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1955-1956



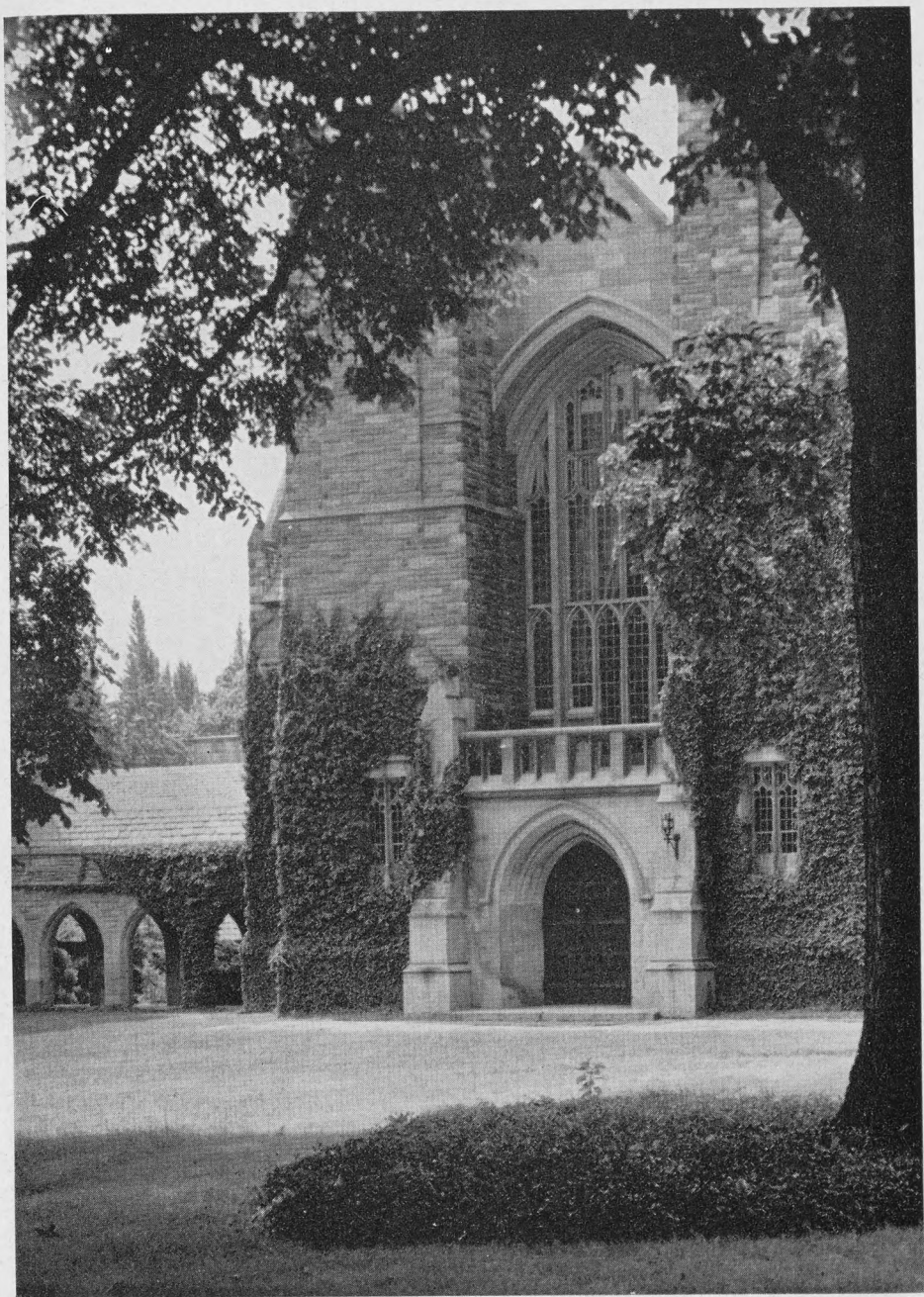
SWARTHMORE - PENNSYLVANIA

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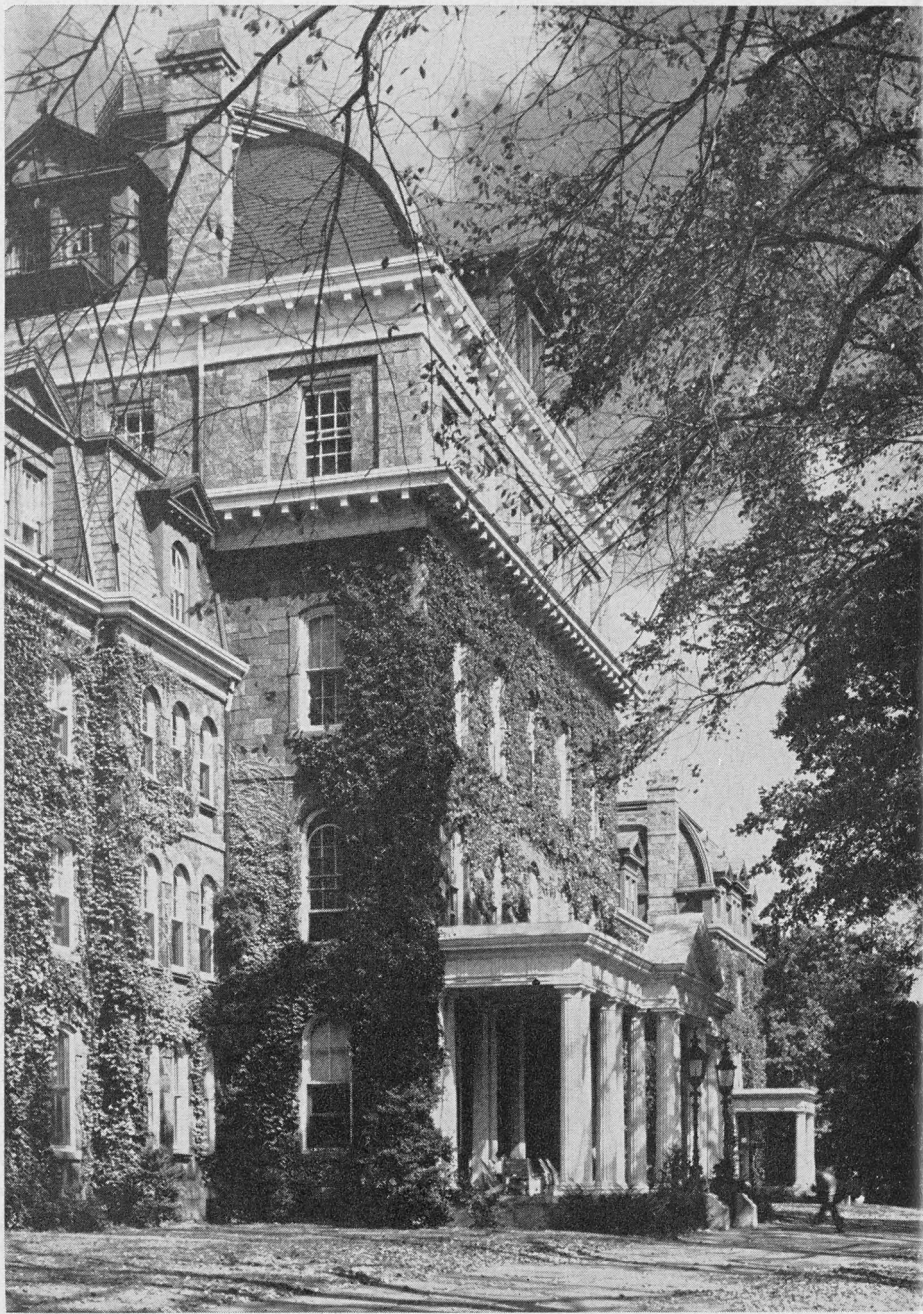
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Parrish Hall

SWARTHMORE COLLEGE
BULLETIN

CATALOGUE ISSUE

1955-1956

SWARTHMORE, PENNSYLVANIA

Volume LIII

Number 1

September, 1955

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For women: Dean Susan P. Cobbs

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Charles G. Thatcher, *Business Manager*

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Maralyn Orbison, *Assistant Dean (for Women)*

W. Park Woodrow, *Vocational Adviser (for Men)*

ALUMNI AFFAIRS AND PUBLIC RELATIONS

Joseph B. Shane, *Vice-President*

GENERAL INFORMATION

W. Park Woodrow, *Director of News Office*

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1955

OCTOBER							NOVEMBER							DECEMBER							
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1956

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1957

JANUARY							FEBRUARY							MARCH						
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28	29	30					26	27	28	29	30	31		23	24	25	26	27	28	29	

College Calendar

1955

Fall Semester

September 15-17	Freshman placement days
September 19	Registration, 1: 30 p. m.
September 20	Classes and honors seminars begin
October 4	Meeting of the Board of Managers
November 1	Executive Committee of the Board of Managers
November 12	Mid-semester reports
November 24-27	Thanksgiving recess
December 6	Annual Meeting of the Board of Managers
December 17	Christmas recess begins, 12: 00 noon

1956

January 3	Christmas recess ends, 8: 00 a. m.
January 3	Executive Committee of the Board of Managers
January 13	Registration for spring semester, 1: 30 p. m.
January 14	Classes and seminars end
January 16, 17	Review period for course students
January 18	Honors seminars begin for spring semester
January 18	Mid-year examinations begin
January 28	Mid-year examinations end

Spring Semester

February 1	Classes begin
February 7	Executive Committee of the Board of Managers
March 6	Meeting of the Board of Managers
March 17	Mid-semester reports
March 24	Spring recess begins, 12: 00 noon
April 2	Spring recess ends, 8: 00 a. m.
April 3	Executive Committee of the Board of Managers
May 1	Honors seminars end
May 1	Executive Committee of the Board of Managers
May 11	Written honors examinations begin
May 12	Classes end for seniors
May 17	Classes end
May 17-19	Senior comprehensive examinations
May 18	Enrollment in classes for fall semester, 1: 30 p. m.
May 18, 19	Review period for course students
May 21	Written honors examinations end
May 21	Final examinations begin
May 24-26	Oral honors examinations
May 30	Final examinations end
June 1	Meeting of the Board of Managers
June 2	Alumni Day
June 3	Baccalaureate Day
June 4	Commencement Day

College Calendar (Tentative)

1956

Fall Semester

September 20-22	Freshman placement days
September 24	Registration, 1: 30 p. m.
September 25	Classes and honors seminars begin
October 2	Meeting of the Board of Managers
November 6	Executive Committee of the Board of Managers
November 17	Mid-semester reports
November 22-25	Thanksgiving recess
December 4	Annual Meeting of the Board of Managers
December 19	Christmas recess begins, 5: 00 p. m.

