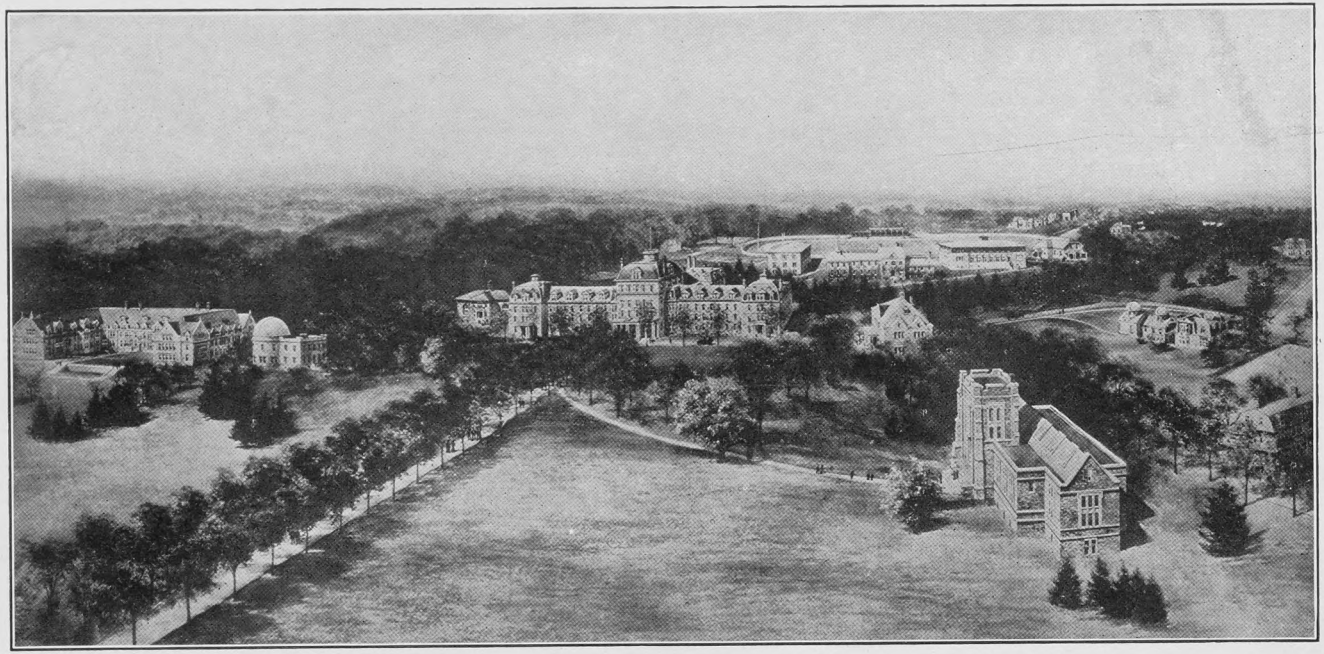
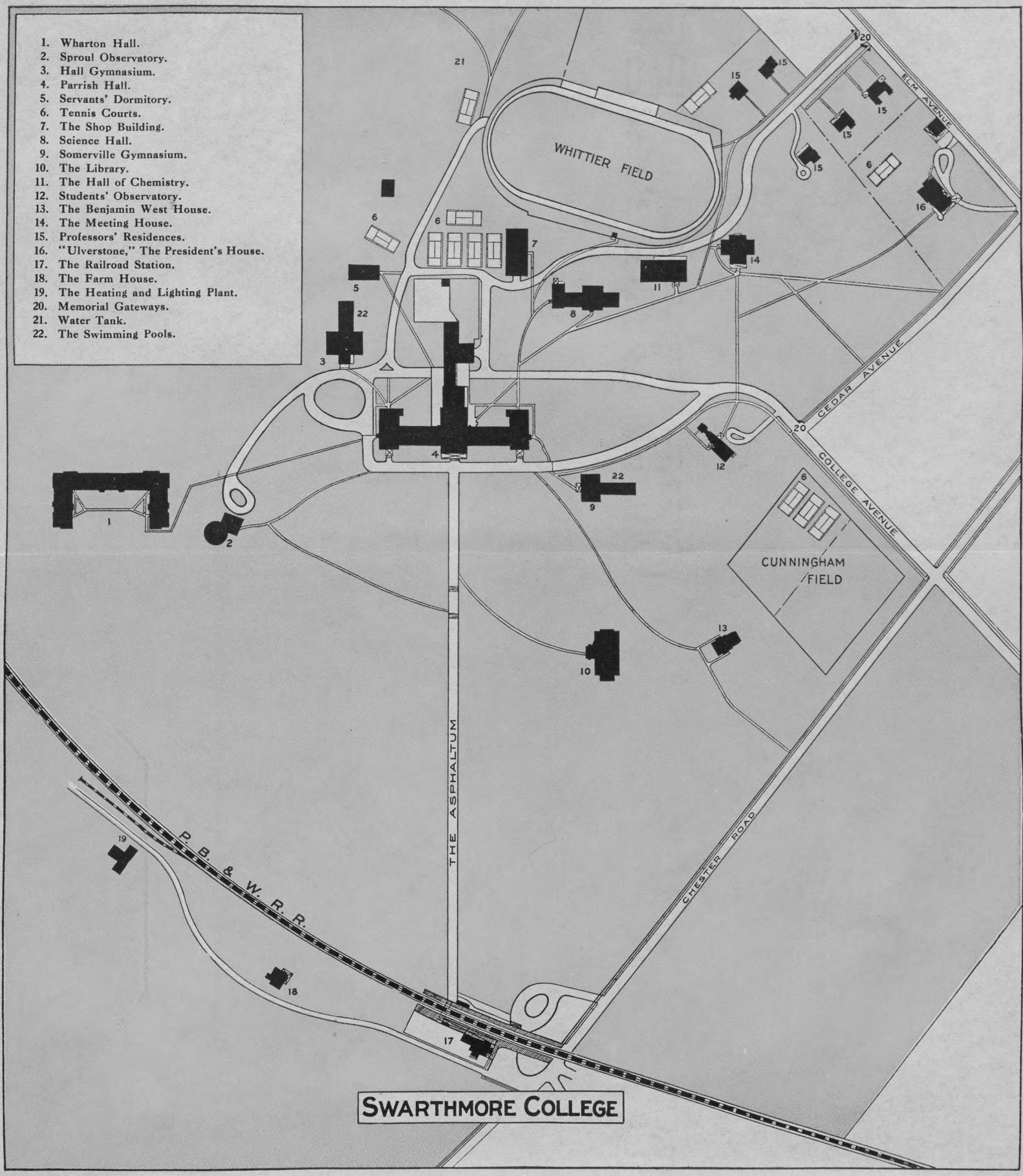


SWARTHMORE COLLEGE


1. Wharton Hall.
2. Sproul Observatory.
3. Hall Gymnasium.
4. Parrish Hall.
5. Servants' Dormitory.
6. Tennis Courts.
7. The Shop Building.
8. Science Hall.
9. Somerville Gymnasium.
10. The Library.
11. The Hall of Chemistry.
12. Students' Observatory.
13. The Benjamin West House.
14. The Meeting House.
15. Professors' Residences.
16. "Ulverstone," The President's House.
17. The Railroad Station.
18. The Farm House.
19. The Heating and Lighting Plant.
20. Memorial Gateways.
21. Water Tank.
22. The Swimming Pools.
WHITTIER FIELD
ELM AVENUE
CEDAR AVENUE
COLLEGE AVENUE
CUNNINGHAM FIELD
THE ASPHALTUM
P. B. & W. R. R.
CHESTER ROAD
SWARTHMORE COLLEGE

SWARTHMORE COLLEGE

SWARTHMORE COLLEGE BULLETIN

CATALOGUE NUMBER

FORTY-SEVENTH YEAR

1915-1916

Founders' Day, 1915

Gifts and Bequests

Wharton Hall

General College Information

SWARTHMORE, PENNSYLVANIA

Printed for the College

Vol. XIII. No. 2. Twelfth Month, 1915

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Printed by the Franklin Printing Company
Philadelphia, Pa.
1915

SWARTHMORE COLLEGE

1915-16

FOUNDERS' DAY, 1915

The eighth annual celebration of Founders' Day occurred this year on October 23. The occasion was marked by the usual academic procession of guests, faculty, students, and prospective students down to and including the Class of 1935; by addresses in the out-door auditorium; by a Tea and Reception to the invited guests in the Library; by the planting of an oak tree on the campus; by a foot-ball game with Franklin and Marshall and by a play presented in the evening by the students in Parish Hall.

In order to indicate the historical union and co-operation of the two Quaker commonwealths of Pennsylvania and Delaware, the governors of these two states participated in the programme of exercises in the out-door auditorium. Robert M. Janney, President of the Board of Managers, gave an introductory address in which he outlined the ideals of the Quaker founders of both the state and college. Governor Miller made a historical address on the important and permanent value of William Penn's contributions to the law and government of Delaware. Governor Brumbaugh dwelt upon the great Quaker and American ideals of conduct in personal and social life, and in the development of education both public and private.

This coöperation of the chief executives of Pennsylvania and Delaware in celebrating the occasion was further emphasized by their joint planting of an oak tree in the Presidents' and Governors' Row on the College Campus.

The celebration of Founders' Day this year may therefore be considered somewhat in the light of a precedent for the future coöperation of all three of the Quaker commonwealths, namely, Pennsylvania, Delaware and New Jersey; and perhaps the occasion may be so widened in the future as to provide for the expression of the fundamental ideals in the founding of other American commonwealths as well.

BEQUESTS AND GIFTS

By the will of the late Wilson M. Powell, of New York, one thousand dollars was bequeathed to the College, and this amount has been added to the General Endowment Fund. The class of 1894 made a gift to the College on the twentieth anniversary of their graduation, of an avenue of scarlet oaks bordering the walk from the railway station to Wharton Hall, and about two hundred conifers, deciduous trees and shrubs which have been planted on the southwest campus.

WHARTON HALL

The third and last section of Wharton Hall, the men's dormitory, is now being built and it is expected that the building will be ready for use in September, 1916. When the new section is completed there will be quarters for about two hundred and ten men in residence, which with the day students would provide for two hundred and fifty men. The plans call for two large rooms in the basement of the new section. These rooms will be used for meeting places for the men.

SWARTHMORE COLLEGE CATALOGUE

FORTY-SEVENTH YEAR

1915-1916

SESSION DAYS OF COLLEGE IN BOLD-FACE TYPE

1916

January

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October

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1917

January

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February

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March

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April

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27	**28**	**29**	**30**	**31**		

June

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24	25	26	27	28	29	30

COLLEGE CALENDAR

1916

First Month 4.....Third-day ....College Work resumes at 8.00 A. M.
First Month 31.....Second-day ...Mid-year Examinations begin.
Second Month 4.....Sixth-day .....Registration and Enrollment in Classes for the Second Semester.
Second Month 5.....Seventh-day ...First Semester ends.
Second Month 7.....Second-day ...Second Semester begins.
Third Month 14.....Third-day .....Meeting of Board of Managers.
Third Month 24.....Sixth-day .....College Work ends at 4.00 P. M. for the Spring Recess.
Fourth Month 4.....Third-day ....College Work resumes at 8.00 A. M.
Sixth Month 2.....Sixth-day .....Final Examinations begin.
Sixth Month 9.....Sixth-day .....Meeting of Board of Managers.
Sixth Month 9.....Sixth-day .....Class Day.
Sixth Month 10.....Seventh-day ...Alumni Day.
Sixth Month 11.....First-day .....Baccalaureate Day.
Sixth Month 12.....Second-day ...*Commencement.*
Sixth Month 13 to Ninth Month 19..*Summer Recess.*
Ninth Month 18.....Second-day ...Examinations for Admission.
Ninth Month 19.....Third-day .....Matriculation, Registration and Enrollment in Classes.
Ninth Month 19.....Third-day .....Examinations for Admission.
Ninth Month 20.....Fourth-day ...Examinations for Admission.
Ninth Month 20.....Fourth-day ...College Work begins at 8.00 A. M.
Tenth Month 3.....Third-day .....Meeting of Board of Managers.
Tenth Month 28.....Seventh-day ...Founders' Day. College Work suspended for the day.
Eleventh Month 29...Fourth-day ...College Work ends at 1.00 P. M. for the Thanksgiving Recess.
Twelfth Month 4....Second-day ...College Work resumes at 8.00 A. M.
Twelfth Month 5....Third-day ....*Annual Meeting of Corporation.*
Twelfth Month 20...Fourth-day ...College Work ends at 4.00 P. M. for the Christmas Recess.

1917

First Month 4.....Fifth-day .....College Work resumes at 8.00 A. M.
First Month 29.....Second-day ...Mid-year Examinations begin.
Second Month 2.....Sixth-day .....Registration and Enrollment in Classes for the Second Semester.
Second Month 3.....Seventh-day ...First Semester ends.
Second Month 5.....Second-day ...Second Semester begins.
Second Month 22....Fifth-day .....College Work suspended for the day.
Third Month 13.....Third-day ....Meeting of Board of Managers.

Third Month 23.....	Sixth-day	College Work ends at 4.00 P. M. for the Spring Recess.
Fourth Month 3.....	Third-day	College Work resumes at 8.00 A. M.
Sixth Month 1.....	Sixth-day	Final Examinations begin.
Sixth Month 8.....	Sixth-day	Class Day.
Sixth Month 8.....	Sixth-day	Meeting of Board of Managers.
Sixth Month 9.....	Seventh-day ...	Almuni Day.
Sixth Month 10.....	First-day	Baccalaureate Day.
Sixth Month 11.....	Second-day ...	*Commencement Day.*

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BOARD OF MANAGERS

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Term expires Twelfth Month, 1916

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Term expires Twelfth Month, 1918

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Term expires Twelfth Month, 1919

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PHILIP M. SHARPLES,
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ROBERT PYLE,
MARIANNA S. RAWSON,
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HETTY LIPPINCOTT MILLER,
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HOWARD W. LIPPINCOTT,
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LUCY BIDDLE LEWIS, WILLIAM W. COCKS.

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EMMA MCILVAIN COOPER, ABIGAIL FOULKE PIM,
JOANNA W. LIPPINCOTT, HETTY LIPPINCOTT MILLER,
MARY HIBBARD THATCHER.

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EMMA C. BANCROFT, MARY W. ALBERTSON,
CAROLINE H. WORTH, GEORGE M. LAMB, JR.,
CHARLES F. JENKINS.

THE FACULTY

President

JOSEPH SWAIN, *President of the College,*....''Ulverstone,'' College Campus

B.L., Indiana University, 1883; M.S., 1885; LL.D., Wabash College, 1893; LL.D., Lafayette College, 1911; LL.D., University of Pennsylvania, 1912; student of Mathematics and Astronomy, University of Edinburgh, 1885-86. Instructor in Mathematics and Zoölogy, Indiana University, 1883-85; Assistant U. S. Fish Commissioner, 1884; Professor of Mathematics, Indiana University, 1886-91; Professor of Mathematics, Leland Stanford Junior University, 1891-93; President of Indiana University, 1893-1902. Member of National Council of Education; Member of National Council of Religious Education; Member Board of Trustees, World's Peace Foundation; President, Public Education Association of Philadelphia; President of the National Education Association, 1913-14. President of Swarthmore College from 1902.

Vice President

JOHN ANTHONY MILLER, *Edward H. Magill Professor of Mathematics and Astronomy,*.....Cunningham House, College Campus

A.B., Indiana University, 1890; A.M., Leland Stanford Junior University, 1893; Ph.D., University of Chicago, 1899. Graduate Student, University of Chicago, 1895-97, and summer term, 1898. Instructor in Mathematics, Indiana University, January to June, 1890; Superintendent of Schools, Rockville, Ind., 1890-91; Instructor in Mathematics, Leland Stanford Junior University, 1891-92; Assistant Professor of Mathematics, 1893-94; Acting Professor of Mathematics, Indiana University, 1894-95; Professor of Mechanics and Astronomy, 1895-1906. Professor of Mathematics and Astronomy, Swarthmore College, from 1906. Vice President, from 1914.

Dean of Women

HENRIETTA JOSEPHINE MEETEER, *Assistant Professor of Greek,*..Parrish Hall

A.B., Indiana University, 1901; Ph.D., University of Pennsylvania, 1904. Frances Sergeant Pepper Fellow in Classical Languages, University of Pennsylvania, 1901-04. Dean of Women, University of Colorado, 1904-06. Dean of Swarthmore College, 1906-13; Assistant Professor of Greek, from 1909. Dean of Women, from 1913.

Dean

WILLIAM ALBERT ALEXANDER,.....Benjamin West House, College Campus

A.B., Indiana University, 1901. Library Assistant in Charge of Reference Department, Indiana University, 1901-05. Acting Instructor in History, Swarthmore College, 1907-08; Registrar, Swarthmore College, 1905-13. Dean, from 1913.

ELIZABETH POWELL BOND, *Dean Emeritus,*.....
6300 Greene Street, Germantown, Philadelphia

A.M., Hon., Swarthmore College, 1897. Dean of Swarthmore College, 1886-1906.

ARTHUR BEARDSLEY, *Emeritus Professor of Engineering, and Librarian of the Friends' Historical Library,*.....301 College Ave.

C.E., Rensselaer Polytechnic Institute, 1867; Ph.D., Hon., Swarthmore College, 1889. Instructor in Mathematics and Engineering, University of Minnesota, 1869-70; Professor of Civil Engineering, 1870-72. Professor of Engineering, Swarthmore College, 1872-98.

WILLIAM HYDE APPLETON, *Emeritus Professor of the Greek Language and Literature,*.....The Clinton, Tenth and Clinton Sts., Philadelphia

A.B., Harvard University, 1864; A.M., 1867; LL.B., 1869; Ph.D., Hon., Swarthmore College, 1888; LL.D., Swarthmore College, 1912; student of Greek and Philology, Universities of Berlin and Bonn, 1870-71; Athens, 1881-82. Tutor in Greek, Harvard University, 1868-70. Professor of Greek and German, Swarthmore College, 1872-88; Acting President and President, 1889-91; Professor of Greek and Early English, 1891-1905; Professor of the Greek Language and Literature, 1905-09.

SUSAN J. CUNNINGHAM, *Emeritus Professor of Mathematics and Astronomy,*.....107 N. Thirty-fourth Street, Philadelphia

Sc.D., Hon., Swarthmore College, 1888. Special student at Vassar College, 1866-67; student under Professor of Astronomy at Harvard University during the summers of 1874 and 1876; at Princeton College, in the summer of 1881; at Williams College, the summers of 1883 and 1884; student in Mathematics under private coach at Newnham College, Cambridge, England, during the long vacation term of the summers of 1877, 1878, 1879, and 1882; student at the Observatory of Cambridge, England, during the summer of 1887, and at Greenwich Observatory, the summer of 1891; student at the University of Chicago during the first half of the summer quarters of 1894 and 1895. Instructor in Mathematics, Swarthmore College, 1869-72; Assistant Professor, 1872-74; Professor, 1874-1906.

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

C.E., Union College, 1874; A.B., 1874; A.M., 1877; Sc.D., 1907. Professor of Physics, Swarthmore College, 1888-1914. Vice President, 1892-1914.

SPENCER TROTTER, *Professor of Biology,*.....''Pennyscroft,'' Cheyney, Pa.

M.D., University of Pennsylvania, 1883. Jessup Fellow, Philadelphia Academy of Natural Sciences, 1878-80; Resident Physician and Surgeon, Pennsylvania Hospital, 1883-85; Lecturer in Zoölogy in the Wagner Free Institute of Science, Philadelphia. Professor of Biology and Geology, Swarthmore College, from 1888.

WILLIAM ISAAC HULL, *Isaac H. Clothier Professor of History and International Relations,*.....504 Walnut Lane

A.B., Johns Hopkins University, 1889; Ph.D., 1892. Student of History, Universities of Berlin, 1891, and Leyden, 1907. Associate Professor of History and Economics, Swarthmore College, 1892-94; Joseph Wharton Professor of History and Political Science, 1894-1904; Professor of History, 1904-11; Professor of History and International Relations, from 1911.

JESSE HERMAN HOLMES, *Professor of the History of Religion and Philosophy,*.....5 Whittier Place, College Campus

B.S., University of Nebraska, 1884; Ph.D., Johns Hopkins University, 1890. Graduate Student in University of Nebraska, 1884-85; Harvard University,

summer of 1895; Oxford University, 1899-1900; University of Pennsylvania, 1903-05 and 1911-12. Professor of the History of Religion and Philosophy, Swarthmore College, from 1899.

* BENJAMIN FRANKLIN BATTIN, *Professor of the German Language and Literature, and Secretary of the Faculty,*..... The Benjamin West House, College Campus

A.B., Swarthmore College, 1892; Ph.D., University of Jena, 1900. Joshua Lippincott Fellow (Swarthmore College), Berlin and Athens, 1893-94; student of German and Philosophy, Universities of Berlin, 1898-99, and Jena, 1899-1900; student of Germanics, Universities of Leipzig and Munich, 1909-10. Instructor in Rhetoric and Composition, and in Greek, Swarthmore College, 1892-93; Assistant Professor of German, 1900-02; Professor of German, from 1902.

ISABELLE BRONK, *Susan W. Lippincott Professor of the French Language and Literature,*.....317 N. Chester Road

Ph.B., Illinois Wesleyan University, 1893; Ph.D., University of Chicago, 1900. Student of French and German, Wellesley College, 1880-83; Germany and France, 1883-84; University of Leipzig, Sorbonne, and Collége de France, 1889-91; University of Chicago, summer quarter of 1896 and 1897-98. Fellow in Romance Languages, University of Chicago, 1898-1900; student in the Bibliothèque Nationale, summers of 1902, 1903, 1904, and 1908; at the University of Grenoble, first half of summer session 1906; in Paris and Madrid, 1910-11. Assistant in the Romance Languages and Literatures and head of Beecher House, University of Chicago, 1900-01. Assistant Professor of the French Language and Literature, Swarthmore College, 1901-02; Professor, from 1902.

GELLERT ALLEMAN, *Professor of Chemistry,*..... 8 Whittier Place, College Campus

B.S., Pennsylvania College, 1893; Ph.D., Johns Hopkins University, 1897. Berlin, 1911-12. Instructor in Chemistry, University of Maine, 1897-98; Instructor in Chemistry, Washington University, 1898-1902. Professor of Chemistry, Swarthmore College, from 1902.

PAUL MARTIN PEARSON, *Professor of Public Speaking,*....516 Walnut Lane

A.B., Baker University, 1891; A.M., 1895; Litt.D., 1909. Student of English and Oratory, Northwestern University, 1894-95; Harvard University, 1901-02. Assistant in Oratory, Northwestern University, 1895-1902. Assistant Professor of Public Speaking, Swarthmore College, 1902-04; Professor from 1904.

GEORGE FREDERICK BLESSING, *I. V. Williamson Professor of Mechanical Engineering,*.....6 Whittier Place, College Campus

B.M.E., Kentucky University, 1897; M.E., 1905; Ph.D., Hanover College, 1906. Draftsman with the Snead Iron Works, Louisville, Ky., 1897-98; Draftsman with the Brown-Ketchum Iron Works, Indianapolis, Ind., 1898-99; Draftsman with the Louisville Bridge and Iron Company, Louisville, Ky., summer, 1899; Associate Professor of Mechanical Engineering, Nevada State University, 1899-1900; Draftsman with Joseph McWilliams & Co., Contractors, Louisville, Ky., summer, 1900; Professor of Mechanical Engineering, Nevada State University, 1900-05; Assistant to Engineer of Tests, Southern Pacific Railroad, Sacramento, Cal., summer, 1902; in charge of Design and Research

* Absent on leave.

Work for the Eureka Oil Burning Company, San Francisco, Cal., summer, 1903; designer, Pacific Foundry, San Francisco, Cal., summer, 1904; Design and Research Work in Turbine Pumps, Platt Iron Works, Dayton, Ohio, 1905-06; designer in steam Turbine Department of General Electric Company, Lynn, Mass., 1906; Assistant Professor of Machine Design, Sibley College, Cornell University, 1906-08; Lecturer, Machine Design, Cornell University, summer session, 1907 and 1908. Professor of Mechanical Engineering, Swarthmore College, from 1908.

* HAROLD CLARKE GODDARD, *Alexander Griswold Cummins Professor of English,*.....3 Whittier Place, College Campus

A.B., Amherst College, 1900; A.M., Columbia University, 1903; Ph.D., Columbia University, 1906. Instructor in Mathematics, Amherst College, 1900-02; Instructor in English Literature, Northwestern University, 1904-06; Assistant Professor of English Literature, Northwestern University, 1906-09. Professor of English, Swarthmore College, from 1909.

WALTER DENNISON, *Professor of Greek and Latin,*.....
2 Whittier Place, College Campus

A.B., University of Michigan, 1893; A.M., 1894; Ph.D., 1898; student at the University of Bonn, 1894-95; Fellow of the American School of Classical Studies at Rome, 1895-97. Instructor in Latin, University of Michigan, 1897-99; Professor of Latin and Roman Archæology, Oberlin College, 1899-1902; Junior Professor of Latin, University of Michigan, 1902-10; Annual Professor of Latin at the American School of Classical Studies at Rome, 1908-09. Professor of Greek and Latin, Swarthmore College, from 1910.

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

A.B., Indiana University, 1896; Ph.D., Cornell University, 1903. President White Fellow in Political and Social Science, Cornell University, 1897-98; President White Traveling Fellow, Universities of Halle and Berlin, 1898-99; Instructor in Economics, Cornell University, 1899-1904; Joseph Wharton Professor of Economics, Swarthmore College, 1904-08; Professor of Political Science, University of Cincinnati, 1908-12; Professor of Political Science, Swarthmore College, from 1912.

BIRD THOMAS BALDWIN, *Professor of Psychology and Education,*.....
521 Elm Avenue

B.S., Swarthmore College, 1900; A.M., 1903; Ph.D., Harvard University, 1905; Supervising Principal Moorestown Friends' Schools, 1900-02; Graduate Student University of Pennsylvania, 1901-02; Joshua Lippincott Traveling Fellow (Swarthmore College) Harvard University, 1902-03; Assistant in Education, Harvard Summer School, 1903; Graduate Student and Assistant in Psychology and Logic, Harvard University, 1903-04; Thayer Scholar, Harvard University, 1904-05; Professor of Psychology, West Chester State Normal School, 1905-09; Student Leipzig University, Germany, summer, 1906; Lecturer in Psychology and Education, Swarthmore College, 1906-10; Lecturer in Psychology and Education, University of Chicago, 1909-10; Associate Professor of Education and Head of the School of the Art of Teaching, The University of Texas, 1910-12; Professor of Education, University of Tennessee, summers 1912 and 1913; Professor of Educational Psychology, Johns Hopkins University, summer 1915; Professor of Psychology and Education, Swarthmore College, from 1912.

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* Absent on leave.

LOUIS NEWTON ROBINSON, *Professor of Economics,*.....411 College Avenue

A.B., Swarthmore College, 1905; Ph.D., Cornell University, 1911; Graduate Student, Cornell University, 1905-06; Joshua Lippincott Traveling Fellow of Swarthmore College, Universities of Halle and Berlin, 1906-07; Fellow in Economics and Statistics, Cornell University, 1907-08. Member and Secretary of the Pennsylvania State Penal Commission. Instructor in Economics, Swarthmore College, 1908-10; Assistant Professor, 1910-13; Professor, from 1913.

HARVEY CORNELIUS HAYES, *Morris L. Clothier Professor of Physics,*.....
526 Walnut Lane

Harvard University: A.B., 1907; A.M., 1908; Ph.D., 1911; Research Fellow and Assistant in Physics, Harvard University, 1910-11; Instructor in Physics, 1912-13; Instructor in Physics, The Harvard Summer School, 1910-13; Professor of Physics, Swarthmore College, from 1914.

JOHN RUSSELL HAYES, *Librarian,*.....517 Elm Avenue

A.B., Swarthmore College, 1888; A.B., Harvard University, 1889; LL.B., University of Pennsylvania, 1892; student of English, Universities of Oxford and Strasburg, 1892-93. Assistant in English, Swarthmore College, 1893-95; Assistant Professor, 1895-1906. Librarian, from 1906.

LEWIS FUSSELL, *Assistant Professor of Electrical Engineering,*.....
Riverview and Baltimore Avenues

B.S., Swarthmore College, 1902; M.S., 1903; E.E., University of Wisconsin, 1907; Ph.D., 1907. Student, Cornell Summer School, 1904; Joshua Lippincott Fellow (Swarthmore College), University of Wisconsin, 1905-06. Instructor in Physics, Swarthmore College, 1902-05; Assistant in Electrical Engineering, University of Wisconsin, 1906-07. Instructor in Electrical Engineering, Swarthmore College, 1907-09; Assistant Professor of Electrical Engineering, from 1909.

WALTER ROSS MARRIOTT, *Assistant Professor of Mathematics,*.....
306 Union Avenue

A.B., Indiana University, 1906; A.M., Swarthmore College, 1907; Ph.D., University of Pennsylvania, 1911. Assistant in Mathematics, Swarthmore College, 1906-07; Instructor in Mathematics, 1907-09; Assistant Professor, from 1909.

ROY BENNETT PACE, *Assistant Professor of English,*.....
1 Whittier Place, College Campus

A.B., Richmond College, 1897; A.M., George Washington University, 1898; A.M., Harvard University, 1901; student of English, Germanic Philology and Romance (absent on leave), University of Chicago, 1914-15. Professor of English, Woman's College of Richmond, 1901-02; Professor of English, Ouachita College, 1904-07; Instructor in English, Swarthmore College, 1907-09; Assistant Professor, from 1909.

SAMUEL COPELAND PALMER, *Assistant Professor of Biology,*..315 Cedar Lane

A.B., Swarthmore College, 1895; A.M., Swarthmore College, 1907; A.M., Harvard University, 1909; Ph.D., Harvard University, 1912; Joshua Lippincott Fellow (Swarthmore College), 1907-08 and 1910-11; student, Summer School, Harvard University, 1903 and 1908; holder of Philadelphia Academy of Natural Science's Table, Marine Biological Laboratory, Woods Hole, Mass.,

1907; student, Bermuda Biological Station, 1909. Assistant in Zoölogical Laboratory, Radcliffe College, 1908-09; Assistant in Zoölogical Laboratory, Harvard University, 1907-09. Director of Athletics, Swarthmore Preparatory School, 1885-1900; Vice Principal, 1900-07; Acting Assistant Professor of Biology and Geology, Swarthmore College, 1909-10; Assistant Professor, from 1911.

GEORGE WILLIAM LEWIS, *Assistant Professor of Mechanical Engineering,*..
16 Princeton Avenue

M.E., Cornell University, 1908; M.M.E., 1910. Machine Work with Allis-Chalmers Company, Scranton, Pa., summer, 1904; Foundry Work with Allis-Chalmers Company, Scranton, Pa., summer, 1905; Experimental Gas Engine Work with Fairbanks-Grant Company, Ithaca, N. Y., summer, 1906. Instructor in Machine Shop, Cornell University, Summer Session, 1908; Instructor in Machine Design, Sibley College, Cornell University, 1908-09; Instructor in Experimental Engineering, Sibley College, Cornell University, 1909-10. Assistant Professor of Mechanical Engineering, Swarthmore College, from 1910.

SCOTT BARRETT LILLY, *Assistant Professor of Civil Engineering,*.....
4 Whittier Place, College Campus

B.S., Michigan Agricultural College, 1907; C.E., Cornell University, 1909. Assistant to the Park and Boulevard Engineer, Detroit, Mich., summer, 1907 08; in City Engineer's Office, Grand Rapids, Mich., summer, 1910 and 1912. Instructor in Civil Engineering, Cornell University, 1907-10. Acting Assistant Professor of Civil Engineering, Swarthmore College, 1910-11; Assistant Professor, from 1911.

CLARA PRICE NEWPORT, *Assistant Professor of German,*.....
1 Whittier Place, College Campus

A.B., Swarthmore College, 1903; Ph.D., University of Wisconsin, 1908. Graduate Student, University of Chicago, 1903-04; Student of German and French, University of Berlin, Sorbonne and Collège de France, and University of Munich, 1904-05; Graduate Scholar in German, University of Wisconsin, 1906-07; Teaching Fellow in German, 1907-08; Instructor in Latin, Swarthmore College, 1908-09; Acting Assistant Professor of German, Swarthmore College, 1909-10; Instructor in German, University of Kansas, 1910-12; Assistant Professor of German, Swarthmore College, from 1912.

HENRY JERMAIN MAUDE CREIGHTON, *Assistant Professor of Chemistry,*.....
308 Chester Road

B.A., Dalhousie University, 1906; M.A., Dalhousie University, 1907; M.Sc., University of Birmingham, 1909; D.Sc., Das eidgenössisches Polytechnikum, Zürich, 1911; University of Heidelberg, 1909-10. Dalhousie University, summers of 1914 and 1915. H. M. Royal 1851 Exhibition Science, Research Scholar, 1908-10. Demonstrator in Chemistry, Dalhousie University, 1907-08; Lecturer on Physical Chemistry, 1911-12. Instructor in Chemistry, Swarthmore College, 1912-13; Assistant Professor, from 1913.

HOWARD COOPER JOHNSON, *Lecturer in Law,*.....
1210-14 Commonwealth Building, Philadelphia

B.L., Swarthmore College, 1896; LL.B., University of Pennsylvania, 1899; Lawyer; Member of the Board of Managers, Swarthmore College. Lecturer in Law, from 1913.

ALBERT WINSLOW BARKER, *Assistant Professor of Fine Arts,*...Moylan, Pa.

School of the Pennsylvania Academy of Fine Arts, School of Industrial Art of the Pennsylvania Museum. Instructor, School of Industrial Art of the Pennsylvania Museum, 1903-13. Assistant Professor of Fine Arts, Swarthmore College, from 1914.

EUGENE LEROY MERCER, *Director of Physical Education,*.....Wharton Hall

M.D., University of Pennsylvania, 1913; Graduate in Physical Education, University of Pennsylvania, 1915; Physician and Director, Summer Camp, 1913; Freshman Football Coach, University of Pennsylvania, 1913; Assistant Physical Instructor and Track Coach, Swarthmore College, 1914-15; Director of Physical Education, Swarthmore College, from 1915.

LILLIAN SHAW, *Director of Physical Education of the Women,*..Parrish Hall

A.B., Queens College, 1912; Student of Physical Education, Harvard University Summer School, 1914; Graduate of the Sargent School of Physical Education, 1915. Director of Physical Education of the Women, Swarthmore College, from 1915.

THOMAS WALTER GILKYSON, *Instructor in Law,*.....
1210-14 Commonwealth Building, Philadelphia

A.B., Swarthmore College, 1901; A.M., 1904; LL.B., University of Pennsylvania, 1908. Practicing Law in Philadelphia since admission to the bar, 1908. Acting Instructor in History, Swarthmore College, 1907-08; Instructor in Law, Swarthmore College, from 1910.

MAUD BASSETT GORHAM, *Instructor in English,*.....144 Park Avenue

A.B., Radcliffe College, 1902; A.M., Radcliffe College, 1906; Ph.D., Radcliffe College, 1910. Instructor in English Composition, Wellesley College, 1910-11. Instructor in English, Swarthmore College, from 1911.

CLARA MABEL HOGUE, *Instructor in English,*.....Parrish Hall

A.B., Greenville College, 1904; A.M., Northwestern University, 1910. Reader in English Literature, Northwestern University, 1910-11. Reader in English, Swarthmore College, 1911-12. Instructor in English, from 1912.

ALLEN BROWN WEST, *Instructor in Greek and Latin,*.....318 Chester Road

A.B., Milton College, 1907; A.M., University of Wisconsin, 1910; Ph.D., University of Wisconsin, 1912; Rhodes Scholar, Oxford University, 1907-09; 1910-11. Student and Assistant in Latin and History, University of Wisconsin, 1909-10; Fellow in Latin, University of Wisconsin, 1911-12. Instructor in Greek and Latin, Swarthmore College, from 1912.

MARION VIRGINIA PEIRCE, *Instructor in French and Spanish,*.....
144 Park Avenue

A.B., Swarthmore College, 1903; A.M., University of Chicago, 1904. Fellow in Romance Languages, University of Chicago, 1903-04; Joshua Lippincott Traveling Fellow (Swarthmore College), studying at the Sorbonne, Ecole des hautes études, Collège de France, and Bibliothèque Nationale, Paris, 1904-05; doing research work in the Biblioteca Nacional, Madrid, and the Bibliothèque Nationale, Paris, 1906-07; graduate student, University of Pennsylvania, 1907-08; student in the Bibliothèque Nationale, Paris, 1911-12. Professor of Romance Languages, Cornell College, 1905-06; Instructor in French and Spanish, Swarthmore College, from 1913.

JOHN HIMES PITMAN, *Instructor in Mathematics and Astronomy,*..... 317 N. Chester Road

A.B., Swarthmore College, 1910; A.M., 1911. Joshua Lippincott Fellow (Swarthmore College), University of California, 1911-12; Lick Observatory Fellow, 1912-13. Instructor in Mathematics and Astronomy, Swarthmore College, from 1913.

PHILIP MARSHALL HICKS, *Instructor in Public Speaking,*.....Avondale, Pa.

A.B., Swarthmore College, 1905; A.M., 1913. Assistant in Public Speaking, Swarthmore College, 1911-14. Instructor, from 1914.

PRISCILLA GOODWYN GRIFFIN, *Instructor in English,*.....231 Kenyon Avenue

A.B., Swarthmore College, 1910; Member of Board of Examiners for Teachers, Alabama State Department of Education, 1911-13. Instructor in English, Swarthmore College, from 1914.

WALTER HÄNRICHS RENNER TRUMBAUER, *Instructor in English,*..Swarthmore

B.S., University of Pennsylvania, 1912; A.M., University of Pennsylvania, 1913; University Scholar, 1912-13; Assistant in English, University of Pennsylvania, 1913-14; Instructor in English, Swarthmore College, from 1914.

