Manning.

Three hours a week for one semester. Offered annually.

Lectures, prescribed reading, and special reports on the political, economic, intellectual and constitutional history of Great Britain. After History 1. A prerequisite for students who take two Honors seminars in British History.

3. The History of the United States up to the Civil War. Associate Professor Manning.

Two hours a week for one semester. Offered in 1929-30.

Lectures on the colonial period, the Revolution, the formation of the Constitution, the Jacksonian period, and the emergence of the problems leading to the Civil War. Special reading to count for three hours credit. Not open to Freshmen.

4. The History of the United States from the Slavery Controversy to the Present Time. Assistant Professor Anderson.

Two hours a week for one semester. Offered in 1928-29.

The Civil War and the Reconstruction period, followed by a study of the industrial transformation of the United States since the Civil War and its effects on American social, political, constitutional, diplomatic history. Not open to Freshmen. Special reading for three hours credit.

Greek 10. The History of Greece. Professor Shero.

Three hours a week during the first semester. Offered in 1929-30.

A study of Greek civilization in its most significant aspects to the time of the

Hellenistic kingdoms, preceded by a brief survey of the Oriental civilizations by which the Greeks were influenced. Special attention will be given to the 6th and 5th centuries B. C.

Latin 13. The History of Rome. Professor Brewster.

Three hours a week during the first semester. Offered in 1930-31.

The history of Rome from the earliest times to the beginning of the Barbaric Invasions. The course stresses the Roman genius for organization and administration.

5. The Renaissance. Assistant Professor Albertson.

Two hours a week for one semester. Offered annually.

Lectures, prescribed reading, and special reports on the history of Europe during the fourteenth, fifteenth and sixteenth centuries. Special reading for three hours' credit. After History 1 and preferably after or together with History 2. Valuable for Honors students in the Divisions of English Literature and the Social Sciences.

6. The History of Europe in the Nineteenth Century. Assistant Professor Anderson.

Three hours a week for one semester. Offered in 1928-29.

Lectures, reading, and reports on the development of Europe since the period of the French Revolution. After History 1.

7. The History of Europe in the Twentieth Century. Assistant Professor Anderson.

Three hours a week for one semester. Offered in 1929-30.

Lectures, reading, and reports on the origins, history, and results of the World War. After History 1. Not open to Freshmen. A prerequisite to the Honors seminar to be offered in this subject.

8. Constitutional History. Associate Professor Manning.

Two hours a week for one semester.

Lectures, cases, and readings in the development of the Anglo-American Common Law, and the constitutional system of one of the two countries. Based on Pollock and Maitland, Blackstone, Holmes, and the cases. To be offered whenever sufficient Seniors who contemplate studying law are ready to take it. After History 1 and after or together with History 2.

9. International Law. Professor Hull.

Two hours a week throughout the year. Offered in 1929-30.

This course is open to Juniors and Seniors, and is designed to present the outlines of the international law of peace, war, and neutrality. The principles of the science are illustrated by a weekly discussion of current international events.

10. International Government. Professor Hull.

Two hours a week throughout the year.

This course is open to Seniors and Juniors. It traces the historic development of international government and illustrates its strength and weakness, its achievements and attempts, by a weekly discussion of current international events.

11. International Relations. Professor Hull.

Two hours a week throughout the year.

This course is open to Seniors and Juniors. It is based on a text-book, library and newspaper study of current international problems, their historical development, and their significance as related to international law and international government.

12. The History of Quakerism. Professor Hull.

Three hours a week throughout the year.

A text-book, library and direct-contact study of the general history of Quakerism during the past three centuries, its connection with English Puritanism and European mysticism, with special stress on its literature and biography. George Fox's *Journal* and A. N. Brayshaw's *The Quakers* will be used as the basis of class discussion, and each student will present the results of individual research into the life and writings of one or more Quaker worthies. The Clement M. Biddle Friends' Historical Library is notably rich in materials relating to this work; while Friends' Meetings and Friendly work in general are largely centered in and around Philadelphia.

For Honors Courses in History, see pp. 56-57.

13. Quaker Solutions of Social Problems. Professor Hull.

Two hours a week throughout the year.

A study of outstanding social problems such as the family, childhood, the position of women, immigration, the colored races, the rural problem, the city, the industrial problem, pauperism and charity, intemperance, social purity, crime and punishment, war and peace. These problems will be discussed from the point of view of their growth and their present status and with special reference to the historic Quaker "testimonies" concerning them. John Woolman's *Journal and Other Papers* and William Penn's *Some Fruits of Solitude* will be used as the Quaker basis of class discussion. The Biddle Memorial Library contains a rich store of materials relating to the Quaker aspects of this course, while the other college courses in Social Science and visits to various institutions connected with them should co-ordinate well with it. The work of the American Friends' Service Committee and various other Friendly social activities are readily accessible from Swarthmore.

14. History Seminar for Senior Major Students.

One afternoon a week throughout the year. Offered annually.

Informal meetings with various members of the department, for reports and discussions in connection with preparation for the departmental Comprehensive Examination. Credit hours to be adjusted to the needs of individual students.

History Readings as prerequisite to Honors Courses.

Courses Greek 10 and Latin 13 are prerequisite to reading for Honors in the Classics; Course 1 is a prerequisite to reading for Honors in the Social Science or English groups; these courses must be taken in the Freshman or Sophomore years. Course 2 is essential for the history seminars in the Social Science or English groups and should be taken in Sophomore year. Courses 3 and 4 are essential for students who plan to read American economic or constitutional history in the Social Science group. All history lecture courses are open to all who may be interested to attend.

For Honors Courses in History, see pp. 56-57.

Mathematics and Astronomy

The staff for instruction in this department consists of Professor John A. Miller,* Professor Arnold Dresden, Professor Ross W. Marriott,* Associate Professor John H. Pitman, Assistant Professor Michel Kovalenko. Alice Rogers is Research Assistant, and the Reverend Walter A. Matos, a Volunteer Observer in the Observatory. Murat Louis Johnson is non-resident Lecturer in Mathematics of Insurance. During the second semester of 1928-

* On leave of absence during the second semester of 1928-29.

29, Professor M. J. Babb, University of Pennsylvania, is Visiting Professor of Mathematics.

The College requirement of six hours of mathematics for graduation may be satisfied by passing course 2. Students who contemplate majoring in mathematics or reading for honors in the Division of Mathematics, Astronomy and Physics are recommended to take courses 1, 3 and 4 in their Freshman year. They should also acquire a reading knowledge of French and Scientific German, if possible, before the beginning of their Junior year.

Graduate courses are offered in the department. These are given from time to time in accordance with the needs of the individual student.

A department library is located on the first floor of the Observatory. It contains about 3,000 volumes and is sufficiently complete to make it a good working library. It is reasonably supplied with standard treatises, particularly those published in the last two decades. It contains complete sets of nearly all the American mathematical and Astronomical periodicals, and sets (some of which are complete; some of which are not) of the leading English, German and French periodicals. This library receives the publications of many of the leading observatories in exchange for the publications of the Sproul Observatory.

The equipment of the observatory is best suited for astrometric and kindred problems. The various eclipse expeditions from the Observatory have yielded considerable eclipse data.

A description of the instrumental equipment for astronomy may be found on pages 15 and 16. The teaching staff is at present devoting as much time as is consistent with their teaching duties to studies in stellar parallax with the 24-inch telescope, to photography with the 9-inch doublet, and to the study of eclipses of the sun. Students interested in any of these problems may work with advantage in conjunction with one of the professors. Results of departmental studies are published in the Sproul Observatory publications and in various scientific journals.

The Observatory is open to visitors on the second and fourth Tuesday nights of each month, except those Tuesday nights that

fall in a vacation period. Visitors thus have an opportunity of seeing, in the course of a year, many celestial objects of various types.

COURSES IN MATHEMATICS

1. Freshman Mathematics. Professor Babb, Professor Marriott, and Professor Dresden.

Three hours a week during the first semester, and two hours a week during the second semester. Offered annually.

The fundamental algebraic operations and their laws of combination; development of the function concept; a short review of factoring and simultaneous equations; the transformation theorems; remainder theorems; symmetric functions; binomial theorem; permutations and combinations; series; theory of equations; determinants and elimination. The text is largely supplemented by problems that require the student to set up his own equations. Fine, *College Algebra.*

2. Freshman Mathematics. Associate Professor Pitman and Assistant Professor Kovalenko.

Three hours each week throughout the year. Offered annually.

This course is intended for those students who expect to do only one year's work in mathematics. A study of the elementary algebraic and transcendental functions and their applications to various fields of knowledge as mechanics, physics, chemistry, biology and economics. The construction and interpretation of graphs is emphasized. The essentials of trigonometry.

Gale and Watkeys, *Elementary Functions.*

3. Trigonometry. Assistant Professor Kovalenko and Professor Babb.

Two hours a week. Offered each semester.

The trigonometric ratios; reduction of trigonometric identities, solution of trigonometric equations; inverse functions; solution of triangles and use of tables. Students who expect to major in this department, in Physics, Chemistry or Engineering should take this course during the first semester of their Freshman year.

4. Analytic Geometry. Assistant Professor Kovalenko, Professor Babb, and Professor Miller.

Three hours a week. Offered each semester.

Theory of Cartesian and Polar co-ordinates; the straight line; the conic sections; the general equation of the second degree.

Prerequisites, first semester of Courses 1 or 2 and Course No. 3.

5. The Mathematics of Investment and Insurance. Professor Miller and Mr. Johnson.

Two hours a week during second semester. Offered in alternate years.

The theory of compound interest; annuities; sinking funds; interest rates; theory of Probability; mortality tables. Completion of this course, Courses Nos. 12 and 14, and an introduction to the theory of Finite Differences should enable the student to proceed with the examinations for admission to the Actuarial Society of America. Skinner, *Mathematical Theory of Investment.*

Prerequisite, Course No. 1.

11. Differential Calculus. Assistant Professor Kovalenko, Professor Marriott and Professor Dresden.

Three hours a week. Offered each semester.

Prerequisite, Course No. 4.

12. Integral Calculus. Professor Babb, Professor Marriott, and Professor Dresden.

Three hours a week. Offered each semester.

Prerequisite, Course No. 11.

13. Analytic Mechanics. Associate Professor Pitman.

Three hours a week during first semester. Offered annually.

Composition and resolution of forces; center of gravity; moments; velocity; acceleration; collision of bodies; the integration of simple equations of motion. One of the purposes of the course is to develop facility in applying mathematical formulæ and methods to the investigation of physical phenomena. Miller and Lilly, *Analytic Mechanics.*

Prerequisite, Course No. 12.

14. Theory of Equations. Professor Dresden.

Three hours a week during first semester. Offered annually.

Operations on Complex numbers. Solutions of cubic and quadratic equations. General properties of polynomials. Separation and calculation of roots of numerical equations. Dickson, *First Course in the Theory of Equations.*

Prerequisite, Course No. 4.

15. Solid Analytic Geometry. Professor Dresden.

Three hours a week during second semester. Offered annually.

Fine and Thompson, *Co-ordinate Geometry.*

Prerequisite, Course No. 12.

16. Advanced Calculus. Professor Marriott and Professor Dresden.

Three hours a week during first semester. Offered annually.

Total and partial derivatives; theory of infinitesimals; definite integrals; approximations. The aim of the course is three-fold; to ground the student in the elementary work which has preceded it; to give an introduction to more advanced topics; and to develop skill in the application of the principles of the Calculus to Geometry, and Mechanics. Osgood, *Advanced Calculus.*

Prerequisites, Courses Nos. 12, 14, 15.

17. Differential Equations. Professor Dresden.

Three hours a week during second semester. Offered annually.

A study of ordinary and partial differential equations, with their applications to geometrical, physical, and mechanical problems. Murray, *Differential Equations.*

Prerequisite, Course No. 12.