1957

January 3	Christmas recess ends, 8: 00 a. m.
January 8	Executive Committee of the Board of Managers
January 18	Registration for spring semester, 1: 30 p. m.
January 19	Classes and seminars end
January 21-22	Review period for course students
January 23	Honors seminars begin for spring semester
January 23	Mid-year examinations begin
February 2	Mid-year examinations end

Spring Semester

February 5	Executive Committee of the Board of Managers
February 6	Classes begin
March 5	Meeting of the Board of Managers
March 23	Mid-semester reports
March 23	Spring recess begins, 12: 00 noon
April 1	Spring recess ends, 8: 00 a. m.
April 2	Executive Committee of the Board of Managers
May 7	Honors seminars end
May 7	Executive Committee of the Board of Managers
May 17	Written honors examinations begin
May 18	Classes end for seniors
May 23	Classes end
May 23-25	Senior comprehensive examinations
May 24	Enrollment in classes for fall semester, 1: 30 p. m.
May 24-25	Review period for course students
May 27	Written honors examinations end
May 27	Final examinations begin
May 30-June 1	Oral honors examinations
June 5	Final examinations end
June 7	Meeting of the Board of Managers
June 8	Alumni Day
June 9	Baccalaureate Day
June 10	Commencement Day

The Corporation

Board of Trustees

PERSONNEL
OF

SWARTHMORE COLLEGE

The Corporation

- CLAUDE C. SMITH, *President*
1617 Land Title Building, Philadelphia 10, Pa.
- PHILIP T. SHARPLES, *Vice-President*
Twenty-Third and Westmoreland Sts., Philadelphia 40, Pa.
- ELEANOR STABLER CLARKE, *Secretary*
Crumwald Farm, Wallingford, Pa.
- HELEN GAWTHROP WORTH, *Assistant Secretary*
805 Augusta Road, Westover Hills, Wilmington 6, Del.
- E. LAWRENCE WORSTALL, *Treasurer*
421 Chestnut St., Philadelphia 1, Pa.

Board of Managers

Emeriti

- RUTH POTTER ASHTON, 409 Elm Avenue, Swarthmore, Pa.
- ELSIE PALMER BROWN, 1622 Twenty-ninth Street, N. W., Washington 7, D. C.
- CLEMENT M. BIDDLE, P. O. Box 743, Church St. Sta., New York 8, N. Y.
- EDITH WILSON JACKSON, 317 North Chester Road, Swarthmore, Pa.
- LYDIA FOULKE TAYLOR, 23 Summit Avenue, Larchmont, N. Y.
- BARCLAY WHITE, 22 North Thirty-sixth Street, Philadelphia 4, Pa.

Life Members

- FRANK AYDELOTTE, 88 Battle Road, Princeton, N. J.
- ELEANOR STABLER CLARKE, Crumwald Farm, Wallingford, Pa.
- ISAAC H. CLOTHIER, JR., 801 Market Street, Philadelphia 5, Pa.
- MARY LIPPINCOTT GRISCOM, 314 East Central Avenue, Moorestown, N. J.
- ROBERT E. LAMB, 3429 West Indiana Avenue, Philadelphia 32, Pa.
- HADASSAH M. L. PARROT, 1025 Westview Street, Philadelphia 19, Pa.
- CLAUDE C. SMITH, 1617 Land Title Building, Philadelphia 10, Pa.
- HELEN GAWTHROP WORTH, 805 Augusta Road, Westover Hills, Wilmington 6, Del.

Term Expires December, 1955

- BOYD T. BARNARD, 914 Lincoln-Liberty Building, Philadelphia 7, Pa.
- HILDA LANG DENWORTH, 301 Elm Ave., Swarthmore, Pa.
- THOMAS B. MCCABE, Front and Market Streets, Chester, Pa.
- ANNA ENGLE TAYLOR, 8240 Fairview Road, Philadelphia 17, Pa.
- *CAROLINE BIDDLE MALIN, 305 West 18th St., New York 11, N. Y.
- *JACK B. THOMPSON, Clifton Forge, Va.

Term Expires December, 1956

- T. STOCKTON MATTHEWS, Garrett Building, Baltimore, Md.
- PHILIP T. SHARPLES, Twenty-third and Westmoreland Streets, Philadelphia 40, Pa.
- C. NORMAN STABLER, 230 West Forty-first St., New York, N. Y.
- HOWARD S. TURNER, 103 Lebanon Hills Drive, Pittsburgh 28, Pa.
- *VIRGINIA BROWN GREER, Farnum Road, Media, Pa.
- *NORMAN H. WINDE, Ridley Creek Road, R.D. 2, Media, Pa.

Term Expires December, 1957

- ELISABETH HALLOWELL BARTLETT, 1922 Mount Royal Terrace, Baltimore 17, Md.
- NICHOLAS KELLEY, 70 Broadway, New York 4, N. Y.
- PHEBE UNDERHILL SEAMAN, Jericho, N. Y.
- E. LAWRENCE WORSTALL, 33 Dudley Avenue, Lansdowne, Pa.
- *ANNE PHILIPS BLAKE, 215 North Rd., Lindamere, Wilmington 3, Del.
- *CHARLES P. LARKIN, JR., Crozer Building, Chester, Pa.

* Nominated by the Alumni Association.

Term Expires December, 1958

ISABEL JENKINS BOOTH, 54 The Strand, New Castle, Del.
RICHARD C. BOND, 1300 Market St., Philadelphia, Pa.
THEODORE WIDING, 800 Lincoln-Liberty Building, Philadelphia 7, Pa.
ALFRED H. WILLIAMS, Providence Road, Wallingford, Pa.
*CATHARINE W. DONNELLY, 1202 Windy Gate Road, Baltimore 4, Md.
*WILLIAM F. LEE, 5 Guernsey Road, Swarthmore, Pa.

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The President is ex-Officio a member of Every Committee

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FRANK AYDELOTTE
ISABEL JENKINS BOOTH
ELEANOR STABLER CLARKE
ISAAC H. CLOTHIER, JR.
HILDA LANG DENWORTH
MARY LIPPINCOTT GRISCOM

ROBERT E. LAMB
HADASSAH M. L. PARROT
THOMAS B. MCCABE
PHILIP T. SHARPLES
THEODORE WIDING
E. LAWRENCE WORSTALL
HELEN GAWTHROP WORTH

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THEODORE WIDING
NICHOLAS KELLEY
CHARLES P. LARKIN, JR.

THOMAS B. MCCABE
PHILIP T. SHARPLES
CLAUDE C. SMITH
E. LAWRENCE WORSTALL

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CLAUDE C. SMITH
FRANK AYDELOTTE
ANNE PHILLIPS BLAKE
HILDA LANG DENWORTH
HADASSAH M. L. PARROT

CAROLINE BIDDLE MALIN
PHEBE UNDERHILL SEAMAN
HOWARD TURNER
THEODORE WIDING
NORMAN H. WINDE
HELEN GAWTHROP WORTH

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BOYD T. BARNARD
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MARY LIPPINCOTT GRISCOM

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ELLEN FERNON REISNER
JACK B. THOMPSON
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RICHARD C. BOND
ISAAC H. CLOTHIER, JR.

T. STOCKTON MATTHEWS
C. NORMAN STABLER
ALFRED H. WILLIAMS
E. LAWRENCE WORSTALL

Household and Student Affairs

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ELISABETH HALLOWELL BARTLETT
ELEANOR STABLER CLARKE
HILDA LANG DENWORTH

CATHARINE W. DONNELLY
VIRGINIA BROWN GREER
ANNA ENGLE TAYLOR
THEODORE WIDING

Nominating

ROBERT E. LAMB
CAROLINE BIDDLE MALIN
FRANK AYDELOTTE

ELEANOR STABLER CLARKE
HOWARD S. TURNER
HILDA LANG DENWORTH

* Nominated by the Alumni Association.

Alumni Association Officers

1955-1957

President, JOHN H. LIPPINCOTT, JR. '27, Chalfonte-Haddon Hall, Atlantic City, N. J.
Vice-President for Men, WILLIAM B. PLATE '26, 7 Crest Acre Court, Summit, N. J.
Vice-President for Women, ELLEN FERNON REISNER '31, 102 W. Mermaid Lane, Chestnut Hill, Philadelphia 18, Pa.
Secretary, JANET MCCOMBS BALDWIN '45, Old Yellow Springs Road, R. D. 1, Malvern, Pa.

Alumni Council

Zone I

TERM EXPIRES

JUNE

- 1956 JOHN W. DUTTON '28, c/o J. M. Fronefield, Wayne, Pa.
WM. A. LIMBERGER, M.D. '23, Green Ledge Farm, R.D. 4, West Chester, Pa.
- 1957 ROBERT G. HAYDEN '47, Baltimore Pike, Swarthmore, Pa.
ALBERT W. PRESTON, JR. '23, 56 Park Ave., Crafton, Pittsburgh 5, Pa.
WILLIAM D. TAYLOR '36, "Mytholme" Box 542, Coatesville, Pa.
- 1958 F. PRESTON BUCKMAN, JR. '41, Jericho Manor, Apt. 346, Jenkintown, Pa.
J. EARLE EDWARDS, JR. '36, 137 Rutgers Ave., Swarthmore, Pa.
- 1956 ANN LAPHAM FRAZER '38, 146 Scenic Road, Springfield, Pa.
LOUISE DAVIS MULLOY '24, Winding Lane, R.D. 3, Media, Pa.
- 1957 ANNA BANCROFT COLES '23, 125 E. Oak Ave., Moorestown, N. J.
ELIZABETH SEAMAN DAWES '34, 20 Benjamin West Ave., Swarthmore, Pa.
MARY WILSON RIDPATH '19, Presidential Apts., City Line, Philadelphia 31, Pa.
- 1958 MARGARET WALKER LIPPINCOTT '45, Rose Valley Road, Moylan, Pa.
ELIZABETH McCABE THIEME '27, 78 Rose Valley Road, Wallingford, Pa.