LEONARD BAYLISS KRUEGER, *Acting Instructor in Economics,*..... 204 S. 36th Street, Philadelphia

Ph.B., University of Wisconsin, 1914; A.M., University of Pennsylvania, 1915; graduate student, University of Wisconsin, summer term, 1914; Assistant in Industry, Wharton School of Finance and Commerce, University of Pennsylvania, 1914-15. Acting Instructor in Economics, Swarthmore College, from 1915.

ANNETTE S. PLASS, *Instructor in French,*.....317 N. Chester Road

A.B., University of Iowa, 1900; A.M., University of Iowa, 1903; Sorbonne and Collège de France, 1900-02; Student in the Bibliothèque Nationale, summers of 1904, 1905, 1906; Graduate Student, Columbia University, 1909-10; Student in London and Paris, 1910-13. Assistant in French, University of Iowa, 1902-03; Professor of Romance Languages, Washburn College, 1903-07; Principal of Plass School for Girls, 1913-15; Instructor in French, Swarthmore College, from 1915.

ALBERT W. PRESTON, *Instructor in Engineering,*.....114 Cornell Avenue

Four years apprenticeship C. R. G. & P. Ry., 1898-1902; Head Machinist, C. G. W. St., Hoe, Mo., 1902-04; Machinist Foreman, D. & R. G. Ry., Salida, Colo., 1904-05; Machinist Foreman, Colorado Southern, Trinidad, Colo., 1905-06. Toolmaker, McNeil & Co., Joplin, Mo., 1906-07; Machinist Foreman, Southern Pacific Co., Oakland, Cal., and Sparks, Nev., 1907-10. Instructor in drawing, Southern Pacific Apprentice School, 1910-15; Assistant to Engineer of Tests, Southern Pacific Co., summer, 1913; Instructor in Engineering, University of Nevada, 1910-15; Instructor in Engineering, Swarthmore College, from 1915.

RALPH GERENE GUTELIUS, *Instructor in Chemistry,*....123 Princeton Avenue

A.B., Ohio State University, 1915. Instructor in Chemistry, Swarthmore College, from 1915.

ANTONIA WEISSBRAUN, *Acting Instructor in German,*...318 N. Chester Road

Ph.D., University of Vienna, 1913. Teacher's Examination pro facultate docenti, University of Vienna, 1913; Student at Summer School, London, England, 1914; Student, University of Birmingham, England, 1914-15. Acting Instructor in German, Swarthmore College, from 1915.

MARY R. LEWIS, *Lecturer in Hygiene,*....46 N. Fortieth Street, Philadelphia

B.S., Wilmington College, 1911; M.D., Woman's Medical College of Pennsylvania, 1911. School Medical Inspector, Philadelphia; Acting Superintendent, Woman's Hospital, Philadelphia, 1913. Assistant Obstetrician, Woman's Hospital; Associate Member of Staff, West Philadelphia Hospital for Women; Physician, Western Temporary Home for Children, Philadelphia; Lecturer in Hygiene, Swarthmore College, from 1913.

JEAN HAMILTON WALKER, *Assistant in French,*.....318 Harvard Avenue

A.B., Swarthmore College, 1910. Graduate Student, University of Chicago, as Lucretia Mott Fellow, from Swarthmore College, and as Fellow of the University of Chicago in Romance Languages, 1910-11. Student in Belgium and Germany, 1900-04; in Paris, summer of 1912. Teacher of French and German, Catharine Aiken School, Stamford, Conn., 1911-13; Assistant in French, Swarthmore College, from 1913.

L. ELOISE VEST, *Assistant in Psychology and Education,*.....Parrish Hall

A.B., Swarthmore College, 1915. Graduate Student, Swarthmore College, 1915-16. Assistant in Psychology and Education, Swarthmore College, from 1915.

ETHEL MAY BURNETT, *Assistant in History,*.....
3025 W. Dauphin Street, Philadelphia

A.B., Swarthmore College, 1915. Assistant in History, Swarthmore College, from 1915.

ADMINISTRATIVE OFFICERS

JOSEPH SWAIN, M.S., LL.D., *President.*
JOHN ANTHONY MILLER, Ph.D., *Vice President.*
HENRIETTA JOSEPHINE MEETEER, Ph.D., *Dean of Women.*
WILLIAM ALBERT ALEXANDER, A.B., *Dean.*
JOHN RUSSELL HAYES, A.B., LL.B., *Librarian.*
HARRIET E. WORRELL, *Secretary to the President.*
CHESTER ROBERTS, *Superintendent.*
ELLA MICHENER, *Assistant to the Dean of Women.*
CLARA E. MCCANCE, *Secretary to the Dean.*
ANNA ETHEL FOSTER, A.B., *Assistant Librarian.*
ANNE C. BRIERLY, *Dietitian.*
SARAH DODDRELL COALE, *Matron of Wharton Hall.*
CAROLINE AUGUSTA LUKENS, B.L., *Matron of Parrish Hall Center.*
MARY E. COOK, *Director of the Laundry.*
ELIZABETH GRAHAM REDHEFFER, *Bookkeeper.*
ELIZABETH SWARTZ, *Nurse.*

STANDING COMMITTEES OF THE FACULTY

The President of the College is *ex-officio* a member of all Committees.

Alumni.
ROBINSON, BATTIN, J. R. HAYES, MARRIOTT, NEWPORT, FUSSELL.

Absence.
BROOKS, MEETEER, ALEXANDER, BLESSING, BALDWIN.

Athletics.
MILLER, PALMER, MERCER.

Collection and Meeting Attendance.
HOLMES, MEETEER, BATTIN, TROTTER, ROBINSON, MARRIOTT

Diploma and Commencement.
BRONK, ALLEMAN, H. C. HAYES, PALMER, CREIGHTON.

Dramatics and Musical Activities.
DENNISON, MEETEER, PEARSON, BATTIN, NEWPORT, PACE.

Entrance Requirements.
ALEXANDER, DENNISON, HULL.

Founders' Day.
HULL, ALLEMAN, ALEXANDER, MEETEER, PEARSON, BRONK.

Library.
TROTTER, HULL, BRONK, J. R. HAYES.

Preparatory Schools.
BALDWIN, ALEXANDER, BATTIN, DENNISON.

Prescribed and Extra Work.
ALLEMAN, ALEXANDER, MILLER.

Public Speaking.
PEARSON, HOLMES, BLESSING, BALDWIN, LILLY.

Receptions.
MEETEER, BRONK, ROBERTS, FUSSELL, CREIGHTON, HOGUE.

Student Social Affairs.
BATTIN, MEETEER, NEWPORT, MILLER.

Student Affairs.
BLESSING, MEETEER, DENNISON, HOLMES, LILLY.

Student Publications.
BLESSING, PEARSON, TROTTER, PACE, BROOKS, LEWIS.

Teachers' Appointment.
DENNISON, BALDWIN, HOLMES, ALEXANDER.

Secretary of the Faculty.
BENJAMIN F. BATTIN.

SWARTHMORE COLLEGE

LOCATION AND FOUNDATION

The Borough of Swarthmore is situated southwest of Philadelphia on the Central Division of the Philadelphia, Baltimore, and Washington Railroad. It is eleven miles from Broad Street Station, with which it is connected by twenty-three inbound and twenty-six outbound trains daily, the running time of which varies from nineteen minutes on express schedule to thirty minutes on the local schedule. Three trolley lines, running cars at twenty-minute intervals, also connect with Philadelphia elevated and surface lines.

The college buildings and campus occupy a commanding position upon a hill not far from the center of the town. The view includes several miles of the Delaware River, the nearest point of which is about four miles distant. The college property comprises over two hundred acres of ground, including a large tract of woodland and the beautiful rocky valley of Crum Creek.

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 upon 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 main-

taining a high standard of scholarship. These aims have been faithfully observed 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, three hundred and forty-eight 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 Dean of Women and several instructors and matrons reside in the building.

Wharton Hall, the dormitory for young men, named in honor of its donor, Joseph Wharton, late President of the Board of Managers, was opened for occupancy at the beginning of the college year 1904-05. The portion of the building thus far completed accommodates one hundred and twenty-five students. The total capacity of the hall will be about two hundred. It stands in the west campus on the same ridge as Parrish Hall, and commands a fine view of the Delaware River valley.

The *Hall of Physics and Engineering* is a two-story stone building with basement, one hundred and sixty-two by sixty-four feet, devoted to the departments of Physics and Engineering. It contains lecture and recitation rooms, electrical, physical and engineering laboratories, draughting rooms, engine and boiler rooms. All departments are well equipped, and new apparatus and machinery are added as occasion demands.

The *Hall of Chemistry,* which was completed in 1904, is a red brick building two stories high, one hundred and four by sixty-four feet, and contains a finished basement. The basement has an assay laboratory furnished with wind and muffle furnaces; a fireproof combustion room, a laboratory for gas analysis, a photometric dark room, large stock room, and cloak and toilet rooms. On the first floor are offices, and laboratories for quantitative analysis and for general chemistry. The large amphitheater lecture room, seating one hundred persons and extending to the basement, is reached from this floor. The second

floor contains the organic laboratory, the laboratory for qualitative analysis, the laboratory for physical chemistry, the laboratory for electrolytic chemistry, and the library. Two balance rooms, one on the first floor and one on the second floor, contain balances mounted on columns built independently of the foundations and floors of the building. The laboratories are splendidly equipped with all the necessary modern apparatus. The chemical library contains a well-selected list of scientific and technical books pertaining to chemistry, and complete sets of five of the leading chemical journals. 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 London 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 Senator William Cameron Sproul, '91, stands on the site formerly occupied by the President's house, and contains nine rooms. On the first floor are an office, a departmental library, a computation room, two class rooms, and a shop room. On the second floor are a modern lecture room seating seventy-five persons, a dark room, and the dome room. The dome is a steel structure covered with copper, forty-five feet in diameter. It is revolved by an electric motor. 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 provided with the usual oculars, helioscope, position micrometer, double-slide plateholder, and a ray filter.

There is also 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 instru-

ment 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 is also a measuring engine for measuring five-by-seven photographic plates, and a blink microscope.

Stephen Loines has recently 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. It is housed in the Sproul Observatory.

The *Students' Astronomical Observatory,* situated on the campus a short distance southeast of Parrish Hall, is especially 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 very good spectroscope. The observatory also contains a transit instrument of three inches aperture, a mean time and a sidereal clock and a chronograph. Mounted in a room adjoining the transit room is a Milne seismograph, presented by Joseph Wharton, which records photographically all 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. This Library was built and furnished from the $50,000 generously presented to the College by Mr. Andrew Carnegie and is maintained from the income on a like 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 Mr. Edward L. Tilton, of New York. In the second story of the massive entrance tower, is a large fireproof apartment, which contains the Friends' Historical Library; 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 Mr. Morris L. Clothier 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, well-lighted 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 and the tower room devoted to the Friends' Historical Library; below are alcoves containing reference books and other books in common use.

The *Engineering Building.* This building is of concrete block construction with reinforced concrete floors, columns and stairs. It is three stories high, and one hundred and twelve feet long by fifty feet wide. In architectural design it is simple and effective, representing the latest and best type of factory building construction. The ground floor contains a room used for experimental and research work on the heat treatment of metals, a store room for stock and equipment, a vault for records, a lavatory, and a locker room equipped with steel lockers. But the main part of this floor is divided between the forge and the foundry, furnished with a modern equipment of down-draft forges that is one of the chief advantages of the building.

On each of the three shop floors is a large tool room centrally located. These rooms, similar in construction, have wire-mesh partitions and doors through which an unobstructed view of the entire floor may be obtained from any position.

On the second floor are an office for the shop, an office for records of the department, a lecture room, and a stock room. Here too is located the main shop which has, besides its complement of metal-working machines, a large equipment of especially designed benches for vise work.

The third floor, which is similar in plan and dimensions, is equipped for pattern-making and general woodworking. A room on this floor which is used as a reading room and workshop library, contains a large number of technical periodicals and such books of reference as are constantly required by engineering students. On this floor is located a large motor for operating the elevator and the power machinery, and an additional motor which operates a saw-bench independently.

A large double stack, constructed like the walls, of concrete blocks, passes up the center of the west side wall. One flue of this stack is used for the forges, and the other for a smelting furnace. Two smaller stacks, placed on the opposite side wall, are intended mainly for ventilation.

The building is covered with a slag roof, and, with the ex-

ception of the roof and some wooden partitions on the third floor, is entirely fireproof; the openings from the stair areaway are protected by fire doors. The building is heated by steam radiation operated on the Webster vacuum system, and the lighting is entirely with electric lamps. A feature of the various shops is that all the machinery is driven by electric motors, while the various machines are grouped on small motor drives so that long lines of countershafting are entirely avoided.

The *President's House.* The property on the east edge of the campus on the corner of Elm Avenue and Cedar Lane, recently owned by W. H. Miller, has been purchased by the College and is used for the President's house.

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 fifty by eighty feet, equipped with apparatus for individual and class work and a good 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 the women. 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 who take work in the department of Physical Education.

Two *Swimming Pools,* one for the women and another for the men, were erected during the summer of 1912. These pools were presented to the College by Philip M. Sharples. The building which contains the women's swimming pool is connected by a corridor with Somerville Hall, and the men's pool is connected in like manner with the William J. Hall Gymnasium. The rooms are well ventilated and lighted; the pools are of the most modern construction. They are tiled on the sides by glazed tiling and on the bottom by hexagon vitriolized tiling. The capacity of the pools is about one hundred and fifty thousand gallons of water. Each pool is supplied with a constant flow of filtered water, which is pumped continually from the pools through the filters and returned to the pools again heated to the proper temperature. Thus the water is kept in the best hygienic condition.

A number of shower baths, five-foot steel lockers with combination locks, and offices for the supervision of the pools have been added to both buildings. A gallery in the men's pool provides space for visitors.

The *Heating and Lighting Plant.* A central heat, light and power plant was erected in 1911 at a cost of about one hundred thousand dollars. The power house is a single-story brick structure, located south of the P. B. & W. R. R. tracks. Four one-hundred-and-twenty-five-horse-power Dillon boilers and three Harrisburg engines, operating two seventy-five-kilowatt and one fifty-kilowatt generators, have been installed. The engines are the Fleming automatic type, and are directly connected with twenty-three-hundred-volt, alternating-current generators. Heat, light and power for all college purposes are provided by the new plant.

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

Whittier Field, the athletic ground for men, provides excellent facilities for football, baseball, and lacrosse, and has also a good quarter-mile cinder track. Upon the campus are tennis courts and additional space for lacrosse and baseball.

Cunningham Field, the women's athletic ground, includes a part of the east campus beyond Somerville Hall. This field, enclosed by a hedge of California privet, is divided into the three terraces which make ample provision for basketball, tennis, and English field hockey. This field was given by students, alumnæ, and friends of the College as a tribute to Susan J. Cunningham, who has for many years been closely identified with the interests of the women students of Swarthmore.

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

The daily sessions of the College are opened with a gathering of students and instructors for the reading of the Bible, or for some other suitable exercise, preceded and followed by a period of silence. 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 9.00 on First-day mornings for the consideration of religious subjects. Preceding the meeting there are also classes in the First-day School to which students are invited. By these means, and particularly by individual influence, and by the constant effort to maintain in the institution a spirit in harmony with the purpose of its founders, it is believed that a proper care is exercised to mould the characters of the students in conformity with Christian standards.

STUDENTS' SOCIETIES

Two literary societies are maintained by the students: the *Athenæum* by the men, the *Somerville* by the women. Regular meetings are held for literary and other exercises, which afford opportunity to acquire skill in parliamentary practice and in debate. They are regarded as valuable auxiliaries in the work of the College. Each society has, under the management of its own members, but accessible to all students, a library and a reading room containing periodicals and daily papers. The total number of books in these libraries is over four thousand.

The *Joseph Leidy Scientific Society* has for its object keeping in touch with the results of modern investigation in Astronomy, Biology, Chemistry, Physics, and Engineering. At its meetings, held monthly, announcements of recent discoveries are made by the various instructors, and their meaning and importance are

briefly discussed. Papers are also prepared and read by the student members.

The *Cercle français* holds frequent meetings and is open to all students in the French Department after the middle of their first year. Its object is to afford increased opportunities for acquiring a practical knowledge of the French language.

The *Deutscher Verein* holds occasional sessions for the purpose of affording its members a greater ease and facility in expressing themselves in idiomatic German. Students are thus brought into more positive acquaintance with German customs, amusements, music, and literature.

The *Mathematical and Astronomical Club* is an association of students in Mathematics and allied subjects, and of instructors in Mathematics. It meets on the first and third Tuesdays of each month to discuss subjects not pertinent to the class room.

The *Classical Club* meets once a month during the college year. Addresses and papers are given on subjects which emphasize the broader aspect of classical culture and civilization.

The *English Club,* open to all students, meets twice a month to hold discussions and to listen to papers and addresses upon topics of literary and dramatic interest.

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

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

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 especial object of promoting closer fellowship and a truly democratic spirit. Public meetings for worship are held every Sunday evening, the young men meeting in Collection Hall and the young women in Somerville 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. If he desires to grant them permission to effect such an organiza-

tion, he will advise the student representatives of the particular faculty committee under whose supervision the organization is placed.

COLLEGE PUBLICATIONS

Two periodicals are published by the students under the supervision of the faculty: *The Phœnix,* a weekly publication, is devoted to undergraduate journalism; the *Halcyon* is published annually by the Junior Class.

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

LIBRARIES AND READING ROOMS

The libraries of the College collectively contain over thirty thousand volumes.

The chief sources of income for increasing the collection in the college library are these: the Edgar Allen Brown Fund, established by his family in memory of Edgar Allen Brown, of the Class of 1890; the Alumni Fund; and the General Library Fund.

The library is open Monday to Friday, inclusive, 8.00 A. M. to 6.00 P. M. and 7.15 to 10.00 P. M.; Saturday, 8.00 A. M. to 12.15 P. M., 1.00 to 5.00 P. M., and 7.15 to 10.00 P. M.

Residents of the borough of Swarthmore are cordially invited 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 stored in rooms practically fireproof, 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, or to ARTHUR BEARDSLEY, Librarian, 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 especial 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 following periodicals are taken by the College:

Advocate of Peace
American Anthropologist
American Chemical Journal
American Economic Review
American Historical Review
American Journal of Archæology
American Journal of International Law
American Journal of Mathematics
American Journal of Philology
American Journal of Psychology
American Journal of Science
American Journal of Sociology
American Journal of Theology
American Machinist
American Mathematical Monthly
American Philological Association Transactions
American Political Science Review
American Oxonian
American Scandinavian Review
Anglia
Annalen der Physik
Annales Politiques et Littéraires
Annals of the American Academy
Annals of Mathematics
Art and Archæology
Astronomical Journal
Astronomische Nachrichten
Astrophysical Journal
Atlantic Educational Journal
Atlantic Monthly
Automobile, The
Berichte der Deutschen Chem. Gesellschaft
Berliner Philologische Wochenscrift
Biblical World
Boston Transcript
Brill Magazine
British Journal of Psychology
Bulletin of the American Mathematical Society
Bulletin de Correspondance Hellènique
Bulletin of the Pan American Union
Bulletin of the Seismological Society of America
Cartoons
Cassinia
Cement Age
Century Magazine
Chaucer Society Publications
Chemical News
Child, The
Christian Register

Christian Science Herold, Monitor, and Journal
Classical Journal
Classical Philology
Classical Quarterly
Classical Review
Classical Weekly
Columbia University Quarterly
Delinquent, The
Dial, The
Dialect Notes
Dodge Idea
Drama, The
Early English Text Society Publications
Economic Journal
Education
Educational Administration and Supervision
Educational Foundations
Educational Review
Electric Journal
Electric Railway Journal
Electrical Review
Electrical World
Electrician (London)
Electro-Chemical and Metallurgical Industry
Electrotechnische Zeitung
Elementary School Journal
Engineering Magazine
Engineering News
Engineering Record
Engineering and Contracting
Englische Studien
English Journal
English Review
Etude
Folklore Journal
Folklore Society Publications
Forum
Foundry, The
Friends' Fellowship Papers
Friends' Intelligencer
Gas Industry
Gas Power
General Electric Review
Harper's Monthly Magazine
Harper's Weekly
Harvard Graduates' Magazine
Harvard Studies in Classical Philology
Harvard Theological Review
Hibbert Journal
History Teacher's Magazine
Home and School Education
Horseless Age
Illuminating Engineer
Illustration (Paris)
Independent
Industrial Engineering
International Journal of Ethics
International Socialist Review
International Studio
Jahrbuch d. Kaiserl. Deutschen Archæolog. Instituts
Jahrbücher für Nationalökonomie und Statistik
Johns Hopkins University Studies
Journal de Physique
Journal of the American Chemical Society
Journal of American Folklore
Journal of Animal Behavior
Journal for Biological Chemistry
Journal of the Chemical Society (London)
Journal of Criminal Law and Criminology
Journal of Educational Psychology
Journal of English and Germanic Philology
Journal of Experimental Pedagogy
Journal of Hellenic Studies
Journal of Philosophy, Psychology and Scientific Methods
Journal of Political Economy
Journal of the Royal Statistical Society
Journal of the Society of Chemical Industry
Liebig's Annalen der Chemie
Literary Digest
Living Age

Machinery
Malone Society Publications
Mechanical Engineer
Mississippi Valley Historical Review
Modern Electrics
Modern Language Association Publications
Modern Language Notes
Modern Language Review
Modern Philology
Modern Sanitation
Motor Cycle News
Municipal Engineering
Nation, The
National Geographic Magazine
National Municipal Review
National Prisoners' Aid Association Review
New Witness
New York Times Book Review
North American Review
New Republic
New Statesman
Observatory
Outlook
Pedagogical Seminary
Pennsylvania Magazine
Photo-Era
Physical Review
Physikalische Zeitschrift
Poetry
Poetry Journal
Polical Science Quarterly
Popular Astronomy
Popular Mechanics
Power
Practical Engineer
Present Day Papers
Psychological Clinic
Public, The
Publications of the Astronomical Society of the Pacific
Punch
Quarterly Journal of Economics
Quarterly Journal of Public Speaking
Quarterly Review
Reactions
Readers' Guide to Periodical Literature
Religious Education
Review of Reviews
Romania
Royal Astronomical Society, Monthly Notices
School and Home Education
School Review
Scientific American
Scientific American Supplement
Scientific Monthly
Scribner's Magazine
Sewanee Review
Sibley Journal
Single Tax Review
Story Tellers' Magazine
Survey
Swarthmore Halcyon, and Phœnix
Technical World Magazine
Technology Review
Theosophical Quarterly
Transactions of the American Mathematical Society
Unpopular Review
Western Electrician
Woodcraft
Woodworker, The
World's Work
Yale Review
Zeitschrift für Electro-Chemie
Zeitschrift für Phys. Chemie
Zeitschrift Gesamte Turbine-wesen

THE MUSEUM OF BIOLOGY AND GEOLOGY

The Museum contains a collection for educational purposes only, and the specimens from its cases are in constant use in the lecture room and laboratory. It is steadily becoming a more perfect means of illustrating the different departments of biology and geology.

It includes the following collections:

1. The *Joseph Leidy Collection of Minerals,* the result of thirty years' discriminating collection by its founder, consists of exceedingly valuable cabinet specimens of minerals, characteristic rocks and ores, and models of the various systems of crystallization.

2. The *Collection Illustrating Comparative Osteology* is composed of a large series of partial and complete skeletons, prepared at Prof. Henry Ward's Natural History Establishment in Rochester, N. Y. The collection illustrates the structure and framework of vertebrates.

3. The *Wilcox and Farnham Collection of Birds* comprises stuffed specimens of native and foreign birds. Nearly all the species visiting this State are represented.

4. The *Frederick Kohl Ethnological Collection* consists of Indian implements, weapons, clothing, etc., mostly from Alaska.

5. The *C. F. Parker Collection of Shells* is made up of choice typical land, fresh water, and marine shells. These specimens were all selected by the late Dr. Joseph Leidy from the extensive collection of the founder, C. F. Parker, who was for many years the Curator in charge of the Academy of Natural Sciences of Philadelphia.

6. The *Robert R. Corson Collection of Stalactites and Stalagmites* is composed of specimens from the Luray Caverns, which illustrates the peculiar limestone formations of Luray and similar districts.

7. The *Eckfeldt Herbarium* contains over two thousand specimens illustrating the flora of Pennsylvania. The *Annie Shoemaker Collection* is a valuable addition to this.

8. The *Joel Scarlet Collection of Minerals and Crystallo-*

graphic Specimens was presented to the Chemical Department by the heirs of the late Joel Scarlet, of Kennett Square, Pa. This collection, which has been placed in cases located in the library of the Chemical Building, consists of about three thousand well-selected specimens, many rare and valuable. It is used for the course in Mineralogy and is accessible to students under the supervision of the instructor.

In addition to the above, there is a large and constantly increasing collection of specimens of vertebrates and invertebrates (including the U. S. Fish Commission Educational Collection), of dissected specimens for demonstration in the lectures on Physiology, of glass and papier-maché models illustrating special points in vegetable and animal morphology, besides about three hundred classified diagrams and colored charts illustrating every branch of natural history.

EXPENSES

The charge for board, room, and tuition ranges from $425 to $525, of which at least $275 is payable in advance. The remainder is due on the first of January. The charge varies in accordance with the size and location of the room. Every student's bill for the first payment is mailed before the opening of the college year, and the student is held responsible for prompt payment in advance. Thirty days after the opening of college 5 per cent. will be added to all bills unpaid at that time. The bill for the second payment is mailed before the first of January. In case bills are not paid before the end of the first semester students owing such bills may be excluded from all college exercises for the second semester. Students withdrawing 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 choose rooms according to date of application for admission. In order to reserve a room in any one of the dormitories each student must make a deposit of $10 when the room is chosen. This sum will be held as a fund to cover breakage or any other damage to college property, and the loss involved if a student fails to occupy the room reserved for him. The unexpended balance will be returned after graduation.

The tuition fee for non-resident students is $175 a year, of which $150 is payable in advance, and the remainder on the first of January.

In case of illness no extra charge is made unless a physician or trained nurse is employed. When the connection of a student with the College shall, before the end of the period for which payment has been made, be terminated by sickness or any other cause considered unavoidable by the faculty, the student may have the privilege of sending an approved substitute for the unexpired term, or, upon making written application to the President of the College, may receive credit for two thirds of the tuition fee for the unexpired term from the date of the said application. Payments are to be made by check or draft to the order of SWARTHMORE COLLEGE, Swarthmore, Pa.

DINING-ROOM RATES

Per college year, $175; per month, $22; per week, $6; single breakfast or lunch, 30 cents; single dinner (except Sunday), 40 cents; Sunday dinner, 50 cents; dinners per month, $9; lunches per month, $7.

The college year for instructors and administrative officers begins with the Saturday preceding Registration Day, and ends with the Saturday following Commencement Day, but does not include the Christmas vacation. Instructors and officers who wish meals before the beginning or after the end of the college year are expected to make arrangements in advance at the Superintendent's office.

The charge for board and room for instructors and administrative officers is $275 per year.

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.

The college year for freshmen will end with the close of final examinations. *Freshmen will be expected to leave the College on or before Thursday preceding Commencement.*

Students purchase their own books, which are furnished by the College at the lowest rates obtainable. They also buy their own stationery and drawing implements, and pay a reasonable rate for laundry work done at the College.

A fee of $3 a semester is charged in every laboratory science, except in Chemistry and Engineering.

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 $10 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 materials 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 $5 a semester is charged for each course in woodworking, forging, and machine practice; a fee of $2 a semester is charged for each course in field practice and surveying; an additional fee of $2 is charged for the annual survey.

A deposit of $5 is required for each course in shop work or founding. This deposit will be retained to cover breakage and loss of tools or supplies, and, after deduction for such items, the balance will be refunded upon the completion of the course.

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

In addition to the payments made directly to the College there are a number of other items of living expense such as clothing, care of health, recreation, traveling, etc., which the student must meet. The combined expenditures of both classes vary considerably, of course, from student to student. In order to ascertain the limits of such variation a careful statistical inquiry was made at the end of the college year 1912-13 among a number of students, who at the beginning of the first semester, had been requested to make detailed reports regarding their expenditures for the year. The results are presented in the following tables:

Total Expenditures for College Year 1912-13.	Women.	Men.	Both.	Per Cent.
Under $500	4	1	5	4.9
$500 to $600	9	15	24	23.3
$600 to $700	8	16	24	23.3
$700 to $800	8	16	24	23.3
$800 to $900	4	7	11	10.7
$900 to $1,000	2	7	9	8.7
Over $1,000	4	2	6	5.8
Total	39	64	103	100.0

Board, clothing, lodging, care of health, tuition, books, apparatus, recreation, traveling, and miscellaneous expenses are in-

cluded in the above table. The average total expenditure of the thirty-nine women was $716.98; of the sixty-four men, $704.09. It will be noted that slightly more than one half (exactly 51.5 per cent.) of the students of both sexes in the above table spent less than $700 for the year, and nearly three fourths of them (exactly 74.8 per cent.) less than $800. Compared with other institutions situated in this part of the country the above figures indicate a very moderate cost of living for the great majority of Swarthmore students.

None of the one hundred and three students included in the above table was in receipt of scholarship or other material aid from the College. In other words they were meeting all expenses on their own account, and their annual totals are therefore considerably higher than those of students who receive financial assistance or its equivalent. At present fellowships and scholarships (see pp. 46 to 50) are available for over sixty students who are able to comply with the conditions imposed. In addition to the one hundred and three students whose total expenditures are presented in the above table, eight scholarship holders reported the cost to themselves of the college year 1912-13. Each of the eight received on an average the equivalent of $131.25 from the College, and spent in addition to this $437.48. On comparing these figures with the averages of the above table it is evident that the receipt of aid in the case of the nine scholarship students is combined with economy in their other college and living expenses.

Day students residing in Swarthmore avoid payment of board, lodging, washing, etc., to the College, although, of course, expenses of this sort must be met as part of the family budget or otherwise. In 1912-13, the average total expenditure of four such students for tuition, books, apparatus, and recreation—the only directly college costs they had to meet—was $230.25, of which $161.50, or 70 per cent., was accounted for by tuition fees.

Other forms of economizing may be noted. Day students residing along the line of the P. B. & W. R. R. may take advantage of the very low rates of transportation offered by the forty-six-trip school tickets. On the other hand, a certain loss is incurred by students not in residence and therefore not in close contact at all times with the life of the College. Those who expect to

give a portion of their time to remunerative work outside of the College, moreover, should not underestimate the difficulties involved in performing it and complying satisfactorily with college requirements at the same time. As a general rule, it may be said that only those in good health and of more than the average mental ability can secure results in this way that are commensurate with the sacrifices involved. On the other hand, the democratic atmosphere of the College assures a manly recognition of the worth of such efforts to work one's way through College.

FELLOWSHIPS AND SCHOLARSHIPS

FELLOWSHIPS

The JOSHUA LIPPINCOTT FELLOWSHIP of $450 founded by HOWARD W. LIPPINCOTT, A.B., 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 1916-17 must be received by the faculty before February 20, 1916.

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 $450 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 1916-17 must be received by the faculty by February 20, 1916.

The HANNAH A. LEEDOM FELLOWSHIP of $400, was founded by the bequest of Hannah A. Leedom. 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 stand-

ing for the pursuit of graduate studies under the direction of the faculty or with their approval. Applications for this fellowship for 1916-17 must be received by the faculty by February 20, 1916.

The MARTHA E. TYSON FELLOWSHIP of $450, founded by the Somerville Literary Society in 1913, is sustained by the contributions of the 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 College, 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 1916-17 must be received by the Committee of Award not later than February 20, 1916.

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 $200 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 WOODNUTT SCHOLARSHIP FUND.

3. The ANNIE SHOEMAKER SCHOLARSHIP, a free scholarship for board and tuition, 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 WILLIAM C. SPROUL SCHOLARSHIP. William C. Sproul, a graduate of the Class of 1891, offers annually a scholarship of $150 to the graduate in best standing in the Chester High School. This scholarship may continue throughout the college course.

7. The following scholarships are offered for work done in the College in 1915-16. They are of the value of $200 each for 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 DEBORAH FISHER WHARTON SCHOLARSHIP will be awarded to a member of the Junior Class.

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

(*c*) 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 their ability. They will be awarded at the discretion of the Committee on Trusts. Application should be made to the President of the College.

9. The ISAAC STEPHENS SCHOLARSHIPS. Four scholarships of $50 per year.

10. The I. V. WILLIAMSON SCHOLARSHIPS FOR PREPARATORY SCHOOLS. Eleven scholarships of the value of $150 each for resident students, and $75 each for day students, are offered to members of classes graduating in 1916 in the following schools:

2 to Friends' Central School .....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 Abington Friends' School.....Jenkintown, Pa.
2 to George School .....George School, Pa.

For conditions see next paragraph.

11. For the year 1916-17, Swarthmore College offers three scholarships of $150 each for resident students and $75 each for day students, to members of classes graduating in 1916 in the following schools:

1 to Swarthmore Preparatory School .....Swarthmore, Pa.
1 to Swarthmore Public High School.....Swarthmore, Pa.
1 to The West Chester High School.....West Chester, Pa.

The scholarships named in this and the preceding paragraph will be awarded upon competitive examination under the direction of the college faculty. None will be awarded to applicants who fail to be admitted without conditions to the Freshman Class, and every holder of such scholarship must pursue in College the studies leading regularly to the degree of Bachelor of Arts. The College reserves the right to require some form of service from students receiving scholarships from the College.

12. A friend of Swarthmore College and of the University of Pennsylvania offers a scholarship of $100 for the college year 1916-17 to a graduate of Swarthmore College taking work in any department of the university.

13. The Western Swarthmore Club offers in conjunction with the College, a competitive scholarship of $350. Students inter-

ested are requested to apply to the Secretary of the Club, Francis E. Broomell, 601 Reaper Block, Chicago, Illinois.

14. The Mary Coates Preston Scholarship Fund. A sum of money has been left by the will of Elizabeth Coates to Josephine Beistle, of Swarthmore, as trustee, the annual interest of which will be about three hundred dollars. 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 Woman's Medical College of Pennsylvania offers a scholarship of $140, full tuition, to a young woman graduate of Swarthmore College. This amount is to be given annually during the four years of medical work, thus having a total value of $560 to the student receiving the scholarship.

16. The Trenton Swarthmore Club offers in conjunction with the College, a competitive scholarship of $400. The scholarship is open only to male students in the vicinity of Trenton, N. J., and the award is based upon scholarship, character, leadership, and athletic standing. Students interested are requested to apply to the Secretary of the Club, Owen Moon, Jr., 8 South Stockton Street, Trenton, N. J.

17. The Philip M. Sharples Scholarship. Philip M. Sharples, of West Chester, offers annually two four-year scholarships; one to a young man and one to a young woman, graduating from the West Chester High School. Fuller details may be secured from the principal of the West Chester High School.

18. 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 for character, scholarship, and influence.

ADMISSION

APPLICATION FOR ADMISSION should be made as early as possible by letter to the Dean of the College. Students are not admitted for a period of less than the current college year, but, when vacancies exist, students may enter profitably upon the work of a sufficient number of courses. All applicants must present satisfactory testimonials of good character from their former teachers, and students coming from other colleges must present certificates of honorable dismissal.

ADMISSION TO THE COLLEGE is granted (1) to candidates who pass satisfactory examinations covering the entrance requirements stated below, pages 52 to 68; and (2) to those who present certificates signed by the principals of duly accredited schools, made out upon forms furnished by the College, affording sufficient evidence that the entrance requirements have been met.

1. EXAMINATIONS FOR ADMISSION may be taken either at the close of the college year, or in the autumn. (See the calendar on page 7 for the dates.)

2. ADMISSION BY CERTIFICATE. Graduates of Friends' schools and of public high schools, approved by the faculty and Instruction Committee, will be admitted to the College on certificate of the principal, but are not in every case received without condition. The faculty admits these students *on trial,* and reserves the right to change their classification or to decline to continue their connection with the College if they find them to be insufficiently prepared. The privilege of sending students on certificate may be withdrawn from any school whose pupils are found to be deficient. Principals of other schools who wish to have students admitted on their recommendation should correspond with the Dean on the subject.

Certificates issued by the College Entrance Examination Board, which was organized in 1899 by the Association of Colleges and Preparatory Schools of the Middle States and Maryland, will be accepted in place of examinations on the subjects

therein certified to as passed. Information as to the examinations held by this board may be obtained by addressing The Secretary of the College Entrance Examination Board, Substation 84, New York, N. Y.

Graduation from an acceptable four years' high school course or its equivalent is required for admission to the Freshman class on certificate. An applicant may offer substitutes for some of the optional subjects listed below, but in such cases the student is required to substitute for college electives such work as had been omitted in preparatory school. Thus there would be no increase in the number of credit hours required for graduation, but fewer electives could be included in the four-year college course.

ENTRANCE REQUIREMENTS

It is to be carefully noted that the subjects included among the entrance requirements are rated as strictly as possible according to the *time* that should have been devoted to preparatory work in each.

In regard to a *unit* of admission requirements, the faculty of Swarthmore College has approved the following statement, which has been adopted by the National Conference Committee on Standards of Colleges and Secondary Schools, the College Entrance Examination Board, and the Carnegie Foundation for the Advancement of Teaching:

A unit represents a year's study in any subject in a secondary school, constituting approximately a quarter of a full year's work.

This statement is designed to afford a standard of measurement for the work done in secondary schools. It takes the four-year high school course as a basis, and assumes that the length of the school year is from thirty-six to forty weeks, that a period is from forty to sixty minutes in length; and that the study is pursued for four or five periods a week. By this standard a satisfactory year's work in any subject cannot be accomplished under ordinary circumstances in less than one hundred and twenty sixty-minute hours or their equivalent. Schools organized on any other than a four-year basis can, nevertheless, estimate their work in terms of this unit.