31. Undergraduate Reading Course in Mathematics.

Undergraduate students may, under direction, prepare papers upon subjects requiring a rather extensive examination of the literature of a problem.

51. Mathematical Analysis. Professor Marriott.

Three hours a week during first semester, and three hours a week during second semester.

An introduction to higher mathematical analysis, including the number concept from a standpoint of regular sequences; number fields and domains; properties of functions of real and complex variables, linear transformations and collineations; matrices and invariants. The course is intended as a transition from the elementary to the higher mathematics.

Open to Seniors and Graduates majoring in Mathematics.

52. Vector Analysis. Professor Marriott.

Three hours a week during first semester.

The method of Gibbs and Heaviside. The operations with Vectors, applications to physical problems. Gibbs, *Vector Analysis.*

53. Theory of Functions of a Complex Variable. Professor Marriott.

Three hours a week during second semester.

Goursat, *Mathematical Analysis, Vol. II.* Open to Graduates and Senior Honors in Mathematics.

54. Partial Differential Equations of Physics. Professor Marriott.

Three hours a week during second semester.

Open to Graduates and Senior Honors in Mathematics.

55. Theory of Functions of a Real Variable. Professor Dresden.

Three hours a week throughout the year.

A study of the fundamental concepts, including continuity, differentiability and integrability; the theory of sets; the integral of Lebesgue.

Open to Graduates and Senior Honors students.

61. Graduate Reading Course in Mathematics.

Graduate students may work in Mathematics with one of the professors on any problem on which the professor is working. The student is encouraged to become familiar with the literature of the problem and to ground himself in its fundamental principles. The numbers of hours' credit is arranged with each student.

COURSES IN ASTRONOMY

1. Descriptive Astronomy. Professor Miller and Associate Professor Pitman.

Three hours a week during the year. Offered annually.

A study of the fundamental facts and laws of Astronomy, and of the methods and instruments of modern astronomical research. The course is designed to give information rather than to train scientists. A study of the text-book will be supplemented by lectures illustrated by lantern slides from photographs made at various observatories. The class will learn the more conspicuous constellations and have an opportunity to see the various types of celestial objects through the telescope. The treatment is non-mathematical. Duncan, *Astronomy.*

Prerequisite, *Solid Geometry and Trigonometry.*

2. Practical Astronomy. Associate Professor Pitman.

Three hours a week during the first semester. Given 1928-29.

Theory and use of the transit instrument; determination of time; the latitude of Swarthmore; determination of longitude. Intended for students of Astronomy and Engineering and those desiring to take the civil service examinations for positions in the United States Coast and Geodetic Survey.

Prerequisites, Mathematics No. 3 and Astronomy No. 1.

31. Undergraduate Reading Course.

Undergraduate students may, under direction, prepare papers upon subjects requiring a rather extensive examination of the literature of a problem.

51. Orbit Computation. Associate Professor Pitman.

Three hours a week during second semester. Given in 1928-29.

Central orbits; computation of the orbit of a comet or an asteroid. Leuschner's *Short Method;* Tisserand, *Determination des Orbites.*

Open to Seniors and Graduates.

52. Method of Least Squares. Associate Professor Pitman.

Three hours a week during second semester.

Prerequisite, Mathematics No. 11.
Open to Juniors and Seniors.

53. Theory and Practice of Interpolation. Associate Professor Pitman.

Three hours a week during the second semester.

Prerequisite, Mathematics No. 11.
Open to Juniors and Seniors.

54. Stellar Parallax. Professor Miller and Associate Professor Pitman.

The theory of trigonometric parallax. The measurement and reduction of parallax plates. Discussion of errors. The theory of spectroscopic parallaxes. Other methods.

Open to graduate students. Given in 1928-29.

55. Celestial Mechanics. Professor Miller.

Three hours a week during first semester. Given in 1928-29.

Moulton, *Introduction to Celestial Mechanics.*

A statement of the Honors Course in the Division of Mathematics, Astronomy and Physics is given on pages 58-60.

61. Graduate Reading Course.

Graduate students may work in Astronomy with one of the professors on any problem on which the professor is working. The student is encouraged to become familiar with the literature of the problem and to ground himself in its fundamental principles. He may participate in actual observations at the telescope; in the measurement of photographic plates; and in the reduction of observations. The number of hours credit is arranged with each student.

Music

ALFRED J. SWAN, DIRECTOR

I. The courses in music are intended for students who are anxious to acquire a better understanding and appreciation of this art. To the student who is a performer they will be an aid in the choice, arrangement, and grasp of his material; to the student who merely wants to listen more intelligently to the music that he hears in concert halls and churches they will give an insight into the history, the foundations, and the craftsmanship of the great works of musical art. The instruction combines a clear presentation of the whole historical epoch and its ideals in life and art with an analysis of its most representative music. In this way the study of e. g. the 17th Century in music would begin with a picture of contemporary life and manners in Italy and Germany and the resultant widely-different

types of art, and then proceed to analyze and compare arias of Scarlatti and Leo on the one hand, and Bach and Händel on the other. After applying himself to such comparative studies, the student should be able to discern between the style of various composers from hearing their music played. The vast scope of music history necessitates its division into two courses:

A. *The older music.* The period of history treated here is from about 1150 to 1800, and the analysis comprises folk songs, plain chant, and the songs of the troubadours (melody, rhythm), the vocal music of the Flemings and Italians (polyphony), and the instrumental music from Monteverdi to the early Beethoven (harmony). No previous acquaintance with musical theory or practice is required for this course, and such technical matters as are necessary for the study of the scores are taken up at the outset.

Three hours weekly through the year.

B. *Modern music.* This course is devoted to the 19th and early 20th Centuries in music: the later Beethoven, the Romanticists, the national schools of opera (German, Italian, Russian, French), Impressionism, the effect of the war of 1914, and the present outlook. This course may be taken independently of the preceding, but students are not advised to do so unless they have had some musical experience and are acquainted with the works of the classics.

Two hours weekly through the year.

II. The Swarthmore College Mixed Chorus, Orchestra, and Glee Club are open to all students who are able to participate in the performance of opera, madrigals, folk-songs, symphonies, and concertos. Rehearsals are held in Bond Hall and Collection Hall at 7 P.M. on Mondays and Tuesdays. Try-outs are held several times a year.

Philosophy and Religion

The instruction in this department is under the direction of Professors Jesse H. Holmes and Brand Blanshard. George F. Thomas is Assistant Professor. One course is given by Dean Frances Blanshard.

The purpose of the department on the philosophical side is

to familiarize the student, so far as may be, with the principal historic systems of thought, to acquaint him with the chief issues that arise in the course of philosophic reflection and the considerations that have been offered for their solution, and to afford a discipline in independent thought. The work is conducted by means of lectures, recitations, discussions and the frequent writing of papers.

COURSES IN PHILOSOPHY

1. Logic. Professor Blanshard.

Three hours a week first semester. Offered annually.

A study of the chief types of reasoning, inductive and deductive. Special attention is given to the analysis of concrete cases of reasoning and to practice in the detection of fallacies.

2 (*a*). Introduction to Philosophy. Professor Blanshard; Assistant Professor Thomas.

Three hours a week. Offered each semester.

A review of the relations of philosophy to science and religion, a statement of its classic problems and a preliminary study of some of the principal answers. Paulsen's *Introduction to Philosophy* is used as a basis.

2 (*b*). Metaphysics. Assistant Professor Thomas.

Three hours a week second semester. Offered annually.

This may be considered as a continuation of Course 2 (*a*). A consideration of the nature and tests of truth, an analysis of fundamental concepts, and study of selected problems as raised by modern thinkers from Descartes to Bergson.

3. History of Ethics. Assistant Professor Thomas.

Two hours a week first semester. (Not offered in 1929-30.)

An introduction to theoretical ethics through its history. The emergence of problems and fundamental concepts is noted in selections from the greatest ethical thinkers of the Greek, Christian, Medieval, and Modern periods.

4. Ethics. Professor Blanshard; Assistant Professor Thomas.

Three hours a week second semester. Offered annually.

A study of "the science of conduct and character." It will include an introduction to the various systems of ethical theory, an attempt to find a sufficient basis for moral principles, and discussion of the application of such principles to conduct. Paulsen's *System of Ethics* is used as a basis.

5 (*a*). The History of Science. Professor Holmes.

Two hours a week first semester. Offered annually.

The beginnings of curiosity and of explanation: the beginnings of organized knowledge. Attainments in science of the ancient nations, and its development down to our time. Sedgwick and Tyler, *History of Science,* has been used as a text-book.

5 (*b*). Survey of Present-Day Science. Professor Holmes.

Two hours a week second semester. Offered annually.

The basic assumptions and logic of science. Methods of observation and experiment.

Natural law; its meaning and value. The general principles accepted in the various sciences, and the open problems: evolution, relativity, electron theory of matter, etc.

6 (*a and b*). History of Philosophy. Professor Holmes.

Three hours a week throughout the year. Offered annually.

The first half year is devoted to ancient and medieval philosophy, the second to modern philosophy. In ancient philosophy, special attention is given to the Republic of Plato and the Ethics of Aristotle. The study of modern philosophy begins with Descartes and reviews in outline the chief systems to the present day. The attempt is made to acquaint the student with the various philosophies, so far as possible, at first hand through readings from their own works. The readings are co-ordinated with the aid of Weber and Perry's *History of Philosophy* and other similar works.

7. Aesthetics. Mrs. Blanshard.

Two hours a week first semester.

A historical and critical study of the principal theories of the nature of beauty, designed especially for students of English Literature. The study is conducted through lectures, discussions, papers, and assigned readings. Carritt's *Theory of Beauty* is used as a starting point.

COURSES IN RELIGION

1. Bible Study. Assistant Professor Thomas.

Two hours a week throughout the year. Offered annually.

Intended to give such general knowledge of the Bible, its origin, contents, and qualities as literature as should be possessed by all intelligent persons. The work of the student will consist largely in indicated readings in the Old and New Testaments.

2 (*a*). History of Religions. Professor Holmes.

Two hours a week first semester. Offered annually.

A brief study of primitive religions and of the principal religious systems of the world. Menzies, *History of Religion,* and Barton, *The Religions of the World,* have been used as text-books.

2 (*b*). History and Problems of Christianity. Professor Holmes

Two hours a week second semester.

A survey of the history of the Christian Church beginning with the period of the Book of Acts and coming down to the present time. Especial attention is given to the origin and growth of doctrine, and of the various Christian sects. Allen, *Continuity of Christian Thought,* Pfleiderer, *Development of Christianity,* and Guighebert, *Christianity,* have been used as text-books.

A statement of Honors Work in Philosophy is given on page 58.

For use in connection with the courses in religion, there is a small but carefully selected museum of religious curios, an excellent library and several hundreds of lantern slides, together with the usual equipment of maps, charts and pictures. Additions to this collection will be welcomed. Some of the greatest of all archæological collections are near enough to be made use of by Swarthmore students, and frequent visits to them are possible.

Especially to be noted is the Archæological Museum of the University of Pennsylvania, with its remarkable collections from Babylonia, Assyria and Egypt, its Buddhist Temple, and its exhibition of objects of interest to the student of religions, from the American Indians, the Esquimaux, and many other peoples. Mention should also be made of the great libraries of Philadelphia and the opportunities open to Swarthmore students of attending the lectures courses, often by the leading scholars in their fields, which are given from time to time in the Drexel, Franklin and Wagner Institutes and at the University of Pennsylvania.

Physical Education

The Physical Education of the College is under the direction of E. LeRoy Mercer, M.D., Associate Professor of Physical Education. He is assisted in the courses for men by Robert H. Dunn, and for women by Elizabeth Lanning, Virginia Brown and Dr. Eleanor Balph.