Zone II

- 1956 ROBERT M. BROWNING '34, 32 Llewellyn Rd., Montclair, N. J.
- 1957 JOHN L. DUGAN, JR. '43, 58 Whitney Rd., Short Hills, N. J.
- 1958 WILBUR M. McFEELY '29, 117 Graham Street, Highland Park, N. J.
- 1956 LUCINDA WHITE LOHR '43, 42 St. Johns Ave., Mt. Tabor, N. J.
- 1957 ELIZABETH BARTLESON BOOTH '26, 38 Canterbury Lane, Westfield, N. J.
- 1958 GERTRUDE PAXSON SEIBERT '29, 105 Brookside Rd., Darien, Conn.

Zone III

- 1956 ORRICK METCALFE '26, 305 S. Broadway Street, Natchez, Miss.
- 1958 WALTER T. SKALLERUP, JR. '42, 1701 K Street, N.W., Washington 6, D. C.
- 1956 CAROLINE LIPPINCOTT FORMAN '28, Easton, Maryland
- 1958 LISBETH CROWELL LIEBERMAN '45, 104 Kelvin Lane, Oak Ridge, Tenn.

Zone IV

- 1956 VICTOR R. JOSE '43, 215 N.W. 10th St., Richmond, Ind.
- 1958 SPENCER R. KEARE '25, 1270 Linden Avenue, Highland Park, Ill.
- 1956 LAURAMA PAGE PIXTON, 549 Clarence Ave., State College, Pa.
- 1958 BARBARA MOORE GARY '48, 7708 Juniper Ave., Gary 5, Indiana

Zone V

- 1957 EDWARD A. JAKLE '40, 11634 Winding Way, Los Altos, Calif.
- 1957 WINIFRED CAMMACK BOND '43, 1230 Wabash St., Pasadena 3, Calif.

The Faculty

- COURTNEY SMITH, *President* 324 Cedar Lane
 B.A., M.A., Ph.D., Harvard University.
- EDWARD K. CRATSLEY, *Vice-President—Financial Operation and Control, and Professor of Economics* 925 Strath Haven Avenue
 B.A., College of Wooster; M.B.A. and D.C.S., Harvard University.
- JOSEPH B. SHANE, *Vice-President—Public Relations and Alumni Affairs, and Professor of Education* Cunningham House
 B.A., Swarthmore College; M.A., University of Pennsylvania.
- SUSAN P. COBBS, *Dean and Professor of Classics* West House
 B.A., Randolph-Macon Woman's College; M.A., New York University; Ph.D., University of Chicago.
- EVERETT L. HUNT, *Dean and Professor of English* 604 Elm Avenue
 B.A., Huron College; M.A., University of Chicago; D.Litt., Huron College.
- JOHN M. MOORE, *Associate Dean, Registrar and Professor of Philosophy*,
 2 Whittier Place
 B.A., Park College; B.D., Union Theological Seminary; M.A., Harvard University; Ph.D., Columbia University.
- GILMORE STOTT, *Associate Dean and Lecturer in Philosophy*,
 318 Dartmouth Avenue
 B.A. and M.A., University of Cincinnati; B.A. and M.A., Oxford University; M.A. and Ph.D., Princeton University.
- MARALYN ORBISON, *Assistant Dean* Swarthmore College
 B.A., Swarthmore College.
- †DEBORAH WING, *Assistant Dean* Swarthmore College
 B.A., Swarthmore College; M.A., Radcliffe College.
- CHARLES G. THATCHER, *Business Manager* 613 Ogden Avenue
 B.A., Swarthmore College; M.E., Cornell University; M.M.E., Johns Hopkins University.

EMERITI

- LYDIA BAER, *Associate Professor Emeritus of German*
 Brookside Road, Wallingford, Pa.
 B.A., Oberlin College; M.A. and Ph.D., University of Pennsylvania.
- ALFRED MANSFIELD BROOKS, *Professor Emeritus of Fine Arts* Gloucester, Mass.
 B.A. and M.A., Harvard University; M.A., Indiana University.
- HENRY JERMAIN MAUDE CREIGHTON, *Professor Emeritus of Chemistry*,
 High-Solas, Glen Margaret, Nova Scotia, Canada
 B.A., M.A. and LL.D., Dalhousie University; M.Sc., University of Birmingham; D.Sc., Das eidgenössische Polytechnikum, Zürich.
- PHILIP MARSHALL HICKS, *Professor Emeritus of English Literature* .. Avondale, Pa.
 B.A. and M.A., Swarthmore College; Ph.D., University of Pennsylvania.
- WOLFGANG KÖHLER, *Research Professor Emeritus of Philosophy and Psychology*
 (on special research grant) Princeton, N. J.
 Dr. Phil., University of Berlin; D.Sc., University of Pennsylvania, University of Chicago, Kenyon College.
- ROSS W. MARRIOTT, *Professor Emeritus of Mathematics* 213 Lafayette Avenue
 B.A., Indiana University; M.A., Swarthmore College; Ph.D., University of Pennsylvania.
- HENRIETTA JOSEPHINE MEETEER, *Professor Emeritus of Greek and Latin*,
 309 Warwick Road, Haddonfield, N. J.
 B.A., Indiana University; Ph.D., University of Pennsylvania.
- SAMUEL COPELAND PALMER, *Professor Emeritus of Botany*,
 26th and Chestnut Streets, Chester, Pa.
 B.A. and M.A., Swarthmore College; M.A. and Ph.D., Harvard University.

PROFESSORS

- *MARY ALBERTSON, *Professor of History* 405 Walnut Lane
 B.A., M.A., and Ph.D., Bryn Mawr College.

† Absent on leave, 1955-56.

* Absent on leave, spring semester, 1955-56.

- † SOLOMON E. ASCH, *Professor of Psychology* 513 Elm Avenue
 B.S., College of the City of New York; M.A. and Ph.D., Columbia University.
- GEORGE J. BECKER, *Professor of English* 401 Walnut Lane
 B.A., M.A., and Ph.D., University of Washington.
- RICHARD B. BRANDT, *Professor of Philosophy* 521 Elm Avenue
 B.A., Denison University; B.A., University of Cambridge; Ph.D., Yale University.
- HEINRICH BRINKMANN, *Professor of Mathematics* 403 Walnut Lane
 B.A., Stanford University; M.A. and Ph.D., Harvard University.
- SAMUEL T. CARPENTER, *Isaiah V. Williamson, Professor of Civil and Mechanical Engineering* 612 Ogden Avenue
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- WILLIAM J. COPE, *Professor of Mechanical Engineering* 6 Crum Ledge
 B.S. in M.E., University of Utah; M.E., Stanford University; Sc.D., in M.E., Massachusetts Institute of Technology.
- EDWARD H. COX, *Edmund Allen Professor of Chemistry* 416 Park Avenue
 B.S., Earlham College; M.A., Harvard University; Sc.D., University of Geneva.
- W. C. ELMORE, *Professor of Physics* Baltimore Pike, R. D. 3, Media
 B.S., Lehigh University; Ph.D., Yale University.
- ROBERT K. ENDERS, *Isaac H. Clothier, Jr., Professor of Biology* ... 311 Elm Avenue
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HOUSE DIRECTOR'S OFFICE

House Director, SARA M. LITTLE, B.A., Smith College.
Assistants to the House Director, KATHRYN A. DAVISSON, JANET D. VEEDER, JESSIE C. GIBSON.

SUPERINTENDENT'S OFFICE

Superintendent of Buildings and Grounds, HARRY WOOD.
Director of Arthur Hoyt Scott Horticultural Foundation, JOHN C. WISTER, B.A., Harvard University, D.Sc., Swarthmore College.
Consulting Engineer, ANDREW SIMPSON, B.A., Swarthmore College; M.S., Cornell University.
Assistants to the Superintendent, CLIFFORD RENSHAW, SR., ARLINGTON ACKERMAN, RICHARDSON FIELDS, CLIFFORD RENSHAW, JR.
Secretaries, VERONICA SULLIVAN, FRANCIS KAVANAGH.

DIETITIAN'S OFFICE

Dietitian, RUTH E. CARR, B.S., SIMMONS COLLEGE.
Assistant Dietitian, HILDA HOPKINS SMITH, B.S., Simmons College.

ALUMNI AND FUND OFFICES

Director, KATHRYN BASSETT.
Alumni Recorder, MYRA H. YOUNG.
Secretaries, BARBARA T. LUKENS, A.B., Middlebury College; Elnora Cox Swartz.

NEWS OFFICE

Director, W. PARK WOODROW, B.A., Swarthmore College.

HEALTH SERVICE

Physician, MORRIS A. BOWIE, B.A., University of Colorado; M.D., Harvard University. Diplomate, American Board of Internal Medicine.
Consulting Psychiatrists:
LEON J. SAUL, B.A. and M.A., Columbia University; M.D., Harvard University.
J. W. LYONS, B.A., University of Scranton; M.D., University of Pennsylvania.
Diplomates, American Board of Psychiatry and Neurology (P).
Nurses:
ANNE AUSTIN, R.N., REGINA L. HOLTZMAN, R.N., MARY McCULLOUGH, R.N.,
E. ELIZABETH McGEARY, R.N., ELSE SHAW.

The Rhodes Scholarship Trust

The Rhodes Scholarship Trust maintains an office in this country for the purpose of administering the selection of American Rhodes Scholars and conducting the affairs of the Rhodes Scholarships in the United States. This office was located at Swarthmore College during the presidency of Dr. Frank Aydelotte, who served as the first American Secretary. On the occasion of the appointment of Courtney Smith to the American Secretaryship this office was located in Princeton, N. J., and returned to Swarthmore when Dr. Smith took up his duties as president of the College in September, 1953.

American Secretary of the Rhodes Scholarships, Courtney Smith
Assistant to the American Secretary, Gilmore Scott
Secretary, Elsa Palmer Jenkins

Introduction to Swarthmore College

INTRODUCTION TO SWARTHMORE COLLEGE

Introduction to Swarthmore College

Swarthmore College, founded in 1864 by members of the Religious Society of Friends, is a small co-educational college situated eleven miles southwest of Philadelphia. In accordance with the traditions of its Quaker background, Swarthmore students are expected to prepare themselves for full, well-rounded lives as individuals and as responsible citizens through exacting intellectual study supplemented by a varied program of sports and extra-curricular activities.