The total number of units required on this basis for admission to Swarthmore College is *fourteen and a half.*

AURAL AND ORAL TESTS IN FOREIGN MODERN LANGUAGES

In accordance with a resolution adopted in 1908 by the Modern Language Association of America and a similar one adopted in 1914 by the Association of Modern Language Teachers of the Middle States and Maryland, it is recommended that the schools preparing students for Swarthmore College prescribe adequate aural and oral tests for all candidates who desire to present a foreign modern language in satisfaction of requirements for admission.

I. General Statement of Subjects Required for Entrance

1. Elementary Algebra	1½ units	*Required* subjects, *seven and one half* units.
2. Plane Geometry	1 unit	
3. English	3 units	
4. History	2 units	
5. Elementary French	2 units	*Optional* subjects. Of these enough must be offered to *aggregate seven* units.
6. Advanced French	2 units	
7. Elementary German	2 units	
8. Advanced German	2 units	
9. Greek	3 units	
10. Elementary Latin	2 units	
11. Advanced Latin	2 units	
12. Elementary Science	2 units	
13. Solid Geometry	½ unit	
14. Trigonometry	½ unit	

II. Detailed Statement of Subjects Required for Entrance

1. Elementary Algebra (*one and a half* units).

The four fundamental operations; factoring; simple equations in one, two, and three unknown quantities; radicals; fractional and negative exponents; quadratic equations in one, two, and three unknown quantities; ratio and proportion; binomial theorem for positive integral exponents; arithmetic and geometric series. The student should acquire facility in algebraic manipulation, in the application of algebra to concrete problems, and in the interpretation of results.

2. PLANE GEOMETRY (*one* unit).

The theorems and constructions presented in a good modern high school text. Solution of numerous original exercises and loci problems; application of geometry to mensuration.

3. ENGLISH (*three* units).

REQUIREMENTS IN ENGLISH FOR 1916-1919

A. READING

With a view to large freedom of choice, the books provided for reading are arranged in the following groups, from each of which at least two selections are to be made, except as otherwise provided under Group I.

GROUP I—CLASSICS IN TRANSLATION

The *Old Testament,* comprising at least the chief narrative episodes in Genesis, Exodus, Joshua, Judges, Samuel, Kings, and Daniel, together with the books of Ruth and Esther.

The *Odyssey,* with the omission, if desired, of Books I, II, III, IV, V, XV, XVI, XVII.

The *Iliad,* with the omission, if desired, of Books, XI, XIII, XIV, XV, XVII, XXI.

The *Aeneid.*

The *Odyssey, Iliad,* and *Aeneid* should be read in English translations of recognized literary excellence.

For any selection from this group a selection from any other group may be substituted.

GROUP II—SHAKESPEARE

Midsummer Night's Dream,	*Richard II,*
Merchant of Venice,	*Richard III,*
As You Like It	*Henry V,*
Twelfth Night,	*Coriolanus,*
The Tempest,	*Julius Cæsar,**
Romeo and Juliet,	*Macbeth,**
King John,	*Hamlet.**

*If not chosen for study under B.

GROUP III—PROSE FICTION

Malory: *Morte d' Arthur* (about 100 pages).
Bunyan: *Pilgrim's Progress, Part I.*
Swift: *Gulliver's Travels* (voyages to Lilliput and to Brobdingnag).
Defoe: *Robinson Crusoe, Part I.*
Goldsmith: *Vicar of Wakefield.*
Frances Burney: *Evelina.*
Scott's Novels: any *one.*
Jane Austen's Novels: any *one.*
Maria Edgeworth: *Castle Rackrent,* or *The Absentee.*
Dickens' Novels: any *one.*
Thackeray's Novels: any *one.*
George Eliot's Novels: any *one.*
Mrs. Gaskell: *Cranford.*
Kingsley: *Westward Ho!* or *Hereward, the Wake.*
Reade: *The Cloister and the Hearth.*
Blackmore: *Lorna Doone.*
Hughes: *Tom Brown's Schooldays.*
Stevenson: *Treasure Island,* or *Kidnapped,* or *Master of Ballantrae.*
Cooper's Novels: any *one.*
Poe: *Selected Tales.*
Hawthorne: *The House of the Seven Gables,* or *Twice Told Tales,* or *Mosses from an Old Manse.*
A collection of *Short Stories* by various standard writers.

GROUP IV—ESSAYS, BIOGRAPHY, ETC.

Addison and Steele: *The Sir Roger de Coverley Papers,* or Selections from the *Tatler* and *Spectator* (about 200 pages).
Boswell: Selections from the *Life of Johnson* (about 200 pages).
Franklin: *Autobiography.*
Irving: Selections from the *Sketch Book* (about 200 pages), or *Life of Goldsmith.*
Southey: *Life of Nelson.*
Lamb: Selections from the *Essays of Elia* (about 100 pages).
Lockhart: Selections from the *Life of Scott* (about 200 pages).

Thackeray: Lectures on *Swift, Addison,* and *Steele* in the *English Humorists.*

Macaulay: Any one of the following essays: *Lord Clive, Warren Hastings, Milton, Addison, Goldsmith, Frederic the Great, Madame d' Arblay.*

Trevelyan: Selections from the *Life of Macaulay* (about 200 pages).

Ruskin: *Sesame and Lilies,* or *Selections* (about 150 pages).

Dana: *Two Years before the Mast.*

Lincoln: *Selections,* including at least the two Inaugurals, the Speeches in Independence Hall and at Gettysburg, the Last Public Address, the Letter to Horace Greeley; together with a brief memoir or estimate of Lincoln.

Parkman: *The Oregon Trail.*

Thoreau: *Walden.*

Lowell: *Selected Essays* (about 150 pages).

Holmes: *The Autocrat of the Breakfast Table.*

Stevenson: *An Inland Voyage* and *Travels with a Donkey.*

Huxley: *Autobiography* and selections from *Lay Sermons,* including the addresses on *Improving Natural Knowledge, A Liberal Education,* and *A Piece of Chalk.*

A collection of *Essays* by Bacon, Lamb, DeQuincey, Hazlitt, Emerson, and later writers.

A collection of *Letters* by various standard writers.

Group V—Poetry

Palgrave's *Golden Treasury* (*First Series*): *Books II and III,* with special attention to Dryden, Collins, Gray, Cowper, and Burns.

Palgrave's *Golden Treasury* (*First Series*), *Book IV,* with special attention to Wordsworth, Keats and Shelley (if not chosen for study under B).

Goldsmith: *The Traveler* and *The Deserted Village.*

Pope: *The Rape of the Lock.*

A collection of English and Scottish *Ballads,* as, for example, some *Robin Hood* ballads, *The Battle of Otterburn, King Estmere, Young Beichan, Bewick and Grahame, Sir Patrick Spens,* and a selection from latter ballads.

Coleridge: *The Ancient Mariner, Christabel,* and *Kubla Khan.*

Byron: *Childe Harold, Canto III or IV,* and *The Prisoner of Chillon.*

Scott: *The Lady of the Lake,* or *Marmion.*

Macaulay: *The Lays of Ancient Rome, The Battle of Naseby, The Armada, Ivry.*

Tennyson: *The Princess,* or *Gareth and Lynette, Lancelot and Elaine,* and *The Passing of Arthur.*

Browning: *Cavalier Tunes, The Lost Leader, How They Brought the Good News from Ghent to Aix, Home Thoughts from Abroad, Home Thoughts from the Sea, Incident of the French Camp, Hervé Riel, Pheidippides, My Last Duchess, Up at a Villa—Down in the City, The Italian in England, The Patriot, The Pied Piper, "De Gustibus"—, Instans Tyrannus.*

Arnold: *Sohrab and Rustum,* and *The Forsaken Merman.*

Selections from *American Poetry,* with special attention to Poe, Lowell, Longfellow, and Whittier.

B. Study

The books provided for study are arranged in four groups, from each of which one selection is to be made.

Group I—Drama

Shakespeare: *Julius Cæsar, Macbeth, Hamlet.*

Group II—Poetry

Milton: *L'Allegro, Il Penseroso,* and either *Comus* or *Lycidas.*

Tennyson: *The Coming of Arthur, The Holy Grail,* and *The Passing of Arthur.*

The selections from Wordsworth, Keats and Shelley in *Book IV* of Palgrave's *Golden Treasury* (*First Series*).

Group III—Oratory

Burke: *Speech on Conciliation with America.*

Macaulay's Two *Speeches on Copyright,* and Lincoln's *Speech at Cooper Union.*

Washington's *Farewell Address* and Webster's *First Bunker Hill Oration.*

GROUP IV—ESSAYS

Carlyle: *Essay on Burns,* with a selection from Burns's *Poems.*
Macaulay: *Life of Johnson.*
Emerson: *Essay on Manners.*

When examinations are taken at the College the two examinations in English may be taken separately, one at the close of the college year and the other in the autumn.

Too much emphasis cannot be laid on the necessity, especially in the preparation of the work assigned for careful study, of persistent drill looking toward the attainment of thoroughness, accuracy, and exactness. Both the entrance examination and (in the case of students provisionally admitted on certificate) the work of the first semester may be expected to test these qualities.

4. HISTORY (*two* units).

Preparatory work in any two of the following fields of History will be accepted.

(a) ANCIENT HISTORY, with special reference to Greek and Roman history, a short introductory study of the more ancient nations and the chief events of the early Middle Ages, down to the death of Charlemagne (814).

(b) MEDIÆVAL AND MODERN EUROPEAN HISTORY, from the death of Charlemagne to the present time.

(c) ENGLISH HISTORY.

(*d*) AMERICAN HISTORY AND CIVIL GOVERNMENT.

Each of the above topics is intended to represent one year of historical work wherein the study is given five times a week, or two years of historical work wherein the study is given three times a week.

The requirement in history involves comparison and the use of judgment on the pupil's part rather than the mere exercise of memory. The requirement presupposes the use of good textbooks, collateral reading, and practice in written work. Geographical knowledge should be tested by requiring the location of places and movements on an outline map.

5. Elementary French (*two* units).

Ability to pronounce French accurately, to read at sight easy French prose, to put into French simple English sentences taken from the language of everyday life, or based upon a portion of the French text read, and to answer questions on the rudiments of the grammar as defined below. The preparation should occupy two years, five recitations a week.

The first year's work should comprise: (1) Careful drill in pronunciation; (2) the rudiments of grammar, including the inflection of the regular and the more common irregular verbs, the plural of nouns, the inflection of adjectives, participles, and pronouns, the use of personal pronouns, common adverbs, prepositions, and conjunctions, the order of words in the sentence, and the elementary rules of syntax; (3) numerous easy exercises, designed not only to fix in the memory the forms and principles of grammar, but also to cultivate readiness in the reproduction of natural forms of expression; (4) the reading of from one hundred to one hundred and seventy-five duodecimo pages of graduated texts, with constant practice in translating into French easy variations of the sentences read (the teacher giving the English), and in reproducing from memory sentences previously read; (5) writing French from dictation.

The second year's work should comprise: (1) The reading of from two hundred and fifty to four hundred pages of easy modern prose in the form of stories, plays, or historical or biographical sketches; (2) constant practice, as in the previous year, in translating into French easy variations upon the texts read; (3) frequent abstracts, sometimes oral and sometimes written, of portions of the text already read; (4) writing French from dictation; (5) continued drill upon the rudiments of grammar, with constant application in the construction of sentences; (6) mastery of the forms and use of pronouns, pronominal adjectives, of all but the rare irregular verb forms, and of the simple uses of the conditional and subjunctive.

Suitable texts for the second year are: About's *Le Roi des montagnes;* Bruno's *Le Tour de la France;* Daudet's easier short tales; De la Bédollière's *La Mère Michel et Son Chat;* Erckmann-Chatrian's stories; *Foa's Contes biographiques* and *Le Petit Robinson de Paris;* Foncin's *Le Pays de France;* Labiche and

Martin's *La Poudre aux yeux* and *Le Voyage de M. Perrichon;* Legouvé and Labiche's *La Cigale chez les fourmis;* Malot's *Sans famille;* Mairet's *La Tâche du petit Pierre;* Mérimée's *Colomba;* extracts from Michelet; Sarcey's *Le Siège de Paris;* Verne's stories.

6. Advanced French (*two* units).

Ability to read at sight, with the help of a vocabulary of special or technical expressions, difficult French not earlier than that of the seventeenth century; to write in French a short essay on some simple subject connected with the works read; to put into French a passage of easy English prose; to answer questions involving an advanced knowledge of syntax, and to carry on a simple conversation in French. After the successful completion of Elementary French, the preparation for Advanced French should cover two years, of five recitations a week.

The first year's work of Advanced French should comprise the reading of from four to six hundred pages of ordinarily difficult French, a portion of which must be in dramatic form; constant practice in giving French paraphrases, abstracts, or reproductions from memory of selected portions of the matter read; the study of a grammar of moderate completeness; writing from dictation.

Suitable texts are: About's stories; Augier and Sandeau's *Le Gendre de M. Poirier;* Béranger's poems; Corneille's *Le Cid* and *Horace;* Coppée's poems; Daudet's *La Belle-Nivernaise;* La Brète's *Mon Oncle et Mon Curé;* Madame de Sévigné's letters; Hugo's *Hernani* and *La Chute;* Labiche's plays; Loti's *Pêcheur d'Islande;* Mignet's historical writings; Molière's *L'Avare* and *Le Bourgeois gentilhomme;* Racine's *Athalie, Andromaque,* and *Esther;* George Sand's plays and stories; Sandeau's *Mademoiselle de la Seiglière;* Scribe's plays; Thierry's *Récits des temps mérovingiens;* Thiers's *L'Expédition de Bonaparte en Egypte;* Vigny's *La Canne de jonc;* Voltaire's historical writings.

The second year's work of Advanced French should comprise the reading of from six hundred to one thousand pages of standard French, classical and modern, only difficult passages being explained in the class; the writing of numerous short themes in French; the study of syntax.

Suitable reading matter will be: Beaumarchais's *Barbier de Séville;* Corneille's dramas; the elder Dumas's prose writings; the younger Dumas's *La Question d'argent;* Hugo's *Ruy Blas,* lyrics, and prose writings; La Fontaine's fables; Lamartine's *Graziella;* Marivaux's plays; Molière's plays; Musset's plays and poems; Pellissier's *Mouvement littéraire au XIXe siècle;* Renan's *Souvenirs d'enfance et de jeunesse;* Rousseau's writings; Sainte-Beuve's essays; Taine's *Origines de la France contemporaine;* Voltaire's writings; selections from Zola, Maupassant, and Balzac.

7. Elementary German (*two* units).

(*a*) During the first year the work should comprise: (1) Careful drill upon pronunciation; (2) the memorizing and frequent repetition of easy colloquial sentences; (3) drill upon the rudiments of grammar, that is, upon the inflection of the articles, of such nouns as belong to the language of everyday life, of adjectives, pronouns, weak verbs, and the more usual strong verbs; also upon the use of the more common prepositions, the simpler uses of the modal auxiliaries, and the elementary rules of syntax and word-order; (4) numerous easy exercises designed not only to fix in mind the forms and principles of grammar, but also to cultivate readiness in the reproduction of natural forms of expression; (5) the reading of from seventy-five to one hundred pages of graduated texts from a reader, with constant practice in translating into German easy variations upon sentences selected from the reading lesson and given by the teacher in English, and in the reproduction from memory of sentences previously read.

(*b*) During the second year the work should comprise: (1) The reading of from one hundred and fifty to two hundred pages of literature in the form of easy stories and plays; (2) accompanying practice, as before, in the translation into German of easy variations upon the matter read, and also in the unprepared reproduction, sometimes oral and sometimes in writing, of the substance of short and easy selected passages; (3) continued drill upon the rudiments of the grammar, directed to the ends of enabling the pupil, first, to use his knowledge with facility in the formation of sentences, and, secondly, to state his knowledge correctly in the technical language of grammar.

Stories suitable for the elementary course can be selected from the following list: Andersen's *Maerchen* and *Bilderbuch ohne Bilder;* Arnold's *Fritz auf Ferien;* Baumbach's *Die Nonna* and *Der Schwiegersohn;* Gerstaecker's *Germelshausen;* Heyse's *L'Arrabbiata, Das Maedchen von Treppi,* and *Anfang und Ende;* Hillern's *Hoeher als die Kirche;* Jensen's *Die Braune Erica;* Leander's *Träumereien* and *Kleine Geschichten;* Seidel's *Maerchen;* Stoekl's *Unter dem Christbaum;* Storm's *Immensee* and *Geschichten aus der Tonne;* Zschokke's *Der Zerbrochene Krug.*

The reading of long plays is not advisable for the elementary course, but one short play is recommended. Among shorter plays the best available ones are perhaps Benedix's *Der Prozess, Der Wieberfeind,* and *Guenstige Vorzeichen;* Eiz's *Er ist nicht Eifersuechtig;* Wichert's *An der Majorsecke;* Wilhelmi's *Einer Muss Heiraten.* A good selection of reading matter for the second year would be Andersen's *Maerchen,* or *Bilderbuch,* or Leander's *Träumereien,* to the extent of, say, forty pages. After that such a story as *Das Kalte Herz,* or *Der Zerbrochene Krug;* then *Hoeher als die Kirche,* or *Immensee;* next a good story by Heyse, Baumbach, or Seidel; lastly, *Der Prozess.*

8. Advanced German (*two* units).

(*a*) The work of the third year should comprise, in addition to the elementary course, the reading of about four hundred pages of moderately difficult prose and poetry, with constant practice in giving orally and in writing paraphrases, abstracts, or reproductions from memory of selected portions of the matter read; also grammatical drill upon the less usual strong verbs, the use of articles, cases, auxiliaries of all kinds, tenses and modes (with special reference to the infinitive and subjunctive), and likewise upon word-order and word-formation.

Suitable reading for the third year can be selected from such works as the following: Ebner-Eschenbach's *Die Freiherren von Gemperlein;* Freytag's *Die Journalisten* and *Bilder aus der Deutschen Vergangenheit,* for example, *Karl der Grosse, Aus den Kreuzzuegen, Doktor Luther, Aus dem Staat Friedrichs des Grossen;* Fouqué's *Undine;* Gerstaecker's *Irrfahrten;* Goethe's *Hermann und Dorothea* and *Iphigenie;* Heine's poems and *Reisebilder;* Hoffman's *Historische Erzaehlungen;* Lessing's

Minna von Barnhelm; Meyer's *Gustav Adolf's Page;* Moser's *Der Bibliothekar;* Riehl's *Novellen,* for example, *Burg Neideck, Der Fluch der Schoenheit, Der Stumme Ratsherr, Das Spielmannskind;* Rosegger's *Waldheimat;* Schiller's *Der Neffe als Onkel, Der Geisterseher, Wilhelm Tell, Die Jungfrau von Orleans, Das Lied von der Glocke, Balladen;* Scheffel's *Der Trompeter von Saeckingen;* Uhland's poems; Wildenbruch's *Das Edle Blut.*

(*b*) The work of the fourth year should comprise the reading of about five hundred pages of good literature in prose and poetry, reference readings upon the lives and works of the great writers studied, the writing in German of numerous short themes upon assigned subjects, independent translation of English into German.

9. Greek (*three* units).

(*a*) Elementary Greek. Grammar (Goodwin's recommended); Elementary Composition; Xenophon's *Anabasis,* Book I.

(*b*) Advanced Greek. *Anabasis,* Books II, III, IV; *Iliad,* Books I, II, III; Greek Prose Composition; Translation at sight.

[Students who offer Advanced Greek are expected to offer also General History of Greece to the death of Alexander.]

10. Elementary Latin (*two* units).

First Latin Book; reading which shall not be less in amount than Cæsar's *Gallic War,* I-IV, and which may be selected from Cæsar (*Gallic War* and *Civil War*) and Nepos (*Lives*); the writing of simple Latin prose.

11. Advanced Latin (*two* units).

Reading which shall not be less in amount than Cicero, *the Orations against Catiline, for the Manilian Law* and *for Archias;* and Virgil, *Aeneid,* I-VI. This amount of reading may be selected from the following: Cicero (*Orations, Letters,* and *De Senectue*) and Sallust (*Catiline* and *Jugurthine War*); Virgil (*Bucolics, Georgics,* and *Aeneid*) and Ovid (*Metamorphoses, Fasti,* and *Tristia*). With this reading there should be carried on systematic and regular work in composition, involving a thorough knowledge of all regular inflections, all common irregular

forms, and the ordinary syntax and vocabulary of the prose authors read.

Candidates should be examined in translation at sight of both prose and verse. The vocabulary, construction, and range of ideas of the passages set will be suited to the preparation secured by the reading indicated above. Exercises in translation at sight should begin in school with the first lessons in which Latin sentences of any length occur, and should continue throughout the course with sufficient frequency to insure correct methods of work on the part of the student. From the outset particular attention should be given to developing the ability to take in the meaning of each word—and so, gradually, of the whole sentence —just as it stands; the sentence should be read and understood in the order of the original, with full appreciation of the force of each word as it comes, so far as this can be known or inferred from that which has preceded and from the form and the position of the word itself. The habit of reading in this way should be encouraged and cultivated as the best preparation for all the translating that the student has to do. Finally, the full meaning of the passage to be translated should be expressed in clear and natural English. The school work in Latin should include also much reading aloud, writing from dictation, and translation from the teacher's reading. Learning suitable passages by heart is also very useful, and should be practiced.

12. Elementary Science (*two* units).

The equivalent of a year's course, five periods a week, in each of two branches of science, each to comprise both classroom and laboratory work. Time spent in the laboratory shall be counted at one half its face value. A year's course in any branch *without laboratory work* will count as only one half of a unit, and four such courses will be necessary to meet the requirement in Elementary Science. A selection may be made from the following list of sciences:

Physics.—The course of instruction in physics should include:

(1) The study of one standard textbook, for the purpose of obtaining a connected and comprehensive view of the subject.

The student should be given opportunity and encouragement to consult other scientific literature.

(2) Instruction by lecture table demonstrations, to be used mainly for illustration of the facts and phenomena of physics in their qualitative aspects and in their practical applications.

(3) Individual laboratory work consisting of experiments requiring at least the time of thirty double periods. The experiments performed by each student should number at least thirty. The work should be so distributed as to give a wide range of observation and practice.

The aim of laboratory work should be to supplement the pupil's fund of concrete knowledge and to cultivate his power of accurate observation and clearness of thought and expression. The exercises should be chosen with a view to furnishing forceful illustrations of fundamental principles and their practical applications. They should be such as yield results capable of ready interpretation, obviously in conformity with theory, and free from the disguise of unintelligible units.

Slovenly work should not be tolerated, but the effort for precision should not lead to the use of apparatus or processes so complicated as to obscure the principle involved.

Throughout the whole course special attention should be paid to the common illustrations of physical laws and to their industrial applications.

In the solution of numerical problems, the student should be encouraged to make use of the simple principles of algebra and geometry to reduce the difficulties of solution. Unnecessary mathematical difficulties should be avoided and care should be exercised to prevent the student from losing sight of the concrete facts in the manipulation of symbols.

CHEMISTRY.—It is recommended that the candidate's preparation in chemistry should include:

(1) Individual laboratory work, comprising at least forty exercises selected from a list of sixty or more, not very different from the list given by the College Entrance Examination Board.

(2) Instruction by lecture-table demonstrations, to be used

mainly as a basis for questioning upon the general principles involved in the pupil's laboratory investigations.

(3) The study of at least one standard textbook, to the end ulty members appointed annually by the President of the Col- of the most important facts and laws of elementary chemistry.

Botany.—The work in this subject should include those topics in the leading divisions of the subject which are now regarded by most teachers as fundamental. The general sequence of topics is that recommended by the College Entrance Examination Board, but this point is not regarded as especially important, and the sequence, the methods, and the textbooks are left to the judgment of the individual teacher.

The amount of work in this course is designed to occupy a year of five periods a week. Where special circumstances, such as exceptional difficulty in obtaining material, etc., prevent the completion of the entire amount, it is recommended as better to omit some of the minor topics here and there and concentrate on the more important topics than to attempt to cover them all superficially.

Individual laboratory work by the students is essential and should receive at least double the amount of time given to recitation. Records of the laboratory work, properly certified by the teacher, in which stress is laid upon diagrammatically accurate drawing and precise, expressive description should be required.

Physical Geography.—The candidate's preparation should include:

(1) The study of one of the leading secondary textbooks in physical geography, that a knowledge may be gained of the principles, and of well-selected facts illustrating those principles.

(2) Individual laboratory work, comprising at least forty exercises selected from a list not very different from the one given by the College Entrance Examination Board. From one third to one half of the candidate's classroom work should be devoted to laboratory exercises. In the autumn and spring, field trips should take the place of laboratory exercises.

Zoölogy.—The requirement in this subject is based upon the statement of a committee appointed by the American Society of

Zoölogists. The outline of a course in general zoölogy is contained in the publications of the College Entrance Examination Board. The outline should be developed on the basis of a course of laboratory study guided by definite directions. This should be supplemented by the careful reading of at least one modern elementary textbook in general zoölogy. At least two thirds of the time should be devoted to the practical studies of the laboratory. If good nature-studies have not preceded the course in high-school zoölogy, pupils should be encouraged to do supplementary work in the line of natural history. A notebook including drawings of the chief structures studied anatomically, and also those drawings required in natural history, with notes on demonstrations and in explanation of drawings, should be required.

13. Solid Geometry (*one half* of a unit).

The theorems and constructions in a good modern text, including the sphere and spherical figures. Solution of many original exercises, loci problems, and numerical examples.

No entrance credit in solid geometry will be allowed to a student who has spent less than one half year, of four or five recitations a week, in its preparation.

14. Trigonometry (*one half* of a unit).

The trigonometric ratios; solution of trigonometric equations; reduction of trigonometric identities; multiple angles; theory and use of logarithms and tables; solution of triangles.

No entrance credit in trigonometry will be granted to a student who has spent less than one half year, five recitations a week, in its preparation.

ADVANCED STANDING

No student is admitted to advanced standing later than the beginning of the senior year. Students entering from other colleges must complete at least one full year's work at Swarthmore College in fulfillment of the requirements for the degree of Bachelor of Arts. Students who come from other colleges must present full credentials for both college and preparatory work,

and a letter of honorable dismissal. If the credentials are satisfactory to the Committee on Admission, the candidate will be given, without examination, an equivalent amount of credit upon the records of the College. All applicants for advanced standing for work done in other than approved colleges or universities will be admitted to such standing only by examination. Examinations for such credit shall cover the full equivalent of corresponding courses at Swarthmore College. Application for advanced standing should be made in writing to the Dean. Examinations will be held only at the College.

REQUIREMENTS FOR GRADUATION

THE GENERAL UNDERGRADUATE COURSE OF STUDY

The degree of Bachelor of Arts is conferred upon those who complete the undergraduate course as outlined below. This course is based upon uniform requirements for admission, and upon certain studies which are prescribed for all matriculates. In addition to securing this fundamental uniformity, it provides for the varied needs and capacities of individuals by permitting a wide range of election on the part of the student or his adviser; and it seeks, also, to provide a thorough training, extending over three or four years, in some one department of study. The requirement of a thesis from a candidate for the Bachelor's degree is left to the option of the head of the department in which the major is taken.

Candidates for graduation in the Department of Liberal Arts are required to complete one hundred and twenty-four "hours" in addition to the prescribed work in physical education. For the number of hours required for graduation in the Departments of Engineering and in the Department of Chemistry, see the courses of study outlined under the various departments. *The foregoing are minimum requirements. Students may be required to complete additional "hours" for graduation as penalties for absences from collection or from classroom, laboratory, or other college exercises.* An "hour" signifies one recitation or lecture (or its equivalent) a week throughout one college semester. A recitation or lecture is regularly fifty-five 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. It is designed to make the laboratory exercise, as nearly as possible, equivalent in its demands to the hour defined above.

The prescribed number of hours for students majoring in the Departments of Liberal Arts is seventeen for each semester of the freshman year and fifteen for each semester of the sophomore, junior, and senior years. The prescribed number of hours for students majoring in Engineering ranges from fifteen to twenty for each semester.

An average quality grade shall be required for graduation, and for the purpose of determining this quality grade, numerical values called "points," shall be given to the grade letters, as follows: 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 sufficient to pass a course, but does not count any "point."

In accordance with this valuation the requirements in "points" for graduation of all students, both those in arts and in applied science, is one hundred and twenty-four. This is a requirement for Arts students of an average grade of C. In other words, Arts students are required for graduation to present one hundred and twenty-four hours of credit and one hundred and twenty-four "points." Students in applied science will be required for graduation to present the number of hours of credit now prescribed (ranging from one hundred and thirty-two to one hundred and fifty-one) and one hundred and twenty-four "points."

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. Students often find it difficult, however, 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 be-

low 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. For students entering from other schools or colleges these grades shall be determined from their entrance certificates. 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.

I. *Prescribed Studies.*—These studies must be taken by all students who are candidates for graduation, unless for special reasons permission to substitute some other work is obtained from the proper faculty committee. The whole of the first year is 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. The prescribed work, amounting to forty-three hours, exclusive of the Physical Education, includes the following studies:

Group 1. English.—Ten hours, four of which must be taken in English Composition, and six in English Literature.

Group 2. Greek, Latin, French, German.—Twelve hours in any one of these languages, or six hours in each of two.

Group 3. Bible Study, History, Economics, Political Science.—Nine hours, three of which must be taken in Bible Study, and six in one of the following departments: History, Philosophy, Economics, Political Science, Psychology and Education.

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.

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 should 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. *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 eighteen 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 thirty-six 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. No matter how much credit may have been given on entrance, no student is allowed to graduate who has not been enrolled as a student of Swarthmore College at least one year and who has not had in the College at least one year's work in his major.

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 124 hours.

III. *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 programme will permit:

Anthropology,	Engineering,	Law,
Art,	English,	Mathematics,
Astronomy,	French,	Philosophy,
Bible Study,	Geology,	Physics,
Biology,	German,	Political Science,
Botany,	Greek,	Psychology,
Chemistry,	History,	Public Speaking,
Economics,	History of Religion,	Spanish,
Education,	Latin,	Zoölogy.

UNIFORM CURRICULUM FOR THE FRESHMAN YEAR IN THE COURSES IN ARTS

FRESHMAN YEAR

	First Semester		Hours per Week		
See Page			Class	Lab'y	Credits
	Major Study or Elective....	.....	—	—	3
84	English **1**.....	Composition.....	2	—	2
85	English **4**.....	General Introduction.....	3	—	3
144	Mathematics **251**.....	Solid Geometry.....	3	—	3
	or				
146	Astronomy **262**.....	Descriptive Astronomy.....	—	—	—
	Language.....	.....	3	—	3
	Elective.....	.....	—	—	3
149	Physical Education.....	.....	2	—	—
		Totals.....	13	—	17

Second Semester

	Major Study or Elective....	.....	—	—	3
84	English **1**.....	Composition.....	2	—	2
85	English **4**.....	General Introduction.....	3	—	3
144	Mathematics **253**.....	Trigonometry.....	3	—	3
	or				
146	Astronomy **262**.....	Descriptive Astronomy.....	—	—	—
	Language.....	.....	3	—	3
	Elective.....	.....	—	—	3
149	Physical Education.....	.....	2	—	—
		Totals.....	13	—	17

THE COURSES OF STUDY IN APPLIED SCIENCE

The degree of Bachelor of Arts in the Departments of Mechanical, Civil, Electrical, and Chemical Engineering, and in the Department of Chemistry, is conferred upon those students who complete the prescribed work as outlined under the various departments above named.

IRREGULAR COURSES OF STUDY

Irregular courses of study, not including in due proportion the prescribed major and elective studies, may be pursued by students who have been regularly admitted to the College by examination or by certificate only in special cases and by approval of the Faculty Committee on Prescribed and Extra Work.

UNIFORM CURRICULUM FOR THE FRESHMAN AND SOPHOMORE YEARS IN APPLIED SCIENCE

The curriculum for the first and second years of the four-years' courses leading to degrees in the Departments of Mechanical, Civil, Electrical, and Chemical Engineering is the same in every respect. Students in Chemistry, for the first and second years, follow the same courses as given below except that women students are required to take certain electives instead of the prescribed courses, where specified.

FRESHMAN YEAR

First Semester			Hours per Week		
See Page			Class	Lab'y	Credits
138	Shop **203***	Pattern-making	—	6	2
144	Mathematics **251**	Solid Geometry	3	—	3
144	Mathematics **252**	Algebra	3	—	3
84	English **1**	Composition	2	—	2
85	English **4**	General Introduction	3	—	3
122	Chemistry **171**	General Inorganic	2	3	3
136	Drawing **191**	Engineering	—	6	2
149	Physical Education		2	—	—
		Totals	15	15	18

Second Semester

138	Shop **203** and **204***	Pattern-making and Foundry	—	6	2
144	Mathematics **253**	Trigonometry	3	—	3
144	Mathematics **252**	Algebra	2	—	2
84	English **1**	Composition	2	—	2
85	English **4**	General Introduction	3	—	3
122	Chemistry **171**	General Inorganic	2	3	3
137	Drawing **192**	Engineering	—	6	2
149	Physical Education		2	—	—
		Totals	14	15	17

* Women majoring in Chemistry may substitute an elective for Shop Work and Drawing.

SOPHOMORE YEAR

See Page	*First Semester*		Hours per Week: Class	Lab'y	Credits
137	Drawing **193***.....	Descriptive Geometry	—	6	2
138	Shop **204, 205** and **206***.....	Forge work and Machine work	—	6	2
145	Mathematics **254**.....	Analytical Geometry.....	3	—	3
122	Chemistry **172**.....	Qualitative Analysis.....	1	6	3
71	Group 2†.....	.....	3	—	3
148	Physics **271**.....	General Physics.....	2	2	3
138	Mechanical Engineering **213**	Materials of Construction...	2	—	2
149	Physical Education.....	.....	2	—	—
		Totals.....	13	20	18

	Second Semester				
137	Drawing **194***.....	Empirical Design.....	—	6	2
138	Shop **206***.....	Machine work	—	6	2
145	Mathematics **255**.....	Differential Calculus.....	3	—	3
122	Chemistry **172**.....	Qualitative Analysis.....	1	6	3
71	Group 2†.....	.....	3	—	3
148	Physics **271**.....	General Physics.....	2	2	3
139	Civil Engineering **223** or Elective*.....	Surveying.....	—	4	2
140	Annual Survey **230***.....	Long Survey.....	—	—	1
149	Physical Education.....	.....	2	—	—
		Totals.....	11	24	19

* Women majoring in Chemistry may substitute electives for Drawing, Shop, and Surveying.

† The courses to be followed in Group 2 are determined by the student's previous training in these languages.

COURSE ADVISERS

All students are expected to confer with their respective course advisers before enrolling in classes. The professor in charge of the major subject will serve as course adviser for each student who has chosen a major subject. The President will designate the course adviser for students who have not chosen their major subjects.

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.

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 is 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 times 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 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 incomplete; 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 students will then be notified by the Dean of the terms of the conditions.

An average quality grade shall be required for graduation, and for the purpose of determining this quality grade easily, numerical values, to be called "points," shall be given to the grade letters, as follows: 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 sufficient to pass a course, but does not count any "point."

In accordance with this valuation the requirements in "points" for graduation of all students, both those in arts and in applied science, is one hundred and twenty-four. This is a requirement

for Arts students of an average grade of C. In other words, Arts students are required for graduation to present one hundred and twenty-four hours of credit and one hundred and twenty-four "points." All other students (students in applied science) will be required for graduation to present the number of hours of credit now prescribed (ranging from one hundred and thirty-two to one hundred and fifty-one) and one hundred and twenty-four "points."

The above requirement went into effect beginning with the class entering in 1913 (class of 1917); for the class of 1916, beginning with the year 1913-14, an average grade of C shall be required of all Arts students for graduation, and in the case of all other students (students in applied science) whose courses are regular, ninety "points" shall be required for graduation.

EXEMPTION FROM EXAMINATIONS

No underclassmen shall be exempted from semester final examinations; seniors with grades of A shall be exempt in the final examinations of the second semester.

ABSENCES FROM EXAMINATION

Students who are absent from any examination, announcement of which was made in advance of the date of the examination, shall be given a make-up examination 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 causes making the absences from examination imperatively necessary, and (2) of a receipt from the office of the superintendent for a fee of $2 which shall be paid by the student in the case of every such make-up examination, except when remitted by the President of the College.

ABSENCES FROM CLASSES

Each instructor shall make on the form provided for the purpose daily reports of student absences to the office 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, The Dean of Women, both *ex officio,* and three other faculty members appointed annually by the President of the College, who shall designate the Chairman of the Committee from among its members.

In dealing with all student absences the Committee on Absences shall classify them either (a) as allowable absences, or (b) as disallowed absences. Allowable absences are absences which in the opinion of the Committee on Absences are incurred for sufficient cause. By sufficient cause is meant any grounds for absence which would justify failure to keep a stated business appointment; provided, however, that no absence shall be considered allowable by the Committee on Absences unless a written explanation of it is made by the student taking it on a form provided for this purpose at the Dean's office. Such explanation must be made by the student in advance of the absence, or, if this be impossible, at the earliest practicable time thereafter. In case the absence is not reported in advance the student shall be required to state fully on the form referred to above the reasons for his delay in reporting it. Failure to explain absences promptly and adequately shall be sufficient ground for classifying them as disallowed.

All absences not coming under the definition of allowable absence shall be considered disallowed absences subject to discipline. In the exercise of their powers of discipline over absences of the latter character the Committee on Absences may warn students, parents, or guardian; may place students on probation and fix the terms of said probation; and may require students to make hours of credit for graduation in addition to the requirements as stated in the Catalogue; provided, however, that such credit penalties shall not exceed the ratio of the number of absences to the number of hours of attendance required to make one hour of credit, and, provided further, that, in the case of students who reach the end of the first semester of their senior year with a penalty of less than one full hour of credit imposed under this section, said penalty may be removed by the Committee on Absences.

For each disallowed absence on days beginning or ending the Thanksgiving, Christmas and spring recesses, or ending the sum-

mer vacation, students shall be required to make one half hour of credit for graduation in addition to the requirements as stated in the Catalogue. Absences penalized under this section shall not be subject to discipline provided under other sections of these rules.