The aim of the department of Physical Education is to promote the general physical well being of the students, and to assist them to gain the hygienic, corrective, and educative effect of rightly regulated exercise.

In order that this object may be better attained, and to assist the director in gaining a definite knowledge of the strength and weakness of the individual, a careful physical examination and medical inspection is required, which serves as a basis for the work.

All students must take the prescribed work in Physical Education. It is strongly recommended that, before entering College, each student undergo a thorough visual examination and be fitted with glasses, if there is a need for them.

The Health Laws of the State of Pennsylvania require successful vaccination against smallpox before a person can enter a private, parochial or public school as a student.

For a general statement in regard to the facilities for physical training at Swarthmore see pp. 19-20.

REQUIREMENTS FOR MEN

Two hours a week of regular prescribed work are required of all men in the first and second year classes.

Intercollegiate contests in various athletic and aquatic sports are conducted by the Athleic Association, but under the supervision of the Athletic Committee and the Director of Physical Education, who may at any time forbid any man entering a contest whose physical condition is not satisfactory.

COURSES FOR MEN

1. Physical Education. Dr. Mercer and Mr. Dunn.

Two hours a week throughout the year (two sections).

This course is required of all first-year men, who may elect from the following during the fall months, opening of college to Thanksgiving recess: Football, lacrosse, cross-country, track, and tennis.

Ending of Thanksgiving recess to spring recess: The classes meet in the gymnasium and the work consists of gymnastics and athletics so fitted to the student's life that it will be both beneficial and pleasant.

Ending of spring recess to Commencement, election may be made from the following: Baseball, lacrosse, track, and tennis.

2. Physical Education. Dr. Mercer and Mr. Dunn.

Two hours a week throughout the year (two sections).

This course is required of all second-year men. The plan and nature of the work is similar to Course 1, but more advanced.

3. Hygiene. Dr. Mercer.

One hour a week from Thanksgiving Recess to Spring Recess.

This course is required of all first-year men. Offered annually.

REQUIREMENTS FOR WOMEN

Three hours of exercise each week is required of all resident and non-resident women throughout their college course. For Freshmen, Sophomores, Juniors, and Seniors two of these periods must be taken in supervised athletics or gymnastics. Exceptions to these requirements are made only for physical disability and at the discretion of the college physician, in which case suitable work is prescribed. One period of swimming per week is required of all students except Juniors and Seniors who have passed the required tests.

All gymnastic work, games and swimming are under the personal supervision of the instructor.

First year students are required to attend a course of lectures

in Personal and Sex Hygiene, given once a week during the first semester.

Application for information in regard to the regulation costume for athletics and gymnastics should be made to Director of Physical Education of the Women.

COURSES FOR WOMEN

1. Hockey. Miss Lanning, Miss Parry and Assistant.

Two periods per week. Fall to Thanksgiving.

Required of first- and second-year students and elective for third- and fourth-year students.

Varsity Hockey required of squad members instead of class hockey.

2. Archery. Miss Lanning and Assistant.

Two periods per week. Fall to Thanksgiving Recess and Spring Recess to June.

Elective for third- and fourth-year students in the Fall. Open to all students in the Spring.

3. Horseback Riding. Mr. Bowen.

Two periods per week. Fall to Thanksgiving. Recess and Spring Recess to June.

Elective for all students.

The Women's Athletic Association has made it possible for the individual student to pay a minimum rate for the course rather than the customary Riding fee.

4. Swimming. Miss Lanning, Miss Parry and Assistant.

One period per week throughout the year.

Beginners, Intermediate, or Advanced Class instruction in strokes, diving or life saving is required of all first- and second-year students.

Class instruction or one free period of swimming per week is required of third- and fourth-year students who have not passed stated tests.

Varsity swimming is required, Thanksgiving Recess to Spring Recess, for squad members. Two periods per week are taken in place of Class Swimming and one gymnastic class.

5. Educational Gymnastics. Miss Lanning and Assistant.

One period per week. Thanksgiving Recess to Spring Recess.

Required of first-, second-, and third-year students.

Marching, tactics, calesthenics, and games.

6. Elementary and Advanced Apparatus. Miss Lanning and Miss Parry.

One period per week. Thanksgiving Recess to Spring Recess.

Open to all students.

The course includes work on the horse, parallel bars, rings, Swedish boom and climbing ropes.

7. Elementary and Advanced Dancing. Miss Lanning.

One period per week. Thanksgiving Recess to Spring Recess.

Open to all students.

Elementary classes include natural, interpretative and character dances.

Advanced classes include more advanced work in technique and pantomime.

8. Special Corrective Gymnastics. Miss Lanning.

One period per week. Thanksgiving Recess to Spring Recess.

Advised for students who need special exercise because of incorrect posture, poor physical development, or minor orthopedic defects.

Daily exercise is necessary on the part of the student in order to gain beneficial results.

Physics

The instruction in this department is under the direction of Associate Professor Winthrop R. Wright. Dr. M. W. Garrett is Assistant Professor.

The courses in physics are designed to meet two basic needs; first, that of the student who desires a comprehensive view of the underlying ideas of physical science, and second, that of the student who requires physics for professional reasons. The courses in General Physics and Atomic Physics together fulfill the first requirement, though the treatment is necessarily non-mathematical and somewhat elementary. The course in General Physics is accepted by medical schools and, in connection with the course in Engineering Physics, it also meets the requirements for engineering.

Advanced work in physics is given in Honors sections whenever possible. A detailed statement of the Honors work in physics is given on pages 59-60. Where the Honors method is not possible, arrangements may be made to obtain the desired work in the course in Advanced Physics. In general the requirements in mathematics and chemistry applying to entrance upon Honors work in physics apply to the course in Advanced Physics.

The Physics Library is located in the Science Building and contains several hundred volumes in addition to files of ten of the more important physical periodicals, both American and foreign.

The laboratories are equipped for the elementary experiments in all branches of physics and for advanced experiments in electricity and optics. A small shop in the department permits the construction of special apparatus for instructional and research purposes.

1. General Physics.

Four hours throughout the year. Offered annually.

Three recitations and one laboratory period of two hours each week. This course

presupposes no previous training in physics and is open to students of any year. This course is prerequisite for students of engineering and of medicine and for those intending to pursue any Honors work in physics.

2. Engineering Physics.

Two hours during the first semester. Offered annually.

This is a continuation of General Physics and presents in more detail those parts of mechanics, heat, and electricity which are widely applied in engineering. Required of engineering majors. One lecture and one laboratory period each week.

3. Electrical Measurements.

Two hours for the second semester. Offered alternate years.

One recitation and one three-hour laboratory period each week. The underlying principles of electrical measurements are presented and their application is shown in the more important laboratory methods. The experiments include the precise measurement of resistance, current, potential difference, quantity, capacity, inductance, and the magnetic properties of iron.

Prerequisite, General Physics.

4. Atomic Physics.

Two hours for the second semester. Offered annually.

Two lectures each week. The subject includes an elementary discussion of the more prominent developments in physics during the last twenty-five years. It centers around the problem of the constitution of matter and presents the simpler aspects of cathode and Roentgen rays, photoelectricity, thermoelectricity, radioactivity, and spectrum analysis in their bearing on this question.

Prerequisite, General Physics.

5. Advanced Physics.

Hours to be arranged.

It is expected that advanced physics will usually be confined to the Honors work. This course is provided to fit the needs of those who desire special work in experimental physics and may be arranged in any branch of physics.

Physiology and Zoology

The instruction in this Department is under the direction of Dr. Detlev W. Bronk, Professor of Physiology and Bio-physics. The instructing staff includes Professor Bronk; Dr. W. R. Amberson, Lecturer in the History of Zoology; Walter J. Scott, Instructor in Physiology and Zoology; Dr. Edward Hellweg, part-time Instructor in Cytology; and Samuel R. M. Reynolds, Assistant in Zoology.

The purpose of the department is to give students a thorough and comprehensive view of the nature and mechanism of animal life and of the more important generalizations of the zoological sciences. It endeavors to meet the needs of students who are primarily interested in gaining a rather general view of zoology and physiology, as well as those who desire a more thorough and

comprehensive training in preparation for the life of a professional zoologist, for secondary school teaching, or graduate study in medicine, physiology or zoology.

Courses 1-A, 2-A, 3, 4, 5 and 6 have been arranged to satisfy the needs of the general student and do not assume the necessity for giving a training in preparation for more advanced courses. They aim to give rigorous training in scientific methods and to present a complete view of the subject which must therefore be lacking in detail. Courses 1-B and 2-B are for those students who plan to take advanced work in the department and are therefore able to sacrifice some breadth in these beginning courses for the more important details that are necessary as a foundation for the later work.

It is assumed that those students who desire to specialize in this field will, as a rule, be sufficiently able and interested to avail themselves of the unusual opportunity for advanced work offered by the Honors Courses in Physiology-Zoology. For those who do not elect to do so a number of advanced courses of a fundamental nature are offered each year. These courses are usually offered in alternate years and it is therefore important that students plan their program a year in advance.

At the present time the department occupies the first two floors of the east wing of Science Hall. The elementary laboratories are equipped with modern apparatus for experimental work in all of the fields of physiology and zoology and offer unusual facilities for individual work. The advanced and research laboratories are being developed to meet the needs of the Honor and graduate student and are being equipped for work in all phases of the several sciences. Due to close relationships with the Departments of Physics and Electrical Engineering the available electrical equipment is unusually fine and offers exceptional opportunities for work in electro-physiology.

The departmental library contains a large collection of modern works in these fields and complete files of the leading American and English journals.

1 (*a*). General Zoology. Professor Bronk, Mr. Scott, and Mr. Reynolds.
Three hours a week throughout the year. Offered annually.
Lectures and conferences covering the more important aspects of invertebrate and

vertebrate zoology, including comparative morphology and physiology, ecology, evolution, elementary embryology and genetics, distribution, etc. In the laboratory the student makes an experimental study of these various problems.

1 (*b*).

A course similar to the above but designed for students anticipating further courses in this field. The lecture hour is the same as that for 1 (a), but the conference period is devoted to more advanced and detailed subjects.

2 (*a*). Elementary Physiology. Professor Bronk and Mr. Scott.

Three hours a week throughout the year. Offered annually.

This course is open to all students. It begins with an elementary study of human anatomy. This is followed by a consideration of the physiology of muscle, nerve, circulation, respiration, central nervous system, special senses, and digestion. The treatment is designed to give a broad understanding of the mechanism of the human body.

The course may be taken with or without laboratory work. The limited numbers admitted to the laboratory perform standard experiments on living tissue and on themselves as subjects.

2 (*b*).

A course similar to the above but designed for students anticipating further courses in this field. The lecture hour is the same as that for 2 (a), but the conference period is devoted to more advanced and detailed subjects.

3. History of Zoology. Dr. Amberson.

Two hours a week during the first semester.

A general course of lectures tracing the evolution of Zoology. Special attention is paid to the philosophical aspects of the science and its influence on the development of civilization. Open to students who have had no preliminary courses in Zoology.

4. Zoology and Social Problems. Professor Bronk.

Two hours a week throughout the year.

A lecture course for students in the social sciences and similar fields of specialization. It will treat such aspects of zoology as eugenics, population, food supply, public health, insect problems, elementary anthropology, etc. No prerequisites.

5. Anthropology.

Two hours a week throughout the year.

Lectures and conferences on physical anthropology and ethnology. No prerequisites.

6. Organic Evolution.

Two hours a week during the second semester.

A general survey of the evidence for the theories of evolution, the factors responsible for the evolutionary changes and an historical review of the development of the science. No prerequisites.

7. Vertebrate Anatomy. Mr. Scott.

Four hours a week during the second semester.