The college campus contains about 300 acres of rolling wooded land in the borough of Swarthmore in Delaware County, Pennsylvania. The borough of Swarthmore is a small residential suburb within half an hour's commuting distance of Philadelphia on the West Chester branch of the Pennsylvania Railroad. Situated near the intersection of U. S. Route 1 (Baltimore Pike) and Pennsylvania State Highway 320, Swarthmore is easily accessible by car.* Because of its location, Swarthmore College students are able to combine the advantages of a semi-rural setting with the opportunities offered by Philadelphia. Especially valuable is the cooperation made possible with three other nearby institutions, Bryn Mawr and Haverford Colleges and the University of Pennsylvania.

OBJECTIVES AND PURPOSES

The purpose of Swarthmore College is to make its students more valuable human beings and more useful members of society. It shares this purpose with other educational institutions, for American education is a direct outgrowth of our democratic principles. Democracy is based on the infinite worth of each individual. It can operate successfully only when men are willing to seek together a common good. It depends upon knowledge and understanding of the complex problems of modern society. The debt of our educational system to democracy is equalled only by the debt of democracy to education.

While a common purpose underlies all American education, each school and college and university seeks to realize that purpose in its own way. Each must select those tasks it can do best. Only in this way can it be most effective. Only by such selection can it contribute to the diversity and richness of educational opportunity which is a part of the American heritage and the American strength.

THE RELIGIOUS TRADITION

Swarthmore College was founded by the Religious Society of Friends and it seeks to illuminate the life of its students with the spiritual principles of

* To reach the college, motorists should turn off U. S. Route 1 to State Highway 320 in the direction of Chester and continue south along Chester Road in the borough of Swarthmore about half a mile until reaching College Avenue. There a right turn is made to the college campus.

that Society. Although it has been non-sectarian in control since the beginning of the present century and although the children of Friends are in a minority, the college seeks to preserve the religious traditions out of which it sprang.

The essence of Quakerism is the individual's responsibility for seeking truth and for applying whatever truth he believes he has found. As a way of life, it emphasizes hard work, simple living, and generous giving; personal integrity, social justice, and the peaceful settlement of disputes. The college does not seek to impose on its students this Quaker view of life, or any other specific set of convictions about the nature of things and the duty of man. It does, however, have the two-fold aim of encouraging conscious concern about such questions and unceasing re-examination of any view which may be held regarding them. That is the kind of ethical and religious character which Swarthmore seeks to develop.

THE COMMUNITY LIFE

Swarthmore is a small college by deliberate policy. Its enrollment in normal years is about 900 students, of whom 425 are women and 475 are men. It is semi-rural in location, residential and co-educational in character. These features create an ideal environment for personal growth. Co-education provides the most natural environment for both men and women, who in their common work and play come to value each other for their true worth. Almost all of the students live in the college dormitories and eat together in the dining room. A large number of faculty houses are within campus boundaries, making it possible for students to have valuable social contacts with their professors outside the classroom. The residential character is the basis for a community life in which the ideals of the college influence every member. Growth in emotional maturity, necessary both for personal satisfaction and for effective action, is an integral part of the total educational program.

For this reason the college encourages a wide variety of extra-curricular activities. Participation in sports has many values, social as well as individual. Membership in student organizations is important. In practising parliamentary procedure and in facing the victories and defeats of elective office, students learn to live together, ironing out the clash of personalities and the friction of different views. They learn the effectiveness of enthusiasm and the frustration of indifference. They learn to soften their uncritical intolerance as they struggle to live successfully together. They learn the meaning of responsibility as they become responsible for their activities.

THE EDUCATIONAL PROGRAM

Swarthmore's educational program is based on the philosophy that self-discovery and self-development are more valuable than the simple demon-

strative method of teaching. Therefore, whenever it is possible, students are encouraged to make their own analyses, based on original source material or on laboratory experiments.

Believing also that a liberal education is based on knowledge of many areas of human experience, the college requires that freshmen and sophomores take a wide variety of courses. This plan allows them to test their ability in subjects they have already studied and to explore new fields. By the end of their sophomore year, students are expected to make two decisions: first, what their field of concentration will be for the last two years; and second, whether they prefer to take "Honors work" or to continue their study in regular courses.

Honors work, more fully described on pages 56 to 58, is a method of study open to juniors and seniors who have shown independence and responsibility in their academic work. They are freed from classroom routine and meet with their instructors in small weekly seminar groups for discussion and evaluation of their work. Since an honors student pursues only one major and one related minor subject during a semester, this system facilitates greater concentration and greater independence than is possible under the usual academic routine. The development of the "honors" or seminar method was begun under President Aydelotte in 1922, and because of its success, it has been widely imitated in other institutions.

ACADEMIC COMPETENCE

Democracy demands a broad base of intelligent understanding of issues. It also necessitates a high order of excellence in those who are destined to become its leaders. Swarthmore can best serve society by the maintenance of high standards. It is peculiarly fitted by tradition and performance for this essential role, and it is precisely this readiness to do a particular job well that gives the College its value in the educational mosaic of American democracy.

Education is largely an individual matter, for no two students are exactly alike. Some need detailed help, while others profit from considerable freedom. The program of Honors study, in which Swarthmore pioneered, is designed to give recognition to this fact. It is the most distinctive feature of our educational program. For many students it provides an enriching and exciting intellectual experience. It has as its main ingredients freedom from class work, maximum latitude for the development of individual responsibility, concentrated work in broad fields of study, and close association with faculty members in small seminars. The Honors program and the Course program are parallel systems of instruction for students during their last two years. Both are designed to evoke the maximum effort and development from each student, the choice of method being determined by individual need and capacity.

A college is never static. Its purposes and policies are always changing to meet new demands and new conditions. The founders of Swarthmore would find in it today many features they never contemplated when they shaped the College in the middle of the nineteenth century. Swarthmore, if it is to remain alive, must be forever changing. And many people are continually engaged in shaping its destiny—the Board of Managers, administration, faculty, students, alumni, parents, and the community as a whole. The goal is to achieve for each generation, by means appropriate to the times, that unique contribution and that standard of excellence which have been the guiding ideals of Swarthmore from its founding.

Admission

Inquiries concerning admission and applications should be addressed to the Deans of the College: from men, to Dean Everett L. Hunt; from women, to Dean Susan P. Cobbs.

GENERAL STATEMENT

In the selection of students the college seeks those qualities of character, social responsibility, and intellectual capacity which it is primarily concerned to develop. It seeks them, not in isolation, but as essential elements in the whole personality of candidates for admission.

In the competition for admission preference is given to the children of Friends and alumni who can meet the requirements. It is also the policy of the college to have the student body represent not only different parts of the United States but many foreign countries, both public and private secondary schools, and various economic, social, religious, and racial groups.

Selection is important and difficult. No simple formula will be effective. The task is to select those who give real promise of distinction in the quality of their personal lives, in service to the community, or in leadership in their chosen fields. Swarthmore College must choose its students on the basis of their individual future worth to society and of their collective realization of the purpose of the college.

Admission to the freshman class is normally based upon the satisfactory completion of a four-year program preparatory to advanced liberal study. Applicants are selected on the following evidence:

1. Record in secondary school;
2. Recommendation of the school principal or headmaster and of others who know the applicant;
3. Ratings in the Scholastic Aptitude Test and in three Achievement Tests of the College Entrance Examination Board. In some cases, special tests may be given by the college.
4. Personal interview with one of the Deans or an appointed representative;
5. Reading and experience, both in school and out.

Applicants must have satisfactory standing in school, and in aptitude and achievement tests, and should show strong intellectual interests. They should also give evidence of sturdiness of character, promise of growth, initiative, seriousness of purpose, and a sense of social responsibility. As future members of the college community, they should represent varied interests, types, and backgrounds.

PREPARATION

Applicants are urged to make their choice of college as early as possible in order to plan the work of their school years with the assistance of the Committees on Admission. In general, preparation should include:

1. *Skills:* The following skills are essential to success in college work and should be brought to a high level by study and practice throughout the preparatory period:
 - a. The use of the English language with accuracy and effectiveness in reading, writing, and speaking.
 - b. The use of the principles of arithmetic, algebra, and plane geometry.
 - c. The use of one, or preferably of two, foreign languages to the point of reading prose of average difficulty at sight, and of writing and speaking with some ease and proficiency.
2. *Subjects:* All, or almost all, of the preparatory course should be composed of the subjects listed in the following four groups. Variations of choice and emphasis are acceptable although some work should be taken in each group.

History and Social Studies: American, English, European, and ancient history; political, social, and economic problems of modern society.

Literature and Art: American, English, and foreign literature, ancient and modern; music, art, architecture.

Natural Science and Mathematics: chemistry, physics, biology, astronomy; algebra, geometry, trigonometry. A college major in science or engineering presupposes substantial work in algebra, in plane and, if possible, solid geometry, and in trigonometry.

Languages: English, Latin, Greek, German, French, Spanish, other European or Oriental languages. Applicants who expect to major in science are strongly advised to include German and, if possible, French in their school programs.

APPLICATIONS AND EXAMINATIONS

Applications must be filed in the office of the Deans by February 15 of the year in which the candidate wishes to be admitted. An application fee of \$5.00, which is not refundable, is required of all candidates.

All applicants for admission are required to take the Scholastic Aptitude Test and three Achievement Tests given by the College Entrance Examination Board.

The Achievement Test in English Composition is required of all candidates; the other two Achievement Tests are chosen by the candidate from

two different fields. Candidates for engineering must take the test in Advanced Mathematics.

In 1955-56 these tests will be given in various centers throughout this country and abroad on December 3, January 14, March 17, May 19 and August 8. Applicants are normally expected to take the required tests in March of their Senior year. Scholarship candidates are urged to take the Scholastic Aptitude Test in December or January, and other applicants may do so if they wish. Those who wish to take the tests *for practice* at the end of the Junior year are encouraged to do so. All such applicants must repeat the tests in their Senior year, however, in order to give themselves the advantage of maximum preparation.