Students shall have the right to a hearing before the Committee on Absences in cases involving the imposition of credit penalties by the Committee, and the right to petition the Faculty in cases where, after such hearing has been given, they are dissatisfied with the decision of the Committee. In all questions involving the number of a student's absences the reports of Instructors shall be considered authoritative.

DEGREES

BACHELOR OF ARTS

The degree of Bachelor of Arts is conferred upon students who have complied with the requirements for graduation as stated on pages 69 to 75.

MASTER OF ARTS *

1. The degree of Master of Arts may be conferred upon graduates of Swarthmore College or of other institutions of satisfactory standing who have spent at least a year in residence at this College, pursuing a systematic course of non-professional study approved by the faculty. The amount of work required of candidates for the Master's degree consists of the equivalent of thirty credit hours in courses of instruction of advanced grade, of which at least twenty hours shall be in a major subject and the remainder in a minor subject to be approved by the professor in charge of the major subject. All candidates must have completed the work of the major subject in the undergraduate course as stated on page 72, before entering upon graduate work. *No work counted for the first degree will be accepted for the second degree.* In no case will the Master's degree be conferred upon resident students in less than one year after the conferring of the Bachelor's degree. It must be understood, however, that only students of ability and maturity will be able to finish the work in one year. No person will be recommended for the Master's degree who shall not have attained a grade of A or B on examination in each subject.

2. The degree may be conferred upon graduates of Swarthmore College who have devoted one year to graduate work in residence at another college or university, and who have fulfilled the requirements indicated in the preceding section.

3. The degree may be conferred upon graduates of Swarthmore College not in residence at any college or university, who

* Candidates holding the degree of Bachelor of Science, who have fulfilled all the requirements prescribed for the degree of Master of Arts, may at their option receive the degree of Master of Science.

have completed a course of non-professional advanced study approved by the faculty, substantially equivalent in kind, grade, and amount to that prescribed for the resident candidates for that degree. Courses of study will be assigned to candidates upon an application to the faculty, in which they state the subjects they desire to pursue.

All candidates *in absentia* must register (by correspondence, if necessary) at the beginning of each college year, and make reports to the faculty at the end of each semester.

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 composed of the professors in charge of the major and minor subjects respectively, and three other members of the faculty appointed by the President of the College. A majority vote of this committee is required for favorable recommendation to the faculty. This examination will be held only when notification of the intention to appear for examination is given to the Dean on or before the first of April of the year in which the candidate desires to receive the degree. The thesis must be presented on or before May 25th of the year in which the candidate desires to receive the degree, and a bound copy of the thesis must be deposited in the college library by July following.

Every resident candidate shall pay the regular tuition for each year of residence and a diploma fee of $5. Every non-resident candidate shall pay a registration fee of $5 and an additional fee of $20 when the degree is conferred.

ADVANCED DEGREES IN ENGINEERING

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

English

The instruction in this department is under the direction of Professor Harold Clarke Goddard * and Assistant Professor Roy Bennett Pace. Maud Bassett Gorham, Clara M. Hogue, Walter H. Trumbauer, and Priscilla Goodwyn Griffin are Instructors.

The purpose of the work in English is to impart the ability to write 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.

The requirements and electives in Composition may be seen below. Of the courses in English Literature, Course 4 fulfills the prescription in English Literature, and is a prerequisite to all other courses in English; Courses 8, 10, 11, and 12 are open to all students who have completed Course 4; Courses 6, 7, 9, and 13 are open to all students who have completed six additional hours elected from Courses 8, 10, 11, and 12, and also with the consent of the instructor, to Juniors and Seniors whose major subject is not English; Course 5 is similarly open to students who have completed the six additional hours elected from Courses 8, 10, 11, and 12, and also, with the consent of the instructor, to Juniors and Seniors whose major subject is another language; Courses 14, 15, and 16 are open only as stated under the courses. In certain cases a more advanced course and its prerequisite may, with the permission of the professor in charge of the department, be taken together.

1. Composition. Assistant Professor Pace, Miss Gorham, Miss Hogue, Mr. Trumbauer, and Mrs. Griffin.

Two hours a week throughout the year. Offered annually.

Prescribed, in the Freshman year, for all candidates for graduation. Short and long themes and regular conferences throughout the year, together with assigned collateral reading.

2. (*a*) Elementary Journalism. Assistant Professor Pace.

Two hours a week during the first semester. Offered in 1915-16.

Elective for all students who have passed in Course 1. A study is made of representative daily and weekly journals, and all writing is along journalistic lines.

* Professor Goddard is absent on leave during 1915-16.

2. (*b*) Second Year Composition. Mrs. Griffin.

Two hours a week throughout the year. Offered annually.

Prerequisite, Course 1. This course continues, along more advanced lines, the work of the Freshman year, emphasis being placed upon expository writing.

3. Narrative Writing. Miss Hogue.

Two hours a week throughout the year. Offered annually.

Open only to those who have attained a grade of A or B in Course 1, 2 (*a*), or 2 (*b*). The chief emphasis of this course is on the short story; the analysis of its structure and practice in writing it. In the second semester some time is devoted to the writing of one-act plays.

ENGLISH LANGUAGE AND LITERATURE

4. General Introduction to English Literature. Miss Gorham, Miss Hogue, Mr. Trumbauer, and Mrs. Griffin.

Three hours a week throughout the year. Offered annually.

The first semester of Course 4 is devoted, in the main, to a study of various literary types. Representative examples of lyric and narrative poetry, of the drama, novel, and essay are discussed and criticised in the classroom. Lectures upon versification and a few of the fundamental principles of literary criticism. The second semester is given to a rapid survey of the history of English literature from the Anglo-Saxon to the Victorian period. A large amount of collateral reading and frequent written reports are required during both semesters.

Course 4 is prescribed, in the Freshman year, for all candidates for graduation, and is prerequisite to all other courses in English.

5. Anglo-Saxon. Assistant Professor Pace.

Three hours a week throughout the year. Offered in 1916-17.

The work of the first semester is based on Bright's *Anglo-Saxon Reader*. During the second semester Béowulf and one other poem are read. Lectures on phonology, and a general survey of the Anglo-Saxon period. Béowulf in particular is studied as a monument not only of the language but also of early English life.

Except with the consent of the instructor, Course 5 must be continued throughout the year.

6. Chaucer. Miss Gorham.

Three hours a week throughout the year. Offered in 1915-16.

After an introductory study of Middle English grammar and phonology, Course 6 is devoted to a careful reading of a number of the *Canterbury Tales*, several of the Minor Poems, and the *Troilus and Criseyde*. Brief selections are read from the works of Langland and other writers of the period.

Course 6 must be continued throughout the year.

7. The English Drama. Mr. Trumbauer.

Three hours a week throughout the year. Offered annually.

Course 7 deals with a selected period or aspect of the English drama. Subject for 1915-16: The Elizabethan Drama, exclusive of Shakspere.

Course 7 must be continued throughout the year.

8. Shakspere. Assistant Professor Pace.

Three hours a week throughout the year. Offered annually.

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

9. Prose Fiction. Assistant Professor Pace.

Three hours a week during the second semester.

The object of Course 9 is twofold: to trace the development of the art of fiction, and to study the novel as a criticism of life. Careful study of a number of representative novels and more rapid reading of others.

10. English Poetry. Miss Hogue.

Three hours a week throughout the year. Offered annually.

The work of this course is devoted to the English poets of a selected period, the emphasis being placed on the interpretation of individual masterpieces rather than on the study of literary movements. Subject for 1915-1916: English Poetry of the Nineteenth Century.

Course 10 may be taken as a whole or by semesters.

11. English Prose. Miss Gorham.

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 social, political, and ethical ideals of the English people, as embodied in the prose literature of a slected period.

Subject for 1915-16: The Eighteenth Century.

Course 11, except by special permission, must be continued throughout the year.

12. American Literature. Assistant Professor Pace.

Three hours a week throughout the year. Offered in 1915-16.

A survey of the history of American literature, emphasis being placed upon the nineteenth century and upon leading writers.

13. The Principles of Literary Criticism. Professor Goddard.

Three hours a week during the second semeter. Offered in 1916-17.

Course 13 is designed to give some acquaintance with the principles underlying the criticism and interpretation of literature and art.

14. Special Topics. Professor Goddard.

Three hours a week during the second semester. Offered in 1916-17.

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 conducted on the seminary plan and is intended primarily for Seniors majoring in English; it is open to others only by special permission.

15. Teachers' Course in English. Assistant Professor Pace.

Two hours a week during the first semester. Offered in 1916-17.

In this course a study is made of methods of teaching (*a*) composition in secondary schools, and (*b*) selected works from the lists of college entrance requirements.

Open to Juniors and Seniors majoring in English.

16. Linguistics. Assistant Professor Pace.

One hour a week throughout the year. Offered in 1915-16.

The Philadelphia libraries of particular value in connection with work in the department of English are the following: the Library of the University of Pennsylvania; the Philadelphia Library; the Mercantile Library; the Free Library of Philadelphia.

French and Spanish

The instruction in this department is under the direction of Professor Isabelle Bronk. Marion Peirce and Anette S. Plass are Instructors and Jean H. Walker is Assistant.

The courses of study in French are designed to afford a high degree of literary culture, as well as to impart thorough training in the grammar and linguistics of the language. Until the middle of the second year, the authors studied are all selected from those of modern times, and the greatest attention is given to colloquial French. The student is then ready to be brought into contact with the more artificial (rhetorical) forms of expression constantly occurring in the higher grades of literature. The fact that French is a living tongue is kept ever in view. For this reason but little English is used in the classroom. Free composition, dictation, memorizing, and conversation are required throughout the courses. Much attention is given to pronunciation, and the relations of modern French to classical, popular, and low Latin are brought often before the students.

The course in Spanish is arranged with a view to giving, as far as possible, a practical knowledge of this language, and also some idea of the modern literature of Spain.

From eleven to fourteen courses in French are given each year. The Class in Course 21 is divided into four sections, the classes in Courses 22 and 23 into three each.

Students who are prepared in Elementary French (see page 59) enter Course 22; those who are prepared in Advanced French (see page 60) enter Courses 24 and 26.

Students who elect French as a major study are required to complete the work of five full years, or thirty "hours," and to take either Course 31 or Course 36.

The first semester's work in Elementary French and Elementary Spanish will not be accepted toward a degree unless followed by the work of the second semester in the same language.

Some of the lists of works studied, as given below, are subject to a slight modification.

21. Elementary French. Professor Bronk, Miss Peirce, Miss Walker, and Mrs. Plass.

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 the student to read ordinary French with ease, to understand to some extent the language when spoken, and to form simple sentences, both oral and written.

Thieme and Effinger, *French Grammar.* Beginner's Reader, followed by narrative prose (Daudet's easier short stories, Mérimée, *Colomba,* or George Sand, *La Mare au diable*) and by a modern play.

Open to all students.

22. Reading of Nineteenth Century Prose, Grammar, and Composition. Professor Bronk, Miss Peirce, and Mrs. Plass.

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

This course is designed to supplement and extend Course 21. Prose composition and drill upon the essential principles of the grammar 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. A survey is also taken of the different literary movements which prevailed in France during the nineteenth century, and of their causes and effects.

Prose composition. Prose selected from the writings of Balzac, Bazin, Claretie (Vol. VI, Magill's series), Coppée, Erckmann-Chatrian, France (Vol. III, Magill's series), Hugo, Maupassant, Zola, or others.

Prerequisite, Course 21.

23. Reading of Dramatic Masterpieces, Grammar, and Composition. Professor Bronk, Miss Peirce, and Mrs. Plass.

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

The work in grammar and prose compostion is a continuation of that in Course 22. The structure of the classical and romantic tragedy is studied, as well as comedy in the hands of Molière. Upon the completion of Course 23, students should possess an accurate reading knowledge of French, the ability to use the language as a means of oral and written expression, and an acquaintance with the more important modern, as well as a few classic authors.

Prose composition. Corneille (one play), Racine (part of one play), Hugo, *Ruy Blas* or *Hernani,* Molière, *Le Bourgeois gentilhomme.*

Prerequisite, Course 22.

24. Seventeenth Century History and Literature. Professor Bronk.

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

This course is conducted mainly in French. Particular attention is given to the social as well as to the literary tendencies of the time, and the students present reports upon pertinent topics, as well as abstracts of the works read.

Lectures on the history and society of the seventeenth century. Corneille, *Le Cid;* Molière, *Les Précieuses ridicules;* Racine, *Athalie;* La Fontaine, *Fables* (ed. Hachette).

Prerequisite, Course 23.

25. Eighteenth Century Literature. Professor Bronk.

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

This course is conducted in French. The history of the eighteenth century is studied to some extent, and its literary characteristics are compared with those of the seventeenth and nineteenth. Reading, reports, and abstracts.

Voltaire's Prose (extracts, edited by Cohn and Woodward); Beaumarchais, *Le Mariage de Figaro;* selections from Buffon, Diderot, Montesquieu, Rousseau, etc.

Prerequisite, Course 24.

26. Advanced Prose Composition. Miss Peirce.

Two hours a week during the year. Offered annually.

This course is conducted mainly in French. The work is based upon selected texts, and drill is also given in the writing of French themes and letters.

Prerequisite, Course 23.

27. Seventeenth Century Prose. Miss Peirce.

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

This course is conducted in French. Informal lectures are given and these are accompanied by discussions of the works studied, by collateral reading, and by reports.

Selections from Pascal, *Les Provinciales* and *Pensées;* from La Rochefoucauld, *Maximes;* from Bossuet, *Oraisons funèbres;* from Madame de Sévigné, *Lettres;* and from La Bruyère, *Les Caractères.*

Prerequisites, Courses 24, 25, and 26.

28. Literary Criticism. Miss Peirce.

Two hours a week during the second semester.

The object of this course is to introduce the student to a style of writing in which the French particularly excel, as well as to stimulate him to original thought and investigation. The work is in French, with discussions, illustrative readings, and reports.

Selections from Sainte-Beuve's *Causeries du lundi* (Harper's edition) and from Brunetière, *Etudes critiques.*

Prerequisite, Course 27.

29. Modern French Comedy. Miss Peirce.

Two hours a week during the second semester. Offered in 1915-16.

The masterpieces of about fifteen representative dramatists are studied, attention being fixed particularly upon the different manners in which they reflect contemporary life. A comparison is also made of their various styles. The work is in French.

30. Lyric Poetry and Versification. Professor Bronk.

One hour a week throughout the year. Offered annually.

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 is used as a textbook and is supplemented by further reading from the poets studied.

Prerequisite, Course 25.

31. Outline Course in French Literature. Professor Bronk.

Two hours a week throughout the year. Offered annually.

This course is designed as a substitute in some measure for Courses 33 and 36, and 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. Pellissier, *Littérature française,* is used as a handbook.

Open to advanced students who are able to speak and understand the French language. Credit for three hours is given.

32. History of the Novel. Professor Bronk.

Two hours a week for one semester.

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 textbook, and about fifteen representative novels are read by the students outside of the class. The course is conducted in French and on the seminary plan.

Open to advanced students with a fairly good command of French.

33. Sixteenth Century Literature. Professor Bronk.

Two hours a week throughout the year.

A general survey with Darmesteter and Hatzfeld, *Le Seizième Siècle en France,* as a basis. This course is given in French.

Open to students who have successfully completed Courses 28 (or 29) and 30.

34. Voltaire and Jean-Jacques Rousseau. Professor Bronk.

One hour a week throughout the year. Offered annually.

A more thorough study of the lives and works of these two writers than can be attempted in Course 25.

35. Practical Phonetics. Miss Peirce.

One hour a week throughout the year. Offered in 1915-16.

A study of French pronunciation, based upon the Abbé Rousselot's manual, *Précis de prononciation française.*

36. Old French. Phonology, Morphology, and Syntax. Professor Bronk.

Two hours a week throughout the year.

Translation into modern French of the selections in Constans, *Chrestomathie de l'ancien français,* with particular regard to linguistic forms. The reading of *Extraits de la Chanson de Roland* (ed. Paris), *Aucassin et Nicolete* (ed. Suchier), and *La Vie de St. Alexis.*

The course in Old French will be found an important basis, both for the study of early English and for the historical study of the French language.

Open to students who have had advanced Latin and who possess a fair command of French.

37. French Conversation. Miss Peirce.

Two hours a week throughout the year.

One hour's credit is given each semester.

38. Elementary Spanish. Miss Peirce.

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.

Hall, *All Spanish Method;* Harrison, *Spanish Reader;* Tamayo y Bans, *Lo Positivo;* Valdés, *La Algería del Capitán Ribot.*

International Correspondence. Beginning in the second year, an opportunity is given to students to carry on, under direction, a correspondence with French students.

The French Library is supplied with the treatises and books of reference necessary to illustrate the courses given. It is enriched annually by important additions.

Occasional public lectures are given by French scholars or men and women of note.

The *Cercle Français* meets twice a month during the academic year.

German Language and Literature

The instruction in this department is under the direction of Professor Benjamin F. Battin* and Assistant Professor Clara Price Newport. Antonia Weissbraun is Acting Instructor.

The courses of study in this department are designed to afford grammatical and linguistic training, and (for those who have not had a full classical course) a degree of literary culture. They bring the student into touch with the character and genius of the German people.

Emphasis is laid upon the relations of the German to the English and to the classical languages; upon etymology and syntax; and upon social conditions and political events. The courses, however, are literary rather than historical and philological.

In the classroom, translation into English is discontinued as soon as possible and expressive reading of the German text is substituted; the students begin early to use the German in recitations. The idiomatic sentence and modern colloquial language form the basis of the work in composition. Reading and translating at sight are cultivated.

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

The first semester's work in Courses 41, 42, 43, and 49 will not be accepted toward a degree unless followed by the work of the second semester in the same language.

41. Elementary German. Assistant Professor Newport and Miss Weissbraun.
Three hours a week throughout the year. Offered annually.
Thomas, *Practical German Grammar*, Part I; Grimm, *Maerchen* (twelve selections); Eichendorff, *Aus dem Leben eines Taugenichts;* Gerstaecker, *Germelshausen;* German Prose Composition; Schiller, *Wilhelm Tell* (first three acts). This course is for those who have had no preliminary training in German; it presupposes a discipline of several years' language work in Latin and French; and prepares for progressive and independent work. It aims to give a definite knowledge of German grammar, an ability to understand spoken German, to converse during the recitation, to summarize in German the topics discussed in class, to write easy German, to acquire a correct pronunciation, and to memorize simple lyrics.

42. Advanced German. Assistant Professor Newport and Miss Weissbraun.
Three hours a week throughout the year. Offered annually.
Thomas, *Practical German Grammar* (reviewed and continued); Schiller, *Wilhelm Tell* (*completed*); one of Riehl's *Culturgeschichtliche* Novellen; Baumbach, *Der*

* Professor Battin is absent on leave during 1915-16.

Schwiegersohn; Freytag, *Die Journalisten;* Goethe, *Iphigenie auf Tauris;* E. S. Buchheim, *Elementary Prose Composition* (Parts II and III); German ballads and lyrics (seven to be memorized). Lectures in German on literary characters and social conditions.

43. Schiller. Miss Weissbraun.

Three times a week throughout the year. Offered annually.

Hauff, *Lichtenstein.* Schiller, *Werke, Deutsche Verlags Anstalt, Stuttgart.* Lectures in German on German literature and the life of Schiller. The students present summaries in German of the texts read and oral discussions of assigned topics.

This course presupposes a systematic knowledge of the grammar and the ability to converse.

44. Goethe. Assistant Professor Newport.

Three times a week throughout the year. Offered annually.

Goethe, *Werke, Deutsche Verlags Anstalt, Stuttgart.* A careful study of Goethe's works. Course 44 presupposes a systematic knowledge of the grammar and the ability to converse readily. The students present summaries in German of the texts read and oral discussions of assigned topics.

45. Middle High German. Professor Battin.

Three hours a week, second semester. Offered annually.

Middle High German; Wright, *Primer;* Grammars, Weinhold, 2te aufl., Paul, 5te aufl.; *Nibelungenlied* (ed. Zarncke). This course and Courses 46, 47, 48 are conducted in German and are primarily for those making a major in German.

46. Goethe's *Faust.* Assistant Professor Newport.

Three hours, one semester.

47. Exhaustive Study of Some Author. Professor Battin, Assistant Professor Newport, and Miss Weissbraun.

Three hours a week during first semester.

Lessing—*offered in* 1915-16.

For students majoring in German.

48. The German Novel. Professor Battin.

Three hours a week, one semester.

History and development of the German novel, with extensive reading and the presentation of theses and discussions.

49. Scientific German. Assistant Professor Newport.

Three hours a week throughout the year. Offered annually.

Brandt and Day, *Scientific German.*

Prerequisite, Course 42.

50. Advanced Scientific German. Professor Battin.

Two hours a week, one semester.

Schwegler, *Geschichte der Philosophie;* Humboldt, *Ansichten der Natur.*

Prerequisite, Course 49.

51. Outline Course in German Literature. Assistant Professor Newport.

Three hours a week throughout the year. Offered in 1916-17.

This course aims to give a clear conception of the historical development of German literature. Prerequisites are ability to read rapidly and accurately and to comprehend lectures in German.

52. Richard Wagner. Professor Battin.

Three hours a week, first semester.

Wagner, *Leben und Werke.*

53. Geschichte des deutschen Volks. Professor Battin.

Two hours a week, each semester.

David Mueller, *Geschichte des deutschen Volks.*

54. Teachers' Course. Professor Battin.

Twice a week, second semester.

55. The German Drama in the Nineteenth Century. Assistant Professor Newport.

Three hours a week, first semester. Offered in 1916-17.

Development of the drama in Germany from Kleist to the present day. Extensive reading and the presentation of theses and discussions.

56. German Literature in the Eighteenth Century. Professor Battin.

Three hours a week, second semester.

A general survey with extensive reading.

57. Advanced Prose Composition. Miss Weissbraun.

Two hours a week, second semester. Offered in 1915-16.

This course is conducted mainly in German. The work is based on selected texts and drill is also given in writing German themes and letters.

Open to students who have completed Course 43.

58. Lyric Poetry in the Eighteenth and Nineteenth Centuries. Miss Weissbraun.

One hour a week, secoond semester. Offered in 1915-16.

This course is intended for the rapid reading and committing to memory of the best German lyrics of the period covered.

Open to students who have completed Course 43.

The *Deutscher Verein* meets occasionally for lectures, conversation, and social enjoyment.

International Correspondence: Students who desire it are given an opportunity to carry on, under direction, correspondence with students in German Institutions.

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.

Greek and Latin

The instruction in this department is under the direction of Professor Walter Dennison. Henrietta Josephine Meeteer is Assistant Professor of Greek and Allen B. West is Instructor in Greek and Latin.

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, and of the collections in the University Museum in Philadelphia. In connection with Courses 70 and 76 a visit is made each year to the Metropolitan Museum of New York.

Special attention is called to Courses 61 and 62 in Greek and 71 in Latin, which are provided for those who, previous to entering college, have not been able to complete the preparatory work required for admission to the freshman courses.

Students who enter College with four years of Latin will elect Course 72; those who enter with two or three years of Greek will elect Course 64.

The attention of all students is called to Course 69c in the History of Greek Literature, to Course 70 in the Art of the Greeks, to Course 73c in Roman Literature in English, and to Course 76 in the Topography and Monuments of Ancient Rome; for these courses a knowledge of Greek or Latin is not required.

A Teachers' Course in Latin (78) is offered for Seniors who expect to take positions as teachers of Latin and Greek in public and preparatory schools. Those who elect this course must before the end of the senior year have pursued at least Courses 72a, 72b, 73a, 73b, 73c, 75, and 76; the head of the department will recommend as teachers of Latin only those who have completed these courses satisfactorily. Such students are expected also to take at least Course 61 in Greek.

A *Freshman Scholarship Prize in Latin* is awarded to the

student who passes the best competitive examination in the Latin comprised in the average four years' course in the high school; this examination is open to the Freshman members of Course 72.

Students desiring detailed information concerning the courses in Greek and Latin are invited to consult with the instructors.

GREEK

61. Beginners' Course. Grammar; reading of Xenophon, *Anabasis,* Book I. Professor Dennison.

Three hours a week throughout the year. Offered annually.

This course is provided for those who have not had an opportunity of studying elementary Greek in the preparatory school.

62. Xenophon, *Anabasis,* Books II-IV. Assistant Professor Meeteer.

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

A continuation of Course 61. Students who complete this course are admitted in the second semester to Course 63.

63. Homer, *Odyssey.* Assistant Professor Meeteer.

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

The earlier books will be read entire and portions of the later books.

64. (a) Greek tragedy, Æschylus, *Eumenides;* Sophocles, *Philoctetes;* Euripides, *Troades.* Some time will be devoted to a study of the Greek theatre. Assistant Professor Meeteer.

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

Students who enter college with at least two years of Greek elect this course. [The following works will be read in 1916-17: Æschylus, *Prometheus;* Sophocles, *Antigone;* Euripides, *Alcestis.*]

64. (*b*) Selected Dialogues of Plato, including the *Crito, Apology,* and *Phœdo.* Lectures on the doctrines of the various schools of Greek philosophy. Assistant Professor Meeteer.

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

65. (*a*) Historical Prose; selected books of Herodotus and Thucydides; some account of the early Greek historians. Mr. West.

Two hours a week during the first semester. Offered in 1916-17.

65. (*b*) Theocritus and Bucolic Poetry. Professor Dennison.

Two hours a week during the second semester. Offered in 1915-16.

66. (*a*) Demosthenes and the Attic Orators. Mr. West.

Three hours a week during the first semester. Offered in 1915-16.

66. (*b*) Selections from the Lyric Poets. Mr. West.

Two hours a week during the second semester. Offered in 1916-17.

68. Greek Prose Composition. Assistant Professor Meeteer.

One hour a week during the second semester. Offered in 1916-17.

The purpose of this course is to give facility in the writing of simple Greek prose.

69. (*a*) Modern Greek; current periodicals. Mr. West.

One hour a week during the first semester. Offered in 1916-17.

Elective for students who have spent three or more years in the study of classical Greek.

69. (*b*) The New Testament. Mr. West.

One hour a week during the first semester. Offered in 1915-16.

The peculiarities of Hellenistic Greek will be pointed out. The class will read from a "harmony" of the gospels, and will study selections from the epistles descriptive of the primitive church.

69. (*c*) History of Greek Literature. Mr. West.

One hour a week during the first semester. Offered annually.

A survey of the rise and development of Greek literature in its various forms—the epic, comedy, tragedy, the lyric, history, philosophic writing, pastoral poetry, etc. No knowledge of Greek is required. The course is designed to be of suggestive value, especially to advanced students in the modern languages and literatures.

70. The Art of the Greeks. Professor Dennison.

Two hours a week during the first semester. Offered in 1916-17.

A course of lectures giving an introduction to the various departments of Greek art, especially architecture, sculpture, and painting; the purpose of the course, in part, is to give some preparation for future visits to the great museum collections of Europe and America. A knowledge of Greek is not required. Open to all students except Freshmen. This course is given in alternate years only.

LATIN

71. Preparatory Latin. Mr. West.

Three hours a week throughout the year. Offered annually.

This course is arranged for those who enter college with either two or three years only of preparatory Latin, and who therefore cannot at once enter the regular Freshman course. Selections from Cicero, Virgil, and Ovid will be read, as the needs of the class require. Students who desire to take this course are requested to consult with the instructor in charge as early as possible.

72. (*a*) Cicero, Essay *On Friendship;* miscellaneous selections; exercises in Latin writing. Professor Dennison.

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

See note under Course 72 *b*.

72. (*b*) Livy, Book I, and selections from Books II-X; Plautus, *Menaechmi.* Professor Dennison.

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

Courses 72 *a* and 72 *b* form the regular Freshman elective.

73. (*a*) Horace, *Odes* and *Epodes;* studies in the private and social life of the Romans. Professor Dennison.

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

See note under Course 73 *c*.

73. (*b*) Tacitus, *Germania,* and *Agricola.* Professor Dennison.

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

See note under Course 73 *c*.

73. (*c*) Roman Literature in English. Lectures and collateral reading. Elective for Sophomores, Juniors, and Seniors. Mr. West.

One hour a week during the second semester. Offered annually.

For this course a knowledge of Latin is not required.

Courses 73 *a*, 73 *b*, and 73 *c*, form the regular Sophomore elective.

74. (*a*) Catullus and selections from Tibullus, Propertius, and Ovid; studies in the lyric and elegiac poets of Rome. Mr. West.

Three hours a week during the first semester. Offered in 1916-17.

74. (*b*) Selected Letters of Seneca; the Latin Fathers; Christian Hymns; the philosophic and religious faiths of the first three centuries of the Empire, and the introduction of Christianity. Mr. West.

Three hours a week during the second semester. Offered in 1916-17.

74. (*c*) Roman Satire. Mr. West.

Three hours a week during the first semester. Offered in 1915-16.

The origin of satire and the fragments from the early satirists. Representative selections from Horace and Persius. Analysis of the best satires of Juvenal and comparison with other sources for the moral life of Rome in the second century.

74. (*d*) The Earlier Roman Emperors. Mr. West.

Three hours a week during the second semester. Offered in 1915-16.

Biographical and historical studies based upon Suetonius, *Lives of the Cæsars* and Tacitus, *Annals*. While some attention will be given to the evolution of the imperial form of government, the main emphasis will be upon the characters of the emperors and the statesmen of the first century.

75. Latin Prose Composition. Mr. West.

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

Opportunity is afforded in this course for constant practice in writing and speaking Latin. Some attention will be given also to the refinements of Latin style.

76. Topography and Monuments of Ancient Rome. Professor Dennison.

Two hours a week during the first semester. Offered in 1915-16.

Lectures illustrated with the stereopticon, and assigned readings. The different departments of Roman art will be treated briefly, both independently and in their relation to Greek and to modern art; in particular the appearance of the ancient city will be discussed and the extant monuments described. No knowledge of Latin is required for this course; it is hoped it will prove of interest to those who expect some time to visit Rome. Open to all students except Freshmen. This course is given in alternate years only.

77. (*a*) Martial and Petronius. Professor Dennison.

Two hours a week during the first semester. Offered in 1916-17.

77. (*b*) The Letters of Pliny the Younger. Professor Dennison.

Two hours a week during the second semester. Offered in 1916-17.

77. (*c*) The Letters of Cicero. Professor Dennison.

Two hours a week during the first semester. Offered in 1915-16.

78. Teachers' Course. Professor Dennison.

Two hours a week throughout the year. Offered annually.

Lectures and reports upon the text of Cæsar, Cicero, Virgil, and other Latin authors

commonly read in the preparatory schools. For admission to the course see the introductory announcement above (p. 94).

79. Latin Sight Reading. Mr. West.

Two hours a week throughout the year, one hour credit. Offered annually.

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 Ovid's *Metamorphoses* will be read in 1915-16, selections from the Latin Drama in 1916-17. Sight reading tends to make the student rely upon his own memory and ingenuity rather than upon lexicon and grammar, thereby making the study of the language more natural and less difficult.

90. The History of Greece. Mr. West.

Two hours a week throughout the year. Offered in 1915-16.

The history of Greece, from the earliest times to the death of Alexander the Great, supplemented by Fling's *Source Book of Greek History* and by other illustrative source material.

91. The History of Rome. Mr. West.

Two hours a week throughout the year. Offered in 1916-17.

The history of Rome, from the earliest times to the beginning of the Barbaric Invasions, supplemented by Munro's *Source Book of Roman History* and by selected passages from Roman historians.

Public Speaking

The instruction in this department is under the direction of Professor Paul M. Pearson. Philip M. Hicks is Instructor, and Elizabeth B. Oliver is Assistant.

The work in this department falls along two lines. The aim is primarily to develop and train the voice to be an efficient instrument in self expression and the interpretation of literature.

The department also endeavors to give thorough training in the principles and practice of effective public speaking; to develop poise, confidence, and the clearness of thought and utterance, indispensable to the man whose success depends upon his ability to deal with his fellow men, whether his field of activity be professional, technical, or in the business world.

In line with the belief that frequent practice in speaking is the requisite for successful results, the work in practical public speaking has been arranged in one hour courses to meet the needs of students who desire to carry work in the department throughout the college course.

81. Declamation. Professor Pearson, Mr. Hicks, and Miss Oliver.

Two hours a week throughout the year. Offered annually.

The aim of this course is to acquire purity, flexibility, and strength of voice, and an easy, natural manner in reading the different forms of literature. Students are

required to commit selected passages, which they recite before the class. Cummock, *Choice Readings.* The classes are organized in small sections, so that the students may have the personal criticism of the instructor. Frequent conferences with students are given.

82. Advanced Declamation. Professor Pearson.

Two hours a week throughout the year. Offered annually.

The aim of the course is to complete studies not fully developed in other courses of the department, and to give specital training in story telling and in interpreting the modern drama. Prerequisite Courses 81 and 84 or 86.

83. Teachers' Course in Public Speaking and Reading.

One hour a week during one semester.

The aim of this course is to teach students how to become teachers of reading. Among the fundamental topics taken up are: Articulation, Pronunciation, and Voice Control, Methods of Teaching Reading, Observation, and practice teaching.

84. Interpretation. Professor Pearson.

Two hours a week throughout the year. Offered in 1915-16.

The purpose of the course is to acquire the best possible expression of the literature studied. After learning the spirit of the author and of his time, an attempt is made to give his writing such expression as will reveal the thought and emotion for which the words are but signs. The course covers the field of American literature, one writer being studied each week. Vincent, *American Literature Masters.* Prerequisite, Course 81.

85. Special Declamation. Miss Oliver.

Three hours a week throughout the year. Offered annually.

Students meet the instructor for private lessons at hours agreed upon. Each student taking the course is required to give public recitals during the year. Course open only to those who major in Public Speaking.

86. Shakspere. Professor Pearson.

Two hours a week throughout the year. Offered in 1916-17.

Several plays of Shakspere are read during the year; assigned passages are committed and recited. Prerequisite, Course 81.

87. History of Oratory. Mr. Hicks.

One hour a week during the second semester. Offered every other year. Offered in 1915-16.

A survey of the development and practice of the art of Public Speaking, including the lives of the great masters of oratory, presented in lectures by the instructor and supplemented by research by the students.

88. Extempore Speaking. Mr. Hicks.

One hour a week throughout the year.

This course affords weekly practice in informal speaking. Special emphasis is laid upon speech structure and in outlining and criticizing representative speeches. This course is a prerequisite for courses 89, 90, and 91.

Extemporaneous Speaking. Pearson and Hicks.

89. Debate. Mr. Hicks.

One hour a week throughout the year.

Fosters, *Argumentation and Debating,* furnishes the ground work for the course, and the work takes the form of discussions of questions of current interest. During a part of the year a thorough drill is given in parliamentary law, the classes being conducted as public meetings presided over by the students in turn.

90. Psychology of Public Speaking. Mr. Hicks.

One hour a week throughout the year.

This course aims to familiarize the students with the employment of the various methods of persuasion in speaking. Scott, *Psychology of Public Speaking.* Among the topics treated are mental imagery, suggestion, the emotions, the crowd, and memory; weekly practice in speaking is continued.

91. Oratory. Mr. Hicks.

One hour a week during the first semester.

A study of the requirements of the more formal types of modern oratory based upon a critical examination of the best models of deliberative, legal, pulpit, and platform oratory. Classroom speeches of a more formal nature are required, but the student is at liberty to follow whatever type seems most desirable. Ringwalt, *Modern American Oratory.*

Public Speaking Contests and Prizes

The various public speaking contests are under the direction of the College Debate Board, which consists of three members of the Faculty, and five students, elected annually. The public speaking events are designed to bring out the ability of the students and to encourage college spirit. Besides having the honor of representing the College in a number of important intercollegiate events, the students compete for prizes in the various contests.

An annual oratorical contest, open to all students, is held in February. The student winning first place represents the College in the Pennsylvania Oratorical Union contest, in which Lafayette, Lehigh, Ursinus, Muhlenberg, and Franklin and Marshall are competitiors.

Pennsylvania Debating League. Through the initiative of Swarthmore College, a debating league was organized in 1903 between Swarthmore, Franklin and Marshall, Dickinson, and State Colleges. The plan of the intercollegiate debate is that of the round-robin. Each college prepares two teams, one on the affirmative and one on the negative of the question, which is debated. At Swarthmore there is a trial debate among the students to determine the teams for this debate. All debates are held the first Friday in March. The negative teams remain at home, and the affirmative teams go to the college fixed on the schedule.

The *President's Prize* is contested in debate by representatives of the Sophomore and Freshman Classes. The student presenting

the best debate is awarded a gold medal offered by the President of the College.

The *Delta Upsilon Prize* of $25 is competed for in the college oratorical contest. 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 Prize in Extemporaneous Speaking.* By a gift of $1,000, E. M. Bunting of New York, makes permanent the prizes that have hitherto been provided annually for this purpose. Two prizes of $25 each are offered, one contested for by the young men and one by the young women.

Declamation Contest for the Wm. W. Cocks prizes of $50. Contestants for these prizes must have completed two courses in Public Speaking and one in English; the six students having the highest marks in these courses are chosen to compete.

Potter Prize Speaking. Three cash prizes, $12, $8, and $5. Competition open to all students of the College. Twenty-four hours before the time announced for the contest the question for debate is announced, and the contestants are required to draw for sides. Each speaker is required to make a brief opening speech, and a second longer speech in answer to the arguments presented by his opponents. The prizes are given by Justice W. P. Potter of the Supreme Court of Pennsylvania.

The Swarthmore Chapter of *Delta Sigma Rho,* the national society for the promotion of sincere and effective public speaking, chooses its members each spring from the Junior Class.

The *Phi Kappa Psi Prizes* in oratory are open to competition among preparatory schools. The contest is held at the College annually.

History and International Relations

The instruction in this department is under the direction of Professor William I. Hull. Allen B. West, Instructor in Greek

and Latin, conducts Courses 90 and 91. Ethel Burnett is Assistant.