This course is devoted to a study of vertebrate skeletons, complete dissections of the cat, less complete dissections of the cadaver and weekly conferences.

Prerequisites, 1 and 2.

8. Cytology and Histology. Dr. Hellweg.

Three hours a week during the first semester.

The work of this course is primarily designed to give a rigorous training in micro-

scopic technique. Some time is also devoted to a study of the physico-chemical structure of protoplasm and the physiology of cells. The latter part of the semester is given to comparative histology. Prerequisites, 1 and 2.

9. Embryology.

Three hours a week during the second semester.

Lectures and laboratory work on the embryonic development of certain invertebrates and vertebrates. Special attention is given to modern methods of experimental embryology. Prerequisites, 1, 2, and 8.

10. Mammalian Physiology. Professor Bronk.

Two hours a week during the second semester.

A laboratory course of experiments illustrating the more important features of the circulatory, respiratory and nervous systems. Prerequisites, 1 and 2.

11. Review of Current Literature. Members of the Staff and Seniors.

One hour a week throughout the year.

Weekly reports and discussions on the more important articles in current physiological and zoological journals. Open only to juniors and seniors.

12. Bio-Physics. Professor Bronk.

Three hours a week during the first semester.

A course of lectures, discussions and laboratory exercises on some of the physical phenomena that are of importance to the biologist. Among the topics considered are: energy exchanges in the body, osmotic pressure, surface energy, colloids, physical structure of protoplasm, hydrogen ions and the living organism, light and its effects on tissues, etc. Prerequisites, 1 and 2.

For Honors Courses in Physiology-Zoology, see pages 65-66.

Political Science

The instruction in this department is under the direction of Professor Robert C. Brooks, assisted by Richmond P. Miller and Mrs. George Galloway.

The primary aim of the courses offered in political science is to prepare students for intelligent and effective citizenship.

To this end an effort is made to interpret the political life and movements of our time in city, state, and nation. Particular attention is given to criticisms of existing institutions and proposals for their reform. Governments and parties in the leading foreign nations of the world are considered not only because of their intrinsic importance, but also for the valuable suggestions they may yield toward the solution of our American problems.

Though the courses in political science are designed primarily to produce intelligent and effective citizenship, they should also prove more immediately helpful to those who intend to enter

politics, law, public service, journalism, business, or the teaching of civics. Students who expect to devote themselves to advanced study and research in political science should be able to lay the foundations for such work in the undergraduate courses offered by this department.

Unsupported by collateral study in economics and history much of the significance of political science will be lost. Psychology, philosophy, and anthropology are also valuable aids. A reading knowledge of German or French should be acquired as soon as possible by students of political science, and both of these are essential for graduate study in this field. Training in English and public speaking is highly desirable.

Changes in advanced courses to be made from year to year will enable students to take more work in political science than is here scheduled.

1. Government and Parties in England and Continental Europe. Professor Brooks, Mr. Miller, Mrs. Galloway.

Three hours a week throughout the year. Offered annually.

An outline study of the framework of government and the organization, methods, and aims of the leading political parties of England, France, Switzerland, and Germany. Particular attention is given to the constitutional documents of the countries studied and to the more accessible sources of official information regarding them. Wherever possible, comparisons are drawn between the political institutions and problems of the countries studied and those of the United States.

Open to all students.

2. American Political Parties and Party Problems. Mr. Miller.

Three hours a week during second semester. Offered annually.

A study of the growth, organization, aims and methods of political parties in the United States, with particular reference to the financing of parties, primary and convention system, and electoral reforms generally. Open to all students except Freshmen.

3. American Federal Government. Mr. Miller.

Three hours a week during first semester. Offered annually.

A study of the present structure and functions of the Federal Government of the United States.

Open to all students except Freshmen.

4. Municipal Government in the United States. Mrs. Galloway.

Two hours a week during the first semester. Offered in 1928-29.

A somewhat detailed study of municipal organization and functions in the United States. Particular attention will be given to the city of Philadelphia. Reform proposals, such as the commission plan, the city manager plan, short ballot, and the work of bureaus of municipal research, will be discussed.

5. American State Government. Professor Brooks.

Two hours a week during the first semester. Offered in 1928-29.

A study of the organization and functions of state government in the United States, with particular reference to Pennsylvania. The legislative branch will be given special attention in this course for the present.

6. Political Motives. Professor Brooks.

Two hours a week throughout the year. Offered annually.

A study of the motives influencing men in their political activities, particularly as revealed in biographies and autobiographies of American leaders of recent date.

Open only to Juniors and Seniors.

7. Political Problems of Today. Professor Brooks.

Two hours a week during the second semester. Offered in 1929-30.

A review of the principal political problems international and internal confronting the world today, and of the proposed solutions therefor. Open to Seniors majoring in the department and in allied departments, to Sophomores preparing to read for honors, and, without credit, to Honors students.

8. Special Readings in Political Science. Professor Brooks.

Two hours a week during second semester. Offered annually.

For the college year 1928-29 the reading in this course was upon the American Political Novel, works of recent date being preferred. As in Course 6 above, the principal aim of the course was to study the motives of political activity.

1 (*a*). Introduction to Sociology. Mr. Miller.

Three hours a week during the first semester. Offered in 1928-29.

A study of the problems of human welfare and social progress, including the method and goals of social work. Visits to institutions in the Philadelphia district.

1 (*b*). Social Ethics. Mr. Miller.

Two hours a week throughout the year. Offered annually.

During the first semester the general topic considered in this course will be the appreciation of character under such difficulties as physical handicaps, immigration, unemployment, and old age. The second semester will be devoted to a discussion of the more significant programs of reconstruction proposed by American and European social reformers.

A statement of the Honors Course in the Division of the Social Sciences is given on pages 54-58.

Romance Languages

The Instruction in this department is temporarily under the direction of Associate Professor Charles R. Bagley. The teaching staff includes Professor Bagley; Señorita Mercedes C. Iribas, Instructor in Spanish; Marie Bourdin Bacher, Instructor in French; Dr. Margaret Pitkin, Instructor in Romance Languages; Dr. P. F. Giroud, Lecturer in French Literature; Lucia Norton Valentine and Dr. Jane Beardwood part-time Instructors in French.

The courses in French for the first two years are designed to impart a thorough training in the grammar and the phonetics of the language along with the ability to read modern French with facility. Until the end of the second year the authors studied are all selected from those of the nineteenth and twentieth centuries, and the greatest attention is given to colloquial French. At the beginning of the third year the emphasis is shifted gradually from the language to the literature, the history and the other phases of French civilization. The fact that French is a living tongue is kept ever in view; with very few exceptions, all courses are given in French. Much attention is given to pronunciation, and the relations of modern French to classical, popular, and low Latin are often brought before the students. Free composition, dictation, memorizing, and conversation are required throughout the courses. The general object of the instruction in French is first to teach the student the language while giving him glimpses of the civilization which lies beyond; then when he has mastered the language sufficiently, to bring him in direct contact with the French civilization, as far as that is possible, through the study of France, her literature, history, art, philosophy, and ideas. Majors and Honors Students in this department are encouraged to spend some time in France; if possible, to do a part of their undergraduate work there.

The courses in Spanish are arranged with a view to giving a practical knowledge of the language and also a general idea of the literature of Spain. Special attention is given to the study of contemporary Spanish literature. Spanish is the language of the classroom.

The course in Italian is, for the present, primarily a reading course, designed to give students enough fundamentals and practice to enable them to develop the ability to read modern Italian with pleasure and profit. Pronunciation is taught, not only for its practical value, but also as an aid to translating and reading without translating.

The class in Course 2 is divided into four sections, the class in Course 3 into two, and the class in Course 2c into three sections. There are also two sections of Spanish 2.

Students who are prepared in Elementary French, as defined

by the College Entrance Examination Board, enter Course 2; those who are prepared in Intermediate French enter a special section of 2, called 2s; those who are prepared in Advanced French, enter Course 3. Also those students who, at the time of entering college, pass the advanced placement test are admitted to Course 3. Experience has shown that students who enter college with three years or more of preparation in French usually do well in their college work, and that those who enter with only two years of French often have difficulty with college French. Students prepared in Elementary Spanish enter Course 2; those prepared in Advanced Spanish enter Course 3. The course in Italian is open to all students.

Students who elect French as a major study are required to complete the work of five full years, or thirty semester hours, in French, and to take Courses 6 and 16.

The first semester's work in Elementary French and in Elementary Spanish will not be accepted towards a degree unless followed by the work of the second semester in the same language.

Some of the lists of works as given below are subject to slight modification from year to year.

1. Elementary French. Dr. Pitkin and Dr. Beardwood.

Three hours a week throughout the year. Offered annually.

This course is intended for those who begin French in college. Its aim is to enable students to read ordinary French with ease, to understand to some extent the spoken language, and to form simple sentences, both oral and written.

Bovée, *Première année de français,* and Hills and Dondo, *Contes dramatiques.*

2. Reading of Contemporary French Prose and Poetry, Grammar with Composition, and History. Associate Professor Bagley, Madame Bacher, Dr. Pitkin, Mrs. Valentine, and Dr. Beardwood.

Three hours a week throughout the year. Offered annually.

This course is designed to extend and supplement Course 1. Prose composition and grammar drill are continued; much attention is given to idioms and synonyms; the reading becomes more rapid; and French is made almost exclusively the language of the classroom. Free composition on the history of France alternates with grammar review and set composition on an assigned passage.

Selected works of Balzac, Bazin, Coppée, Erckmann—Chatrian, Daudet, Hugo, Maupassant, Mérimée, Dumas, A. France, or others.

Bovée, *Deuxième année, de français;* Fraser and Squair, *Shorter French Course;* Barton and Sirich, *French Review Grammar and Composition.*

Lavisse, *Histoire de France* (Cours Moyen), edited by Green and Vaillant.

2 (*c*). Elementary French Conversation. Madame Bacher and Mrs. Valentine.

One hour a week throughout the year. Offered annually.

3. Introduction to French Classicism, Romanticism, and Realism. Composition and History. Associate Professor Bagley and Madame Bacher.

Three hours a week throughout the year. Offered annually.

This course is a general study, in French, of the three great movements in French literature, and a special study of representative texts of each period. Particular attention is given to the historical background of the different periods; free composition is based on chapters from Malet's *Histoire de France.* Class discussion in French is required, and occasionally original essays on outside reading are read and criticised in class. Grammar review and composition on assigned subjects alternate with free composition on history.

Corneille: *Le Cid;* Racine, *Andromaque;* Molière, *Le Bourgeois Gentilhomme;* Lamartine, *Graziella;* Musset, *Poésies et On ne badine pas;* Flaubert, *Trois Contes;* Maupassant, *Selections from Guy de Maupassant* (Schinz); Koren, *French Composition;* Malet, *Histoire de France,* edited by Doolin.

4. Advanced French Conversation. Madame Bacher.

One hour a week throughout the year. Offered annually.

5. Advanced French Prose Composition. Dr. Pitkin.

Two hours a week during the first semester. Offered annually.

The aim of this course is to give increased facility in the writing of the French language, by means of intensive study of chosen models and translation and paraphrase of English into French. Much free composition is also required. Frequent conference periods care for the students' individual needs.

Armstrong, *Syntax of the French Verb;* Bassett, *La Carte de France.*

6. Practical Phonetics. Dr. Pitkin.

Two hours a week during the second semester. Offered annually.

This course is designed to give the student increased facility and greater precision in spoken French, by means of a scientific study of the sounds of the French language. Phonetic dictation, readings in French, conversation, etc.

Nicholson, *Practical Introduction to French Phonetics.*

7. Seventeenth Century French Literature.

Two hours a week throughout the year. Offered in 1929-30.

Lectures, reading, discussion, essays. In French.

Prerequisite, French 3.

8. *Explication de textes.* Madame Bacher.