Application to take the tests should be made directly to the College Entrance Examination Board, Box 592, Princeton, New Jersey. A bulletin of information may be obtained without charge from the Board. Students who wish to take the tests in any of the following western states, territories, and Pacific areas, Arizona, California, Colorado, Idaho, Montana, Nevada, New Mexico, Oregon, Utah, Washington, Wyoming, Alaska, Hawaii, Alberta, British Columbia, Mexico, Australia, and all Pacific Islands including Formosa and Japan, should address their inquiries and send their applications to the College Entrance Examination Board, Box 9896, Los Feliz Station, Los Angeles 27, California. Application should be made to the Board at least a month before the date on which the test will be taken.

No additional tests are required of candidates for scholarships. They must, however, write for a special application blank at least two weeks in advance of the date on which applications for admission are due. Information concerning scholarships will be found on pages 33 to 40.

Notices of the action of the Admissions Committee will be mailed about May 1.

ADVANCED STANDING

For favorable consideration, applicants for advanced standing must have had a good scholastic record in the institution from which they wish to transfer, and must present full credentials for both college and preparatory work and a letter of honorable dismissal. They must take the Scholastic Aptitude Test and three achievement tests given by the College Entrance Examination Board if these tests have not been taken previously.

As a general rule, students are not admitted to advanced standing later than the beginning of the sophomore year. Four terms of study at Swarthmore College constitute the minimum requirement for a degree, two of which must be those of the senior year.

Expenses

Charges per academic year of two semesters:

Board, room, and tuition	\$1,525*
General fee	125
	<hr/>
Total charges	\$1,650

While a general charge for board, room and tuition is made, this may be divided into \$800 for tuition and \$725 for board and room. The general fee of \$125 per year covers the costs of student health, library and laboratory fees, athletic fees, arts and crafts, and the support of several other extra curricular activities.

An additional deposit of \$25 per semester is required of each student, payable in advance, to cover incidental bills. Students may charge purchases at the college bookstore, and certain other charges agreed to by the Business Office. When this deposit has been exhausted a new one will be required immediately. Any unused balance is returned at the time of graduating or leaving college.

One half of the total sum is due not later than Registration Day at the beginning of the fall semester. Bills are mailed before the opening of the current term. Payments should be made by check or draft to the order of SWARTHMORE COLLEGE. A student is not a registered student at Swarthmore College, nor on any class roll, until his bill is paid. Correspondence about financial matters should be addressed to the Accountant, Miss G. Caroline Shero.

No reduction or refunding of tuition can be made on account of absence, illness, voluntary withdrawal, or dismissal from college. No reduction or refund will be made for failure to occupy the room assigned for a given term, nor is the general fee refundable. In case of absence or withdrawal from the college and provided due notice has been given in advance to the Business Office, there will be a refund of two-thirds of the board charge for any time in excess of two weeks. Exceptions will be made for students who are required by the draft to leave during the course of the academic year. In these cases tuition, general fee, board and room charges will be refunded on a pro rata basis.

THE TUITION PLAN

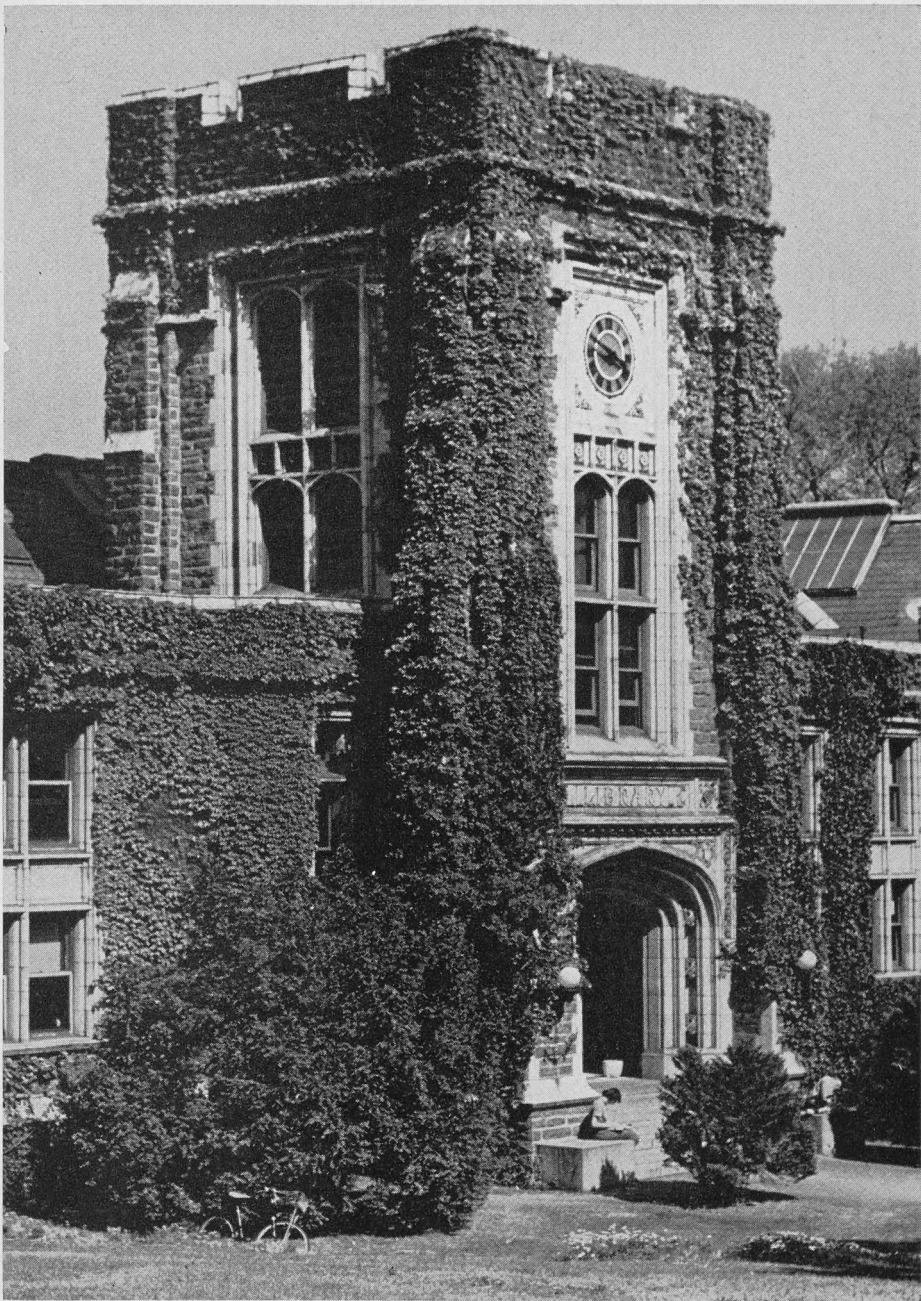
Many of the parents of students may wish to pay all tuition, fees, and residence charges on a monthly basis. It is now possible to arrange this

* An advance deposit of \$25 is required of all new students in order to reserve a place in college for the coming year. A similar deposit of \$15 is required of returning students. These deposits are credited against the bill for tuition, board, and room.

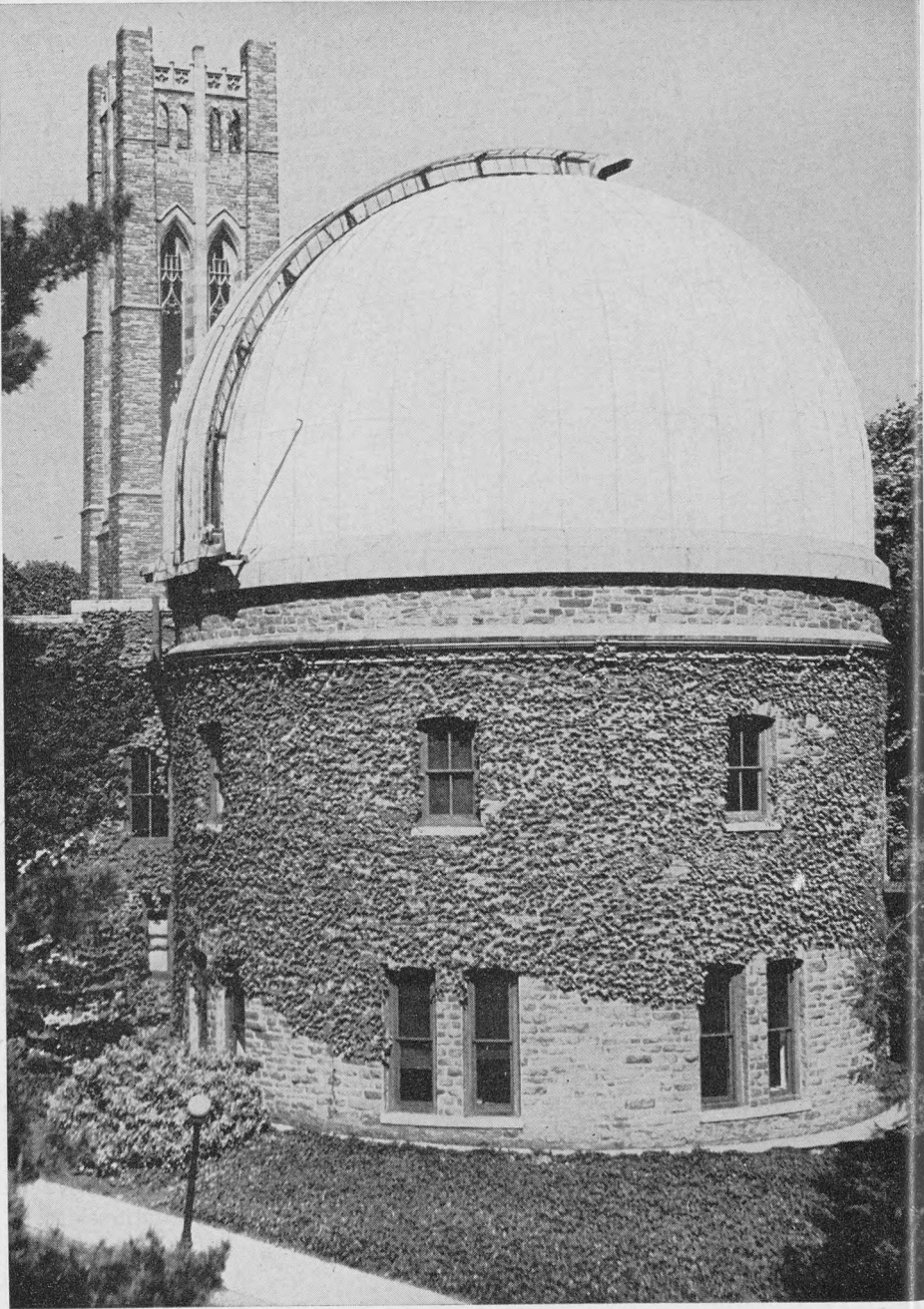
under The Tuition Plan. The cost is four percent greater than when payments are made in cash in advance. Details of its operation will be furnished by the College with the first semester's bill in September.