The courses are conducted by means of classroom lectures and library work, which are coördinated by the students in written outlines and reports. The purpose of the department is to afford training in the discriminating use of historical materials; to cultivate the historical habit of mind; and to develop a knowledge of European, English and United States history, as a whole, together with a more detailed knowledge of certain great epochs, institutions, and personages in the history of western civilization. Each of the various threads of the historic story is followed consecutively, and especial stress is laid on biography, a careful study of the life-work of twenty-four great social leaders being included within the courses.

International relations are emphasized throughout all the courses in history, and four courses are devoted to a study of the development of international relations and the laws governing them, particularly as illustrated in the work of the two Hague Conferences.

Twelve course are offered, six each year, four of them being devoted to European History, and two each to English History, American History, Modern International Relations, and International Law.

90. The History of Greece. Mr. West.

Two hours a week throughout the year. Offered in 1915-16.

The history of Greece, from the earliest times to the death of Alexander the Great, is supplemented by Fling's *Source Book of Greek History,* and by other carefully selected illustrative source material.

91. The History of Rome. Mr. West.

Two hours a week during the second semester. Offered in 1914-15.

The history of Rome, from the earliest times to the beginning of the Barbarian Invasions, is supplemented by Munro's *Source Book of Roman History* and by selected passages from Roman historians.

92. The History of France. Miss Burnett.

Three hours a week throughout the year. Offered in 1915-16.

A consecutive history of the French people, from the time of the Barbarian Invasions to the present, with a biographical study of Charlemagne, Joan of Arc, Coligny, Robespierre, and Napoleon.

93. The History of Germany.

Three hours a week throughout the year. Offered in 1914-15.

A consecutive history of the German people, from the time of the Barbarian In-

vasions to the present, with a biographical study of Luther, Frederick the Great, and Bismarck.

94. (*a*) The History of England (to 1603). Professor Hull.

Three hours a week throughout the year. Offered in 1915-16.

England to the end of the Tudor Period, with a biographical study of Alfred, Henry II, and Queen Elizabeth.

94. (*b*) The History of England (from 1603). Professor Hull.

Three hours a week throughout the year. Offered in 1916-17.

England from the beginning of the Stuart Period, with a biographical study of Cromwell, Chatham, Pitt, and Gladstone.

95. (*a*) The History of the United States (to 1783). Professor Hull.

Three hours a week throughout the year. Offered in 1915-16.

The United States to the end of the Revolution, with a biographical study of Franklin and Washington.

95. (*b*) The History of the United States (from 1783). Professor Hull.

Three hours a week throughout the year. Offered in 1916-17.

The United States from the beginning of the Critical Period, with a biographical study of Washington, Clay, and Lincoln.

96. (*a*) Modern International Relations (Europe). Professor Hull.

Three hours a week throughout the year. Offered in 1915-16.

The historic background of the Great War, together with its immediate causes and significance.

96. (*b*) Modern International Relations (America). Professor Hull.

Three hours a week throughout the year. Offered in 1916-17.

A history of the relations between the United States and the Latin-American Republics, with a special study of the problem of the Monroe Doctrine and its proposed solutions.

97. (*a*) International Law (The Law of Peace). Professor Hull.

Two hours a week throughout the year. Offered in 1915-16.

The essentials of the international law of peace, with a careful study of the constructive programme of the two Hague Conferences.

97. (*b*) International Law (The Law of War and Neutrality). Professor Hull.

Two hours a week throughout the year. Offered in 1916-17.

The essentials of the international law of war and neutrality, particularly as exemplified in the two Hague Conferences and in the warfare of the Twentieth Century.

The work in this department may be greatly aided by the books and other collections in the following Philadelphia libraries and museums: The Pennsylvania Historical Society, Locust and Thirteenth Streets, which possesses an admirable collection of material relating to Pennsylvania and American Colonial History; the University of Pennsylvania's Library and Archæological Museum, Thirty-fourth and Spruce Streets, which are

especially rich in materials relating to modern and classical European History. The department itself is building up as rapidly as possible a collection of books and documents relating to international law and diplomacy.

Political Science

The instruction in this department is under the direction of Professor Robert C. Brooks.

The fundamental 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 for the solution of our American problems.

Though the courses in political science are 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 pedagogy 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 are 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.

101. American Political Parties and Party Problems. Professor Brooks.
Three hours a week during first semester. Offered annually.
A study of the growth, organization, aims, and methods of political parties in the

United States, with particular reference to the primary and convention system, financing of parties, and the charges of corruption in American politics and life.

Open to all students except Freshmen.

102. American Federal Government. Professor Brooks.

Three hours a week during second semester. Offered annually.

A study of the origin, development, and present structure of the Federal Government of the United States. Designed as a continuation of Course 101, but may be elected separately.

Open to all students, except Freshmen.

103. Government and Parties in England and Continental Europe. Professor Brooks.

Two 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.

104. Municipal Government in England and Continental Europe. Professor Brooks.

Two hours a week during first semester. Offered annually.

A study of municipal government in England, France, and Germany, with the particular purpose of discovering suggestions for the improvement of city government in the United States. Special financial and social problems of city life, such as municipal ownership, taxation of unearned increment, the drift of population to urban centers, the housing problem, sanitation, and provision of facilities for recreation are also discussed.

Prerequisite, Courses 101, 102, or 103, or the equivalent of one of these.

105. Municipal Government in the United States. Professor Brooks.

Two hours a week during second semester. Offered annually.

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.

Prerequisite, Courses 101, 102, or 103, or the equivalent of one of these.

106. American State Government and Experimental Legislation. Professor Brooks.

Two hours a week throughout the year. Offered annually.

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, and a large part of the work of the class will consist in experimental legislation, *i. e.*, the drafting, discussion, and voting of bills upon topics of current interest.

Prerequisites, Course 101, 102, or 103 or the equivalent of one of these.

107. History of Political Ideas. Professor Brooks.

One hour a week throughout the year. Offered in 1916-17.

A study of the development of political thought. The first part of the course is devoted to a series of lectures on Oriental, Greek, Roman, and mediæval political

ideas, students being assigned collateral reading in Plato, Aristotle, Polybius, St. Augustine, Thomas Aquinas, Dante, and others. Political philosophers of later date are studied principally from their writings, particular attention being given to Machiavelli, Bodin, Hobbes, Locke, Montesquieu, Rousseau, Burke, Bentham, Mill, Maine, and Seeley.

Open only to Juniors and Seniors.

108. Recent American Political Thought. Professor Brooks.

Two hours a week throughout the year. Offered in 1916-17.

A study of the writings of the more notable recent commentators upon American political life and ideals with particular reference to the probable large developments of the immediate future.

Open only to Juniors and Seniors.

Economics

The instruction in this department is under the direction of Professor Louis N. Robinson.* Leonard B. Krueger is Acting Instructor.

Good citizenship implies intelligent citizenship. The broadest purpose of college instruction in Economics is to contribute to the former by the cultivation of the latter. From this point of view the study of Economics should appeal to all students, for the duties of citizenship await them all. In a narrower way, work in Economics should prove useful to those who intend to devote themselves to law, business, journalism, philanthropy, or the public service. Finally, for those who wish to prepare for investigation or teaching in this field, college instruction, with its closer personal relation between student and teacher, should provide suitable preparation for graduate study and research in larger institutions.

Collateral work in Political Science, History, German, and French is strongly recommended for all who intend to devote much time to Economics. A knowledge of general biological theory, of psychology, and of philosophy would add greatly to the value of work done in this department. No credit will be given in courses which run throughout the year, unless the work of the entire year is taken.

The advanced courses will be changed from year to year, thus enabling students to take more work in the department than is here scheduled.

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* During 1915-16 Professor Robinson gives only part of his time to class work.

111. Principles of Economics. Mr. Krueger.

Three hours a week throughout the year. Offered annually.

The first part of this course consists of a study of the fundamental laws and principles of economics; the second part deals with the application of these laws to the public questions of the day, such as those connected with the tariff, taxation, currency, trusts, trade unions, strikes, socialism, and the railroads.

Not open to Freshmen except to those majoring in Economics.

112. Money, Credit, and Banking. Professor Robinson.

Two hours a week throughout the year. Offered in 1915-16.

The work of this course will be divided into three parts: (a) a study of the principles of money, credit and banking; (b) a study of the exemplification of those principles in the monetary and banking history of certain countries; (c) a study of present-day currency and banking problems in the United States. As a supplement to the classroom work, visits will be made to the mint and to banking institutions in Philadelphia.

Prerequisite, Course 111 or its equivalent.

113. Public Finance. Professor Robinson.

Two hours a week throughout the year. Offered in 1916-17.

The subject-matter of this course will be the nature of governmental wants, public expenditures, budgets, and budgetary legislation, the development of tax systems, the different kinds of taxes, the theory of incidence, the problem of equity, practical ideals for a tax system in the United States, and the theory and extent of public debts.

Prerequisite, Course 111 or its equivalent.

114. Organization, Management, and Problems of Business. Mr. Krueger.

Three hours a week throughout the year. Offered annually.

A discussion of the main features of agriculture, manufacturing, and transportation, and the relation of each to the government. The historical development, the changes in structure, the organizing, the financing, the management, the economic and social problems are considered in detail.

Open to all students.

115. Criminology. Professor Robinson.

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

Three general subjects are treated in this course. The first has to do with the theory and data of criminality. The second subject deals with criminal law and criminal procedure. The third relates to penology. Visits are made to the various penal and reformatory institutions in Philadelphia and vicinity.

Open to all students.

116. Modern Philanthropy. Professor Robinson.

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

The large public questions involved in the relief of the indigent and in the care of the insane, the feeble-minded and other dependents. Visits are made to representative institutions in Philadelphia and vicinity.

117. Resources and Industries. Mr. Krueger.

Three hours a week throughout the year. Offered in 1915-16.

This course consists of a study of the mineral, water, forest, and land resources of the United States with special emphasis on their conservation. Following this the principal agricultural and manufacturing industries of the United States will be studied and discussed. Attention will also be given to the main continental and oceanic routes of travel.

Open to all students.

118. Socialism. Professor Robinson.

Two hours a week during the first semester. Offered in 1916-17.

Attention will be given in this course to the various forms of socialistic theory. Its main object, however, is to describe the evolution of the Socialist movement and the organization of Socialistic parties, to measure the present strength of the movement and to examine its methods and aims.

119. The Labor Problem. Professor Robinson.

Two hours a week during the second semester. Offered in 1916-17.

A study of the history, activities, and structure of labor organizations, and the influence of economic and political theories upon them.

The location of Swarthmore enables her students to take advantage of many valuable opportunities for study afforded by Philadelphia collections and institutions. The library of the University of Pennsylvania contains collections aggregating 22,000 volumes for the support of the work of the Wharton School of Finance and Commerce, particularly the Colwell Collection of 7,000 volumes, and the Cary Collection of 3,000 pamphlets. The Philadelphia Commercial Museum contains extensive and interesting collections of raw materials and finished products and a library on commercial topics. As a great center of manufacturing, commercial and banking activities, Philadelphia enables the student to deal with many economic questions on the ground. Her widely known philanthropic institutions are similarly available for sociological investigation.

Law

The instruction in this department is under the joint direction of T. Walter Gilkyson and Howard Cooper Johnson, Instructors in Law.

The courses in law are designed to give to the student an insight into legal reasoning and a general knowledge of the fundamental legal relations which govern our society. It is expected that these courses will serve as a helpful introduction to professional study for those who aim to prepare themselves for the life of the lawyer; that those students who desire to equip themselves for active business life, will be aided by an intelligent study of the principles which lie at the basis of commercial life; and that all will find in the systematic study of the science of the law a broadening influence that will tend to general culture.

125. Law and Social Progress. Mr. Gilkyson.

One hour a week throughout the year. Offered annually.

The purpose of this course is to discover the relation between law and modern social and economic conditions. The student will first become familiar with the fundamental principles of the law of crimes, torts, private, and quasi public corporations, and will later work out the relation between these principles and the social and economic conditions of modern society. The influence of modern theories of economics and sociology upon the law, and the development of legal principles, both through statute and decision, in response to such influence, will then be carefully analyzed. It is proposed to carry out this course through lecture work and assigned reading.

126. Contracts. Mr. Johnson.

One hour a week throughout the year. Offered annually.

This course is based on Sullivan's *Business Law,* and is designed to give the student a working knowledge of the law of contracts and negotiable instruments. Classroom discussion of cases illustrating the principles underlying the law covering these topics is the chief work, but special consideration will be given to new laws, state or national, of vital interest.

128. Law of Association. Mr. Johnson.

One hour a week throughout the year. Offered in 1916-17.

A general survey of the law of Pennsylvania corporations and the principles of partnerships and agency will be covered by classroom discussion and reading in Sullivan's *Business Law.* The principles of business organization and management and issuance of securities by and the financial plans of corporation will receive attention.

129. Modern Labor Legislation. Mr. Gilkyson.

One hour a week throughout the year. Offered in 1915-16.

An analysis of the common law principles which govern the relationship of Master and Servant and a study of the recent labor legislation and the changes and modifications it has made in the Common Law.

130. Decedent's Estates. Mr. Johnson.

One hour a week throughout the year. Offered in 1917-18.

The ground here covered will include a study of the Intestate Law, the making and interpretation of wills and the practical duties incident to the position of executor, administrator, trustee, or guardian.

History of Religion and Philosophy

The instruction in this department is under the direction of Professor Jesse H. Holmes.

The object of the courses is to give the student an introduction to the principal religious and philosophical systems of the world, together with a study more in detail of a few of them. The courses offered as electives cover three years. All students are required to take a course of three hours in the study of the Bible.

The work will be varied by lectures, recitations and prepara-

tion of special themes. Several hundreds of lantern slides illustrating various phases of the subject-matter are available, as are also charts, maps, pictures, and a carefully selected library.

Special work may be arranged for students desiring to make preparation for effective Sunday-school teaching. This will be partly in regular classes dealing with the study of the Bible, history of religions, ethics, sociology, psychology, and educational methods, and partly in classes arranged for the special needs of students making application. It is possible to arrange for work of this character covering short periods, such as two or three months.

131. Bible Study. Professor Holmes.

Two hours a week in first semester, one hour a week in second semester. Offered in 1916-17.

Intended to give such general knowledge of the Bible, its origin, contents, and qualities as literature, as should be possessed by all intelligent people. The work of the student will consist largely of indicated readings in the Old and New Testaments. Kent, *Historical Bible,* will be used as a supplementary textbook.

The Class work will include lectures, recitations, study of maps, pictures, etc.

132. History of Religion. Professor Holmes.

Two hours a week during the first semester. Offered in 1916-17.

A brief study of the principal religious systems of the world. Menzies, *History of Religion,* is followed as textbook, but a large part of the work of the course is carried on in the library.

133. The Religion of the Hebrews. Professor Holmes.

Three hours a week during the first semester. Offered in 1916-17.

A study of the Hebrew people, their social and religious customs, their prophets and their literature. It is based upon the study of the books of the Old Testament, Kent, *Historical Bible,* being also used. In the early part of the course attention is given to the origin of the Semites and their early movements, Babylonia, Assyria, and other allied topics.

Open to students who have completed Course 131, and to others who, in the judgment of the instructor, can profitably carry on the work of the class.

134. Life and Times of Jesus. Professor Holmes.

Three hours a week during the secoond semester. Offered in 1916-17.

A study of the social, political, and religious conditions prevailing at the beginning of the Christian era, followed by the life, work, and teachings of Jesus, and the Apostolic age of the Christian Church. Stevens and Burton, *Harmony of the Gospels,* the *Acts of the Apostles,* and the other books of the New Testament, together with Pfleiderer, *Christian Origins,* are made the basis of the work.

Open to students who have completed Course 131, and to others who, in the judgment of the instructor, can profitably carry on the work of the class.

135. History of Christianity. Professor Holmes.

Two hours a week during the second semester. Offered in 1916-17.

A study of the principal events in the history of the Christian church, and especially in the development of Christian doctrines. Some attention will be given to the

history of various Christian sects. Allen, *Continuity of Christian Thought*, Pfleiderer, *Development of Christianity*, have been used as textbooks.

Open to students who have completed Course 131, and to others who, in the judgment of the instructor, can profitably carry on the work of the class.

136. Ethics. Professor Holmes.

Two hours a week, second semester. Offered in 1916-17.

An introduction to the various types of ethical theory, with discussion of some applications of ethical principles. Drake, *Problems of Conduct* has been used as a textbook.

137. History of Philosophy. Professor Holmes.

Three hours a week throughout the year. Offered in 1916-17.

After a brief introductory glance at the early Greek philosophies, especial attention is given to Socrates and to the systems of Plato and Aristotle. Some time is devoted to the development of philosophical systems in the period centering about the beginning of the Christian era; the growth, culmination, and decline of scholasticism, are studied, and the appearance of the modern critical spirit. In the second semester the work is directed to the modern systems beginning with Descartes. Especial attention is given to the philosophy of evolution. Thilly, *History of Philosophy*, is used as a textbook.

Open to Juniors and Seniors.

138. Introduction to Philosophy. Professor Holmes.

One hour a week in second semester. Offered in 1916-17.

A study of the more general present-day theories of science: lectures on the theory of knowledge, fundamental ideas, the meaning of natural law, the theory of evolution in the inorganic and in the organic world. Russell, *First Course in Philosophy* has been used as a textbook.

Open to students who have completed two years of college work in the sciences.

Some of the greatest archæological collections of the world are near enough to be made use of by Swarthmore students, and visits to museums, exhibitions, etc., are frequently possible. Especially to be noted is the Achæological Museum of the University of Pennsylvania, with its remarkable collections illustrating the civilizations of Babylonia, Assyria, and Egypt; its display of amulets, charms, etc., from many parts of the world; its Buddhist Temple showing the externals of worship among the people of India, and collections of similar materials from among the American Indians, the Esquimaux, and many other peoples.

A Museum of Religions has been started at Swarthmore, which has already a valuable collection of religious curios from China, Japan, India, and elsewhere. Additions to this collection will be welcomed.

Mention should be also made of the great libraries of Philadelphia, and of the lecture courses, often by the great scholars

of the World, at Drexel, Franklin, and Wagner Institutes, and at the University of Pennsylvania, in addition to those offered at Swarthmore. The most famous preachers, statesmen and orators are frequently to be heard in Philadelphia, and the opportunities thus afforded are brought to the attention of students.

Psychology and Education

The instruction in this department is under the direction of Professor Bird T. Baldwin, assisted by Eloise Vest. Special Methods Courses for teachers are given by Professors H. C. Hayes, Jesse H. Holmes, Benjamin F. Battin, Paul M. Pearson, Walter Dennison, and Assistant Professor Walter Ross Marriott.

THE AIM OF THE DEPARTMENT

The new department of Psychology and Education is being organized on comprehensive and scientific lines around the central purpose of thorough preparation through intelligent participation and experimentation in school work. On every hand emphasis will be placed on the modern empirical and scientific points of view in psychology and education. Therefore, experimental laboratory courses will be given in both these fields in order to make the work concrete, definite, and scientific. In order to connect theory and practice, and to formulate principles of education, all theoretical and historical courses will be paralleled by work in School Observation, Practice Teaching, and Experimental Education in contemporary school problems.

ASSISTANT TEACHING

Observation and Assistant Teaching will be conducted at Lansdowne, Chester, Media, Wallingford, Rutledge, and a Friends' school, all of which are within a half hour's ride of the College.

All candidates for the recommendation of the department for the Pennsylvania State Certificate will be required to take Education 146 (Principles and Practice of Teaching). In this course, after each student has had the required observation work and has made a series of lesson plans, he teaches daily for at least thirty consecutive type lessons in one or two subjects. He

is also visited by the professor in charge, whom he meets regularly for individual conferences and for class exercises and discussion. This intensive, systematic training under careful supervision and direction, with the background gained in other courses, will practically eliminate the difficult problem of the "inexperienced teacher." Superintendents are glad to find these students, and to accept them as "experienced."

EXPERIMENTAL EDUCATION

Regular courses involving laboratory and field work will be given at the College during the coming year, and special efforts will be made to study educative processes in action through direct experimental methods. This work has been so arranged that graduate students and teachers near the College may meet in class on Thursday afternoon and Saturday morning to work on special problems, and to receive special training in technique. This work will center, in the main, around contemporary problems in the public schools of the community, the Williamson School of Mechanical Trades, the Elwyn Training School for Mentally Defective Children, and the Glen Mills Reformatory at Sleighton Farm.

MORAL EDUCATION

In collaboration with the Department of History of Religion and Philosophy, under the direction of Professor Holmes, the College is able to offer unusual opportunities in Moral Education.

PHYSICAL EDUCATION

This work, which is given in coöperation with the Department of Physical Education, consists of theoretical and practical courses in play, gymnastics, school hygiene and medical inspection, with the double purpose of giving a thorough knowledge of the physical development of school children and of giving materials and methods for the student's future need as a teacher.

TEACHERS' COURSES

Through the coöperation of professors in other departments efforts are being made to correlate and coördinate all the work within the College bearing directly on the preparation of teach-

ers. During the coming year Special Methods Courses will be given in Physics, German, Public Speaking, English, and Latin. These courses are for junior and senior students who have the prerequisites in the special subjects and in Education. Some of the courses will be accompanied by observation and practice teaching under the direction of the instructor in charge.

The Teachers' Courses aim to make a detailed study of the best methods of teaching high-school subjects from the standpoint of adolescent development, and the organization and presentation of subject-matter. The courses are essentially professional in their point of view and emphasize methods of teaching. They consider, aside from their specific characteristic topics, the relative educational value of the subject in secondary schools, the plan and organization of the course of study, the best types of texts and explanatory material, methods of organizing classified bibliography and reference books for school libraries in the subject at hand.

Emphasis is placed on the method of the recitation and types of lesson plans for secondary schools, including a consideration of the transition of method and subject-matter from the elementary to the high school, and from the high school to the College. A limited number of hours of practice teaching in any one of these courses may be counted toward the teaching required for the recommendation of the department of Education for the State College Certificate.

TEACHERS' APPOINTMENT COMMITTEE

A Teachers' Appointment Committee, consisting of Professors Dennison, Baldwin, Holmes, and Dean Alexander, was instituted in 1912. The duty of this committee is to assist the graduates of the College in their effort to secure satisfactory teaching positions. This assistance is to be rendered not only to members of each year's graduating class, but also to earlier graduates who have been teaching meanwhile, and having acquired experience, desire more responsible positions than the ones they now have.

THE STATE COLLEGE CERTIFICATE

Students graduating from college and completing the required number of courses (eighteen semester hours) in Psychology and

Education, including the required practice teaching of not less than thirty regular lessons covering six weeks or more, will be recommended by the Department for the State College Certificate, which carries exemption from all examinations for positions in the public schools of Pennsylvania, and becomes permanent after three years of teaching. This certificate is accepted by a number of other states.

COURSE OF STUDY

No course in this department should be taken before the Sophomore year. The courses designed for the Sophomore year are Ethics (136), General Psychology (139) or (140), and Educational Psychology (141); for the Junior year, Principles of Education (142) History of Education (144), and School Hygiene (145); for the Junior or Senior year, School Supervision (143); and for the Senior year, Practice Teaching (146), Experimental Education (147), and Teachers' Courses* 15, 54, 78, 89, 100, 270, 292.

COURSES OF INSTRUCTION

136. Ethics—Theory, Practice and Teaching. Professor Holmes.

Two hours a week during first semester.

This course aims to present the principal theories as to the basis of right and wrong, to discuss practical questions such as come before men and women in business and social life, and in citizenship. The latter part of the year will be devoted to a consideration of methods of developing morals in schools, uses and abuses of self-government, the work of the church and the Sunday school, boys' and girls' clubs, and other institutions which affect ideals and conduct. Opportunity will be given for observation of such institutions, and, in case of those taking the teachers' course, for practice teaching when possible.

Open to all students.

139. General Psychology. Professor Baldwin and Professor Holmes.

Three hours a week during the first semester.

This course aims to introduce the student to the science of psychology through modern experimental methods together with lectures, demonstrations, and clinical observations. It also aims to lay the foundations for more advanced work in psychology and courses in other departments that demand a knowledge of the fundamental principles of mental activity.

Texts—Pillsbury, Hollingsworth.

141. Educational Psychology. Professor Baldwin.

Three lecture hours a week during second semester.

This course begins with a consideration of the aims and technique of general and experimental psychology and emphasizes the study of the development of mental traits and individual differences throughout childhood and adolescence. Work is carried on by means of lectures, texts, reports, demonstrations, and experiments.

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* In some instances the Teachers' Courses may be taken in the Junior year.

142. Principles of Education. Professor Baldwin.

One hour a week throughout the year.

A study of the principles underlying a science of education furnishes the end and aim of this course. An analysis of the learning process is made and the results and methods of the work accomplished in experiments and studies in education during the last decade are summarized in lectures and illustrated by class demonstrations and experiments. Thorndike's *Educational Psychology.*

143. School Supervision.

Two hours a week during first semester.

An elementary course designed to introduce the student to a general survey of the study by means of a systematic study of the organization, administration, and methods of supervision of public schools; the teaching staff; the school plant and its equipment; the practical problems of school and class management in the elementary and secondary schools; the course of study; daily program; examinations, marking, promotion and grading; Wagner's *School Laws of Pennsylvania.* Text, Snedden and Dutton's, *School Administration* and Bagley's *Class Management.*

Prerequisite, Education 141 or 142.

144. The Philosophy and History of Education.

145. School Hygiene.

One hour per week throughout the year.

This is a course in school and community hygiene for those who are intending to teach. Dresslar's *School Hygiene* is used as a text, supplemented by the instructor's notes and collateral reading.

146. Assistant Teaching. Professor Baldwin.

Three hours a week during the first or second semester.

This course is required of all applicants for the recommendation of the Department for the Pennsylvania State College Certificate. The principles of teaching, school observation and practice teaching furnish the material for the course. Thorndike's *Principles of Teaching* and Carter's *Methods of Teaching* are used as texts, supplemented by collateral reading and the professor's *Outlines on School Observation* and *Practice Teaching.*

The work consists of practice teaching in the elementary and high schools. Students in some of the special Teachers' Courses may, under certain conditions, be excused from a portion of the work. All students are required to teach at least thirty lessons.

Prerequisite, Education 141. Open to Seniors who have not taught and who have had at least three courses in Psychology or Education.

147. Experimental Education. Professor Baldwin and Miss Vest.

Three hours throughout the year.

This course deals with educative processes and agencies in action from the scientific point of view, and is based largely on laboratory investigations and educational research under conditions, which may be controlled, repeated, modified, and carried out serially and chronologically. The course gives training in scientific and statistical methods of approaching educational and psychological problems. Some of the problems studied are: Retardation, elimination, school training, juvenile delinquency, mental deficiency, mental tests, tests for physiological age, physical defects and school standing, adolescent development, and the psychology of high-school branches of learning.

Each student is assigned a special problem for investigation.

Prerequisite, Senior standing or two years' experience in teaching.

149. Applied Psychology. Professor Baldwin.

One hour a week throughout the year. Omitted in 1915-16.

This course deals with the application of psychology to business efficiency, law, medicine, and sociology.

Text, Munsterberg's *General and Applied Psychology.*

TEACHERS' COURSES GIVEN BY OTHER DEPARTMENTS

15. Teachers' Course in English.

Two hours a week during first semester.

The chief emphasis in this course is placed upon the teaching of composition in the secondary school. Consideration is also given to the college preparatory texts, and to the coördination of writing by pupils and the study of literature.

Open to Seniors whose major study is English, and, in special cases, to others who have completed twelve hours of elective work in the department.

Prerequisites, two courses in Psychology or Education for those who wish credit in Education.

54. Teachers' Course in German. Professor Battin.

One hour a week during second semester.

The various methods of teaching German in the secondary schools, the essentials of good textbooks, the place of composition and conversation as helps in language study, and the aims of modern language teaching will be taken up in this course.

Observation and practice teaching.

Prerequisites, two courses in Psychology or Education for those who wish credit in Education.

78. Teachers' Course in Latin. Professor Dennison.

Two hours a week throughout the year.

Lectures and reports upon the text of Cæsar, Cicero, Virgil, and other Latin authors commonly read in preparatory schools.

Observation and practice teaching.

Prerequisites, Latin 72a, 72b, 73a, 73b, 75, 76; two courses in Education or Psychology for those who wish credit in Education.

89. Teachers' Course in Public Speaking and Reading. Professor Pearson.

One hour a week during second semester.

The aim of this course is to teach students how to become teachers of reading. Among the fundamental topics taken up are: Articulation, Pronunciation, and Voice Control, Methods of Teaching Reading.

Observation and practice teaching.

Prerequisite, Public Speaking 81, and two courses in Education or Psychology for those who wish credit in Education.

270. Teachers' Course in Mathematics. Assistant Professor Marriott.

Two hours a week during second semester.

The aim of this course is:

(a) To acquaint the student with the more elementary parts of the History of Mathematics directly connected with his subjects.

(b) To study those topics in which the secondary teacher encounters the greatest difficulties in presentation, to give the student practical laboratory experience in teaching and to make reviews and criticisms of modern texts.

Prerequisites, Mathematics 251, 252, and 253; and two courses in Psychology or Education for those who wish credit in Education.

(This course does not count as required mathematics.)

292. Teachers' Course in Physics. Professor Hayes,

Fine Arts

The instruction in this department is under the direction of Assistant Professor Albert Winslow Barker.

The aim of the course offered in this department is twofold, First, to study the historical development of architecture, sculpture, painting, and the allied arts, as a part of the history of Western civilization, in order to show the share that these arts have had in the creating and fixing of ideals, and in the development of craftsmanship. Second, the principal types and examples of these arts are studied as masterpieces of achievement, of permanent value in defining standards, and for the cultural enjoyment of their special characteristics.

The work consists of illustrated lectures and indicated reading, with the opportunity for laboratory work for either one or two hours additional credit.

151. History of Art from the Christian Era to the Renaissance. Assistant Professor Barker.

One hour a week during first semester.

The source; dominance of architecture in the medieval period; development of craftsmanship.

152. History of Art; Renaissance and Modern Art. Assistant Professor Barker.

One hour a week during second semester.

The initial renaissance of the fourteenth century; the development of painting and sculpture; the growth of the modern spirit in art.

Biology

The instruction in this department is under the direction of Professor Spencer Trotter. Samuel Copeland Palmer is Assistant Professor.

The courses in Biology are designed to give a broad and liberal view of the facts of life as a part of the system of general culture. The successful completion of the several courses as part of the general work for the degree of A. B. is preparatory to the study of Medicine, of Forestry, or of Agriculture. Students are thus enabled to enter the technical schools of the leading universities in the above-named branches.

Special work in the dissection of the human body is likewise afforded students who are preparing for the study of Medicine.

The courses are arranged so as to present a logical sequence throughout the four years of college work for students making Biology their major subject.

Students making Biology their major will be required to take one year each in Chemistry and Physics, and the equivalent of two college years in a modern language, preferably German.

The requirements by the foremost medical schools of the country of two years' preparation in Biology is fulfilled by these courses in Swarthmore College.

These courses likewise lead to the post-graduate work of the university.

COURSES IN GENERAL BIOLOGY

155. General Biology.

(*a*) Zoölogy. Professor Trotter.

Three hours a week during first semester. Offered annually.

This course is an outline study of the structure, classification, distribution, and general natural history of animals. Two lectures a week—three hours laboratory work in the dissection of types.

Textbooks—Hertwig's *Manual of Zoölogy;* Kingsley.

Open to Sophomores and Freshmen.

(*b*) Botany. Assistant Professor Palmer.

Three hours a week during second semester. Offered annually.

A course in elementary botany desiged to give the student a broad view of the whole field of plant growth, structure, development, distribution, and classification. Two lectures a week—three hours laboratory work including field work in May and June.

Open to Sophomores and Freshmen. *Credit is not given in this course* (155) *until both sections (a) and (b) are completed.*

156. Invertebrate Morphology. Assistant Professor Palmer.

Three hours a week during first semester. Offered annually.

A careful and detailed study or invertebrates with laboratory study of the more important orders. Two lectures a week—three hours laboratory.

Prerequisite, 155.

157. Mammalian Anatomy and Physiology. Professor Trotter.

Three hours a week during second semester. Offered annually.

Two lectures a week on mammalian anatomy and physiology with special relation to the human mechanism. Three hours laboratory work in the dissection of the mammal (cat) and the study of organs and tissues. This course includes elementary work in Histology. Textbooks, Huxley's *Lessons in Elementary Physiology,* (1915 ed.); Wilder's *Mammalian Anatomy.*

Prerequisite 155.

158. Advanced Zoölogy. Professor Trotter.

Three hours a week throughout the year. Offered annually.

A laboratory course of six hours a week in systematic work on North American Vertebrata with dissection of types. Textbook, Jordan's *Manual,* and standard works on the several groups of vertebrate animals.

Prerequisite, 155.

159. Embryology. Assistant Professor Palmer.

Three hours a week throughout the year. Offered annually.

Study of the development of a vertebrate with special reference to the development of the chick. The growth of the chick is followed closely from the primitive streak stage to four days. Drawings are required showing the various stages of growth in whole mounts and in selected sections along both transverse and saggital planes. In connection with this course students are instructed in the proper methods of fixation, staining, and sectioning of tissues and in the use of the camera lucida. A minimum of six hours a week laboratory work is required for this course.

Prerequisites, 155, 156, 157.

COURSES IN BOTANY

161. Systematic Botany. Assistant Professor Palmer.

Three hours a week during second semester. Offered annually.

A course in field work devoted entirely to the classification of the native trees and shrubs for the first part of the course, and of spring flowers for the second. Six hours a week of laboratory work. Prerequisite, 155.

162. Cryptogamic Botany. Assistant Professor Palmer.

Three hours a week during first semester. Offered annually.

In this course the development of sex in plants is the keynote of study. Carefully selected forms are secured to bring out this feature in the laboratory. Sach's classification of the Thallophytes is used as the basis of this course. Two lectures a week with four hours laboratory. Prerequisite. 155.

163. Plant Physiology. Assistant Professor Palmer.

Three hours a week during first semester. Offered annually.

A laboratory course to determine the principal functions of the root, stem, leaves, etc., of our common forms of plants. Six hours a week (three hours credit). Prerequisite, 155.

COURSES IN ADVANCED BIOLOGY AND PREPARATORY MEDICINE

164. Genetics. Assistant Professor Palmer.

Two hours a week during first semester. Offered annually.

A lecture course devoted to the discussion of the principles of plant and animal breeding. There will be given also a review of the history of our domesticated animals. Prerequisite, 155.

165. Anthropology. Professor Trotter.

Three hours per week during second semester. Offered annually.

A course of lectures on the zoölogical relations of man, his history as a species and a review of the natural history of mankind (race, culture and geographical distribution), professor's "notes"—consultation of various authors—written reports on assigned subjects. Open to Juniors and Seniors. Prerequisite, 155.

166. Human Anatomy. Professor Trotter.

Three hours a week throughout the year. Offered annually.

Advanced work in osteology, the dissection of the cadaver and a study and dissection of the human brain. Standard textbooks on anatomy. A laboratory course of six hours a week throughout the year, intended especially for students preparing for medicine. Prerequisites, 155, 157, 158, 159.

COURSES IN GEOLOGY

170. Geology and Physiography. Professor Trotter.

Two hours a week during first semester. Offered annually.

A lecture course in Elementary Geology (dynamical and structural) and a study of the physiography and life relations of North America. Textbooks, Chamberlain and Salisbury, *College Geology*—professor's "notes." Open to students above Freshman Class.

The Museum of Biology and Geology is an adjunct to the department of Biology. An account of its collections may be found on page 39. The Academy of Natural Sciences, Logan Square, Philadelphia, affords valuable matter for study and reference both in its collections and library. The museum of the Wagner Free Institute of Science, Seventeenth Street and Montgomery Avenue, Philadelphia, contains valuable aids to study. The library of the University of Pennsylvania, and the Philadelphia Library, corner Locust and Juniper Streets, are available for consultation and research. The Wistar Institute of Anatomy, Thirty-sixth and Woodland Avenue, contains valuable material for study in connection with the pre-medical courses.

Chemistry and Chemical Engineering

The instruction in this department is under the direction of Professor Gellert Alleman. H. Jermain Creighton is Assistant Professor of Chemistry and Ralph G. Gutelius is Instructor in Chemistry.

This department does not aim to develop specialists in any particular branch of chemistry, but presents opportunities for a comprehensive general training in this science.

The successful completion of the courses in Chemistry will enable the student to enter upon graduate work at any leading university, or will be of material assistance to him in various technical pursuits in which he may be engaged. Those intending to prepare for the medical profession will find it advantageous to follow several of the elementary courses here offered.

The new and commodious chemical laboratory, with its splendid equipment, lends every advantage to thorough and modern instruction in this department.

Students who major in Chemistry and Chemical Engineering

must have a reading knowledge of German before entering upon the chemical work pursued during the third year. They should also be thoroughly familiar with elementary mathematics.

The course in Chemistry, as Applied Science, and the course in Chemical Engineering are prescribed for the first and second years.

Students may major in Chemistry, in a course in Arts, requiring 124 hours for graduation; in Chemistry, as Applied Science, requiring 132 hours for graduation; in Chemical Engineering, requiring 140 hours for graduation.

171. General Inorganic Chemistry. Professor Alleman, Assistant Professor Creighton, and Mr. Gutelius.

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 Smith, *General Chemistry for Colleges.*

In the laboratory each student performs about two hundred experiments which are selected from Smith and Hale, *Laboratory Outline of General Chemistry.* Credit in this course is not assigned until the completion of the entire course at the end of the year.

172. Qualitative Analysis. Assistant Professor Creighton.

Three hours a week throughout the year. Offered annually.

The theory and practice involved in the detection of the chemical elements. Special attention is paid to the application of the electrolytic dissociation theory to analysis, and the metallic and nonmetallic elements are studied more fully than in Course 171. Demonstrations, conferences, and individual laboratory work. The textbooks used are A. A. Noyes, *Qualitative Analysis,* and Talbot and Blanchard, *Electrolytic Dissociation Theory;* Baskerville and Curtman, *Qualitative Analysis,* is also recommended. During the second semester, students make Quantitative determinations of a number of typical ions and become familiar with the elementary principles of Quantitative Analysis.