Two hours a week throughout the year. Offered annually.

An intensive and practical study of the French method of analyzing and explaining a given passage.

9. Nineteenth Century French Literature. Associate Professor Bagley.

Two hours a week during the year. Offered in 1928-29.

Lectures, reading, discussions, and reports. In French.

Prerequisite, Course 3.

10. Twentieth Century French Literature. Dr. Giroud.

Two hours a week throughout the year. Offered in 1928-29.

Lectures, reading, discussions, and reports. In French.

Prerequisite, Course 3.

11. Voltaire and Jean-Jacques Rousseau. Madame Bacher.

One hour a week throughout the year. Offered in 1929-30

A thorough study of the lives and works of these two writers. In French.

12. French Lyric Poetry and Versification. Madame Bacher.

One hour a week throughout the year. Offered in 1928-29.

A study of lyric poetry from Villon to the end of the nineteenth century. An examination of French verse-structure from its origin to the present. The work is given in French. Canfield's *Lyrics* and van Roosbroeck's *Anthology of Modern French Poetry* are used as text-books. These are supplemented by further reading from the poets studied.

Prerequisite, Course 3.

13. History of the French Novel.

Two hours a week throughout the year. Offered in 1929-30.

The French novel is here considered both in its origins and development and in its portraiture of life. Morillot's *Le Roman en France depuis 1610 jusqu'à nos jours* is used as a text-book, and representative novels are read by the students outside of the class. The course is conducted in French.

Prerequisite, Course 3 or its equivalent.

14. French Drama. Associate Professor Bagley.

Two hours a week during the year. Offered in 1929-30.

The drama from its beginnings to the present day, with especial emphasis on the eighteenth and nineteenth centuries.

Lectures, reading and discussion in class of representative plays, parallel reading, and essays.

Prerequisite, Course 3 or its equivalent. In French.

15. History of Ideas in France. Associate Professor Bagley.

Two hours a week throughout the year. Offered annually. (For Juniors and Seniors only.)

During the first semester a general survey is made of the publication of important ideas, their development, controversies which they stimulate, the reactions which they cause, from the foundation of the University of Paris to the present day. During the second semester a detailed study is made of certain theories, problems—educational, religious, economic, and political. Descartes, Rousseau, and Bergson are studied as intensively as time allows. Mimeographed copies of notes and bibliography are furnished for each student.

16. Outline Course in French Literature. Dr. Pitkin.

Two hours a week throughout the year. Offered annually.

This course is designed as a review and extension of the courses in literature already pursued. Much attention is devoted to the literary monuments of the Old French period, these being read as far as possible in Modern French translations. The literature of the Renaissance is then taken up, after which consideration is given to the movements and tendencies of later times, the different writers and their works. The outside reading is both wide and varied. This course is conducted in French, by means of lectures, collateral reading, reports, and research work.

Open to advanced students who are able to speak and understand the French language. Credit for three hours is given.

For the Honors Course in French, see pp. 60-62.

Spanish

1. Elementary Spanish. Miss Iribas.

Three hours a week throughout the year. Offered annually.

This course aims to give a knowledge of the essentials of Spanish grammar, the ability to read ordinary Spanish with ease, and some practice in conversation. Hills and Ford, *First Spanish Course; Cuentos Modernos.*

2. Second-year Spanish. Miss Iribas.

Three hours a week throughout the year. Offered annually.

Crawford, *Spanish Composition;* reading of six modern novels and plays, and conversation based upon these works.

3. Third-year Spanish. Miss Iribas.

Three hours a week throughout the year. Offered annually.

A study of Contemporary Spanish Texts.

Italian

1. Reading Italian. Dr. Pitkin.

Two hours a week throughout the year. Offered annually.

Wilkins' *First Italian Book,* and short stories from contemporary writers.

The Freshman Exploration Course

The purpose of the Freshman Exploration Course is that Freshmen may explore various fields of knowledge in order to discover intellectual interests and to plan later college work accordingly. Books are to be read in each of four fields: the sciences, history and government, philosophy and psychology, and the fine arts. The method of teaching will be, not class recitation or lectures, but individual and group instruction in which the reading of each student will be guided and checked by a member of the teaching staff in conferences held every week. The course will give three hours of credit a week; it will be an elective subject, a regular part of the normal Freshman schedule of fifteen hours a week.

At present the enrollment in the Freshman Exploration Course is limited to fifty students. All Freshmen are invited to apply for this reading, but students who have gained exemption from prescribed courses are given preference. Mrs. Blanshard is in general charge of the course.

COURSE IN BIBLIOGRAPHY

A course in bibliography will be offered in the second semester, 1929-30, with two meetings a week for discussion. The more important part of the work will be the daily assignment of problems which will send the student to the reference books, periodicals and other literature in the College Library. The course will also require the compilation of a bibliography. Enrollment is to be limited. The instructor will be Librarian Shaw. The course carries a credit of three semester hours.

STUDENTS, 1928-29

UNDERGRADUATE STUDENTS

Name	Major Subject	Address
ABBOTT, THEODORA GLADYS,	*English,*	Merion.
ACKART, DOROTHY AGNES,	*English,*	Wilmington, Del.
ADELMAN, CHRISTIAN BERT,	*Mech. Engin.,*	Washington, D. C.
ALDEN, FRANCIS CARTER,	*Economics,*	Philadelphia.
ALSTAETTER, WILLIAM RAOUL,	*Chemistry,*	Savannah, Ga.
ANDERS, MARY KATHRYN,	*French,*	Norristown.
ANDERSON, DAVID JOHN,	*History,*	Morton.
ANDERSON, MARY,	*Math. Honors,*	Philadelphia.
ANDREWS, HELEN MARGARET,	*English,*	Woodstown, N. J.
ATKINSON, MILTON JOB,	*English,*	Mt. Holly, N. J.
ATKINSON, JOSEPH L.,	*Economics,*	Palmyra, N. J.
ATKISS, LINCOLN,	*Phys. & Zoology,*	Philadelphia.
BACON, PRISCILLA ALDEN,	*German,*	Salt Lake City, Utah.
BAKER, CLIFFORD CARL,	*Phys. & Zoology,*	Vineland, N. J.
BAKER, E. SIDNEY,		Hagerstown, Md.
BAKER, HENRY DAVIS,		Trenton, N. J.
BAKER, HOWARD ALISON,	*Soc. Sci. Honors,*	Lansdowne.
BALDWIN, ARTHUR FRANK,	*Pol. Science,*	Ridgefield, Conn.
BAMBERGER, BETTY LOYND,	*French,*	Wilmington, Del.
BARNES, CURTIS LYON,	*Economics,*	Philadelphia.
BATTIN, WILLIAM INGRAM, JR.,	*Mech. Engin.,*	Philadelphia.
BAUR, MARGUERITE EMMA,		Philadelphia.
BEACH, BEATRICE FULLERTON,	*English,*	New Haven, Conn.
BENDER, RICHARD OLIVER,	*Chemistry,*	Ridley Park.
BONNER, MARION LILLIAN,	*English,*	Kutztown.
BENNETT, ANNA ELIZABETH,	*English,*	Hastings-on-Hudson, N. Y.
BENNETT, KATHARINE HODGENS,	*French,*	Montclair, N. J.
BESSEMER, HELEN CECILE,	*English,*	Washington, D. C.
BETTS, MARY ELIZABETH,	*Pol. Science,*	Doylestown.
BICKNELL, MERCY REBECCA,	*Mathematics,*	Oxford.
BIDDLE, ANNA L.,	*Mathematics,*	Riverton, N. J.
BIDDLE, CLEMENT M., JR.,	*Economics,*	Mount Vernon, N. Y.
BISHOP, ROBERT FORSYTHE,	*Soc. Sci. Honors,*	Swarthmore.
BLACKBURN, ALBERT ENGLES, JR.,	*English Honors,*	Philadelphia.
BLACKBURN, PHILIP CONKLIN,	*English Honors,*	New York, N. Y.
BLABKBURN, REBECCA,	*English,*	Bedford.
BLAINE, JULIA MERRILL,	*English,*	Pocomoke, Md.
BLUM, WILLIAM, JR.,	*Chemistry,*	Chevy Chase, Md.
BOAK, ROBERTA,	*Latin,*	Oakmont.

Name	Major Subject	Address
BOHN, RHODA THOMPSON,	*Soc. Sciences,*	Greenwich, Conn.
BOND, RICHARD CLARKSON,	*Economics,*	Upper Darby.
BONNER, MARION LILLIAN,	*English,*	Kutztown.
BOONE, WILLIAM ANTON,	*Economics,*	Ottumwa, Iowa.
BOOSER, JAMES HENRY,	*Pol. Science,*	Harrisburg.
BOOTH, HELEN LIPPINCOTT,	*Education,*	Plainfield, N. J.
BOOTH, KATHERINE RAVI,		Old Bennington, Vt.
BOOTH, NORA RAVI,		Old Bennington, Vt.
BOOTH, ROBERT LIPPINCOTT,	*Phys. & Zoology,*	Plainfield, N. J.
BOSTON, GUY DOUGLAS,	*English,*	Berlin, Md.
BOWMAN, EDITH,		Irvington-on-Hudson, N. Y.
BOYER, HOWARD EAVENSON,	*Economics,*	Reading.
BRECHT, ELINOR,	*German,*	Norristown.
BRECHT, JOHN MORGAN,	*Phys. & Zoology,*	Norristown.
BRECHT, SARAH W.,	*English,*	Norristown.
BRIGGS, BARBARA,	*English,*	Yonkers, N. Y.
BRINGHURST, LOUIS S.,	*Phys. & Zoology,*	Felton, Del.
BRINTON, MARGARET HICKMAN,	*English,*	Oxford.
BROOKE, HELEN CAROLINE,	*English,*	Baltimore, Md.
BROOMELL, KENNETH FOSTER,	*English,*	Chicago, Ill.
BROUGHER, MARION ELIZABETH,	*French,*	Wellsville.
BROWN, HARRY FRANKLIN,	*Pol. Science,*	Las Cruses, N. Mex.
BROWN, HOWARD FRANCIS,	*Economics,*	Buffalo, N. Y.
BROWN, THOMAS MCPHERSON,	*Phys. & Zool. Hon.,*	Washington, D. C.
BUCKWELL, DONALD EVERETT,	*English,*	Brooklyn, N. Y.
BURCH, ELEANOR STEWART,	*English,*	Philadelphia.
BURTON, IRWIN GWYNNE,	*Economics,*	Philadelphia.
BURR, JAMES BURGETT,	*Pol. Science,*	Riverton, N. J.
CALHOUN, HELEN PAULINE,	*History,*	Norwood.
CALHOUN, JOSEPH DUKES,	*Soc. Sci. Honors,*	Norwood.
CALVERT, MARJORIE MCGEE,		Rutherford, N. J.
CALWELL, RUTH,	*Soc. Sciences,*	Philadelphia.
CARTER, HAROLD FREDERICK,	*Soc. Sci. Honors,*	Port Monmouth, N. J.
CASTLE, REBECCA SCHOCH,	*English,*	Wayne.
CHAMBERS, ELISABETH HOOGLAND,	*English,*	New Lisbon, N. J.
CHAMBERS, THOMAS SEAL,	*Chemistry,*	Reading.
CHANDLER, LINDA ALICE,	*Mathematics,*	Baltimore, Md.
CHAPMAN, ANNE STEVENSON,		Brooklyn, N. Y.
CHAPMAN, MARIANA,	*Phys. & Zoology,*	Pleasantville, N. Y.
CHRISTIAN, FRANK SHARP,	*Economics,*	Ithan.
CLACK, ELIZABETH,	*History,*	Havre, Mont.
CLEAVER, RUTH BLACKBURN,	*English Honors,*	Rutledge.
CLEPHANE, JOHN WALKER,		Chevy Chase, Md.
CLEPPER, W. WENDELL,	*English,*	Sharon.