ACCIDENT AND SICKNESS INSURANCE

The college makes available both accident and accident and sickness insurance to students through John C. Paige & Company of Boston, Massachusetts. The accident coverage alone, which is strongly recommended for all students, is required of all students who participate in intercollegiate athletic activities. This coverage costs \$5.00 per year (12 months) for women and \$10.00 for men. A combined accident and sickness policy is also available at an annual cost of \$18.00 for women and \$22.00 for men. Application forms are mailed to each student during the summer.



The College Library



Sproul Observatory

Student Aid and Scholarships

The college furnishes scholarships and financial assistance to a substantial number of students from its general funds and from special endowments. About fifty scholarships are awarded to freshmen each year. During the current academic year the college has granted about \$130,000 for scholarships. About one-quarter of that sum is provided by the endowed scholarships listed below. The income from many of these endowments is assigned each year to entering freshmen in accordance with the will of the donor and in his name. Where satisfactory records have been maintained these awards are normally renewed annually from the general funds of the College. Seniors who have had substantial aid may in some cases be asked to finance themselves in part from a College loan fund. All awards are based upon the college record, the financial need of the family as revealed in confidential statements to the Scholarship Committee, through the agency of the College Scholarship Service, and the efforts of the student in earning his own expenses. All applications for scholarships are handled by the Committee on Admissions and Scholarships and should be addressed to the Deans.

GRANTS-IN-AID, to a limited number, may be awarded to students with financial need and average scholastic standing who could not earn all they need without serious detriment to their academic work.

COLLEGE EMPLOYMENT affords opportunity to earn money by regular work at current wage rates in one of the college offices, shops, laboratories or libraries. A student may hold a college job in addition to a scholarship or a grant-in-aid. The distribution of jobs among those authorized to hold them is made by the Student Employment office. Residents of the borough of Swarthmore often send requests for services to the college, which co-operates in making these opportunities known to students. Last year over four hundred students secured work through the office. Many students earn from eight to ten dollars a week and still maintain an excellent scholastic standing.

SCHOLARSHIPS FOR MEN

The GEORGE F. BAKER SCHOLARSHIPS. The George F. Baker Scholarships, awarded for the first time in 1950, have been given to the college as part of a national scholarship program. They are the gift of the George F. Baker Foundation and will be awarded to four freshman men each year. The actual amount of the scholarships, in part determined by financial need, will be a maximum of \$1,200 for each year of the student's college career. Students will be chosen for these awards primarily on the basis of achievement and promise of leadership in business, government and the professions.

OPEN SCHOLARSHIPS FOR MEN. Swarthmore College awards annually five four-year scholarships to men entering the freshman class. These

scholarships, based on the general plan of the Rhodes Scholarships, are given to candidates who, in the opinion of the Committee of Award, rank highest in scholarship, character and personality. The amount of the annual award varies from \$100 to \$1,200 according to the financial need of the winner.

The THOMAS B. McCABE ACHIEVEMENT AWARD, established by Thomas B. McCabe '15, provides an annual grant of \$1,000 open to entering freshman men. Applicants must be residents of Delaware or the Eastern Shore counties of Maryland or Virginia. Selection will be based on achievements which give promise of leadership, and emphasis will be placed on ability, character, personality, and service to school and community.

The SCOTT AWARD AT SWARTHMORE. A scholarship established by the Scott Paper Co. of Chester, Pa., in honor of its former president, Arthur Hoyt Scott of the Class of 1895. Given for the first time in 1953, it will be awarded annually for the next five years to an outstanding sophomore who plans to enter business after graduation and who demonstrates the qualities of scholarship, character, personality, leadership, and physical vigor. The award provides the recipient with \$1,000 for each of his last two years in college.

The SCOTT B. LILLY SCHOLARSHIP, endowed by Jacob T. Schless of the Class of 1914 at Swarthmore College, was offered for the first time in 1950. This scholarship is in honor of a former distinguished Professor of Engineering and, therefore, students who plan to major in engineering will be given preference. The stipend will be a maximum of \$1,200 a year for four years; the exact amount of the award will be determined by the financial needs of the winning applicant.

The PHILIP T. SHARPLES SCHOLARSHIP, a four-year scholarship open to entering freshmen, is designed to honor and encourage young men preparing themselves to be engineers. The committee, in making its selections, will have regard for candidates who rank highest in scholarship, character, personality, leadership, and physical vigor. At least one scholarship will be given each year with a maximum grant of \$1,200. The actual amount of the stipend will be determined by the financial need of the candidate.

The AARON B. IVINS SCHOLARSHIP is awarded annually to a young man of the graduating class of Friends Central School, Overbrook, Philadelphia. It is awarded under the following conditions. The recipient must have been a student at Friends Central for at least two years, he must have good health, high grades, and must be the best all-around student in his class desirous of entering Swarthmore College. This scholarship, awarded by the faculty of Friends Central School, and subject to the approval of Swarthmore College, has a maximum value of \$650.

The HOWARD COOPER JOHNSON SCHOLARSHIP, established by Howard Cooper Johnson '96, provides approximately \$500 a year. It is awarded on

the basis of all-around achievement to a male undergraduate who is a member of the Society of Friends.

The T. H. DUDLEY PERKINS MEMORIAL SCHOLARSHIP is awarded annually to an entering freshman on the basis of qualities of manhood, force of character and leadership; literary and scholastic ability; physical vigor as shown by participation in out-of-doors sports or in other ways. It has a maximum value of \$500.

The MILLER-FLOUNDERS SCHOLARSHIP of \$500 per year is awarded to a freshman man who resides in and has attended school in Delaware County, Pennsylvania. To be eligible for the award the student must have clearly demonstrated leadership in scholastic achievement and in extra-curricular activities during his high school program. The scholarship is usually awarded in alternate years and is renewable provided a satisfactory record is maintained.

The WILLIAM G. AND MARY N. SERRILL HONORS SCHOLARSHIP is a competitive Scholarship for Men, awarded to a candidate for admission to the college, based upon the general plan of the Rhodes Scholarships. The annual stipend is \$375. Preference will be given to men who are residents of Abington Township, including Jenkintown and Glenside, Montgomery County, Pa., but if there is no outstanding candidate from this locality, the scholarship will be open to competition generally.

The SARAH KAIGHN COOPER SCHOLARSHIP, founded by Sallie K. Johnson in memory of her grandparents, Sarah Kaighn and Sarah Cooper, is awarded to a man in the Junior Class who is judged by the faculty to have had, since entering College, the best record for scholarship, character, and influence. The value of this scholarship is approximately \$225 annually.

The DONALD RENWICK FERGUSON SCHOLARSHIP, established by Mrs. Amy Baker Ferguson, in memory of her husband, Donald Renwick Ferguson, M.D., of the Class of 1912, who died during the Second World War, is awarded to a young man who is looking forward to the study of medicine. The scholarship will pay a maximum of \$600.

The PETER MERTZ SCHOLARSHIP carries a stipend of approximately \$500 a year for four years and is awarded to an entering freshman outstanding in mental and physical vigor, who shows promise of spending these talents for the good of the college community and of the larger community outside. The award was established in 1955 by Harold, LuEsther and Joyce Mertz in memory of Peter Mertz who was a member of the class of 1957.

SCHOLARSHIPS FOR WOMEN

OPEN SCHOLARSHIPS FOR WOMEN. Mr. and Mrs. Daniel S. White, of the Class of 1875, on the occasion of the Fiftieth Reunion of that class, established three open competitive scholarships for women, in the names of Howard White, Jr., Serena B. White, and Walter W. Green. These

scholarships are given to candidates who, in the opinion of the Committee of Award, rank highest in scholarship, character and personality. The amount of the award varying from \$100 to \$1,200 is determined in the same way as the scholarships for men.

The ALUMNAE SCHOLARSHIP, established by the Philadelphia and New York Alumnae Clubs, is awarded on the same basis as the Open Scholarships. It is awarded for one year and has a maximum value of \$500.

The ANNIE SHOEMAKER SCHOLARSHIP is granted annually to a young woman of the graduating class of Friends Central School, Overbrook, Philadelphia. The recipient must have been a student at Friends Central for at least two years, she must have good health, high grades, and must be the best all-around student in her class desirous of entering Swarthmore College. This scholarship, awarded by the faculty of Friends Central School, and subject to the approval of Swarthmore College, has a maximum value of \$500.

The GEORGE K. and SALLIE K. JOHNSON FUND provides \$450 a year, to be used, at the discretion of the President of the College, in granting financial aid to young women during their senior year, it being the donor's desire that the President must be satisfied that the applicant is fitted to become a desirable teacher.

The MARY COATES PRESTON SCHOLARSHIP FUND. A sum of money has been left by will of Elizabeth Coates, the annual interest of which will be about \$450. This amount is given as a scholarship to a young woman student in Swarthmore College, preferably to a relative of the donor.

The HARRIET W. PAISTE FUND is limited by the following words from the donor's will: "the interests 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." The value of this scholarship is approximately \$350 annually.

The MARY T. LONGSTRETH SCHOLARSHIP was founded by Rebecca C. Longstreth in memory of her mother and is to be awarded annually "at the discretion of the President of the College to assist a young woman student to pursue her studies in the College." The value of this scholarship is approximately \$225 annually.

The JESSIE STEVENSON KOVALENKO SCHOLARSHIP FUND, the gift of Michel Kovalenko in memory of his wife, provides an annual income of \$225. This sum is to be awarded to a student, preferably a woman, who is in her junior or senior year and who is a major in astronomy, or to a graduate of the college, preferably a woman, for graduate work in astronomy at Swarthmore or elsewhere.