The equivalent of nine hours of laboratory work per week through the year, carrying a credit of three hours for each semester. Credit in this course is not assigned until the completion of the entire course at the end of the year. Prerequisite, 171.

173. Elementary Quantitative Analysis. Professor Alleman and Mr. Gutelius.

Three hours a week during one semester. Offered annually.

Complete analysis of potassium chloride, copper sulphate, calcite, haematite, apatite, sphalerite, clay, Portland cement, and coal.

For students taking Engineering as their major subject. Nine hours of laboratory work per week throughout one semester, carrying a credit of three hours. The time arranged to suit individual requirements. Prerequisite, 174.

174. Quantitative Analysis. Professor Alleman.

Three hours a week throughout the year. Offered annually.

Demonstrations and laboratory work involving methods in gravimetric and volumetric analysis.

Required of students who select Chemistry as their major subject; open as an

elective to all others who have taken Courses 171 and 172 at this institution, or their equivalent elsewhere. The equivalent of nine hours of laboratory work per week throughout the year, carrying a credit of three hours for each semester. The time is arranged to suit individual requirements. Prerequisite, 172.

175. Advanced Quantitative Analysis. Professor Alleman.

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

Examination of foods and food products, and their adulterants. Work in toxicology analysis of sewage, and the sanitary analysis of water.

Required of students who select Chemistry as their major subject; open as an elective to all other students who have had sufficient knowledge of chemistry to follow the course. The work on sewage and water analysis is particularly adapted to students in engineering. The equivalent of nine hours of laboratory work per week during the second semester, carrying a credit of three hours. The time is arranged to suit individual requirements. Prerequisite, 174.

176. Physical Chemistry. Assistant Professor Creighton.

Three hours a week during the first semester. 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; 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: Nernst, *Theoretical Chemistry;* Jones, *Elements of Physical Chemistry;* Young, *Stoichiometry;* Washburn, *Principles of Physical Chemistry.*

Two lectures and three hours per week of laboratory work. Required of students who select Chemistry as their major study. Prerequisites, 174 and 272.

177. Organic Chemistry. Professor Alleman and Mr. Gutelius.

Three hours a week throughout the year. Offered annually.

Lectures, demonstrations, written exercises, and laboratory work. This course includes the work as outlined in Remsen, *Organic Chemistry.* In the laboratory, students make and study the various organic preparations as given in Remsen, *Organic Chemistry.*

Required of all students who select Chemistry as their major subject.

178. Organic Chemistry (Advanced Course). Professor Alleman and Mr. Gutelius.

A continuation of Course 177. Lectures and laboratory work. In the laboratory, students make all the preparations (not previously made in Course 177), as given in Gattermann, *Praxis des Organischen Chemikers.* A knowledge of German is required.

Required of all students who select Chemistry as their major subject.

180. Electro-Chemistry. Assistant Professor Creighton.

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

Lectures and laboratory work. 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 proficient in the measurement of electrical conductivities and electromotive forces, and in making electro-chemical analyses. The laboratory course also includes the testing of Faraday's laws and the measurement of transport numbers, the absolute migration velocity of ions, decomposi-

tion voltage and heat of neutralization. The following textbooks are recommended: Abegg, *Electrolytic Dissociation;* Le Blanc, *Textbook of Electro-Chemistry;* Oettel, *Electro-Chemical Experiments and Exercises in Electro-Chemistry;* Fisher, *Praktikum der Elektrochemie,* and Smith, *Electro-Chemical Analysis.*

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. Prerequisite, 174 and 176.

The number of students in this course is limited to six.

181. Assaying. Professor Alleman.

One hour a week during the first semester. Offered in 1916-17.

Fire assays of ores of gold, silver, lead, zinc, copper, and of numerous metallurgical products. The textbook used is Furnam, *Practical Assaying.*

Three hours of laboratory work per week during the first semester, carrying a credit of one hour.

182. Mineralogy. Professor Alleman.

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

This course consists of lectures on crystallography and descriptive mineralogy; and the determination of minerals by the blow-pipe. Moses and Parsons, *Mineralogy, Crystallography and Blow-pipe Analysis,* is used as a guide. Prerequisite, 165.

183. Physical Chemistry (Advanced Course). Assistant Professor Creighton.

One hour a week during the first semester. Offered annually.

A continuation of Course 176.

Chemical Engineering

The extensive demand made on the part of various industries for men trained both in Engineering and Chemistry has influenced the establishment of a course which will afford preparation along these special lines. The course, as arranged, includes all the prescribed work required for the degree of A. B. Ample opportunity is also afforded the student in the choice of elective studies. The course, faithfully followed, will give the student a liberal education, and, in addition, special training in Chemical Engineering. The course as outlined follows:

FRESHMAN YEAR

Thirty-five "hours" of prescribed work.
See Uniform Curriculum on page 74.

SOPHOMORE YEAR

Thirty-seven "hours" of prescribed work.
See Uniform Curriculum on page 75.

JUNIOR YEAR

See Page	*First Semester*		Hours per Week Class	Lab'y	Credits
148	Physics **272**	Advanced Physics	2	3	3
91	German		3	—	3
	or				
87	French		—	—	—
122	Chemistry **174**	Quantitative Analysis	—	9	3
123	Chemistry **177**	Organic Chemistry	2	3	3
105	History **102** or **103** or **104**		—	—	—
	or				
107	Economics **111**	Elementary Economics and Railroad Transportation	3	—	3
141	Electrical Engineering **237**	Direct Current Theory	2	—	2
141	Electrical Engineering **238**	D. C Lab	—	3	1
		Totals	12	18	18

Second Semester

141	Electrical Engineering **238**	Direct Current Laboratory	—	3	1
141	Electrical Engineering **237**	Direct Current Theory	2	—	2
91	German		3	—	—
	or				
87	French		—	—	3
122	Chemistry **174**	Quantitative Analysis	—	9	3
123	Chemistry **177**	Organic Chemistry	2	3	3
105	History **102** or **103** or **104**		—	—	—
	or				
107	Economics **111**		—	—	3
	Elective		—	—	2
		Totals	7	15	17

SENIOR YEAR

See Page	*First Semester*		Hours per Week Class	Lab'y	Credits
125	Chemistry **180**	Electro Chemistry	2	3	1
126	Chemistry **181**	Assaying	—	3	3
107	Economics **111** or **112** or **113**		3	—	3
	or				
105	History **102** or **103** or **104**		—	—	—
123	Chemistry **178**	Adv. Organic Chemistry	2	3	3
92	German **49** or Elective	Scientific German	2	—	2
	Elective		1	—	1
	Elective		3	—	3
110	Religion and Philosophy **131**	Bible Study	2	—	2
		Totals	15	9	18

Second Semester

141	Engineering **232**	Experimental Laboratory	—	4	2
107	Economics **111** or **112** or **113**		3	—	3
	or				
105	History **102** or **103** or **104**		—	—	—
123	Chemistry **178**	Adv. Organic Chemistry	2	3	3
110	Religion and Philosophy **131**	Bible Study	1	—	1
	Thesis (Chemical)	Laboratory Research	—	12	4
	Elective		2	—	2
		Totals	8	19	15

Engineering

CIVIL, MECHANICAL, AND ELECTRICAL

The instruction in this department is under the direction of Professor George F. Blessing. George W. Lewis is Assistant Professor of Mechanical Engineering, Scott B. Lilly is Assistant Professor of Civil Engineering, Lewis Fussell is Assistant Professor of Electrical Engineering, Albert W. Preston is Instructor, and Samuel S. Shoemaker is Assistant.

The courses in Engineering are designed to train men in the fundamental principles that underlie the branch in which they are majoring, and to give such engineering and practical work 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.

A man must supplement a technical course by experience in practice and contact with real engineering work before he can attain his power as an engineer, and it is hoped that these visits will prove of value to the student when he begins practical engineering work.

The success of an engineer has come more and more to depend upon his ability to meet men of education and culture on equal terms; hence, courses in liberal arts are carried throughout the four years in the belief that they will ultimately benefit the students. The technical courses of study are arranged and conducted with the purpose of imparting a liberal preparation for immediate usefulness in the office, drafting room, or field. By adding familiarity with commercial demands and practice to the preparation of the school, the graduates from these courses may successfully undertake the responsibility of design or superintendence of engineering works. When circumstances permit, undergraduates are encouraged to engage in engineering work during the summer vacation. The experience and maturity so gained are of great value in subsequent collegiate and professional work.

The instruction in this department is given both by lectures

and recitations; in the drafting room, the field work, the laboratory, and shop the aim is to adapt the instruction to the individual needs of the student.

THE EQUIPMENT

The Field Equipment is ample for practice in surveying, and includes transits, levels, plane tables, compasses and other auxiliary apparatus.

Engineering Library and Club Room. This is a large, beautifully furnished room on the second floor of the Engineering Building. It is equipped with electrical connections for stereopticon lantern or motion picture machine. The book shelves in this room contain about one thousand volumes of technical works in which is included transactions of engineering societies and bound volumes of the most important technical papers and journals. Current issues of all the leading engineering magazines are also to be found on the reading tables.

Drafting Rooms. The drafting rooms are equipped with drawing tables, stools and cabinets in which students may keep their drawing supplies. In addition to the above equipment this department has a ten-inch Sibley wood turning lathe, with many extra parts, and a duplex power driven pump for use in sketching and to illustrate the principles of machine construction and design. The Junior and Senior drawing rooms are also equipped with filing cabinets containing blue prints and other data to aid the student in the design courses.

The Engineering Laboratories. The Materials Laboratory contains a 15,000-pound Olsen testing machine, and a larger one having a capacity of 100,000 pounds. Both machines are fitted for tests in tension, compression and deflection. In addition, there is a 50,000-pound Olsen torsional testing machine, and micrometers for measing elongation, compression and deflection, a Fairbank's cement testing machine with a complete equipment for making tests on cement, a White-Souther endurance testing machine, a Shore scleroscope, an Upton-Lewis endurance testing machine and a complete equipment for the heat treatment of metals.

For tests in mechanical engineering the equipment consists of steam and gas engine indicators, planimeters, tachometers,

steam and coal calorimeters, pyrometers, gauge and indicator testing apparatus. This laboratory also contains oil and grease testing apparatus, a Junker calorimeter for gas and liquid fuel tests and gas analysis apparatus.

In the Gas Engine Laboratory the apparatus consists of a five-horse-power Otto gas engine, a ten-horse-power Quincy gasoline and kerosene engine, a four-cylinder twenty-horse-power Rutenber automobile engine direct connected to a Tracy fan dynamometer, a ten-horse-power Mietz and Weiss fuel oil engine and a vertical fifty-horse-power two-cylinder Bruce-Macbeth gas engine. The above engines are fitted for testing with Prony brakes indicating apparatus, etc. This laboratory also contains a "Recco" Rider Ericsson hot-air engine.

The Steam Engine Laboratory contains a fifty horse-power 8 in. x 13 in. x 10 in. Ideal tandem-compound high-speed engine, a 10 in. x 24 in. Wetherell-Corliss engine, a seven-kilowatt horizontal Curtis turbine direct connected to a direct-current dynamo installed with a separate switchboard. This laboratory also contains a 5 in. x 8 in. vertical slide-valve engine. The above engines can be run condensing or non-condensing. The condensing apparatus consists of a Wheeler surface condenser. The steam engine equipment in the power plant consists of two one-hundred-horse-power and one sixty-five-horse-power Harrisburg high-speed engines.

The boiler room contains four one-hundred-and-twenty-five-horse-power horizontal return tubular boilers fitted with turbo blowers and automatic damper regulator. For testing the boilers the plant is equipped with a Wilcox automatic feed water weigher, coal weighing apparatus, flue gas analysis apparatus, etc.

The equipment of the Hydraulic Laboratory consists of a D'Olier centrifugal pump direct connected with a ten-horse-power direct current motor and fitted with necessary apparatus for conducting a complete test such as weirs, nozzles, gauges, etc. A fifteen-horse-power Christiana turbine water wheel fitted with Prony brake, hook gauges, weirs, etc. A small impulse water wheel of the Pelton type.

The Direct Current Laboratory contains a plug type switchboard supplied with direct current power and connected with

the alternating switchboard so that the equipment in both laboratories may be used in either. It makes possible the rapid connection in parallel or series of all the apparatus. The mechanical power for this room is derived from a twenty-five-horse-power variable speed induction motor, and the direct current power from the substation located in the adjoining room. This is equipped with two twenty-five-kilowatt one-hundred-and-ten-volt direct current generators of Westinghouse make driven by two thirty-five-horse-power three-phase General Electric induction motors; and one fifty-kilowatt General Electric induction motor-generator set. In addition to the usual control apparatus there is installed a Tirrill automatic voltage regulator, giving very steady voltage. The apparatus includes shunt, series and compound wound motors and generators, motor-generators and variable speed motors of various types, together with the necessary starting, field, and load rheostats. The meters are of the most accurate type, the range being from .001 to 500 amperes and from .001 to 750 volts.

The Alternating Current Laboratory has a switchboard similar to but larger than the one in the direct-current laboratory. It is supplied with direct current and with twelve different alternating voltages, the latter being obtained from a bank of three twenty-KV-A step-down transformers. In addition to this single- and three-phase supply a pair of Scott transformers of four-KV-A rating deliver two-phase power, and a 7.5-KV-A synchronous generator in the laboratory supplies one, two, three, six or twelve phases. The main power supply comes from the power plant below the railroad, where two seventy-five-KV-A and one fifty-KV-A revolving field alternator develop three-phase power at twenty-three hundred volts. A good modern switchboard is rendered doubly useful for teaching purposes, since there are more than the usual number of switchboard meters which make checking and comparison more effective. Here also there is a Tirrill voltage regulator. In the laboratory in addition to the resistances, inductances, and condensers (one hundred and forty microfarads) there are transformers, single- and three-phase induction motors of several types, a repulsion motor, an inductor generator, two synchronous converters, a synchronous motor, synchronous generator and a vari-

able frequency motor generator set giving from twenty to seventy cycles per second.

Single-phase and three-phase induction potential regulators give close voltage control. There are a number of high-grade ammeters, voltmeters, and wattmeters which make it possible to read closely any current from .1 to 400 amperes and any pressure from 10 to 3,000 volts. A vibrating reed frequency meter, a synchroscope, a contact device for wave form, a power factor meter, recording and integrating meters are available. A fully equipped General Electric oscilligraph is freely used to show wave shape and phase relations.

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.; a portable Sharp-Millar illuminometer. 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

This work extends through two years for all engineering students, and may be continued if desired.

The Machine Shop occupies a large portion of the second floor of the building and it has a floor area of 3,300 square feet. It is exceptionally well lighted and is arranged so that the machine and bench work are entirely separated. 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 machinery is grouped on three drives, each drive operated by its own electric motor.

The machine shop contains an excellent assortment of tools, including screw-cutting engine lathes; speed lathes, simple and back-geared; a planer; a complete universal milling machine with milling cutters; a shaper; a twist-drill grinder, and two vertical drill presses; a lathe-center grinder; plain and swivel vises; lathe chucks, universal and independent, also drill chucks; chucks for milling machine and vises for planing; surface plates; standard gauges and a complete equipment of small tools.

The equipment of the machine shop includes two Hamilton engine lathes, 16 in. x 6 ft.; a Lodge and Shipley lathe of similar size, a Whitney wet tool grinder, and a 16 in. x 8 ft. Champion engine lathe of rugged design for the demonstration of high speed cutting tools. This lathe is double back geared, has taper turning attachment, compound rest and quick change gear device giving forty changes of threads without removing a gear. The gearing on all lathes is covered by guards or casings to prevent accidents.

The Woodworking Shop extends through the entire length of the third floor of the shop building, and has a floor area of more than 3,300 square feet. The work benches are fitted with quick-acting vises and other accessories and are provided with drawers and tool cabinets in sufficient number to assign each student a container for his tools and exercises. The plan of individual assignment of tools and supplies is followed here, and each student is provided with a complete set of tools. The machine equipment is of the best and comprises a motor-driven Oliver thirty-eight-inch band saw with tilting table, and screens and guard for the protection of the operator; a motor-driven Colburn universal saw; a twenty-four-inch Oliver Hand Planer and Jointer with safety cylinder, and Oliver universal wood trimmer; a motor-driven six-inch Oliver hand planer and jointer with safety cylinder; a 16 in. x 10 ft. Oliver wood turning lathe with overhang to spindle and a Mummert Wolf & Dixon Company oil tool grinder; a post drill, and a group of twelve wood turning lathes driven by motor.

The Forge Shop. This equipment consists of ten fires, and one additional master fire. These forges are operated on the down-draft principle, and were designed and constructed for this shop by the Buffalo Forge Company. The exhaust and pressure fans for the system are motor driven, and the blast and exhaust ducts are of moulded concrete. The forge shop is situated on the ground floor of the building and covers an area of more than 1,000 square feet.

The Foundry is also located on the same floor, and has a floor space of more than 1,000 square feet. A gas heated cupola or furnace is in use for melting metals in crucibles. The addi-

tional equipment consists of moulding benches, flasks and other accessory apparatus.

Fees. A fee of five dollars for each semester will be charged for each course in woodworking, forging and machine practice. A fee of two dollars for each semester will be charged for each course in field practice and surveying. An additional fee of two dollars will be charged for the annual survey.

A *Deposit* of five dollars will be required of each student enrolling for a course in shop work or founding. This deposit will be retained to cover breakage and loss of tools or supplies, and, after deducting for such items, the balance will be refunded upon the completion of the course.

THE ENGINEERING BUILDING

A description of the Engineering Building may be found on page 30 of this BULLETIN.

THE MAJOR IN ENGINEERING

The engineering courses extend through four years; and, in this respect, differ from the other major courses offered in the College, which are elected at the beginning of the second year and extend through the three subsequent years. The students in Engineering have thus their entire course arranged with the advice and consent of their course adviser in Engineering.

The major in Engineering may be taken in one of four courses: Mechanical, Electrical, Civil, or Chemical Engineering. The courses of study constituting the major in Engineering are given in detail below, and in the statement of the department of Chemistry.

The work for the first two years is common to all students in Mechanical, Electrical, Civil and Chemical Engineering and includes work in English, Pure Mathematics, Physics, Chemistry, Drawing and Shop Work.

The work offered in the shops throughout the several courses are intended to teach certain principles of manufacturing and to familiarize the student with methods and processes of the mechanic arts. The student works in the various shops of the

department, and completes in each a series of practical exercises. He thus obtains some knowledge of the nature and properties of the various materials he employs, and becomes familiar with the use and care of the more important hand and machine tools.

A complete checking, cost and time-keeping system is in operation throughout the shops. The system is in charge of a shop clerk, and each student is required to spend a part of his time in the office to familiarize himself with the system. The object is to make the shop courses not only a means of developing the powers of observation and judgment, together with the acquisition of mechanical skill, but to familiarize the student with business methods and make the shops serve as a laboratory for work in industrial organization.

During the third year the Mechanical Engineering students take up work in Kinematics of Machinery and Drawing, while those in Civil Engineering are assigned Field Practice, and Elementary Structural Design. During the fourth year, opportunity is offered for more definite specialization in the branches of Mechanical, Electrical and Civil Engineering as indicated in the courses outlined.

For a statement of the requirements for advanced degrees in Engineering, see page 82.

Courses of Study

I. *Civil Engineering.*

Freshman year. See page 74.

Sophomore year. See page 75.

JUNIOR YEAR

See Page	*First Semester*		Hours per Week Class	Lab'y	Credits
139	Mechanical Engineering **215**	Mechanics of Materials	3	—	3
145	Mathematics **256**	Integral Calculus	3	—	3
71	Group **2**		3	—	3
148	Physics **272**	Advanced Physics	2	3	3
141	Electrical Engineering **237**	Direct Current Theory	2	—	2
140	Surveying **224**	Field Practice	—	6	2
141	Electricial Engineering **238**	Direct Current Laboratory	—	3	1
		Totals	13	12	17

Second Semester

139	Mechanical Engineering **215**	Mechanics of Materials	3	—	3
145	Mathematics **257**	Analytic Mechanics	3	—	3
71	Group **2**		3	—	3
141	Electrical Engineering **237**	Direct Current Theory	2	—	2
141	Electrical Engineering **238**	Direct Current Laboratory	—	3	1
137	Civil Engineering **196**	Structural Design	—	6	2
141	Mechanical Engineering **232**	Experimental Laboratory	—	4	2
148	Physics **272** or Elective	Advanced Physics	2	3	3
		Totals	13	16	19

SENIOR YEAR

See Page	*First Semester*		Hours per Week Class	Lab'y	Credits
140	Civil Engineering **226**	Railroads	2	6	4
138	Civil Engineering **198**	Structural Design	2	3	3
71	Group **3**		3	—	3
140	Engineering **225**	Hydraulics	3	—	3
139	M. E. **216** or Elective	Steam Machinery	3	—	3
110	Religion and Philosophy **131**	Bible Study	2	—	2
		Totals	15	9	18

Second Semester

140	Civil Engineering **226**	Railroads	3	—	3
71	Group **3**		3	—	3
	Elective		3	—	3
140	Civil Engineering **228**	Concrete Construction	3	—	3
138	Civil Engineering **198**	Structural Design	—	9	3
	Thesis or Elective	Laboratory Research	—	6	2
110	Religion and Philosophy **131**	Bible Study	1	—	1
		Totals	13	15	18

II. *Mechanical Engineering.*

Freshman year. See page 74.
Sophomore year. See page 75.

JUNIOR YEAR

See Page		First Semester	Hours per Week: Class	Lab'y	Credits
139	Mechanical Engineering **215**	Mechanics of Materials	3	—	3
145	Mathematics **256**	Integral Calculus	3	—	3
71	Group **2**		3	—	3
148	Physics **272**	Advanced Physics	2	2	3
141	Electrical Engineering **237**	Direct Current Theory	2	—	2
137	Mechanical Engineering **195**	Kinematic Drawing	—	6	2
138	Mechanical Engineering **214**	Kinematics	2	—	2
141	Electrical Engineering **238**	Direct Current Laboratory	—	3	1
		Totals	15	11	19

Second Semester

139	Mechanical Engineering **215**	Mechanics of Materials	3	—	3
145	Mathematics **257**	Analytic Mechanics	3	—	3
71	Group **2**		3	—	3
141	Electrical Engineering **237**	Direct Current Theory	2	—	2
141	Electrical Engineering **238**	Direct Current Laboratory	—	3	1
141	Mechanical Engineering **232**	Experimental Laboratory	—	4	2
137	Mechanical Engineering **195**	Kinematic Drawing	—	3	1
148	Physics **272** or Elective	Advanced Physics	2	3	3
		Totals	13	13	18

SENIOR YEAR

See Page		First Semester	Hours per Week: Class	Lab'y	Credits
139	Mechanical Engineering **217**	Machine Design	3	—	3
137	Mechanical Engineering **197**	Machine Design Drawing	—	6	2
71	Group **3**		3	—	3
140	Engineering **225**	Hydraulics	3	—	3
141	Mechanical Engineering **233**	Experimental Laboratory	—	4	2
139	Mechanical Engineering **216**	Steam Machinery	3	—	3
110	Religion and Philosophy **131**	Bible Study	2	—	2
		Totals	14	10	18

Second Semester

139	Mechanical Engineering **217**	Machine Design	2	—	2
137	Mechanical Engineering **197**	Machine Design Drawing	—	6	2
71	Group **3**		3	—	3
	Elective		2	—	2
141	Mechanical Engineering **233**	Experimental Laboratory	—	4	2
139	Mechanical Engineering **219**	Power Plants	3	—	3
143	Mechanical Engineering **249**	Principles of Manufacturing	1	—	1
	Thesis or Elective	Laboratory Research	—	6	2
110	Religion and Philosophy **131**	Bible Study	1	—	1
		Totals	12	16	18

III. *Electrical Engineering.*

Freshman year. See page 74.

Sophomore year. See page 75.

JUNIOR YEAR

See Page		First Semester	Hours per Week: Class	Lab'y	Credits
145	Mathematics **256**	Integral Calculus	3	—	3
71	Group **2**		3	—	3
148	Physics **272**	Advanced Physics	2	3	3
139	Mechanical Engineering **215**	Mechanics of Materials	3	—	3
141	Electrical Engineering **237**	Direct Current Theory	2	—	2
	Elective		—	—	2
141	Electrical Engineering **239**	Illumination	1	2	2
141	Electrical Engineering **238**	Direct Current Laboratory	—	3	1
		Totals	14	8	19

Second Semester

145	Mathematics **257**	Analytical Mechanics	3	—	3
71	Group **2**		3	—	3
141	Electrical Engineering **237**	Direct Current Theory	2	—	2
141	Electrical Engineering **238**	Direct Current Laboratory	—	3	1
139	Mechanical Engineering **215**	Mechanics of Materials	3	—	3
141	Mechanical Engineering **232**	Experimental Laboratory	—	6	2
	Elective		—	—	2
148	Physics **272** or Elective	Advanced Physics	2	3	3
		Totals	13	12	19

SENIOR YEAR

See Page		First Semester	Hours per Week: Class	Lab'y	Credits
142	Electrical Engineering **240**	Alternating Current Theory	3	—	3
142	Electrical Engineering **241**	Alternating Current Laboratory	—	3	1
	Elective		—	—	2
71	Group **3**		3	—	3
140	Civil Engineering **225**	Hydraulics	3	—	3
142	Electrical Engineering **242**	Central Stations and Power Transmission	3	—	3
142	Electrical Engineering **246**	Conferences	1	—	1
139	Mechanical Engineering **216**	Steam Machinery	3	—	3
		Totals	16	3	19

Second Semester

142	Electrical Engineering **243**	Polyphase Currents	3	—	3
142	Electrical Engineering **244**	Polyphase Laboratory	—	3	1
142	Electrical Engineering **245**	Electric Railways	3	—	3
71	Group **3**		3	—	3
	Elective		—	—	3
139	Mechanical Engineering **219**	Power Plants	3	—	3
142	Electrical Engineering **246**	Conferences	1	—	1
	Thesis or Elective		—	—	2
		Totals	13	3	19

191. Engineering Drawing.

Six hours a week during the first semester. Two hours' credit.

Linear drawing, lettering, model and object sketching of machine parts.

Open to Freshmen.

192. Engineering Drawing.

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

This work is intended to instruct the student in the making and reading of commercial working drawings. The character of the work is such as is followed in the best modern drafting rooms, and attention is given to standard conventions, tabulations, titling, etc.

Open to Freshmen.

193. Descriptive Geometry.

Six hours a week during the first semseter. Two hours' credit.

This work consists of lectures, recitations and drawing-board work, upon the presentation of lines, planes and solids; tangencies, intersections, sections, developments and isometric projection. It is intended to give the student an understanding of the theory of projection and the principles necessary to the proper delineation and interpretation of constructive drawings. Work is done in all quadrants, but the practical problems, introduced to illustrate the application of the subject to subsequent work in design, are shown in the third quadrant.

Open to Sophomores; prerequisites, Courses 192 and 251.

194. Empirical Design and Machine Drawing.

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

Machine drawing and empirical designing, an extension of the work in 192. Proportioning of machine details as fixed by practice and empirical methods. Making and using standard data sheets. Making of assembly drawings. The general aim of the course is to give the beginner a drill in the proportioning of such parts as are fixed by common practice rather than by mathematical theory and to apply the work of 192.

Open to Sophomores; prerequisites, Courses 192 and 193.

195. Kinematic Drawing.

Six hours a week during the first semester and three during the second. Three hours' credit.

Drawing-board application of Course 214. Solution of mechanism by means of instant centers, designing of cams, gears, linkages, etc. Drawing of velocity and acceleration diagrams.

Open to Juniors in M.E.; prerequisite, Course 194, and must be taken with Course 215.

196. Elements of Structural Design.

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

Computation of stresses in trusses, mainly by graphic methods. The forms and strength of joints and fastenings used in heavy framing. Besides the graphic analysis of simple beams and roof trusses, complete detail designs and working drawings of joints to resist large tensile stresses, and of a wooden roof truss for given specifications. Elements of designing in structural steels.

Required of Civil Engineering Students only. Open to Juniors; prerequisites, Courses 193 and 194, and must be taken with Course 215.

197. Drawing and Design.

Six hours a week during each semester. Two hours' credit for each semester.

Drawing-room problems in elementary machine design illustrating the work as given in 195. In this course the student for the first time undertakes the design of a complete machine, laying out the general outlines, proportioning the details theoretically, and modifying his results by practical considerations. All computations necessary for the complete design must be carefully and systematically made and kept. Working drawings of the most important details and a finished assembly drawing of the machine are completed.

Open to Seniors in M.E.; prerequisites, Courses 193 and 194, and must be taken with 217.

198. Structural Design.

Six hours during first semester. Three hours' credit. Six hours during second semester. Three hours' credit.

Computation of stresses; types and details of bridge and roof trusses; reports, drawings; complete design of a plate girder and a through Pratt railway bridge.

Open to Seniors in C.E.; prerequisite, Course 196.

199. Topographical Drawing.

Three hours a week during first semester. One hour's credit.

A topographic map will be drawn from the field notes of the annual survey.

Open to Seniors in C.E.; prerequisite, the annual survey.

203. Pattern Making.

Six hours a week during first semester and alternates with 204 during second semester. Two hours' credit for first semester and one hour's credit for second semester.

A preliminary course of instruction in the use of hand and machine tools for woodworking, followed by graded instruction in pattern-making, construction of core boxes, etc.

Open to Freshmen.

204. Foundry Work.

Three hours a week during the second semester. One hour's credit.

Moulding, mixing and casting of metals and core-making, etc. The student is required to produce castings from the complete set of patterns made in Course 203.

Open to Freshmen.

205. Forge Work.

Six hours a week during the first semester. One hour's credit.

Forging, welding, tool-dressing, tempering, etc., and a study of press and die work and "drop forgings."

Open to Sophomores.

206. Machine Work.

Three hours a week during the first semester and six during the second. One hour's credit for first semester and two for the second.

Use of measuring tools, hand and machine tools, fitting and assembling. Operation and use of jigs and other manufacturing fixtures.

Open to Sophomores.

207. Machine Work.

One week preceding the opening of college.

Open to Juniors and Seniors. A continuation of 206.

213. Materials of Construction.

Two hours a week during the first semester.

This course consists of a study of the physical properties and methods of manufacture of the various materials used in engineering construction. It does not treat of the strength of materials as given in the course on Mechanics of Materials. [215.]

Open to Sophomores; prerequisite, Course 171.

214. Kinematics.

Two recitations a week during the first semester. Two hours' credit.

Theory of mechanism, instant centers, cams, gears, linkages, etc. Velocity and acceleration diagrams.

Open to Juniors; prerequisite, Course 194.

215. Mechanics of Materials.

Three recitations a week during first semester. Three hours' credit Two recitations and one lecture a week during second semester. Three hours' credit.

This course continues throughout the year and credit will not be given for a single semester.

This course treats of the resistance of materials, center of gravity, moment of inertia, riveted joints, mechanics of beams, columns, shafts; combined stresses, temperature stresses, impact and resilience. Textbook: Merriman, *Mechanics of Materials.*

Open to Juniors; prerequisites, Courses 256 and 213.

216. Steam Machinery.

Three hours a week during the first semester. Three hours' credit.

The course covers the elementary consideration of the behavior of gases and vapors; theoretical heat engines; application of theory to steam engines; principles governing the transfer of heat from hot gases to water; principles of combustion; boiler furnaces and grates; types of boilers; feed-water heaters, economizers, super heaters, advantages of condensing; types of condensers, condenser pumps, etc.

Open to Seniors; prerequisites, Courses 171, 256, 272 and 273.

217. Machine Design.

One lecture and two recitations a week during the first semester. Three hours' credit. One lecture and one recitation during the second semester. Two hours' credit.

Analysis of complete machines. Selection of mechanism for specified work and study of practical considerations involved. Analysis of energy and force problems in machines. Determination of driving devices as based on work to be done. Proportioning of detailed parts as dictated by stress and practical considerations. Application of the laws of Mechanics and Kinematics to the design of machines and a discussion of empirical design and modifications due to practical considerations.

Open to Seniors; prerequisites, Courses 214 and 195, and must be taken with 197.

218. Pumping Machinery.

Two hours a week during second semester. Lectures, recitations and problems. Two hours' credit.

This course consists of the theory of air compressors, design of distributing systems and compressed air plants; study of machines for pumping liquids, with a description of types, together with a description of pumping plants to meet given conditions. Special attention will be given to centrifugal and turbine pumps, and the complete calculations and part design of a high-pressure, multi-stage turbine pump will be included.

Open to Seniors; prerequisites, Courses 216 and 225.

219. Power Plants.

Two hours a week during second semester. Lectures, recitations and problems. Two hours' credit.

This course consists of the description, function and operating combinations of boilers, engines, heaters, condensers, economizers, piping systems, etc.

Open to Seniors.

223. Surveying.

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

Theory and field work; land surveying; leveling; laying out of buildings; study of construction and adjustment of surveying instruments; drawing of a map from the field notes.

Open to Sophomores; prerequisite, Course 253.

224. Surveying.

Six hours a week during the first semester. Two hours' credit.

Theory and field work. Problems involving the accurate use of chain, tape, transit and level; city surveying.

The field work includes the use of the stadia for both traverse and topography.

Open to Juniors; prerequisite, Course 223.

225. Hydraulics.

Three hours a week during the first semester. Three hours' credit.

Fluids at rest. Hydrostatic pressure. Pressure of water against walls and dams. Steady flow of liquids through pipes and orifices and over weirs. Fluid friction. Loss of head. Steady flow of water in open channels. Kutter's formula and diagrams based thereon. Theory of various kinds of hydraulic motors, etc.

Open to Seniors; prerequisites, Courses 256 and 257.

226. Railroads.

Recitations and field work during the first semester. Four hours' credit. Lectures, recitations and problems during the second semester. Three hours' credit.

First Semester.—Circular curves; transition curves; turnouts, cross-sections. Complete surveys will be made for the location of a section of railway; cross-sections will be taken and structure surveys made. Each student will make a map and profile of the entire line with an estimate of the quantities and cost, including grading, track and structures.

Second Semester.—Lectures, recitations, and problems. The construction, maintenance and operation of railroads.

Open to Seniors; prerequisite, Course 223.

227. Municipal Engineering.

Two hours of recitations, lectures and problems per week, during second semester, two hours' credit.

(a) Study of the design, construction and operation of municipal waterworks and sewerage systems: water and sewage purification; garbage disposal; (b) Roads and pavements.

Open to Seniors; prerequisites, Courses 223 and 225.

228. Concrete Construction.

Three hours' lectures and recitation during the second semester. Three hours' credit.

Study of reinforced construction and design; properties of the material; general theory; tests of beams and columns; working stresses; use of diagrams and tables, in building construction. Complete design of one bay of a reinforced concrete factory building.

229. Engineering Problems.

One hour's credit each semester.

Problems such as occur in ordinary engineering practice, chosen to show the application of the principles of both mechanics and hydraulics to practical design. These problems cover a wide range of subjects and afford opportunity for both analytical and graphical solutions. Computations and reports.

Open to Seniors; elective.

230. The Annual Survey.

One week preceding the opening of college. One hour's credit.

Topographic surveying.

Open to Sophomores and required with Course 223.

231. The Annual Survey.

One week preceding the opening of college.

Topographic surveying; precise measurement; triangulation.

Open to Juniors and required with Course 224.

232. Experimental Laboratory.

Four hours a week during second semester. Two hours' credit.

Use of engineering computing devices. Experiments involving the parallelogram of forces, center of gravity of plates, systems of levers; the mechanical strength of materials, tension, torsion, transverse and compression tests. The study of the variation of mechanical strength with differences in composition or heat treatment applied to steel and cast irons, demonstration of modern methods of tempering, annealing, heat treating, etc. Reports are required to be writen up neatly and fully, and must include all the data and results of tests, together with conclusions. The preparation of the report is considered an important part of the course.

Open to Juniors; prerequisites, Courses 171, 215, 256, 272, 273.

233. Experimental Laboratory.

Four hours each semester. Two hours' credit each semester.

This course covers laboratory work, recitations and written reports. The course covers calibration of indicator springs, steam gauges, thermometers, dynamometers, viscosity and friction tests of lubricants, tests and heating values of coals, tests of various forms of Calorimeters, measurements of water, valve setting, efficiency tests of steam boilers, Corliss simple engine, Ideal compound engine, steam heaters and condensers, pump and water wheels, gas engines, etc.

Open to Seniors; prerequisites, Courses 216 and 232.

234. Gas Machinery Design.

Two lectures a week and one three-hour drawing period. During first and second semester. Three hours' credit.

The course consists of the rational and empirical design of internal combustion engines and gas producers. The drawing period to cover the practical application of principles discussed in the lectures.

Open to Seniors, prerequisites, Courses 214, 215 and 232.

235. Gas Power Machinery.

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

General theory and important points in the design and operation of internal combustion engines and gas producers. Description of existing commercial types, study of relative advantages and consideration of questions of economy.

Open to Seniors.

236. Steam Turbines.

One lecture a week during second semester. One hour's credit.

Classification of turbines and description of leading features of various types. Calculations involved in turbine design. Adaptability to special conditions of service and discussion of building, erecting and testing.

Open to Seniors; prerequisite, Course 216.

237. Direct Current Theory.

Two hours a week throughout the year. Offered annually.

A detailed study of the theory of direct currents, direct-current generators, motors and their applications.

238. Direct Current Laboratory.

One hour a week throughout the year.

The testing of direct-current generators, motors and apparatus.

To accompany Course 237.

239. Illumination.

Two hours a week for the first semester.

Photometrical measurements of light sources, with the theory of light distribution.

Open to Juniors taking Engineering and Science Courses.

240. Alternating Current Theory.

Three hours a week for the first semester.