Name	Major Subject	Address
CLEVELAND, WILLIAM HENRY, JR.,	*English,*	Tulsa, Okla.
CLINE, RUTH ANTES,		Easton.
CLOUGH, MARY HELEN,		Poultney, Vt.
COCKLIN, HELEN ECKELS,	*French,*	Flushing, N. Y.
COHEN, JOHN THOMAS, JR.,	*Civil Engin.,*	Chester.
COHEN, MYER, JR.,	*Soc. Sci. Honors,*	Washington, D. C.
COLEMAN, PHILIP E.,	*Economics,*	Swarthmore.
COLEMAN, WALTER BARTON,	*Economics,*	New York, N. Y.
COLES, HENRY B., JR.,	*Pol. Science,*	Moorestown, N. J.
COLES, MARVIN ROBERTS,	*English,*	Moorestown, N. J.
COLES, OLIVER HAMMOND,	*Botany,*	Woodstown, N. J.
COLLINS, MARION H.,	*English,*	Merchantville, N. J.
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Name	Major Subject	Address
SNYDER, HAROLD EDWARD,	*Soc. Sci. Honors,*	Cincinnati, Ohio.
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STAUFFER, RUTH CAROLINE,		Harrisburg.
STECKEL, JOSEPHINE,	*English,*	Bloomfield, Iowa.
STERN, SOPHIE MATHILDE,	*English,*	Philadelphia.
STICKNEY, DAVID WALTER,	*Economics,*	Montclair, N. J.
STIDHAM, SARA LOUISE,	*French,*	Washington, D. C.
STIDHAM, SHALER,	*Philosophy,*	Washington, D. C.
STIEGLITZ, WILLIAM IRVING,	*Engineering,*	Highland Park, Ill.
STIRLING, ELIZABETH SMYTH,		Wilmington, Del.
STOKES, JOHN H., JR.,	*Phys. & Zoology,*	Swarthmore.
STOUT, ALICE ADELINE,	*History,*	Memphis, Tenn.
STRATTON, VIRGINIA BARNES,	*Education,*	Neosho, Mo.
STRONG, PAUL THEODORE,	*Phys. & Zoology,*	Vineland, N. J.
SULLIVAN, JOSEPH THOMAS,	*Economics,*	Elkins Park.
SUNDERLAND, DOUGLAS AYKROYD,	*Phys. & Zoology,*	Glenside.
SWAIN, HENRY GEORGE,	*Math. Honors,*	East Orange, N. J.
TAYLOR, CLARA BOND,	*Phys. & Zoology,*	Swarthmore.
TAYLOR, JACKSON,	*Economics,*	Swarthmore.
TAYLOR, WILLIAM, JR.,	*Pol. Science,*	Media.
TEMPLE, MARY BEAUMONT,	*Soc. Sci. Honors,*	Swarthmore.
TERRY, EUNICE GOLDING,	*Chemistry,*	Trenton, N. J.
TESTWUIDE, ROBERT LOUIS,	*Economics,*	Sheboygan, Wis.
THOMPSON, BETTY LOUISE,	*English,*	Kennett Square.
THOMPSON, KATHARINE EASTBURN,		Philadelphia.
THOMSON, HAROLD BROWN,	*Pol. Science,*	Basking Ridge, N. J.
TILY, LILY,	*French,*	Bala-Cynwyd.
TOMASSETTI, ALFONSO,	*Engineering,*	Camden, N. J.
TOWNSEND, HELEN,	*English,*	Montclair, N. J.
TREMAIN, JOSEPHINE MARIA,	*English,*	Washington, D. C.
TROLL, HARADON W.,	*Economics,*	St. Clairsville, Ohio.

Name	Major Subject	Address
TURNER, DONALD CARRÉ,	*Engineering,*	Swarthmore.
TURNER, HOWARD HAINES,		Brooklyn, N. Y.
TURNER, RICHARD TOWNSEND,	*Engineering,*	Swarthmore.
TURNER, SELINA ELIZABETH,	*English,*	Chester.
TYLER, MARY WOOLMAN,		Riverton, N. J.
TYSON, WILLIAM ROBERT,	*Chemistry,*	Pottsville.
UNDERWOOD, MILDRED L.,	*English,*	Pottsville.
VANSANT, WILBUR MONROE, JR.,		Philadelphia.
VEASEY, WANDA MAY,	*English Honors,*	Pocomoke, Md.
VISKNISKKI, DAULTON G.,	*Engineering,*	Pittsburgh.
VONAMMON, WINONA,	*Phys. & Zool. Hon.,*	Washington, D. C.
WAGNER, HAROLD EDMUND,	*Economics,*	Darien, Conn.
WALKER, SAMUEL HELLYER,	*Chemistry,*	Hatboro.
WALLING, ROSAMOND ENGLISH,	*Social Sciences,*	Greenwich, Conn.
WALLS, ELIZABETH PHILLIPS,	*English,*	Swarthmore.
WALTER, JOSEPH H., JR.,	*Economics,*	Swarthmore.
WALTON, JANET,		Oxford.
WALTON, JEAN,	*French,*	Swarthmore.
WALTON, LEWIS EDWIN,	*Economics,*	Moorestown, N. J.
WALTON, LOUIS STOCKTON, JR.,		Altoona.
WALTON, MARGARET BROSIUS,	*English,*	George School.
WALTON, MARY,	*French,*	Swarthmore.
WARDELL, ALICE JOSEPHINE,		Pleasantville, N. Y.
WEBSTER, MARIANA,		Gwynedd.
WEBSTER, MERRITT SAMUEL,	*Mathematics,*	Cheyney.
WEIGAND, FREDERICK GEORGE,	*Chem. Engin.,*	Philadelphia.
WEST, HELEN LOUISE,	*Chemistry,*	East Aurora, N. Y.
WESTWOOD, HOWARD CARTER,	*Economics,*	Tecumseh, Neb.
WHITE, FRANCIS FISHER,	*Pol. Science,*	Atlantic City, N. J.
WHITE, JOSIAH,	*Mech. Engin.,*	Atlantic City, N. J.
WICKERSHAM, WILLIAM BALDWIN,	*Engineering,*	Ardmore.
WILLIAMS, FRANK H.,	*Engineering,*	Dayton, Ohio.
WILLIAMS, MARGARET,	*French,*	Ridley Park.
WILLIAMS, MARY ALICE,	*Mathematics,*	Conshohocken.
WILLIS, MARY HELEN,		North Wales.
WILSON, HOUSTON,	*History,*	Milford, Del.
WILSON, RAYMOND HIRAM, JR.,	*Mathematics,*	Duncannon.
WILSON, ROBERT HENRY,	*English,*	Philadelphia.
WILSON, THOMAS ANDREW,	*Chemistry,*	Wilmington, Del.
WINDE, STANLEY IRVING,	*Engin. Honors,*	Waukesha, Wis.
WINDLE, LOUISE FAIRLAMB,	*History,*	West Chester.
WINDLE, SYLVIA CHALFONT,	*History,*	West Chester.
WOLF, DOROTHY FRANCES,	*Latin Honors,*	Chester.

Name	Major Subject	Address
WOOD, HOWARD JOHN,	*Chemistry,*	Edgemoor, Del.
WOOD, MARTHA MERION,	*English,*	Edgemoor, Del.
WOOD-SMITH, JANE MAXWELL,		Pittsburgh.
WOODMAN, MARTHA ELIZABETH,	*English,*	Middletown, N. Y.
WORTH, ANNA,		Claymont, Del.
WORTH, C. BROOKE,	*Phys. & Zoology,*	St. Davids.
WORTH, JOHN SHARPLESS,	*Economics,*	St. Davids.
WORTH, MARGARET,	*Soc. Sci. Honors,*	Claymont, Del.
WRIGHT, ORVILLE REISLER,	*Economics,*	Baltimore, Md.
YANG, JAY YONG,	*Elect. Engin.,*	Chester.
YARD, ELIZABETH HICKCOX,	*Soc. Sci. Honors,*	Evanston, Ill.
YARD, PRISCILLA STERLING,	*Philosophy,*	Evanston, Ill.
YERKES, LOUISE KINSEY,	*English Honors,*	Chicago, Ill.
YODER, RALPH WICKERSHAM,	*Economics,*	Richmond Hill, N. Y.
ZABRISKIE, MARGARET,	*Social Sciences,*	Ho-Ho-Kus, N. J.

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Kentucky	3
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Wisconsin	3
Georgia	2
Michigan	2
Oklahoma	2
Nebraska	2
Tennessee	2
Texas	2
Montana	2
Florida	1
Louisiana	1
Mississippi	1
Missouri	1
New Mexico	1
Utah	1
West Virginia	1
England	1
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HOLDERS OF THE JOSHUA LIPPINCOTT FELLOWSHIP

1893-94.

THOMAS ATKINSON JENKINS, A.B., 1887; Ph.B., University of Pennsylvania, 1888; Ph.D., Johns Hopkins University, 1894; Litt.D., Swarthmore College, 1922; Professor of the History of the French Language, University of Chicago.

BENJAMIN FRANKLIN BATTIN, A.B., 1892; studied in Berlin; Ph.D., Jena, 1900.

1894-95.

DAVID BARKER RUSHMORE, B.S., 1894; M.E., Cornell University, 1895; C.E., Swarthmore, 1897; Sc.D., 1923. Consulting Engineer.

1895-96.

HOWARD WHITE, JR., B.S., 1895; M.S., University of Michigan, 1896; C.E., Swarthmore, 1900. Deceased.

1896-97; 1897-98.

JOHN W. GREGG, B.L., 1894; A.M., Cornell University, 1898; LL.B., George Washington University, 1905. Lawyer.

1898-99.

ELLWOOD COMLY PARRY, B.L., 1897; studied in Berlin; M.L., Swarthmore, 1900; Ph.D., University of Pennsylvania, 1903. Professor of German and French, Central High School, Philadelphia.

1899-1900; 1900-01.

JOHN EDWIN WELLS, B.L., 1896; M.L., 1899; A.M., Columbia, 1900; Ph.D., Yale University, 1915. Head of the Department of English, Connecticut College for Women.

1901-02.

MARY GRAY LEIPER, B.L., 1899; studied in Berlin.

1902-03.

BIRD THOMAS BALDWIN, B.S., 1900; A.M., Harvard University, 1903; Ph.D., *Ibid.*, 1905. Deceased.

1903-04.

ALBERT COOK MYERS, B.L., 1898; M.L., 1901; studied in Universities of Wisconsin and Harvard. Historical Writer.

1904-05.

MARION VIRGINIA (PEIRCE) FRANK, A.B., Swarthmore, 1903; A.M., University of Chicago, 1904; studied in Ecole des Hautes Etudes, Sorbonne, and Collége de France in Paris, and in the Libraries of Madrid.

1905-06.

LEWIS FUSSELL, B.S., 1902; M.S., 1903; E.E. and Ph.D., University of Wisconsin, 1907. Professor of Electrical Engineering, Swarthmore College.

1906-07.

LOUIS NEWTON ROBINSON, A.B., 1905; Ph.D., Cornell University, 1911; studied in Universities of Halle and Berlin, 1906-07; Fellow in Cornell University, 1907-08. Director, with Russell Sage Foundation. Lecturer in Criminology, Swarthmore College.

1907-08.

SAMUEL COPELAND PALMER, A.B., 1895; A.M., 1907; A.M., Harvard University, 1909; Ph.D., *Ibid.*, 1912. Professor of Biology, Swarthmore College, Studied abroad 1927-28.

1908-09.

MARY ELIZA (NORTH) CHENOWETH, A.B., 1907; A.M., 1910; studied in Oxford University, England.