The income of the KAPPA ALPHA THETA SCHOLARSHIP FUND, given by members and friends of the Kappa Alpha Theta Fraternity at Swarthmore, is awarded annually to a woman student. The award amounts to approximately \$125 annually. One or more members of the fraternity who are on the Board of Managers serve on the Committee of Award.

The MARY WOOD FUND provides approximately \$65 a year and may be awarded to a young woman who is preparing to become a teacher.

SCHOLARSHIPS OPEN TO MEN AND WOMEN

The MARSHALL P. SULLIVAN SCHOLARSHIP FUND, established by Creth and Sullivan, Inc. in memory of Marshall P. Sullivan of the Class of 1897, provides \$1,000 annually for one or more scholarships. Preference will be given to graduates of George School, but if no suitable candidate applies from this school, graduates of other Friends schools or other persons will be eligible.

The RCA SCHOLARSHIP, provided by the Radio Corporation of America is awarded to a young man or woman who is making a creditable academic record in the field of science or engineering at the under-graduate level. This scholarship provides \$800 a year and the appointment is usually made for the junior or senior year.

The EDWARD CLARKSON WILSON SCHOLARSHIP. A scholarship with an annual value of \$625 has been established at Swarthmore by friends of Edward Clarkson Wilson, '91, formerly Principal of the Baltimore Friends School. It will be awarded each year to a former student of the Baltimore Friends School, who has been approved by the faculty of the school, on the basis of high character and high standing in scholarship. In any year when there is no outstanding candidate from the students of the Baltimore Friends School, the scholarship may be awarded to another young man or woman who shall meet the required standards and who is approved by the school faculty and the college.

The AMERICAN CYANAMID COMPANY SCHOLARSHIP of \$600 per year is awarded to an outstanding junior or senior who is majoring in chemistry.

The CLASS OF 1915 SCHOLARSHIP FUND was established on the occasion of the Twenty-fifth Reunion of the Class and provides an income of approximately \$550. This sum is to be awarded either to freshmen or other students, with preference given to descendants of the members of the Class of 1915. The Business Manager, the Deans, and members of the Class of 1915 designated by Thomas B. McCabe shall constitute the Committee of Award. This Fund will become a part of the General Endowment of the College on Alumni Day, 1970.

The DANIEL UNDERHILL SCHOLARSHIP, given by Daniel Underhill '94, in memory of his grandfather, Daniel Underhill, member of the first Board

of Managers, provides \$500 annually for a deserving student in need of financial aid.

The AMERICAN VISCOSE CORPORATION SCHOLARSHIP of \$500 per year is awarded to an outstanding sophomore or junior who is majoring in engineering, chemistry, or physics.

The WESTINGHOUSE ACHIEVEMENT SCHOLARSHIP of \$500 per year is awarded to a high ranking major in electrical or mechanical engineering for the senior year.

The RACHEL W. HILLBORN SCHOLARSHIP was founded by Anne Hillborn Philips of the Class of 1892 in memory of her mother, with the stipulation that the income shall go to a student in the junior or senior class who is studying for service in the international field. Preference will be given to a Friend or to one who intends to contribute to world understanding through diplomatic service, participation in some international government agency, the American Friends Service Committee, or similar activities. The annual income amounts to approximately \$450.

The JONATHAN K. TAYLOR SCHOLARSHIP, in accordance with the donor's will, is awarded by the Board of Trustees of the Baltimore Monthly Meeting of Friends. This scholarship is first open to descendants of the late Jonathan K. Taylor. Then, while preference is to be given to members of the Baltimore Yearly Meeting of Friends, it is not to be confined to them when suitable persons in membership cannot be found. The value of this scholarship is approximately \$450 annually.

The PHEBE ANNA THORNE FUND provides an income of approximately \$2,250 for scholarships for students needing pecuniary assistance whose previous work has demonstrated their earnestness and their ability. This gift includes a clause of preference to those students who are members of the New York Monthly Meeting of Friends. These scholarships are awarded by the college under the regulations fixed by the board.

The WESTBURY QUARTERLY MEETING, N. Y., SCHOLARSHIP, amounting to \$250, is awarded annually by a committee of that Quarterly Meeting.

The SARAH ANTRIM COLE SCHOLARSHIP was founded by her parents in memory of Sarah Antrim Cole of the Class of 1934. It is awarded to a graduate of the Worthington High School, Worthington, Ohio or of the North High School, Columbus, Ohio. The scholarship provides a maximum grant of \$500 a year.

The JAMES E. MILLER SCHOLARSHIP. Under the will of Arabella M. Miller, who died Sixth Month 24th, 1922, the sum of \$5,986 was awarded to the Cambridge Trust Company, Trustee under the will of James E. Miller, to be applied to scholarships in Swarthmore College. An annual income of approximately \$200 is available and may be applied toward the payment of board and tuition of students of Delaware County (preference to be given to residents of Nether Providence Township) to be selected by Swarthmore College and approved by the Trustee.

The CHI OMEGA SCHOLARSHIP was established by members and friends of the Chi Omega Fraternity. The income provides an award of approximately \$225 annually to a member of the freshman class who is in definite need of financial aid. Preference is given to daughters or sons of members of the fraternity, but if in any year such a candidate does not apply, the committee will select a freshman woman to receive the award. Applications should be sent to the Office of the Deans before January 1st of the year in which the award is to be made. A member designated by the Fraternity serves on the Committee of Award.

THE DELTA GAMMA SCHOLARSHIP. The Delta Gamma Fraternity provides a fund of which the annual income is approximately \$135.00. This sum is to be awarded to a blind student at Swarthmore College in need of financial assistance. In any year in which there is no such candidate the fund may be awarded to a freshman woman.

The income from each of the following funds is awarded at the discretion of the college to students needing pecuniary aid:

The BARCLAY G. ATKINSON SCHOLARSHIP FUND.

The REBECCA M. ATKINSON SCHOLARSHIP FUND.

The WILLIAM DORSEY SCHOLARSHIP FUND.

The GEORGE ELLSLER SCHOLARSHIP FUND.

The JOSEPH E. GILLINGHAM FUND.

The THOMAS L. LEEDOM SCHOLARSHIP FUND.

The SARAH E. LIPPINCOTT SCHOLARSHIP FUND.

The MARK E. REEVES SCHOLARSHIP FUND.

The MARY SPROUL SCHOLARSHIP FUND.

The HELEN SQUIER SCHOLARSHIP FUND.

The JOSEPH T. SULLIVAN SCHOLARSHIP FUND.

The DEBORAH F. WHARTON SCHOLARSHIP FUND.

The THOMAS WOODNUTT SCHOLARSHIP FUND.

The SAMUEL WILLETS FUND yields an income of approximately \$4,300 annually, "to be applied to educate in part or in whole such poor and deserving children as the Committee on Trusts, Endowments and Scholarships of said college may from time to time judge and determine to be entitled thereto."

In addition to the above fund, Samuel Willets gave scholarships in the name of his children, FREDERICK WILLETS, EDWARD WILLETS, WALTER WILLETS, and CAROLINE W. FRAME. These scholarships have the value of \$225 each. They are awarded by the respective parties, their heirs or assigns, or in the event that the heirs do not exercise their right, by the college authorities.

The I. V. WILLIAMSON SCHOLARSHIPS. Ten scholarships of the value of \$150 each are offered to graduates of designated Friends schools: two each to graduates of Friends Central and George School, one in the boys' and one in the girls' department: and one each to New York Friends

Seminary, Baltimore Friends School, Wilmington Friends School, Moorestown Friends School, Friends Academy at Locust Valley, Sidwell Friends School and Brooklyn Friends School. Any income not utilized in accordance with these conditions is used for free scholarships in accordance with the will of the donor.

FRIENDS COLLEGE SCHOLARSHIPS. Swarthmore College, with a group of other Friends Colleges, has established scholarships to enable students from the smaller Friends Colleges to spend a year at one of the three cooperating colleges in the Philadelphia area: Bryn Mawr, Haverford and Swarthmore. These scholarships will be granted in varying amounts according to need and ability.

SPECIAL LOAN FUNDS

Several loan funds are administered by a committee to which application should be made through the office of the financial vice-president.

THE CLASS OF 1913 LOAN FUND was established by the Class of 1913 at their twenty-fifth reunion. Both principal and income are to be used to provide a loan fund for students in the three upper classes. Individual students may borrow up to \$200 in any one year, the loans to be repayable within five years with interest at four percent.

THE CLASS OF 1916 LOAN FUND was established by the Class of 1916 at their twenty-fifth reunion. The fund is designed to provide loans to senior students, preferably descendants of members of the Class of 1916, or to other students at the discretion of the administering committee. The loans are repayable not later than five years after graduation, with interest at the rate of four percent.

THE JOHN A. MILLER LOAN FUND was established by the Class of 1912 at their twenty-fifth reunion. Both principal and income are to be used to provide a loan fund for students in the three upper classes. Individual students may borrow up to \$200 in any one year, such loans to be repayable within five years with interest at four percent.

THE PAUL M. PEARSON LOAN FUND was established by a number of Dr. Pearson's friends as a memorial for perpetuating his life and spirit. Both principal and income may be used for loans to students, repayable not later than five years after graduation, with interest at the rate of four percent.

THE SWARTHMORE COLLEGE STUDENT LOAN FUND was established by Mr. Clarence J. Gamble, who, feeling such a fund to be of unusual benefit to worthy students, gave a sum to the college on condition that the Board should set aside an equal amount to be added to the fund. Both principal and income may be used for loans to students, repayable not later than five years after graduation with interest at the rate of four percent.

THE ELLIS D. WILLIAMS FUND. By the will of Ellis D. Williams, a legacy of \$25,000 was left to the college, the income from which is to be used for loans to students, repayable not later than five years after graduation, with interest at the rate of four percent.

Educational Resources

The primary educational resources of any college are the quality of its faculty and the spirit of the institution. Second to these are the physical facilities, in particular the libraries, laboratories and equipment.