The theory of alternating currents with especial reference to single-phase generators, motors, and transformers.

Prerequisites, Courses 237 and 238.

241. Alternating Current Laboratory.

One hour a week for the first semester.

A laboratory course including the testing of single-phase generators, motors, transformers, meters, etc.

To accompany Course 240.

242. Central Stations and Power Transmission.

Three hours a week for the first semester.

A study of the electrical design, installation, equipment and economic operation of central stations with the theory of transmission and of the lines used in the distribution of electric power.

Prerequisites, Courses 237 and 238.

243. Polyphase Currents.

Three hours a week for the second semester.

An elementary course in the theory and application of polyphase machinery and appliances.

Prerequisites, Courses 240 and 241.

244. Polyphase Laboratory.

One hour a week for the second semester.

A laboratory course in the testing of polyphase machinery and appliances.

To accompany Course 243.

245. Electric Railways.

Three hours a week for the second semester.

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

Prerequisites, Courses 237 and 240.

246. Conferences.

One hour a week throughout the year.

A seminary course in which papers are presented on definite problems in electrical engineering, with a discussion of methods of solution. This course is supplemented by trips to electric stations in which an opportunity is afforded to observe practical solutions of the problems considered.

247. Social Engineering.

One hour a week throughout the year.

A study of betterment work in the industries. Safety, hygiene, coöperation, profit-sharing, pensions, social insurance, housing, education, recreation and affiliated questions are considered.

248. Efficiency.

Three hours a week during the second semester. One hour's credit.

This work consists of a study of the principles of efficiency. Records, plans, schedules, dispatching, standardized conditions and operations, etc., are considered and applied both to the individual and the shop organization.

249. Principles of Manufacturing and Factory Management.

One hour during the second semester. One hour's credit.

Theory of measuring tools, shop tools and equipment; shop processes; manufacturing methods; theory of cost and time-keeping systems; factory management.

Open to Seniors in M.E.

Mathematics and Astronomy

The instruction in this department is under the direction of Professor John A. Miller. Ross W. Marriott is Assistant Professor. John H. Pitman is Instructor, and Hannah B. Steele is Research Assistant. Murat Louis Johnson of the Penn Mutual Life Insurance Company, is non-resident lecturer in the mathematics of Insurance.

The courses in Mathematics are designed to meet the wants of students desiring later to do graduate work in the best universities; to teach mathematics in the preparatory schools; to pursue engineering or other technical courses.

Students may fulfil the College requirement of six hours of Mathematics for all candidates for graduation, by taking Courses 251 and 253, by taking three hours of Course 252 and Course 253, or by taking six hours of Astronomy. Students majoring in Mathematics will take the first year Courses 251, 252, and 253.

Courses 251, 252 and 253 may be taken in any order. It is preferred, however, that one semester, at least, of Course 252 should precede Course 253. The order in which the remaining courses should be taken is specified for each course.

A description of the instrumental equipment for astronomy may be found on pages 28 and 29. The teaching staff is at present devoting as much time as is consistent with their teaching duties to studies in stellar parallax with the twenty-four-inch telescope, and in comet photography with the photographic telescope. Students interested in either of these problems may work with advantage in conjunction with one of the professors.

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. On clear evenings objects are shown through the great telescope.

The Mathematical and Astronomical Club, an association of students in Mathematics and allied subjects, and instructors in

Mathematics, meets on the first and third Tuesday of each month in the lecture room of the Sproul Observatory. At these meetings, reports are given by students on subjects usually not presented in the classroom. Active participation in the club by students majoring in the department is urged.

A departmental library is located on the first floor of the Observatory. It contains about two thousand 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 in exchange for the publications of the observatory, the publications of many of the leading observatories of the world.

The departmental library has been repeatedly enriched through the benefactions of Professor S. J. Cunningham. Upon her retirement in 1906, she donated her private library. In 1908 she gave a fund which is being spent for the library, and in 1910 she gave a fund the income of which will be devoted to the purchase of books and periodicals. A fund given by Senator William C. Sproul has made possible the purchase of complete files of various astronomical periodicals and other astronomical publications.

COURSES IN MATHEMATICS

251. Solid Geometry. Mr. Pitman.

Three hours a week during first semester. Offered annually.

Phillips and Fisher, *Solid Geometry.*

252. Algebra. Assistant Professor Marriott.

Three hours a week during first semester, and two hours a week during second semester. Offered annually.

The fundamental operations and their laws of combination. A short review of factoring and simultaneous equations. The transformation theorems; remainder theorem; symmetric functions; differences; permutations and combinations; binomial theorem; series; theory of equations; determinants and elimination. Fine, *College Algebra.*

253. Trigonometry. Assistant Professor Marriott and Mr. Pitman.

Three hours a week during first semester; repeated in second semester. Offered annually..

The trigonometric ratios; reduction of trigonometric identities; solution of trigonometric equations; inverse functions; solution of triangles and use of tables.

Lock, *Trigonometry* (Revised edition).

254. Analytic Geometry. Professor Miller.

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

Theory of Cartesian and Polar coördinates; the straight line; the conic sections; the general equation of the second degree. Fine and Thompson, *Coördinate Geometry.*

Prerequisites, Courses 252 and 253.

255. Differential Calculus. Assistant Professor Marriott.

Three hours a week during second semester. Offered annually.

A study of text, supplemented by an occasional lecture. Granville, *Differential and Integral Calculus.*

Prerequisite, Course 254.

256. Integral Calculus. Assistant Professor Marriott.

Three hours a week during first semester. Offered annually.

A study of text, supplemented by lectures. Granville, *Differential and Integral Calculus.*

Prerequisite, Course 255.

257. Analytical Mechanics. Professor Miller.

Three hours a week during second 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.

Open to students who have credit in Course 256.

258. Theory of Equations and Determinants. Assistant Professor Marriott.

Two hours a week during first semester. Offered annually.

Cajori, *Theory of Equations.*

Prerequisite, Course 254.

259. Solid Analytic Geometry. Professor Miller.

Two hours a week during second semester. Offered annually.

Fine and Thompson, *Coördinate Geometry,* supplemented by lectures.

Prerequisite, Course 255.

260. Advanced Calculus. Professor Miller.

Three hours a week during first semester. Offered annually.

Total and partial derivations; theory of infinitessimals; development of series; definite integrals; approximations. The aim of the course is three-fold; to ground the student in the elementary work which has preceded it; to afford the merest introduction to the theory of functions; and to develop skill in the application of the principles of the Calculus to Geometry, and Mechanics. Wilson, *Advanced Calculus.*

Open to students having credit in 257, 258, and 259.

261. The Mathematics of Insurance. Assistant Professor Marriott and Mr. Johnson.

Offered in alternate years. Three hours a week during first semester. Given in 1915-16.

Permutations and combinations; theory of probability; method of finite differences; a study of Part I of Actuaries' Textbook. Completion of this course, and of the regular courses in algebra, plane geometry, plane trigonometry, plane analytic geometry, differential and integral calculus should enable the student to proceed with the examinations for admission to the Actuarial Society of America.

Prerequisite, Course 256.

265. Differential Equations. Assistant Professor Marriott.

Offered in alternate years. Three hours a week during second semester. Offered in 1914-15.

A study of ordinary and partial differential equations, with their applications to geometrical, physical, and mechanical problems.

Prerequisite, Course 256.

266. Higher Algebra. Assistant Professor Marriott.

Three hours a week during first semester, and two 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. Böcher, *Higher Algebra*, and Harkness and Morley, *Theory of Functions.*

Open to Seniors and Graduates majoring in Mathematics.

267. Method of Least Squares. Mr. Pitman.

Three hours a week during first semester. Offered in 1917-18.

The law of errors; the probability curve; adjustment of observations; weights and probable errors. The theory will be applied to practical problems in astronomy. A few supplementary lectures will be given on the methods of interpolation and mechanical quadratures.

Merriman, *Least Squares.*

Open to Juniors and Seniors.

268. Research Courses.

Graduate students may work in conjunction with one of the professors on any problem upon which the professor may be engaged. The student is encouraged to familiarize himself with the literature of the problem in hand and to ground himself in its fundamental principles.

270. Teachers' Course in Mathematics. Assistant Professor Marriott.

Two hours a week during second semester. Offered in 1915-16.

The aim of this course is:

(a) To acquaint the student with the more elementary parts of the History of Mathematics directly connected with his subject.

(b) To study those topics in which the secondary teacher encounters the greatest difficulties in presentation, to give the student practical laboratory experience in teaching, and to make reviews and criticisms of modern texts.

Prerequisites, Mathematics 251, 252, and 253.

[This course does not count as required Mathematics.]

COURSES IN ASTRONOMY

262. Descriptive Astronomy. Professor Miller.

Three hours a week throughout 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 textbook 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. Young, *Manual of Astronomy.*

Prerequisite, Solid Geometry.

263. Practical Astronomy. Mr. Pitman.

Hour to be arranged.

Theory and use of the transit instrument; determination of time; the latitude of Swarthmore; theory of the 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, Courses 255 and 262.

264. Orbit Computation. Mr. Pitman.

Three hours a week during second semester. Offered in 1915-16.

Central orbits; computation of the orbit of a comet or an asteroid. Leuschner's *Short Method.*

Open to Juniors and Seniors having credit in 267.

Physics

The instruction in this department is under the direction of Professor Harvey C. Hayes.

The department aims to give such a thorough and general training in the subject during the first two years' work as will enable one to pursue intelligently the work given in engineering and advance work in any department of physics. This work also affords ample preparation for teaching Physics in high schools and preparatory schools.

Instruction, in most of the courses, is supplemented by rigorous laboratory work. The apparatus used in connection with this work is all modern and mostly new.

The laboratory is well equipped for advanced work in the study of light, or electricity and magnetism.

Students who major in Physics must be prepared to do faithful and painstaking work. They should, if possible, start the work in the freshman year. They must have a reading knowledge of either French or German before entering the work of the Junior year.

Those who major in Physics may equip themselves for the following pursuits: post-graduate work in any leading university, research work in most of the numerous industrial laboratories, various positions in connection with wireless telegraph service.

No credit will be given for the first semester's work in Courses 271 and 272 unless followed by the work of the second semester.

THE COURSES IN PHYSICS

271. General Physics. Professor Hayes.

Three hours throughout the year. Offered annually.

Two hours of lecture and two hours of laboratory work each week. The solution of practical problems involving the various laws which are studied forms a regular and important part of the student's work.

Open to Freshmen.

272. Advanced General Physics. Professor Hayes.

Three hours throughout the year. Offered annually.

Two hours of lecture and three hours of laboratory work each week. Problem work will be assigned throughout the year.

Open to students who have passed Course 271, or who, in the opinion of the instructor, are prepared for this more advanced work.

273. Magnetic and Electrical Measurements. Professor Hayes.

Three hours for first semester. Offered annually.

One or two hours of lecture at the pleasure of the instructor and from three to five hours of laboratory work each week. The course is designed for familiarizing the student with the construction and use of modern standard electrical and magnetic measuring instruments. The laboratory work consists in measuring with extreme accuracy, resistance, electromotive force, current, capacity, and magnetic properties. Both practical and theoretical problems dealing with subjects of electricity and magnetism are assigned regularly.

Open to students who have passed Course 272.

274. Theories of Magnetism. Professor Hayes.

Three hours during second semester. Offered in alternate years.

Two hours of lecture and three hours of laboratory each week. The laboratory work consists in studying the magnetic properties of iron and other metals and the variation in these properties produced by various heat and mechanical treatments.

Open to students who have passed Course 273.

275. Wireless Telegraphy. Professor Hayes.

Three hours during second semester. Alternate with Course 274.

One or two hours of lecture and three or five hours of laboratory work each week at the pleasure of the instructor. The laboratory work deals with the phenomena of high-frequency alternating currents.

Open to students who have passed Course 273.

276. The Conduction of Electricity Through Gases. Professor Hayes.

Three hours a week during first semester.

Three hours of lecture each week. The subject is developed historically and deals with the Cathode Ray, the Canal Rays, and the X-Rays, and their relation to the $\ddot{a}$, β, and γ radiations given out by radium and other radio-active substances. The purpose of the course is to familiarize the student with some of the modern views concerning the constitution of matter.

Open to students who have passed Course 272.

277. Light. Professor Hayes.

Three hours a week during second semester.

Two hours of lecture and three hours of laboratory work each week. The subject is developed, and the various phenomena explained, in accordance with the wave theory. The laboratory work consists in reproducing and obtaining a photographic record of these phenomena.

Open to students who have passed Course 272.

Physical Education

The aim of the departments 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 directors in gaining a definite knowledge of the strength and weakness of the individual, a careful physical examination and medical inspection (eye, nose, and throat) 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.

For a general statement in regard to the facilities for physical training at Swarthmore see pages 31 and 32.

Physical Education of the Men

Instruction in this department is under the direction of E. LeRoy Mercer, M.D.

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 Athletic Association, but under the oversight 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.

1. Physical Education. Dr. Mercer.

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 students' 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.

Lectures in hygiene will be given during the winter.

Freshmen will be required to attend one swimming period weekly.

2. Physical Education. Dr. Mercer.

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. The talks on hygiene are continued.

3. Physical Education. Dr. Mercer.

Juniors and Seniors, one hour each week (optional).

From Thanksgiving recess to the spring recess, gymnastic exercises and recreative games.

Physical Education of the Women

This department is under the direction of Lillian Shaw and Dr. Mary R. Hadley Lewis.

One hour of exercise each day except Sunday is required of all resident and non-resident women students throughout their college course. Two of these periods of each week must be spent in supervised classwork—field hockey in the fall, classwork in the gymnasium in the winter, basketball and tennis in the spring. On the other four days of the week some form of outdoor exercise must be taken. This may be tennis, riding, cross-country tramps, or swimming. Exceptions to these requirements are made only for physical disability and at the discretion of the physician in charge, in which case suitable work is prescribed. Exercise in the gymnasium, swimming and all athletic sports are under the personal supervision of the director.

First-year students are required to attend a course of lectures in Hygiene, given once a week during the first and second semester.

Application for information in regard to the regulation dress for athletics and gymnastics should be made to the Dean.

1. First Year Gymnastics. Miss Shaw.

Two hours a week from Thanksgiving to the Spring Recess.

Required of first-year students.

Elementary German and Swedish gymnastics, gymnastic games, and folk-dancing. In addition, one hour of swimming a week is required of first-year students.

2. Second Year Gymnastics. Miss Shaw.

Two hours a week from Thanksgiving to the Spring Recess.

Required of second-year students.

German and Swedish gymnastics (more advanced than Course 1), gymnastic games, and folk-dancing.

One period a week of swimming is required, in addition.

3. Third-Year Gymnastics. Miss Shaw.

Two hours a week from Thanksgiving to the Spring Recess.

Required of third-year resident students.

German and Swedish gymnastics (more advanced than Course 2), gymnastic games, and folk-dancing.

One period a week of swimming is required, in addition.

4. Fourth Year Gymnastics. Miss Shaw.

Two hours a week from Thanksgiving to the Spring Recess.

Required of fourth-year resident students.

German and Swedish gymnastics (more advanced than Course 3), gymnastic games, and folk-dancing.

5. Fencing. Miss Shaw.

One period a week from Thanksgiving to the Spring Recess.

Open to Juniors and Seniors as an elective period in addition to the two required hours a week.

6. Advanced Elective Gymnastics. Miss Shaw.

One hour a week from Thanksgiving to the Spring Recess.

Open only to members of the class gymnastic squads in addition to the two required hours a week.

Advanced apparatus work, advanced marching, and gymnastic games.

7. (*a*) Advanced Elective Dancing. Miss Shaw.

One hour a week from Thanksgiving to May.

Open to all students as an elective in addition to the two required hours a week.

Æsthetic dancing and advanced folk-dancing.

8. (*b*) Beginners' Elective Dancing. Miss Shaw.

One hour a week from Thanksgiving to May.

9. Special Corrective Gymnastics. Miss Bransom.

Advised for students who need special attention because of poor carriage, slight curvatures, or weak arches.

Daily work on the part of the student in addition to a period once a week with the instructor.

10. Swimming.

Ability to swim is a part of the requirement in Physical Education.

STUDENTS, 1915-16

Graduate Students

Name.	Major Subject.	Residence.
Darlington, Charles Joseph,	*Chemistry,*	Darling.
A.B., Swarthmore College, 1915.		
Schriefer, Louise Lohmann,	*German,*	Brooklyn, N. Y.
A.B., Adelphi College, 1914.		
Vest, Lelia Eloise,	*Education,*	Ottumwa, Iowa.
A.B., Swarthmore College, 1915.		

Undergraduate Students

Adams, Alice Naomi,	*English,*	Swarthmore.
Adams, Virginia Elizabeth,		Lisbon, Ohio.
Agnew, Harman Paul,	*Economics,*	Philadelphia.
Agon, Olga Alice,	*Latin,*	Jeannette.
Ainsworth, Harold,	*Pol. Science,*	Swarthmore.
Alderfer, Clement Joseph,	*Pol. Science,*	Renovo.
Allen, James Everett,	*Chem. Engin.,*	West Chester.
Allen, Margaret,	*History,*	Woodstown, N. J.
Ames, James Wilson,	*History,*	Hawley.
Andrews, Elizabeth Holbert,	*English,*	Rutherford, N. J.
Arnold, James Porter,		Butler, Mo.
Ashmead, Charles Colliday,	*Engineering,*	Beesley's Point, N. J.
Atkins, Helen Marie,	*Pub. Speaking,*	Merchantville, N. J.
Atkinson, Eleanor Williams,		Trenton, N. J.
Atkinson, Helen Dorothy,	*English,*	Moorestown, N. J.
Atkinson, Mary Cleaver,	*Psy. & Edu.*	Trenton, N. J.
Atlee, Clara,	*French,*	Riverton, N. J.
Bailey, Lynn Hamilton,	*Civil Engin ,*	West Collingswood, N. J.
Baird, Frances Laura,	*Latin,*	Wilmington, Del.
Baker, Edwin Warman,	*Pol. Science,*	Baltimore, Md.
Baker, Eugene Thomas,	*Engineering,*	Lansdowne.
Baker, Frances Hawke,	*English,*	Chester.
Baker, Henry Fenimore, Jr.,	*Chem. Engin.,*	Baltimore, Md.
Baker, Rutherford Morse,	*Civil Engin.,*	New York, N. Y.
Baldwin, Ardis Mayhew,	*English,*	Baltimore, Md.
Ballard, Judson Tupper,	*Chem. Engin.,*	Philadelphia.
Ballein, Helen Elizabeth,	*French,*	Winfield, Kans.
Barnard, Boyd Terhune,	*Economics,*	Winfield, Kans.
Barnard, Norris Clements,		Brooklyn, N. Y.
Barnes, Harold Freeman,	*Elect. Engin.,*	Swarthmore.

Name.	Major Subject.	Residence.
BARTLESON, THOMAS LEES,	*Chem. Engin.,*	Chester.
BELL, DOROTHEA,	*Chemistry,*	New York, N. Y.
BELL, JOHN WESLEY,	*Pol. Science,*	Lebanon, Ind.
BELVILLE, CATHARINE READING,		Trenton, N. J.
BERRY, HOMER HENDRICKS,	*English,*	Chester.
BERRY, PAUL BURNETT,	*Chemistry,*	Chester.
BEW, WALTER THEWLIS,	*Chemistry,*	Ventnor, N. J.
BIDDLE, HELEN ROBERTA,		Riverton, N. J.
BINGHAM, LESLIE SHAW,	*Chemistry,*	Millville, N. J.
BISHOP, MARGARET,	*English,*	Lansdowne.
BLACKBURN, JOHN RUSSELL,	*Economics,*	Bedford.
BLACKWELL, CHARLES MCINTIRE,		Trenton, N. J.
BLAKE, JOSEPH MURDOCK,	*Economics,*	Jacksonville, Fla.
BLAU, ROBERT SLOSS,	*Mathematics,*	Cleveland, Ohio.
BODINE, DAVID MONROE, JR.,	*Economics,*	Trenton, N. J.
BONNER, CHARLES GRANNISS,	*Mech. Engin.,*	Philadelphia.
BOUGHTON, FREDERICK ANTHONY,	*Chemistry,*	Tuxedo, N. Y.
BOWER, ETHELWYN,	*Mathematics,*	New York, N. Y.
BRADFIELD, EDMUND SHANNON,	*Mech. Engin.,*	Barnesville, Ohio.
BRIGGS, HARRY SCHWEINHART,	*English,*	Pottstown.
BRIGGS, ISABELLA MCKELVEY,	*Biology,*	Washington, D. C.
BRIGGS, LEON WILLARD,	*Economics,*	Trenton, N. J.
BRONK, DETLEV W.,	*Engineering,*	Troy, N. Y.
BROOKE, RICHARD DAVIS,	*English,*	Philadelphia.
BROWN, HAZEL HEMPHILL,	*Astronomy,*	Philadelphia.
BROWN, HERBERT LAWYER,	*Biology,*	Glen Mills.
BROWN, JANE PANCOAST,	*English,*	Leesburg, Va.
BROWN, JANET MCPHERSON,	*French,*	Washington, D. C.
BROWN, JOHN TRITES,	*Mathematics,*	Media.
BROWN, KENNETH RENT,	*Biology,*	Pendleton, Ind.
BRYAN, ALICE GIBSON,	*Economics,*	Wilmington, Del.
BRYAN, GIDEON WARREN,	*Chemistry,*	Ingraham, Ill.
BUCHER, ELLA BARBARA,	*Pub. Speaking,*	Lansdowne.
BUCKMAN, EMILY MARIAN,	*Biology,*	Trenton, N. J.
BUCKMAN, FRANKLIN PRESTON,	*Biology,*	Trenton, N. J.
BULLOCK, EDWARD SAMUEL,	*Chem. Engin.,*	Wallingford.
BURDSALL, ELLWOOD MORRIS,	*Economics,*	Port Chester, N. Y.
BURDSALL, RICHARD LLOYD,	*Mech. Engin.,*	Port Chester, N. Y.
BUSH, ALVA EDISON,	*Chemistry,*	Eldora, Iowa.
BUSH, EDWIN MONROE,		Lebanon, Ind.
CAMERON, WARREN MELRATH,	*Economics,*	Nottingham.
CARPENTER, ISAAC, JR.,	*Economics,*	White Plains, N. Y.
CARRIS, EDWARD CLAYTON,	*Engineering,*	Woodlynne, N. J.
CHAPPELL, EVA HELEN,	*Mathematics,*	Barnesville, Ohio.
CLARK, HELEN CATHARINE,	*Latin,*	Philadelphia.
CLARKE, WILLIAM ANDERSON,	*Economics,*	Elizabeth, N. J.

Name.	Major Subject.	Residence.
Clemens, Margaret Meyers,	*English,*	West Chester.
Clement, John Frederick,	*Elect. Engin.,*	Oak Summit, N. Y.
Clime, Benjamin Sydney,	*Economics,*	Philadelphia.
Cohen, Hyman Harry,	*Economics,*	Philadelphia.
Coles, Helen,	*Pub. Speaking,*	Merchantville, N. J.
Comley, Roy Clifton,	*Chemistry,*	Lebanon, Ind.
Conner, Viola Martha,		Montchanin, Del.
Conrow, Rebecca Wilson,	*Mathematics,*	Riverton, N. J.
Cook, Florence Longstreth,	*French,*	Philadelphia.
Cope, Margaretta,	*English,*	Philadelphia.
Cope, William Torbert,	*Economics,*	West Chester.
Cornog, Allison Griscom,	*Elect. Engin.,*	Ithan.
Cornog, Elwood Carr,	*Elect. Engin.,*	Ithan.
Cornog, Isaac Clyde,	*Elect. Engin.,*	Concordville.
Cornog, William Lindsay,	*Chemistry,*	Ithan.
Corse, George Fox,	*History,*	Gardenville, Md.
Corson, Ewing Tibbels,	*Mathematics,*	Ocean City, N. J.
Coy, Geraldine Miles,	*Mathematics,*	Glencoe, Ill.
Craighead, Ruth,	*Greek,*	Harrisburg.
Crosley, Mary Ingrahm,	*English,*	Melrose Park.
Cross, Ruth May,	*Mathematics,*	Cynwyd.
Culin, Helen Collins,	*Economics,*	Ogontz.
Culver, Esther Helen,	*German,*	Quogue, N. Y.
Curtin, Ellsworth Ferris,	*Civil Engin.,*	Clarksburg, W. Va.
Daniels, Helen,	*Latin,*	Swarthmore.
Darlington, Dorothea Lindsay,		Darling.
Darlington, Helen Elizabeth,	*History,*	Pomeroy.
Davis, Clark Warren,	*Chem. Engin.,*	South Omaha, Neb.
Davis, Louis Nichols,	*Elect. Engin.,*	West Chester.
Deacon, Isabel Dorothy,	*French,*	Mount Holly, N. J.
Dennis, Fred Condon,	*Mathematics,*	Terhune, Ind.
Denworth, Hugh Frederick,	*Economics,*	West Chester.
Deputy, Helen Gertrude,	*Mathematics,*	Glenolden.
Develin, Dorothy Archer,	*History,*	Camden, N. J.
Dillingham, William Henry,	*Pol. Science,*	Boyce, Va.
Doan, Marcia Sibyl,	*Biology,*	Indianapolis, Ind.
Dolman, Melanie Nickinson,		Swarthmore.
Donnelly, Frederick Stockham,	*Mathematics,*	Trenton, N. J.
Donohugh, Emma Edith,		Swarthmore.
Dowdell, Marcus P.,	*Pol. Science,*	Harrisburg.
Dowdy, Allen Edgar,	*Chem. Engin.,*	Moore.
Doyle, Thomas Henry,	*Civil Engin.,*	Philadelphia.
Duffy, Chester Clyde,	*Engineering,*	Bellaire, Ohio.
Dunham, Mark Addison,	*Mech. Engin.,*	Omaha, Neb.
Eby, Leslie Hyatt,	*Mech. Engin.,*	Sheboygan, Wis.
Elliott, Mark, Jr.,	*Biology,*	Virginia, Minn.

Name.	Major Subject.	Residence.
ELLSWORTH, ABIGAIL MARY,	*English,*	Riverton, N. J.
ENDICOTT, PAUL DAVIS,	*Pol. Science,*	Atlantic City, N. J.
EVANS, EDNA PRISCILLA,		Masonville, N. J.
EVANS, HENRY TURNER,	*Civil Engin.,*	Port Washington, N. Y.
FAHNESTOCK, KATHERINE V.,	*English,*	Harrisburg.
FAIRLAMB, REBEKAH ALCYONE,	*English,*	Brandywine Summit.
FARIES, JEAN REICHNER,	*Biology,*	Bala.
FERRIS, JOHN PRICE,		Milwaukee, Wis.
FETTER, LAURA JACKSON,	*Pub. Speaking,*	Hopewell, N. J.
FIRMIN, MARIAN GOLDSBOROUGH,	*Mathematics,*	Philadelphia.
FORGENG, ILLONA ANNA,	*French,*	Scranton.
FOULKE, HANNAH LIPPINCOTT,		Ambler.
FRICKE, ALICE BIRD,	*Pub. Speaking,*	Swarthmore.
FRICKE, FRANCES BROWN,		Swarthmore.
FRORER, ELIZABETH NEWMANN,	*Mathematics,*	Philadelphia.
FROST, EDWARD LAWRENCE, JR.,	*Pol. Science,*	Floral Park, N. Y.
GASKILL, HELEN GERTRUDE,	*Latin,*	Swarthmore.
GAWTHROP, MARY HICKMAN,	*French,*	Kennett Square.
GAWTHROP, WILLIAM RALPH,	*Chem. Engin.,*	Lancaster.
GEMMILL, PAUL FLEMING,	*Greek,*	York.
GERLITZKI, MARION VIRGINIA,		Doylestown.
GIBSON, PAUL RAYMOND,	*Chem. Engin.,*	Chester.
GILBERT, DORIS MELLOR,	*Mathematics,*	Philadelphia.
GILCHRIST, CHARLES DOUGLAS,	*Mech. Engin.,*	Hoboken, N. J.
GILLESPIE, FRANKLIN SIMCOE,	*Biology,*	Nottingham.
GLICK, LOUIS MAURICE,	*Chem. Engin.,*	West Chester.
GOEHRING, WALTER,	*Economics,*	Philadelphia.
GOFF, SARAH ELISE,	*English,*	Ocean City, N. J.
GOODALL, MARY HALL,	*History,*	Philadelphia.
GOULD, MINNIE ELMA,	*French,*	Towson, Md.
GOURLEY, RUSSELL CONWELL,		Melrose Park.
GOWDY, EDWIN TUDOR,	*Economics,*	Thompsonville, Conn.
GOWDY, LAURANCE PETERS,	*Pol. Science,*	Thompsonville, Conn.
GRAHAM, MALCOLM SAGUE,	*Mech. Engin.,*	Poughkeepsie, N. Y.
GRATZ, MARION CLEVENGER,	*English,*	Pemberton, N. J.
GRIEST, MARY KIRK,	*Latin,*	Philadelphia.
GRIFFEN, GLADYS EVELYN,	*Mathematics,*	Brooklyn, N. Y.
GRIFFITHS, JOSEPHINE MURRAY,	*Mathematics,*	Norristown.
GUTELIUS, FRED PYLE,	*Mech. Engin.,*	New York, N. Y.
HALL, GLADYS CUNNINGHAM,	*English,*	Swarthmore.
HALSEY, MARY DARRACK,	*Pub. Speaking,*	Swarthmore.
HALSTED, JESS,	*Economics,*	Sheboygan, Wis.
HAMILTON, THEOA,	*Chemistry,*	Fargo, N. D.
HAMPSON, CHARITY BELL,	*Latin,*	Govans, Md.
HANSON, AIMEE DOROTHY,	*Latin,*	Perth Amboy, N. J.
HARLAN, RANDOLPH BEHRENS,	*Mech. Engin.,*	Mauch Chunk.

Name.	Major Subject.	Residence.
HARRY, DAVID PERCIVAL, JR.,	*Latin,*	Philadelphia.
HARVEY, MARY ELIZABETH,	*French,*	Brandywine Summit.
HAVILAND, MARGARET,		Brooklyn, N. Y.
HAYES, ESTHER RACHEL,	*English,*	Swarthmore.
HAYES, GEORGE PASSMORE,	*English,*	West Chester.
HAYES, WILLIAM WALDO,	*Chem. Engin.,*	West Chester.
HEACOCK, RALPH HANDERSON,	*Engineering,*	Rising Sun, Md.
HEALD, PUSEY BANCROFT,	*Elect. Engin.,*	Wilmington, Del.
HECK, JOSHUA HOLLAND,	*Elect. Engin.,*	West Chester.
HENDERSON, LEON,	*Economics,*	Millville, N. J.
HERRMAN, DOROTHY DREW,	*History,*	Kensington, Md.
HIBBERD, STANLEY THOMAS,	*Chemistry,*	Media.
HILL, RUTH GLOVER,	*Pub. Speaking,*	Swarthmore.
HODGE, DAVID MALCOLM,		Chester.
HODGE, RICHARD GAMBRILL,	*Engineering,*	Washington, D. C.
HODGE, SEWELL WEBB,	*Mathematics,*	Washington, D. C.
HODGE, WINIFRED THORNTON,	*Latin,*	Washington, D. C.
HOLLINGSHEAD, ELWOOD ROGER,	*Pol. Science,*	Moorestown, N. J.
HOLMES, ESTHER FISHER,	*Pol. Science,*	Riverton, N. J.
HOOT, HENRY IRWIN,	*Engineering,*	Philadelphia.
HOWELL, CHARLES MANLY,	*Civil Engin.,*	Millville, N. J.
HUGHES, ELSIE MAY,	*Latin,*	Rutherford, N. J.
HULL, CHARLA GAIGE,	*Latin,*	Johnson City, N. Y.
HUTCHINSON, HALBERT CONROW,	*Elect. Engin.,*	Plainfield, N. J.
ICKES, HELEN EUGENIE,	*English,*	Norwood.
INGLIS, HELEN FLAGG,	*English,*	Philadelphia.
IRWIN, EVERETT PHELPS,	*Biology,*	Catskill, N. Y.
JACKSON, HERBERT WORTH,	*Economics,*	Lansdowne.
JACKSON, JAMES J., JR.,	*Elect. Engin.,*	Christiana.
JENKINS, BEATRICE MAGILL,	*English,*	Chicago, Ill.
JENKINS, ISABEL COPE,	*Latin,*	Philadelphia.
JOHNSON, CHARLES RUSSELL,	*Elect. Engin.,*	Chester.
JOHNSON, DOROTHY AGNES,	*Mathematics,*	Alexandria, Va.
JOHNSON, HELEN ELIZABETH,	*Greek,*	Braintree, Mass.
JOHNSON, JOHN WILLIAM,	*Economics,*	Coatesville.
JOLINE, DOROTHY ELIZABETH,	*English,*	Tottenville, N. Y.
JONES, BYRON LESTER,	*Mech. Engin.,*	Lebanon, Ind.
JONES, MIRIAM MILLETT,	*Pub. Speaking,*	Swarthmore.
JOYCE, EMILY PARRY,	*Pub. Speaking,*	Swarthmore.
KEENE, MARIAN LINDA,	*History,*	Lansdowne.
KELLEY, WILLIAM DONNELL,	*Engineering,*	Philadelphia.
KELLEY, HELEN MAY,	*Latin,*	Spotswood, N. J.
KENNEDY, FLORENCE,	*French,*	Philadelphia.
KERNS, BEULAH MARGARET,		Moline, Ill.
KIDD, JOHN EDWARD,	*Elect. Engin.,*	Chester.
KING, WILLETTA BLANCHE,	*Mathematics,*	Philadelphia.

Name.	Major Subject.	Residence.
KISTLER, CLARA RUTH,	*Pub. Speaking,*	Shenandoah.
KNEAS, WILDA MARIE,	*French,*	Norristown.
KNOX, GEORGE MOORE,	*Mech. Engin.,*	West Chester.
KOMORI, PHYLLIS,		White Plains, N. Y.
KORN, ADOLPH,	*Civil Engin.,*	Clifton Heights.
KRAUSKOPF, MADELINE,	*French,*	Philadelphia.
KURTZ, MABEL MORGAN,	*Latin,*	Reading.
LACEY, RUTH AGNES,	*Latin,*	Reading.
LAIRD, OLIVE FRANCES,	*Mathematics,*	West Chester.
LANG, HILDA ANNA,	*German,*	Rutledge.
LANG, WALTER BERLINGER,	*Engineering,*	Rutledge.
LAUDENSLAGER, ELMER BORGER,	*History,*	Philadelphia.
LESLEY, CONRAD CLOTHIER,	*Mech. Engin.,*	Media.
LEWIS, LOUISE EVANGELINE,	*English,*	Pendleton, Ind.
LEWIS, LOUISE KER,	*French,*	West Chester.
LIPPINCOTT, RHODA ALICE,	*German,*	Swarthmore.
LOCK, ROY LEE,		East Cleveland, Ohio.
LUCAS, DOROTHY FORDYCE,	*History,*	Woodbury, N. J.
LUKENS, JAMES CLARENCE,	*Economics,*	Moore.
LUKENS, MARY LYNDELL,	*Latin,*	Upper Darby.
LUKENS, SAMUEL CONRAD, JR.,	*Pol. Science,*	Philadelphia.
LUMIS, RUTH ELIZABETH,	*History,*	West Chester.
MCCABE, MARTHA GERTRUDE,		Selbyville, Del.
MCCLELLAN, BESS,	*Mathematics,*	Arden, N. Y.
MCGAHEY, MARY HOWITT,	*Latin,*	Darby.
MCGOVERN, FRANCIS PATRICK,		Cleveland, Ohio.
MCNEILL, CLARENCE ESBIN,	*Elect. Engin.,*	Philadelphia.
MACK, IRENE MILLER,	*English,*	Melrose Park.
MACKENZIE, DOROTHY JOSEPHINE,	*English,*	Elkins Park.
MARCH, JOSEPH WOLF,	*Elect. Engin.,*	Abbottstown.
MARKLE, MARY ANNA,	*English,*	Swarthmore.
MARR, HAROLD GRAHAM,	*Mech. Engin.,*	Swarthmore.
MASON, JOHN TENNEY,	*Economics,*	Wilmington, Del.
MATHER, MARY,	*Mathematics,*	Wayne.
MAULE, WALTER WILLIAM,	*History,*	Gum Tree.
MAXWELL, FRANCES HELEN,	*Pub. Speaking,*	Lansdowne.
MAZE, AUGUSTUS EVERETT,	*Chemistry,*	East Orange, N. J.
MELICK, JAMES BLOOMFIELD,	*Mech. Engin.,*	Media.
MENDENHALL, EDITH WILSON,	*Latin,*	Toughkenamon.
MICHENER, ANNA MARGUERITE,	*Pol. Science,*	Bendersville.
MICHENER, CHARLES RAYMOND,	*Chem. Engin.,*	Bendersville.
MILLER, ELIZABETH RULON,		Riverton, N. J.
MILLER, EVELYN LEVIS,	*History,*	Hatboro.
MILLER, HELEN MAY,	*English,*	Philadelphia.
MOLLOY, JAMES HOWARD,	*Civil Engin.,*	Philadelphia.
MOORE, ABIGAIL IRENE,	*Latin,*	York.