1909-10.

MARY TALBOT (JANNEY) COX, A.B., 1906; studied in University of Berlin, Germany.

1910-11.

SAMUEL COPELAND PALMER, A.B., 1895; A.M., 1907; A.M., Harvard University, 1909; Ph.D., *Ibid.*, 1912. Professor of Biology, Swarthmore College. Studied abroad 1927-28.

1911-12.

JOHN HIMES PITMAN, A.B., 1910; A.M., 1911; studied in University of California. Associate Professor of Mathematics and Astronomy, Swarthmore College.

1912-13.

IOLA KAY EASTBURN, B.L., 1897, A.M., University of Pennsylvania, 1907; Ph.D., *Ibid.*, 1913; Professor of German, Brenan College, Gainsville, Ga.

1913-14.

EDWIN ANGELL COTTRELL, A.B., 1907; A.M., Harvard University, 1913. Professor of Political Science, Leland Stanford Junior University.

1914-15.

FREDERICK MYERLE SIMONS, JR., A.B., 1909; A.M., 1912; studied in the University of Chicago. Deceased.

1915-16.

FRANK H. GRIFFIN, B.S., 1910; A.M., Columbia University, 1916. Chief Chemist, The Viscose Company, Marcus Hook, Pa.

1916-17.

RAYMOND T. BYE, A.B., 1914; A.M., Harvard University, 1915; Ph.D., University of Pennsylvania, 1918. Professor of Economics. University of Pennsylvania.

1917-18.

CHARLES J. DARLINGTON, A.B., 1915; A.M., 1916. Chemist with E. I. du Pont de Nemours & Company.

1918-19.

JOHN E. ORCHARD, A.B., 1916; A.M., Harvard University, 1920; Ph.D., *Ibid.*, 1923. Assistant Professor, Economic Geography, School of Business, Columbia University.

1919-20.

PAUL FLEMING GEMMILL, A.B., 1917; Ph.D., University of Pennsylvania, 1925; Assistant Professor of Economics, University of Pennsylvania.

1920-21.

JOSEPH EVANS SANDS, A.B., 1917; M.D., University of Pennsylvania, 1921. Physician.

1921-22.

DETLEV WULF BRONK, A.B., 1920; M.S., University of Michigan, 1922; Ph.D., *Ibid,* 1925. Professor of Physiology and Bio-Physics, Swarthmore College. Dean of Men.

1922-23.

DAVID MATHIAS DENNISON, A.B., 1921; A.M., University of Michigan, 1922; Ph.D., *Ibid.*, 1924. International Education Board Fellow, Copenhagen, Denmark, 1924-27. Assistant Professor of Physics, University of Michigan.

1923-24.

WILLIAM MORSE BLAISDELL, A.B., 1921; Ph.D., University of Pennsylvania, 1927. Studied in Paris. Instructor in Economics, Swarthmore College.

1924-25.

KATHARINE DENWORTH, A.B., 1914; M.A., Columbia University, 1921. Ph.D., *Ibid.*, 1927. Principal, Bradford Academy, Bradford, Mass.

1925-26.

GEORGE PASSMORE HAYES, A.B., 1918; A.M., Harvard University, 1920. Ph.D., *Ibid.*, 1927. Professor of English, Agnes Scott College, Decatur, Ga.

1926-27.

MARVIN YARD BURR, A.B., 1925; A.M., Columbia University, 1927. Graduate Student and Assistant in Elementary Education, Columbia University.

1927-28.

DOROTHY FLORENCE TROY, A.B., 1926; M.A., Columbia University, 1928. Instructor in English, Swarthmore College.

1928-29.

DOROTHEA A. KERN, A.B., 1927. Student at University of Chicago.

HOLDERS OF THE LUCRETIA MOTT FELLOWSHIP

1895-96.

HELEN BRIGHT (SMITH) BRINTON, A.B., 1895; studied in Oxford University; A.M., Swarthmore, 1899.

1896-97.

MARY STONE MCDOWELL, A.B., 1896; studied in Oxford University, A.M., Columbia University, 1903.

1897-98.

SARAH (BANCROFT) CLARK, B.S., 1897; studied in Newnham College, Cambridge.

1898-99.

EDNA HARRIET RICHARDS, B.L., 1898; studied in Berlin; A.M., Columbia University, 1904. Fellow and Instructor, University of Wisconsin, 1921-22. Teacher of German in High School.

1899-1900.

MARY ELIZABETH SEAMAN, A.B., 1899; studied in Newnham College, Cambridge; A.M., Adelphia College, 1905. Teacher.

1900-01.

ANNA GILLINGHAM, A.B., 1900; A.B., Radcliffe, 1901; A.M., Columbia University, 1910. Teacher in Ethical Culture School, New York, N. Y.

1901-02.

LILLIAN WINIFRED (ROGERS) ILLMER, A.B., 1901; studied in Berlin.

1902-03.

MARGARET HOOD (TAYLOR) SIMMONS, B.L., 1902; studied in Berlin University.

1903-04.

ANNIE ROSS, A.B., 1903; Ph.M., University of Chicago, 1904. Head of Department of French, High School, Flushing, L. I., N. Y.

1904-05.

CHARLOTTE RITZEMA (BOGERT) DOS SANTOS, A.B., 1904; A.M., Columbia University, 1905.

1905-06.

ELIZABETH HALL, A.B., 1905; A.M., Columbia University, 1906. Teacher of English, Media High School.

1906-07.

BERTHA CAROLINE PEIRCE, A.B., 1906; A.M., Cornell University, 1907. Teacher of Latin, Beaver College, Jenkintown, Pa.

1907-08.

JEANNETTE (CURTIS) CONS, A.B., 1907; A.M., 1909; studied in University of Berlin, Germany.

1908-09.

ELIZABETH SIKES (JAMES) NORTON, A.B., 1908; studied in University of Berlin, Germany; A.M., University of Pennsylvania, 1912; Ph.D., *Ibid.*, 1914.

1909-10.

HELEN HARRIET PORTERFIELD, A.B., 1909; studied in University of Chicago.

1910-11.

JEAN HAMILTON (WALKER) CREIGHTON, A.B., 1910; studied in University of Chicago.

1911-12.

ANNA HEYDT, A.B., 1911; A.M., Radcliffe College, 1912. Teacher of Latin and French, Keystone State Normal School, Kutztown, Pa.

1912-13.

CAROLINE HALLOWELL (SMEDLEY) COLBURN, A.B., 1912; A.M., 1918; studied in University of California.

1913-14.

ESTHER MIDLER, A.B., 1913; studied in University of Berlin, Germany. Social Worker.

1914-15.

MARIE SAFFORD (BENDER) DARLINGTON, A.B., 1914; A.M., University of Chicago, 1916.

1915-16.

REBA MAHAN (CAMP) HODGE, A.B., 1915; A.M., Radcliffe College, 1916.

1916-17.

ANNA M. MICHENER, A.B., 1916; A.M., Columbia University, 1917; Ph.D., *Ibid.*, 1921; Economic Research.

1917-18.

HILDA A. (LANG) DENWORTH, A.B., 1917; studied in University of Wisconsin; A.M., University of Pennsylvania, 1921.

1918-19.

EDITH W. (MENDENHALL) HAYES, A.B., 1918; A.M., Columbia University, 1919.

1919-20.

GLADYS AMANDA REICHARD, A.B., 1919; A.M., Columbia University, 1920; Research Fellow in Anthropology, University of California, 1922-23; Ph.D., Columbia University, 1925; Holder of John Simon Guggenheim Fellowship for 1926-27. Studied at Hamburg, Germany. Instructor in Anthropology, Barnard College, Columbia University.

1920-21.

HENRIETTA ALBERT SMITH, A.B., 1920.

1921-22.

ALINE MATHIESON (WOODROW) ROBERTSON, A.B., 1921; studied in University of Glasgow, Scotland.

1922-23.

HENRIETTA IDA (KELLER) HOWELL, A.B., 1922; A.M., Radcliffe College, 1923. Teacher of English, Simon Gratz High School, Philadelphia, Pa.

1923-24.

GERTRUDE MALZ, A.B., 1923; A.M., University of Wisconsin, 1924; Ph.D., *Ibid.*, 1928. Teacher of Latin, Phebe Anna Thorne School, Bryn Mawr, Pa.

1924-25.

GERTRUDE PAULA (KNAPP) RAWSON, A.B., 1924; studied in Somerville College, Oxford, England. Teacher.

1925-26.

MARGARET PITKIN, A.B., 1925; Ph.D., University of Chicago, 1928. Instructor in Romance Languages, Swarthmore College.

1926-27.

ALICE CAROLYN PAXSON, A.B., 1926. Studied at Radcliffe College.

1927-28.

CECILE (JARVIS) BROCHEREUX, A.B., 1927; M.A., University of Pennsylvania, 1928. Teaching French, Haverford School.

1928-29.

GERTRUDE SANDERS, A.B., 1928. Studying at University of Pennsylvania.

HOLDERS OF THE JOHN LOCKWOOD MEMORIAL FELLOWSHIP

1910-11.

EDWIN CARLETON MACDOWELL, A.B., 1909; studied in Harvard University; M.S., Harvard University, 1911; Sc.D., *Ibid.*, 1912. Investigator, Cold Spring Harbor.

1911-12.

HENRY FERRIS PRICE, A.B., 1906; A.M., University of Pennsylvania, 1913; Ph.D., *Ibid.*, 1915. Professor of Mathematics, Pacific University, Forest Grove, Oregon.

1912-13.

WALTER FRANK RITTMAN, A.B., 1908; A.M., 1909; M.E., 1911; Ch.E., 1917; Ph.D., Columbia University, 1914. Consulting Chemical Engineer, U. S. Government and State of Pennsylvania. Professor of Engineering, Carnegie Institute of Technology.

1913-14.

HELEN PRICE, A.B., 1907; Ph.D. University of Pennsylvania, 1915. Head of Latin and Greek Department, Meredith College, Raleigh, N. C.

1914-15.

HELEN HEED, A.B., 1905; A.M., Radcliffe College, 1915. Teacher of English, High School, Pleasantville, N. Y. 1925-26, student, Oxford University, England.

1915-16.

FRANCES DARLINGTON, A.B., 1896; A.M., University of Pennsylvania, 1916. Teacher.

1916-17.

RACHEL KNIGHT, B.L., 1898; A.M., 1909; Ph.D., University of Iowa, 1919. Deceased.

1917-18.

RALPH LINTON, A.B., 1915; A.M., University of Pennsylvania, 1916; Ph.D., Harvard University, 1925. Associate Professor of Sociology, University of Wisconsin.

1918-19.

WALTER HARRISON MOHR, A.B., 1914; A.M., University of Pennsylvania, 1921. Teacher, George School.

1919-20.

ESTHER E. BALDWIN, A.B., 1909; A.M., Columbia University, 1913. Teacher, South Philadelphia High School for Girls.

1920-21.

GEORGE PASSMORE HAYES, A.B., 1918; A.M., Harvard University, 1920. Ph.D., *Ibid.*, 1927. Acting Professor of English, Robert College, Constantinople, 1921-25. Professor of English, Agnes Scott College, Decatur, Ga.

1921-22.

FRANK WHITSON FETTER, A.B., 1920; A.M., University of Princeton, 1922; A.M., Harvard University, 1924. Ph.D., Princeton University, 1926. Teacher, Princeton University.

1922-23.

MARGARET (POWELL) AITKEN, A.B., 1919; A.M., 1921.

1923-24.

WALTER HALSEY ABELL, A.B., 1920; A.M., 1924; Professor of Art, Acadia University, Wolfville, Nova Scotia, Canada.

1924-25.

EDGAR Z. PALMER, A.B., 1919; Studied at University of Wisconsin. Assistant Professor in Economics, College of Commerce, University of Kentucky.