Name.	Major Subject.	Residence.
MOORE, WILLIAM RANDOLPH, JR.,	*Mech. Engin.*,	Roanoke, Va.
MORGAN, ROWLAND RICHARD,	*Chem. Engin.*,	Knightstown, Ind.
MORRISON, BAYARD HUNTER, JR.,	*Chemistry*,	Swarthmore.
MORRISON, ELIZABETH KNOWLES,	*Economics*,	Swarthmore.
MORTON, JEAN FLORENCE,	*French*,	Morton.
MUNCE, JAMES GAY GORDON,	*Pol. Science*,	Swarthmore.
MURCH, JOHN DWIGHT,	*Mech. Engin.*,	Glen Ridge, N. J.
MYERS, ALLEN ISAAC,	*Chem. Engin.*,	Hagerstown, Md.
MYERS, CHARLES LOUIS REED, JR.,		Moore.
MYERS, CLARENCE GATES,	*Pol. Science*,	Waterloo, Iowa.
NABB, MALVERN J.,		Millville, N. J.
NAY, CLARENCE PAUL,	*History*,	Sheridan, Ind.
NEELY, ELEANOR MORGAN,	*Pub. Speaking*,	Pleasant Plains, N. Y.
NEELY, ROSE MARGUERITE,	*German*,	Philadelphia.
NELSON, ALBERT NOEL,		Lebanon, Ind.
NEVILLE, JOSEPH SIDDONS,	*Civil Engin.*,	Delanco, N. J.
NEVYAS, JACOB,	*Biology*,	West Chester.
NEWCOMER, BEATRICE KENT,		Philadelphia.
NEWCOMER, ESTHER ANNE,	*Pub. Speaking*,	Philadelphia.
NICHOLS, ESTHER ORINDA,	*Pub. Speaking*,	Chester.
NUNEZ, MARY,	*Biology*,	Tampa, Fla.
OGDEN, JOHN MAHLON,	*History*,	Ogden.
OGDEN, SAMUEL ROBINSON,	*English*,	Elizabeth, N. J.
OLIN, HARRY ARTHUR,	*English*,	Chicago, Ill.
ORCHARD, JOHN EWING,	*Economics*,	South Omaha, Neb.
ORNDORFF, RUTH MARIE,	*English*,	Philadelphia.
PAINE, DOROTHY BELLE,		Scranton.
PALMER, EDGAR ZAVITZ,		Chester.
PATTISON, ESTHER STOWELL,	*Greek*,	Swarthmore.
PEARSON, ANDREW RUSSELL,		Swarthmore.
PERRY, HORACE MITCHELL,	*Pol. Science*,	Chester.
PETTIT, ALBERT RUSSELL PHIPPS,	*Mech. Engin.*,	Rancocas, N. J.
PHILIPS, CHARLES FLEMING,	*Civil Engin.*,	Downingtown.
PHILIPS, ESTHER HEWES,	*Biology*,	Plainfield, N. J.
PIERCE, ALLIN HUGH,	*Economics*,	Fort Dodge, Iowa.
PIERCE, FLORENCE MAY,	*English*,	Yeadon.
POHLIG, WILLIAM THEODORE,	*Civil Engin.*,	Bala.
POSTLETHWAITE, VIRGINIA,	*Biology*,	Sewickley.
POUND, MABEL LEWELLYN,	*English*,	St. Thomas, Ontario, Can.
POWELL, EDNA MYRTLE,	*English*,	Chester.
POWELL, MARGARET ELGAR,	*Mathematics*,	Lansdowne.
POWERS, MARY ELIZABETH,	*French*,	Lancaster.
PRATT, CARL DAVIS,	*Chem. Engin.*,	West Chester.
PRESTON, ALBERT W.,	*Mech. Engin.*,	Swarthmore.
PRICE, KATHERINE VIRGINIA,	*English*,	Brookline, Mass.
PRICE, THOMAS ROWE, JR.,		Glyndon, Md.

Name.	Major Subject.	Residence.
PROVOST, WILLIAM ROBERT,	*Civil Engin.,*	Chester.
PUGH, CATHARINE WHITE,	*French,*	Swarthmore.
PUGH, ISABEL ROBERTS,	*History,*	Swarthmore.
PYLE, EDITH SHARPLES,	*English,*	West Chester.
PYLE, ELIZABETH,	*Biology,*	Washington, D. C.
PYLE, FREDERIC LAWRENCE,	*Civil Engin.,*	Washington, D. C.
QUAYLE, OSBORNE ROBINSON,	*Chemistry,*	Wilmington, Del.
RAKESTRAW, JOSEPHINE B.,	*History,*	Wildwood, N. J.
RAWSON, ARTHUR JOY,	*Mech. Engin.,*	Brooklyn, N. Y.
REED, LAVINIA TOWNSEND,	*English,*	Woodstown, N. J.
REESE, NELLIE RUTH,	*History,*	West Chester.
REICHARD, GLADYS AMANDA,	*Latin,*	Bangor.
REID, HELEN HUTCHINSON,		Lansdowne.
REILLY, WILLIAM JOSEPH,	*English,*	West Chester.
RICHARDSON, CLARE FRANCES,		Philadelphia.
RIDDLE, FLORENCE,	*History,*	West Chester.
RIDPATH, WILLIAM LINCOLN, JR.,	*Biology,*	Philadelphia.
RIFFERT, JOHN SEBRING,	*Economics,*	Bound Brook, N. J.
RIGGS, JEAN STEWART,	*English,*	Wellsville, Ohio.
ROBERTS, JANE LUKENS,	*English,*	Philadelphia.
ROBERTSON, EDITH ELIZABETH,	*History,*	Wilmington, Del.
ROBERTSON, MARION TEMPLETON,	*French,*	Philadelphia.
ROBERTSON, RALPH MARION,		Warrensburg, Mo.
ROBEY, HELEN KOONS,		Philadelphia.
ROBINSON, MARY OPAL,	*Mathematics,*	Winchester, Va.
ROSE, SARAH RUTTER,	*English,*	Chester.
RUNK, ELEANOR RAE,	*English,*	Philipsburg.
RUSSELL, IRMA KIPP,		Bedford.
SANDS, JOSEPH EVANS,	*Biology,*	Yardley.
SATTERTHWAITE, EDITH RIDGWAY,	*Latin,*	Trenton, N. J.
SCHOEW, FREDERICK WILLIAM,	*Chemistry,*	Chattaroy, W. Va.
SCOTT, HELENE BARRETT,	*French,*	Wilmington, Del.
SEAMAN, PHEBE UNDERHILL,		Jericho, N. Y.
SEEDS, CHARLOTTE VANCOURT,	*English,*	Philadelphia.
SHIDLE, NORMAN GLASS,	*English,*	Swarthmore.
SHOEMAKER, ELIZABETH JACK,	*English,*	Philadelphia.
SHOEMAKER, FLORENCE MATHER,	*French,*	Philadelphia.
SHOEMAKER, LESTER BURTON,	*Economics,*	Tullytown.
SHOEMAKER, SAMUEL STEINER,	*Mech. Engin.,*	Chambersburg.
SHOEMAKER, WILLIAM MACC., JR.,	*Mech. Engin.,*	Norristown.
SHRODE, PAREMENUS CARL,	*Pol. Science,*	Folsomville, Ind.
SIMONS, KATHERINE WOOD,	*English,*	Swarthmore.
SIMPSON, ANDREW,	*Elect. Engin.,*	Darby.
SINZHEIMER, ELSIE MAY,	*Philosophy,*	Philadelphia.
SMITH, CLEMENTINE MARTENIS,	*Latin,*	Perth Amboy, N. J.
SMITH, EDMUND PAUL,	*Civil Engin.,*	Philadelphia.

Name.	Major Subject.	Residence.
SMITH, HAROLD LESLEY,	*Economics,*	Coatesville.
SMITH, WALTER EUGENE,	*Civil Engin.,*	Eureka, N. Y.
SNYDER, MARY ESTHER,	*Psy. and Edu.,*	Quakertown.
SPACKMAN, GEORGE DONALD,	*Mech. Engin.,*	Coatesville.
SPILLER, HELEN NEWBOLD,	*English,*	Philadelphia.
SPROUL, JOHN ROACH,	*Latin,*	Chester.
STABLER, ELEANOR PALMER,	*Psy. and Edu.,*	George School.
STEPHENS, JOHN DAYTON,	*Mathematics,*	Philadelphia.
STEPHENSON, RUTH,	*Biology,*	Philadelphia.
STEWART, CARL BENJAMIN,		Columbia, Mo.
STICKLE, WILMER FRANKLIN,	*Physics,*	Newton, N. J.
STICKNEY, DAVID JOHN,		Buffalo, N. Y.
STOKES, FRANCES BARTLETT,	*Biology,*	Rancocas, N. J.
STOKES, MARIAN ADAMS,	*French,*	West Chester.
STOTENSBURG, ELIZABETH,		Ridley Park.
STOUT, ELINOR CHRISTINA,		Wenonah, N. J.
STOW, FRANKLIN PIERCE,	*Economics,*	Camden, N. J.
STRATTON, ROLAND PANCOAST,	*Pol. Science,*	Moorestown, N. J.
STRODE, KATHARINE ELIZABETH,	*History,*	West Chester.
STRONG, SARAH LUCRETIA,	*German,*	Ringoes, N. J.
SULLIVAN, ANNA ELIZABETH,	*Mathematics,*	Lansdowne.
SUPER, DOROTHY EMMA,	*Latin,*	Minersville.
TANGUY, LEWIS LELAND,	*Mathematics,*	West Grove.
TAYLOR, ESTHER GERTRUDE,		Philadelphia.
TAYLOR, LEONARD K. M.,	*Chem. Engin.,*	West Chester.
TAYLOR, MARY ENTRIKEN,	*English,*	West Chester.
TAYLOR, ROBERT MOSS,	*Biology,*	Chester.
TAYLOR, THOMAS NEWBOLD, JR.,		Baltimore, Md.
TAYLOR, WILLIAM SIMPSON,	*Chem. Engin.,*	Chester.
TEMPLE, CHARLES,	*Elect. Engin.,*	Swarthmore.
TERRADELL, RUSSELL JOSLIN,	*Economics,*	Trenton, N. J.
THATCHER, MARY ALBERTA,	*English,*	Swarthmore.
THOMAS, DOROTHY,	*French,*	New York, N. Y.
THOMPSON, THEODORE RICHARDS,	*Biology,*	Kennett Square.
TICE, FLORENCE MAY,	*German,*	Quakertown.
TILY, MILDRED BROMLEY,		Philadelphia.
TIMMIS, WILLIAM WALTER,	*Civil Engin.,*	Woodhaven, N. Y.
TOERRING, HELENE CARLOTTA,		Philadelphia.
TOMLINSON, EDWIN AUGUSTUS,	*Economics,*	Salem, Ohio.
TOMLINSON, WILLIAM WEST,	*Economics,*	Salem, Ohio.
TREGO, LILLIAN GWINNER,	*English,*	Swarthmore.
TROWBRIDGE, AGNES COWGILL,	*French,*	Pittsburgh.
TURNER, MARY REBECCA WILSON,	*History,*	Betterton, Md.
TWINING, JANE WILLIAMS,	*English,*	Hatboro.
VANHORN, ALICE ROSE,	*Latin,*	Plainfield, N. J.
VANLOON, EMILY LOIS,	*Biology,*	Philadelphia.

Name.	Major Subject.	Residence.
VERLENDEN, ALICE WILDE,	*History,*	Darby.
VERNAM, MARY HEADLEY,	*French,*	Trenton, N. J.
VOELKER, EDWARD DICK,	*Chemistry,*	Swarthmore.
WALL, NORA BLANCHE,	*Economics,*	Clearfield.
WALLACE, CLAIR MAXWELL,	*Civil Engin.,*	Media.
WARE, MARIAN CLEVELAND,		Salem, N. J.
WATERS, LILLIAN ISABEL,	*English,*	Baltimore, Md.
WATSON, ELIZABETH ATKINSON,	*German,*	Doylestown.
WAY, D. HEBERT,	*Chemistry,*	Oxford.
WAYGOOD, LOUISE WYNKOOP,	*English,*	Glenside.
WEBSTER, HAROLD SHOEMAKER,	*Engineering,*	Philadelphia.
WEEKS, MARIE SCHELL,	*French,*	Philadelphia.
WELTZ, EARL H.,	*Chemistry,*	Wilmington, Ohio.
WEST, JOHN BURRISS,	*Civil Engin.,*	Swarthmore.
WESTFALL, HELEN MARIE,	*Latin,*	Milwaukee, Wis.
WESTON, CHARLES MCILVAINE,	*Chemistry,*	Norwood.
WHITE, EDWARD ELIJAH,	*Civil Engin.,*	Glen White, W. Va.
WIDENER, DEAN COPPER,	*Pol. Science,*	Okmulgee, Okla.
WIGMORE, HARRY CHARLES,	*Economics,*	Glenolden.
WILLETS, EDMUND ROBERT, JR.,	*Mech. Engin.,*	Trenton, N. J.
WILLETS, MARGARET VAIL,	*History,*	Trenton, N. J.
WILLIAMS, EMMA T. R.,	*Astronomy,*	Norristown.
WILLIAMS, FRANCES BAKER,		Norristown.
WILLOUGHBY, LAURA ROBINSON,		Baltimore, Md.
WILSON, ANNE ELIZABETH,	*English,*	Princeton, N. J.
WILSON, GEORGE LLOYD,	*Economics,*	Ridley Park.
WILSON, HELEN ELIZABETH,	*Latin,*	Harrisburg.
WILSON, MARGARET,	*French,*	Philadelphia.
WILSON, MARY ELIZABETH,	*English,*	Toughkenamon.
WOOD, GERTRUDE NORMA,	*Mathematics,*	Philadelphia.
WORTH, ELIZABETH SHARPLESS,	*French,*	Coatesville.
WRIGHT, CATHARINE,	*English,*	Baltimore, Md.
WRIGHT, RALPH MCCLELLAN,	*Civil Engin.,*	West Chester.
YAP, DANIEL K. F.,	*Economics,*	Honolulu, I. H.
YARDLEY, CHARLES HENRY,	*Latin,*	York.
YERKES, MARGARET NIELL,	*Pub. Speaking,*	Swarthmore.
YOUNG, DOROTHY,		Easton.
YOUNG, EDITH CORA,	*Mathematics,*	Swarthmore.
YOUNG, EMILY GRACE,	*Pub. Speaking,*	Easton.
YOUNG, ETHEL REID,	*Mathematics,*	Camden, N. J.
YOUNG, FRANCES WILLARD,		Camden, N. J.
YOUNG, HELEN A.,	*French,*	Easton.
YOUNG, HELEN GERTRUDE,	*Mathematics,*	West Chester.
YOUNG, JULIA RALSTON,	*History,*	Rutledge.

Special Students

Name.	Major Subject.	Residence.
Bunting, George Miller, Jr.,	*Elect. Engin.*,	Chester.
Hill, Margaret Livingston,		Swarthmore.
McCance, Clara Elizabeth,	*English*,	Oil City.
Vogler, Mary Emma,	*German*,	Media.
Williams, Edith Roberts,		Norristown.
Worrell, Harriet Elizabeth,		Ogden.

SUMMARY OF STUDENTS BY STATES

Pennsylvania	251
New Jersey	70
New York	30
Maryland	15
Indiana	12
Ohio	11
Delaware	9
District of Columbia	7
Illinois	5
Virginia	5
Iowa	4
Wisconsin	4
Missouri	3
Nebraska	3
West Virginia	3
Connecticut	2
Florida	2
Kansas	2
Massachusetts	2
Minnesota	1
North Dakota	1
Oklahoma	1
Ontario, Canada	1
Honolulu, I. H.	1
Total	*445

* This number does not include the special students.

FELLOWS AND SCHOLARS, 1915-16

Joshua Lippincott Fellow: FRANK H. GRIFFIN, A.B., 1910. Student in Columbia University.

Lucretia Mott Fellow: REBA MAHAN CAMP, A.B., 1915. Student in Radcliffe College.

John Lockwood Memorial Fellow: FRANCES DARLINGTON, A.B., 1896. Student in the University of Pennsylvania.

Hannah A. Leedom Fellow: HAROLD S. ROBERTS, A.B., 1912; A.M., Princeton University, 1915. Student in the University of Wisconsin.

Martha E. Tyson Fellow: ANNE SHOEMAKER HAINES, A.B., 1912. Student in the University of Wisconsin.

Swarthmore-University of Pennsylvania Scholar: CLAUDE CHLORAL SMITH, A.B., 1914.

Western Swarthmore Club Scholar: ALLIN HUGH PIERCE, 1919.

Trenton Swarthmore Club Scholar: FRANKLIN PRESTON BUCKMAN, 1919.

Deborah Fisher Wharton Scholar: OLIVE FRANCES LAIRD, 1916.

Samuel J. Underhill Scholar: HILDA ANNA LANG, 1917.

Anson Lapham Scholars: WILLIAM RALPH GAWTHROP, 1918, and MABEL KURTZ, 1918.

William C. Sproul Scholars: HELEN EUGENIE ICKES, 1917. ESTHER ORINDA NICHOLS, 1918. EDGAR ZAVITZ PALMER, 1919.

Philip M. Sharples Scholars: HERBERT LAWYER BROWN, 1916. FLORENCE RIDDLE, 1916. MARGARET M. CLEMENS, 1917. LOUIS MAURICE GLICK, 1917. WILLIAM JOSEPH REILLY, 1918. MARY ANNE MARKLE, 1918. JOSEPH NEVYAS, 1919. HELEN GERTRUDE YOUNG, 1919.

Philadelphia Board of Education Scholars: MARIE WEEKS, 1916. HELEN CLARK, 1917. MARIAN G. FIRMIN, 1917. EMILY LOIS VANLOON, 1918. ESTHER G. TAYLOR, 1919. MARY K. GRIEST, 1919.

Annie Shoemaker Scholar: DOROTHEA L. DARLINGTON, 1919.

Westbury Quarterly Meeting Scholar: PHYLLIS KOMORI, 1919.

I. V. Williamson Scholars: Friends' Central School, FRANCES BAKER WILLIAMS, 1919; HAROLD SHOEMAKER WEBSTER, 1919. Moorestown Friends' School, EDNA PRISCILLA EVANS, 1919. George School, ELWOOD ROGER HOLLINGSHEAD, 1919. Baltimore Friends' School, THOMAS NEWBOLD TAYLOR, 1919. Wilmington Friends' School, HELENE B. SCOTT, 1919. Swarthmore Preparatory School, ANDREW SIMPSON, 1919. Swarthmore Public High School, MELANIE N. DOLMAN, 1919.

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; Professor of French Philology, University of Chicago.

BENJAMIN FRANKLIN BATTIN, A.B., 1892; studied in Berlin; Ph.D., Jena, 1900. Professor of German Language and Literature, Swarthmore College.

1894-95.

DAVID BARKER RUSHMORE, B.S., 1894; M.E., Cornell University, 1895; C.E., Swarthmore, 1897. Engineer, General Electric Co., Schenectady, N. Y.

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, 1906. Lawyer.

1898-99.

ELLWOOD COMLY PARRY, B.L., 1897; studied in Berlin; M.L., Swarthmore, 1900; Ph.D., University of Pennsylvania, 1903. Instructor in German, 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. Professor of English Literature in Beloit College.

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. Professor of Psychology and Education, Swarthmore College.

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, 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. Instructor in French, Swarthmore College.

1905-06.

LEWIS FUSSELL, B.S., 1902; M.S., 1903; E.E. and Ph.D., University of Wisconsin, 1907. Assistant Professor of Electrical Engineering, Swarthmore College.

1906-07.

LOUIS NEWTON ROBINSON, A.B., 1905; Ph.D., Cornell University, 1911;

studied in University of Halle and Berlin, 1906-07; Fellow in Cornell University, 1907-08. Professor of Economics, Swarthmore College.

1907-08.

SAMUEL COPELAND PALMER, A.B., 1895; A.M., 1907; A.M., Harvard University, 1909; Ph.D., *Ibid.*, 1912. Assistant Professor of Biology, Swarthmore College.

1908-09.

MARY ELIZA (NORTH) CHENOWETH, A.B., 1907; A.M., 1910; studied in Oxford University, England.

1909-10.

MARY TALBOTT (JANNEY) COXE, A.B., 1916; 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. Assistant Professor of Biology, Swarthmore College.

1911-12.

JOHN HIMES PITMAN, A.B., 1910; A.M., 1911; studied in University of California. Instructor in Mathematics and Astronomy, Swarthmore College.

1912-13.

IOLA KAY EASTBURN, B.L., 1897; A.M., 1906; Ph.D., University of Pennsylvania, 1913; Professor of German, Wheaton College, Norton, Mass.

1913-14.

EDWIN ANGELL COTTRELL, A.B., 1907; A.M., Harvard University, 1913. Instructor, Brown University and Wellesley College. Secretary of the Boston Budget Commission.

1914-15.

FREDERICK MYERLE SIMONS, JR., A.B., 1909; A.M., 1912; student in the University of Chicago. Assistant in Department of Economics and Industry, University of Chicago.

1915-16.

FRANK H. GRIFFIN, B.S., 1910; student in Columbia University.

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. Teacher of German, George School.

1899-1900.

MARY ELIZABETH SEAMAN, A.B., 1899; studied in Newnham College, Cambridge. Teacher.

1900-01.

ANNA GILLINGHAM, A.B., 1900; A.B., Radcliffe, 1901. 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, B.L., 1902; studied in Berlin.

1903-04.

ANNIE ROSS, A.B., 1903; Ph.M., University of Chicago, 1904. Teacher of French, High School, Flushing, L. I., N. Y.

1904-05.

CHARLOTTE RITZEMA BOGERT, A.B., 1904; A.M., Columbia University, 1905.

1905-06.

ELIZABETH HALL, A.B., 1905; A.M., Columbia University, 1906.

1906-07.

BERTHA CAROLINE PIERCE, A.B., 1906; A.M., Cornell University, 1907. Teacher.

1907-08.

JEANNETTE (CURTIS) CONS, A.B., 1907; A.M., 1909; studied in University of Berlin, Germany.

1908-09.

LIZZIE SYKES JAMES, A.B., 1908; studied in University of Berlin, Germany; A.M., University of Pennsylvania, 1911; Ph.D., University of Pennsylvania, 1914. Teacher of Latin and German, William Penn High School, Philadelphia, Pa.

1909-10.

HELEN HARRIET PORTERFIELD, A.B., 1909; studied in University of Chicago.

1910-11.

JEAN HAMILTON WALKER, A.B., 1910; studied in University of Chicago. Teacher of French, Mary Lyon School, Swarthmore, Pa; Assistant in French, Swarthmore College.

1911-12.

ANNA HEYDT, A.B., 1911; A.M., Radcliffe College, 1912. Teacher in Irving College, Mechanicsburg, Pa.

1912-13.

CAROLINE HALLOWELL SMEDLEY, A.B., 1912; studied in University of California.

1913-14.

ESTHER MIDLER, A.B., 1913; studied in University of Berlin, Germany.

1914-15.

MARIE SAFFORD BENDER, A.B., 1914; studied in the University of Chicago. Computer and Secretary to the Director of Allegheny Observatory, University of Pittsburgh.

1915-16.

REBA MAHAN CAMP, A.B., 1915; student in Radcliffe College.

HOLDERS OF THE JOHN LOCKWOOD MEMORIAL FELLOWSHIP

1910-11.

EDWIN CARLETON MACDOWELL, A.B., 1909; studied in Harvard University; M.S., Harvard University, 1911; Ph.D., *Ibid.*, 1912. With Carnegie Institute of Experimental Evolution, Cold Springs Harbor, L. I., N. Y.

1911-12.

HENRY FERRIS PRICE, A.B., 1906; studied in University of Pennsylvania; A.M., University of Pennsylvania, 1913; Ph.D., University of Pennsylvania, 1915. Teacher of Mathematics, Swarthmore High School.

1912-13.

WALTER FRANK RITTMAN, A.B., 1908; A.M., 1909; M.E., 1911; Ph.D., Columbia University, 1914. Chemist, United States Bureau of Mines.

1913-14.

HELEN PRICE, A.B., 1907; studied in University of Pennsylvania; Ph.D., University of Pennsylvania, 1915. Professor of Greek and Latin, Oxford College.

1914-15.

HELEN HEED, A.B., 1905; studied in Radcliffe College; A.M., Radcliffe College, 1915. Teacher of English, High School, East Orange, N. J.

1915-16.

FRANCES DARLINGTON, A.B., 1896; student in the University of Pennsylvania.

HOLDERS OF THE HANNAH A. LEEDOM FELLOWSHIP

1913-14.

ARTHUR PERCIVAL TANBERG, A.B., 1910; A.M., 1913; studied in Columbia University; Ph.D., Columbia University, 1915. Chemist, E. I. duPont de Nemour Co.

1914-15.

ARCHER TAYLOR, A.B., 1909; A.M., University of Pennsylvania, 1910; studied in Harvard University; Ph.D., Harvard University, 1915.

1915-16.

HAROLD S. ROBERTS, A.B., 1912; A.M., Princeton University, 1915; student in the University of Wisconsin.

HOLDERS OF THE MARTHA E. TYSON FELLOWSHIP

1914-15.

HELEN PRICE, A.B., 1907; studied in the University of Pennsylvania; Ph.D., University of Pennsylvania, 1915. Professor of Greek and Latin, Oxford College.

1915-16.

ANNE SHOEMAKER HAINES, A.B., 1912; student in the 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.
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.
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; Ph.D., Columbia University, 1914.
1910. JOHN JOHNSON, B.S., 1910.
1911. JOSEPH H. WILLITS, A.B., 1911; A.M., 1912.
1912. HERMAN ELLIOTT WELLS, B.S., 1912.
1913. HENRY LEE MESSNER, A.B., 1913.
1914. ALBERT ROY OGDEN, A.B., 1914.
1915. THOMAS BAYARD MCCABE, A.B., 1915.

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* This medal is placed in the hands of the faculty without restriction for such disposition as may be deemed best. It is usually awarded for Character, Scholarship, and Influence. Until the year 1910 it was known as the College Medal.

DEGREES CONFERRED IN 1915

BACHELOR OF ARTS

In Biology

LILLIE ELIZABETH FLINN.....Philadelphia.
JOHN WALDO HOWELL.....Springfield, Ohio.
RALPH LINTON.....Moorestown, N. J.
ARTHUR HORTON MANN.....Philadelphia.
JOHN GOODWIN TAYLOR.....Chester.
HOWARD EARLE TWINING.....Ivyland.

In Chemistry

WILLIAM HILLES WARD.....Zanesville, Ohio.

In Economics

GILSON GRANT BLAKE, JR.....Jacksonville, Fla.
THOMAS BAYARD MCCABE.....Selbyville, Del.
LEWIS HERBERT TILY.....Cynwyd.
JOHN SCHOLFIELD WILLIAMS, 2D.....Philadelphia.

In English

HELEN SEIDEL EVANS.....Philadelphia.
JESSICA GRANVILLE-SMITH.....Bellport, N. Y.
ETHEL BLANCHE HARVEY.....Moorestown, N. J.
FANNIE ELIZABETH HILL.....Philadelphia.
DENMAN HOWARD KELLEY.....Gilmour, Ind.
DOROTHY POWELL.....Lansdowne.
ELIZABETH MAY ROBERTS.....Glenolden.
GRACE MARGUERITE SCHAEFFER.....Lancaster.

In French

SARA STORM APPLEBY.....Glen Cove, N. Y.
HELEN ELMORE.....Swarthmore.
ELIZABETH DOROTHEA GAGE.....Atlantic City, N. J.
ELMA GREENWOOD JEFFERIS.....Chester.
ESTHER MARIE JENKINS.....Gwynedd.
ANNA LIPPINCOTT MILLER.....Riverton, N. J.
ELLEN JULIA MILLER.....Hatboro.
MARIAN ELIZABETH MUNCE.....Swarthmore.
RACHAEL ELIZABETH ROBERTS.....Moorestown, N. J.
RENA ROTHNER.....Philadelphia.
ETHEL SHOEMAKER.....Philadelphia.
JOSEPHINE ELLIOTTE WILSON.....Chester.

In German

JANE ACKLEY HENRY.....Woodbury, N. J.
AUGUSTE EMILIE JELLINGHAUS.....New York, N. Y.
SARAH BEULAH SHEPPARD.....Mauricetown, N. J.
LEILA NEWTON TAYLOR.....Darby.
LELIA ELOISE VEST.....Ottumwa, Iowa.
VERA LOUISE WALTON.....New Garden.
JENNIE HAINES YERKES.....Swarthmore.

In History

GRACE MARIE ATKINSON.....Philadelphia.
ETHEL MAY BURNETT.....Philadelphia.
WALTER ALOYSIUS COOGAN.....Philadelphia.
HANNAH WORRALL DARLINGTON.....Darling.
IDA BELLE DOWNEY.....Swarthmore.
MARY CAROLINE LANGE.....Media.
MARIAN VINTON PHILIPS.....Downingtown.
MARY BROWN REED.....Reedsville.
SAMUEL SMEDLEY, JR.....Media.

In Latin

EDITH ROSELLE BANER.....Beesley's Point, N. J.
DOROTHY FEHR FAHNESTOCK.....Harrisburg.
GWYNN HENRY KELLER.....West Chester.
AGNES ELIZABETH O'BRIEN.....Philadelphia.
MARTHA LOUISA PANCOAST.....Chester.
LILIAN MARIE PILE.....Philadelphia.
ELINOR ROBINSON.....Wilmington, Del.
BERTHA KENT WEBB.....West Chester.

In Mathematics

REBA MAHAN CAMP.....Swarthmore.
SARA DARLINGTON.....Pomeroy.
BERTHA ELIZABETH DELAPLAINE.....Wilmington, Del.
EARL ARTHUR HUNTER.....Barnesville, Ohio.
RUTH SHORT.....Merchantville, N. J.
JOHN COMLY WHITE.....Lansdowne.

In Philosophy

ELISABETH SOMERS WILLIAMS.....Riverton, N. J.

In Political Science

WILLIAM MARTZ BEURY.....Philadelphia.
PAUL MILLER CUNCANNON.....Kennett Square.
WILLIAM WESLEY MATSON.....West Chester.
FRANK CORWIN OREN.....Wilmington, Ohio.

In Public Speaking

BRETTA CRAPSTER ..... Winfield, Kans.
REBECCA WEBB HOLMES ..... Swarthmore.
MARGARET ANNE MCINTOSH ..... New York, N. Y.
MARGARET MILNE ..... New York, N. Y.

In Chemical Engineering

CHARLES JOSEPH DARLINGTON ..... Darling.
JAMES ROBERT FRORER ..... West Chester.
HERSCHEL GASTON SMITH ..... Austin, Texas.

In Civil Engineering

JOHN WILLIAM RAYMOND, JR. ..... Brooklyn, N. Y.
WILLIAM LAURIE SEAMAN ..... Glen Cove, N. Y.

In Electrical Engineering

KAMAGHIEL GARABED BOYAJIAN ..... Swarthmore.
NORMAN LEROY MACKISSICK ..... West Chester.
JOHN DORMAN ROBINSON ..... Georgetown, Del.
CLAYTON TAYLOR ROGERS ..... Asheville, N. C.

In Mechanical Engineering

JOHN STOKES CARSWELL ..... Philadelphia.
BYRON COLES COLLINS ..... Moorestown, N. J.
AUBREY EDWARD FOX ..... Cadiz, Ohio.
MILTON HOWARD FUSSELL, JR. ..... Philadelphia.
JOHN JOSEPH MATTHEWS ..... Brooklyn, N. Y.
ROGER BACON OWINGS ..... Simpsonville, Md.
NORMAN SHERRERD ..... Haddonfield, N. J.
HARRY JAMES STITES ..... Williamstown.
JOSEPH STANLEY WETHERALD ..... Sandy Springs, Md.

MASTER OF ARTS

In Public Speaking

ELIZABETH BIGGINS OLIVER ..... Chester.

MECHANICAL ENGINEER

HENRY LAWRENCE HESS ..... Philadelphia.

THE ALUMNI ASSOCIATION

The Alumni Association was organized May 8, 1875, and incorporated January 16, 1882. Its object is "to promote union and good feeling among the Alumni, and to advance in all proper ways the interests of Swarthmore College." All graduates are *ipso facto* members of the Association. The Annual Reunion is held on Tuesday of Commencement Week.

OFFICERS FOR 1915-16

President

T. WALTER GILKYSON, '02.....Philadelphia, Pa.

Vice Presidents

BERTHA L. BROOMELL, '94.....Philadelphia, Pa.
HERMAN HOOPES, '74.....Philadelphia, Pa.
PERCIVAL PARRISH, '96.....Philadelphia, Pa.

Secretary and Treasurer

ABBY MARY HALL ROBERTS, '90.....Swarthmore, Pa.

Directors

Term expires June, 1916

CHARLES G. HODGE, '96.....Philadelphia, Pa.
HENRY B. SEAMAN, '81.....New York, N. Y.
BIRD T. BALDWIN, '00.....Swarthmore, Pa.

Term expires June, 1917

ELLEN WILLIAMS BATTIN, '93.....Swarthmore, Pa.
LEVIS M. BOOTH, '99.....Plainfield, N. J.
MARGARET LAURIE SEAMAN, '89.....Glen Cove, N. Y.

SWARTHMORE CLUBS

THE PHILADELPHIA SWARTHMORE CLUB

The Philadelphia Swarthmore Club was founded in 1889. Good fellowship and love of Alma Mater have been the keystone in the arch of the club's continued success. Since 1899

the club has held without interruption an annual meeting and dinner, the Philadelphia association being the only one which has such a record. The first annual dinner was held on April 14, 1889, and was attended by about sixty members. The attendance now averages about one hundred and seventy-five. The club has never had any regular officers, but it is the practice to appoint each year a committee to take charge of the meeting and dinner for the ensuing year. During his lifetime, Mr. Gerit E. H. Weaver was the moving spirit and chairman of this committee. From the date of his death until 1914 Howard Cooper Johnson acted as chairman. Charles C. Miller is the present chairman.

THE WESTERN SWARTHMORE CLUB

The Western Swarthmore Club originated in December, 1903, when at an informal dinner about a dozen Swarthmoreans met and organized the Chicago Swarthmore Club. The Chicago Club met for a year or so at irregular intervals, and, having elected Francis E. Broomell, secretary and treasurer, decided to widen its field, and offer an annual free scholarship, consisting of board, room and tuition. The club was then called the Western Swarthmore Club, and its membership increased to about sixty graduates in the West. The scholarship is open for competition to all high and preparatory school graduates west of the Allegheny Mountains, and the club has sent six students through the freshman year, and has been the means of inducing more than twice that number to choose Swarthmore. In this way all the principal high schools in the Middle West hear of Swarthmore every year, and the students carry her good name wherever they go. The Western Swarthmore Club has thus proved Swarthmore spirit not by words, but by deeds. The present officers are: President, Professor T. A. Jenkins, '87; treasurer, Francis E. Broomell, '93; secretary, F. M. Simons, Jr., '09. All communications should be addressed to the secretary, University of Chicago, Chicago, Ill.

Club Scholars: 1906-07, Murat Louis Johnson, A.B., 1909, Kentucky; 1907-08, Clyde Insley Blanchard, ex-1911, Missouri; 1908-09. Alice Elizabeth Masten, ex-1912, Indiana; 1909-10, James Jacob Schock, 1913, Oklahoma; 1910-11, Edwin Adams Lucas, 1914, Illinois; 1911-12, Lelia Eloise Vest, 1915, Iowa;

1912-13, John Ewing Orchard, 1916, Nebraska; 1913-14, Clarence Gates Myres, 1917, Iowa; 1914-15, Jess Halstead, 1918, Wisconsin; 1915-16, Allen Hugh Pierce, 1919, Iowa.

TRENTON SWARTHMORE CLUB

The Trenton Swarthmore Club is an organization of the Swarthmore men located in Trenton, N. J., formed primarily for the purpose of furnishing a scholarship in Swarthmore College to the preparatory schools in Trenton and vicinity.

The organization offers yearly a full, free competitive honor scholarship of $400 which is awarded to the most worthy male applicant from the neighboring territory, which includes seven of the most prominent preparatory schools within a radius of ten miles.

The requirements of application are based somewhat on those of the Rhodes Scholarship, and embrace scholarship, character, moral force, and physical development. The purpose of the award is to secure and to induce men from that vicinity to enter Swarthmore, the aim of the committee being to attract and develop all-around men, since no particular stress is given to any one line of activity.

Club Scholars: 1910-11, Howard Buckman, 1914, Trenton High School; 1911-12, Hyland Lorraine Hodgson, ex-1915, Trenton High School; 1912-13, Edwin Augustus Tomlinson, 1916, George School; Stanley Avoy Pennock, 1917, Peddie Institute; Frederick Stockton Donnelly, 1917, New Jersey State Model School; Franklin Preston. Buckman, 1919, Trenton High School.

SWARTHMORE CLUB OF WEST JERSEY

A meeting of Swarthmore graduates and ex-students living in and around Riverton and Moorestown, N. J., was held on March 31, 1911, and the name agreed upon as the "Swarthmore Club of West Jersey." Its purpose is expressed in the following: "We the subscribers, hereby form ourselves into an association under the name of the 'Swarthmore Club of West Jersey,' for the purpose of promoting the best interests of Swarthmore College. Dated this the 31st day of March, A.D. 1911." This association now numbers thirty-six members.

THE NEW YORK SWARTHMORE CLUB

The New York Swarthmore Club is an informal organization somewhat similar to the Philadelphia club, possessing neither constitution nor by-laws, although it has recently elected officers and a board of governors. The club, which now includes in its membership nearly one hundred Swarthmore men resident in New York or nearby towns, holds a semi-annual reunion, either a dinner or a smoker, which is attended usually by about sixty Swarthmoreans. The officers for 1915 are: President, Henry C. Turner, 1893; Secretary and Treasurer, Maurice E. Griest, 1904; Board of Governors, Joseph Fitch, 1879; Frederick A. Seaman, 1883; Henry C. Turner, 1893; William S. Barker, 1895; Maurice E. Griest, 1904; Edward P. Palmer, 1906; Henry C. Field, 1909; J. Ernest Hartman, 1912.

INDEX

COMMITTEE ON TRUSTS

CHARLES F. JENKINS,
1024 Race Street, Philadelphia.

EDMUND WEBSTER,
1324 South Broad Street, Philadelphia.

ISAAC H. CLOTHIER,
Eighth and Market Streets, Philadelphia.

HOWARD COOPER JOHNSON,
1210-1214 Commonwealth Building, Philadelphia.

ROBERT PYLE,
West Grove, Pa.

JOSEPH SWAIN,
Swarthmore, Pa.