1925-26.

EMMA T. R. WILLIAMS, A.B., 1916. Graduate student, University of Chicago, 1925-26. Student, Harvard University Observatory.

1926-27.

MARGARET LYLE WALTON, (Mayall), A.B., 1925. Studying at Harvard Observatory.

1927-28.

ALICE P. GARWOOD, A.B., 1913.

1928-29.

JAMES ROLAND PENNOCK, A.B., 1927, Student Harvard University.

HOLDERS OF THE HANNAH A. LEEDOM FELLOWSHIP

1913-14.

ARTHUR PERCIVAL TANBERG, A.B., 1910; A.M., 1913; Ph.D., Columbia University, 1915. Chemist, E. I. du Pont de Nemours Co.

1914-15.

ARCHER TAYLOR, A.B., 1909; A.M., University of Pennsylvania, 1910; Ph.D., Harvard University, 1915. Professor of Germanic Languages, University of Chicago.

1915-16.

HAROLD S. ROBERTS, A.B., 1912; A.M., Princeton University, 1915; student in the University of Wisconsin, 1915-17. Teacher of French and Spanish, Rutgers Preparatory School, New Brunswick, N. J.

1916-17.

HANNAH B. (STEELE) PETTIT, A.B., 1909; A.M., 1912; Ph.D., University of Chicago, 1919. Astronomer.

1917-18.

JAMES MONAGHAN, JR., A.B., 1913; A.M., University of Pennsylvania, 1918.

1918-19.

CHARLOTTE (BREWSTER) JORDAN, B.L., 1882; M.L., 1886; studied in Madrid, Spain. Translator and writer.

1919-20.

PAUL M. CUNCANNON, A.B., 1915; A.M., Princeton University, 1920; Ph.D., Princeton, 1925. Instructor in Political Science, University of Michigan.

1920-21.

WILLIAM CHRISTIE MACLEOD, A.B., 1914; Ph.D., University of Pennsylvania, 1924. Instructor, Wharton School, University of Pennsylvania.

1921-22.

LEON M. PEARSON, A.B., 1920; A.M., Harvard University, 1922. Teacher, Oral English, Haverford School, Haverford, Pa.

1922-23.

W. RALPH GAWTHROP, A.B., 1918; M.S., University of Pennsylvania, 1924. Chemist, Lazote, Inc.

1923-24.

WILLARD S. ELSBREE, A.B., 1922; A.M., Columbia University, 1924; Ph.D., *Ibid.*, 1928. Assistant Professor of Education, Teachers' College, Columbia University.

1924-25.

WALTER ABELL, A.B., 1920; A.M., 1924. Studied in France. Professor of Art, Acadia University, Wolfville, Nova Scotia, Canada.

1926-27.

MARGARET PITKIN, A.B., 1925; Ph.D., University of Chicago, 1928. Instructor in Romance Languages, Swarthmore College.

1927-28.

AUDREY SHAW BOND, A.B., 1926; M.A., University of Chicago, 1928. Assistant, Department of Romance Languages, University of Illinois.

1928-29.

SAMUEL ROBERT M. REYNOLDS, A.B., 1927. Student at University of Pennsylvania.

HOLDERS OF THE MARTHA E. TYSON FELLOWSHIP

1914-15.

HELEN PRICE, A.B., 1907; Ph.D., University of Pennsylvania, 1915. Head of Latin and Greek Department, Meredith College, Raleigh, N. C.

1915-16.

ANNE SHOEMAKER (HAINES) MARTIN, A.B., 1912; A.M., University of Wisconsin, 1916.

1916-17.

KATHERINE PROCTER (GREEN) VINCENT, A.B., 1907; A.M., Columbia University, 1917. Teacher of Latin in High School, Flushing, N. Y.

1917-18.

CHARLOTTE (BREWSTER) JORDAN, B.L., 1882; M.L., 1886; studied in Madrid, Spain. Translator and writer.

1918-19.

EDNA ANNA TYSON, A.B., 1909; A.M., Columbia University, 1919. Teacher of English in High School, Newark, N. J.

1919-20.

DOROTHEA GILLETTE, A.B., 1914; A.M., Columbia University, 1920. Teacher of English, Friends' Central School, Philadelphia, Pa.

1920-21.

BEULAH (DARLINGTON) PRATT, A.B., 1890; A.M., Teachers College Columbia University, 1922. Principal, Friends' School, West Chester, Pa.

1921-22.

RHODA A. LIPPINCOTT, A.B., 1917; A.M., Columbia University, 1922. Teacher of French, Madison, N. J., High School.

1922-23.

GRACE COCHRAN, A.B., 1917. Student, Certificat d' Aptitude d' enseigner le français à l'étranger, Sorbonne, France, 1922. Head of Department of Modern Languages, West Chester, Pa., High School.

1923-24.

MILDRED E. (WILLARD) FRY, A.B., 1920; A.M., University of Pennsylvania, 1924.

1924-25.

CAROLINE E. MYRICK, A.B., 1914; A.M., Radcliffe College, 1916. Teacher.

1925-26.

HELEN E. HOWARTH, A.B., 1920; M.A., Smith College, 1926. Student, Harvard University Observatory.

1926-27.

DOROTHY (PLACK) PUCTA, A.B., 1911; M.A., University of Pennsylvania, 1927. Principal, Canistota, S. D., High School.

1927-28.

EMMA T. R. WILLIAMS, A.B., 1916. Student, Harvard University Observatory.

1928-29.

EDNA JEAN PROSSER, A.B., 1926. Studying at University of Wisconsin.

HOLDERS OF THE IVY MEDAL*

1898. ANNA BELLE EISENHOWER, A.B., 1899; A.B., Radcliffe College, 1900; A.M., *Ibid.*, 1907.
1899. MARY G. LEIPER, B.L., 1899.
1900. MARY S. HAVILAND, B.L., 1900; A.B., Radcliffe, 1901.
1901. GEORGE A. SEAMAN, A.B., 1901. Deceased.
1902. ELLIOTT RICHARDSON, B.S., 1902; C.E., 1905.
1903. SAMUEL T. STEWART, A.B., 1903.
1904. HALLIDAY R. JACKSON, A.B., 1904.
1905. LOUIS N. ROBINSON, A.B., 1905; Ph.D., Cornell University, 1911.
1906. T. H. DUDLEY PERKINS, A.B., 1906. Deceased.
1907. AMOS J. PEASLEE, A.B., 1907; LL.B., Columbia University, 1911.
1908. HERMAN PRITCHARD, B.S., 1908; A.M., 1911.
1909. WALTER F. RITTMAN, A.B., 1908; A.M., 1909; M.E., 1911; Ch.E., 1917; Ph.D., Columbia University, 1914.
1910. JOHN E. JOHNSON, B.S., 1910.
1911. JOSEPH H. WILLITS, A.B., 1911; A.M., 1912; Ph.D., University of Pennsylvania, 1916.
1912. HERMAN ELLIOTT WELLS, B.S., 1912.
1913. HENRY LEE MESSNER, A.B., 1913.
1914. ALBERT ROY OGDEN, A.B., 1914. Deceased.
1915. THOMAS BAYARD MCCABE, A.B., 1915.
1916. HUGH FREDERICK DENWORTH, A.B., 1916; A.M., University of Pennsylvania, 1918.
1917. WILLIAM WEST TOMLINSON, A.B., 1917.
1918. FREDERICK STOCKHAM DONNELLY, A.B., 1918.
1919. CHARLES MANLY HOWELL, A.B., 1919.
1920. DETLEV WULF BRONK, A.B., 1920; M.S., University of Michigan, 1922; Ph.D., *Ibid.*, 1925.
1921. ALAN C. VALENTINE, A.B., 1921; A.M., University of Pennsylvania, 1922. Rhodes Scholar, B.A. (Honors) Oxford University, 1925.
1922. RICHARD WILLIAM SLOCUM, A.B., 1922; LL.B., Harvard University, 1925.
1923. ARTHUR JOY RAWSON, A.B., 1923.
1924. RICHMOND PEARSON MILLER, A.B., 1924.
1925. MARVIN YARD BURR, A.B., 1925; A.M., Columbia University, 1927.
1926. RICHARD MELVILLE PERDEW, A.B., 1926.
1927. JAMES ROLAND PENNOCK, A.B., 1927.
1928. DOUGLASS WINNETT ORR, A.B., 1928.

* The terms of the award of this medal are found in an earlier part of the catalogue.

OAK LEAF MEDAL *

1922. Barbara (Manley) Philips, A.B., 1922.
1923. Isabelle Shaw (Fussell) Ewing, A.B., 1923.
1924. Gertrude Paula (Knapp) Rawson, A.B., 1924.
1925. Inez Victoria Coulter, A.B., 1925.
1926. Lydia Williams Roberts, A.B., 1926.
1927. Katharine Josephine Snyder, A.B., 1927.
1928. Margaret Somerville, A.B., 1928.

* The terms of the award of this medal are found in an earlier part of the catalogue.

DEGREES CONFERRED IN 1928

BACHELOR OF ARTS WITH HONORS

In the Division of English Literature

ELLIS GRAHAM BISHOP (with High Honors).....Swarthmore.
ALICE ELISABETH FOLLWELL (with Honors).....Maplewood, N. J.
ELIZABETH BENDER MOFFITT (with Honors).....Philadelphia.
DOUGLASS WINNETT ORR (with High Honors)....Lincoln, Neb.
EDNA MARGARET SHOEMAKER (with Honors).....Norristown.
ELLA VIRGINIA WALKER (with Honors).....Norristown.
MARIETTA WATSON (with High Honors).....Merion.

In the Division of the Social Sciences

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ANNE KENNEDY (with Honors).....New York, N. Y.
ALEXANDER DUNCAN MACDOUGALL (with Honors)..Summit, N. J.
ROBERT LEWIS SILBER (with High Honors).....Chicago, Ill.
NEWLIN RUSSELL SMITH (with Honors).....Swarthmore.
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MARIAN BALDWIN PRATT (with High Honors)....West Chester.
HENRY ALBERT SMITH (with Highest Honors)....Rutledge.

In the Division of Mathematics, Astronomy and Physics

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HOLBROOK MANN MACNEILLE (with Highest Honors) Summit, N. J.
EDWARD SELLERS (with Highest Honors).....Swarthmore.
MARY WRIGHT (with Honors).....Norristown.

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MARY SCOTT SPILLER (with High Honors).....Swarthmore.

In the Division of Physiology-Zoology

WILLIAM THOMAS BRANEN (with Honors).....Lewistown.
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In Electrical Engineering

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THOMAS HENRY LATIMER FOSTER.....Beaver.
MARTHA GIBBONS .....Upper Darby.
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THEODORE EGBERT NICKLES, JR.....Philadelphia.
LUTE LEE OWREY.....Swarthmore.
HENRY THOMAS PAISTE, JR.....Philadelphia.
MALCOLM BRUCE PETRIKIN.....Chester.
RUEY MAY SIEGER.....Lancaster.
THEODORE SMITHERS .....Philadelphia.
RAYMOND ALBERT TOWNLEY.....Newark, N. J.
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ELISABETH WINIFRED RUMBLE.....Rutledge.
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ANNA ELIZABETH WILLIS.....North Wales.
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RUTH EDITH KERN.....Philadelphia.
GERTRUDE NAOMI TAYLOR.....West Chester.

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FRANCES EYSTER DOWDY.....Philadelphia.
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CARL ALFRED ARENANDER.....Newark, N. J.

With the Major in Electrical Engineering

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With the Major in General Engineering

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CHARLES EDWIN RICKARDS.....Moore.

With the Major in Physiology

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CIVIL ENGINEER

JAMES STRAWBRIDGE MAFFITT, III, A.B.....Swarthmore College, 1925.

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