Laboratories, well equipped for undergraduate instruction and in some cases for research, exist in physics, chemistry, zoology, botany, psychology, astronomy, and in civil, mechanical and electrical engineering. The Sproul Observatory, with its 24-inch visual refracting telescope, is the center of much fundamental research in multiple star systems. The Edward Martin Biological Laboratory provides exceptional facilities for work in psychology, zoology, botany, and pre-medical studies. Recent additions to Beardsley Hall increase the facilities for laboratory instruction and research in engineering.

The SWARTHMORE COLLEGE LIBRARY, in part the gift of Andrew Carnegie, contains reading rooms, offices and a collection of 177,800 volumes. Some 5500 volumes are added annually. About 763 periodicals are received regularly. The general collection, including all but the scientific and technical books and journals, is housed in the library building, situated on the front campus. An addition providing storeroom for 150,000 volumes was erected in 1935. The library is definitely a collection of books and journals for undergraduate use. The demands of Honors work, however, make necessary the provision of large quantities of source material not usually found in collections maintained for undergraduates. It is a point of library policy to try to supply, either by purchase or through inter-library loan, the books needed by students or members of the faculty for their individual research.

In addition, the library contains certain special collections—the British Americana collection, the Wells' Wordsworth and Thompson collections, and a collection of the issuances of 413 private presses.

A number of special features enrich the academic background of the college. Among these are the following:

The BIDDLE MEMORIAL LIBRARY is an attractive fire-proof structure of stone and steel given by Clement M. Biddle, '96, in memory of his father, Clement M. Biddle, who served for over twenty years as a member of the Board of Managers or as an officer of the Corporation of the College. This Library contains two important Collections: the Friends Historical Library and the Swarthmore College Peace Collection.

The FRIENDS HISTORICAL LIBRARY, founded in 1870 by Anson Lapham, is one of the outstanding collections in the United States of manuscripts,

books, pamphlets, and pictures relating to the history of the Society of Friends. The library is a depository for records of Friends Meetings belonging to Philadelphia Yearly Meeting. More than 1,000 record books have been deposited; many of them have been reproduced on microfilm, for which a reading machine is available. The William Wade Hinshaw Index to Quaker Meeting Records indexes the material of genealogical interest in the records of 307 meetings in various parts of the United States. Notable among the other holdings are the Charles F. Jenkins Whittier Collection (first editions and manuscripts of John Greenleaf Whittier), the Mott Manuscripts (over 400 autograph letters of Lucretia Mott, antislavery and women's rights leader), and the Hicks Manuscripts (more than 300 letters of Elias Hicks, a famous Quaker minister). The Library's collection of books and pamphlets by and about Friends numbers approximately 20,000 volumes. Ninety Quaker periodicals are currently received. There is also an extensive collection of photographs of meeting houses and pictures of representative Friends. It is hoped that Friends and others will consider the advantages of giving to this Library any books and family papers which may throw light on the history of the Society of Friends.

The SWARTHMORE COLLEGE PEACE COLLECTION, a section of the Friends Historical Library, is of special interest to research students and others seeking the records of the Peace Movement. Beginning with Jane Addams' personal papers and books relating to peace, the collection contains a rich variety of the documents of early peace groups as far back as the first peace committees in England and the United States about 1815, as well as rare peace posters from many lands, and correspondence and writings of peace and arbitration leaders. Individual writings on peace date back to about 1642. The collection includes some 750 titles of magazines and bulletins devoted to peace, published in the United States and abroad during the past 120 years. There are about 160 titles of bulletins and magazines currently received in eleven languages from 25 countries. This collection is the official depository for the leading peace organizations in the United States. A more complete description of the collection will be found in the *Guide to the Swarthmore College Peace Collection, A Memorial to Jane Addams*, published by the College and available for loan on request.

The WILLIAM J. COOPER FOUNDATION provides a varied program of lectures and concerts which enriches the academic work of the college. The Foundation was established by William J. Cooper, a devoted friend of the college, whose wife, Emma McIlvain Cooper, served as a member of the Board of Managers from 1882 to 1923. Mr. Cooper bequeathed to the college the sum of \$100,000 and provided that the income should be used "in bringing to the college from time to time eminent citizens of this and other countries who are leaders in statesmanship, education, the arts, sciences, learned professions and business, in order that the faculty, students and the

college community may be broadened by a closer acquaintance with matters of world interest." Admission to all programs is without charge.

The Cooper Foundation Committee works with the departments and with student organizations in arranging single lectures and concerts, and also in bringing to the college speakers of note who remain in residence for a long enough period to enter into the life of the community. Some of these speakers have been invited with the understanding that their lectures should be published under the auspices of the Foundation. This arrangement has so far produced eight volumes:

Lindsay, Alexander Dunlop. *The Essentials of Democracy*. Philadelphia, University of Pennsylvania Press, 1929.

Lowes, John Livingston. *Geoffrey Chaucer and the Development of His Genius*. New York, Houghton Mifflin Co., 1934.

Weyl, Hermann. *Mind and Nature*. Philadelphia, University of Pennsylvania Press, 1934.

America's Recovery Program, by A. A. Berle, Jr., John Dickinson, A. Heath Onthank . . . and others . . . London, New York, etc., Oxford University Press, 1934.

Madariaga, Salvador de. *Theory and Practice in International Relations*. Philadelphia, University of Pennsylvania Press, 1937.

Streit, Clarence Kirshman. *Union Now; a Proposal for a Federal Union of the Democracies of the North Atlantic*. New York, Harper, 1939.

Krogh, August. *The Comparative Physiology of Respiratory Mechanisms*. Philadelphia, University of Pennsylvania Press, 1941.

Wilcox, Clair, Editor. *Civil Liberties under Attack*. A series of lectures given in 1950-51. Philadelphia, University of Pennsylvania Press, 1951.

THE ARTHUR HOYT SCOTT HORTICULTURAL FOUNDATION. About three hundred acres are contained in the College property, including a large tract of woodland and the valley of Crum Creek. Much of this tract has been developed as an horticultural and botanical collection of trees, shrubs and herbaceous plants through the provisions of the Arthur Hoyt Scott Horticultural Foundation, established in 1929 by Mrs. Arthur Hoyt Scott and Owen and Margaret Moon as a memorial to Arthur Hoyt Scott of the Class of 1895. The plant collections are designed both to afford examples of the better kinds of trees, shrubs and herbaceous plants which are hardy in the climate of Eastern Pennsylvania and suitable for planting by the average gardener, and to beautify the campus. There are exceptionally fine displays of Japanese cherries, flowering crab apples and tree peonies, and a great variety of lilacs, rhododendrons, azaleas, daffodils, iris, herbaceous peonies, hemerocallis and chrysanthemums. Many donors have contributed generously to the collections. (For full information see *Bulletin of Swarthmore College*, Vol. xxxvii, No. 5.)

The BRONSON M. CUTTING MEMORIAL COLLECTION OF RECORDED MUSIC was established at Swarthmore College in 1936 by a gift of approximately four thousand phonograph records, a radio-phonograph, books and musical scores, from the family of Bronson Murray Cutting, late Senator from New Mexico. Its object is to make the best recorded music available to the undergraduates, faculty, and friends of Swarthmore College, in cooperation with the work of the college Department of Music. The collection is kept up to date with current additions.

The BENJAMIN WEST LECTURE, made possible by gifts from members of the class of 1905 and other friends of the College, is given annually on some phase of art. It is the outgrowth of the Benjamin West Society which built up a collection of paintings, drawings, and prints, which are exhibited, as space permits, in the college buildings. The lecture owes its name to the American artist, who was born in a house which still stands on the campus and who became president of the Royal Academy.

The POTTER SPEECH COLLECTION, established in 1950 with accumulated income of the William Potter Public Speaking Fund, includes a wide variety of recorded poetry, oratory, and drama. It is designed to make available to the Swarthmore College community and friends the best examples obtainable in recordings of literature intended for the ear as well as the eye. Among the three hundred items are included full-length versions of Shakespearean plays, contemporary poets reading their own work, and traditional poetry read by professional speakers. The Department of English Literature administers the collection and selects current additions.

College Life

HOUSING

Swarthmore is primarily a residential college, conducted on the assumption that an important element in education comes from close association of students and instructors. Most students live in dormitories. Many members of the faculty live on or near the campus.

Residence Halls

There are four dormitories for men: Wharton Hall, named in honor of its donor, Joseph Wharton, at one time President of the Board of Managers, and three buildings on the former Mary Lyon School property.

The women's dormitories include the upper floors in the wings of Parrish Hall; Worth Hall, the gift of William P. Worth, 1876, and J. Sharpless Worth, ex-1873, as a memorial to their parents; Robinson House; Palmer, Pittenger and Roberts Hall on South Chester Road.

All freshmen are assigned to rooms by the Deans. Other students choose their rooms in an order determined by lot. Special permission must be obtained to room outside the dormitories.

Students may occupy college rooms during vacations only by special arrangements with the Deans and payment of the required fee. Freshmen are asked to leave college immediately after their last examinations in the spring so that their rooms may be used by Commencement visitors.

Dining Rooms

All students, both men and women, have their meals in two adjoining College Dining Rooms in Parrish Hall. The dining rooms are closed during all vacations.

RELIGIOUS LIFE

The religious life of the college is founded on the Quaker principle that the seat of spiritual authority lies in the Inner Light of each individual. The Society of Friends is committed to the belief that religion is best expressed in the quality of everyday living. There are accordingly no compulsory religious exercises, save in so far as the brief devotional element in Collection may be so considered. Students are encouraged to attend the churches of their choice. Episcopal, Presbyterian, Methodist, and Christian Science churches are located in the borough of Swarthmore; Catholic and other churches in the nearby towns of Morton, Media, and Chester. The Swarthmore Meeting House is located on the campus. Students are cordially invited to attend its meeting for worship on Sunday. Extra-curricular

groups with faculty cooperation exist for the study of the Bible and the exploration of common concerns in religion.

An assembly of the college, called Collection, is held at 10:00 a. m. every Thursday in Clothier Memorial; attendance of students is required. There is regularly a period of silence according to the Friendly tradition and, when these are in keeping with the remainder of the program, the singing of hymns and a reading from the Bible. Lasting from one-half to three-quarters of an hour, Collection normally includes an address; but this is varied by the occasional introduction of musical, dramatic, and other programs.

STUDENT WELFARE

Health

The college physician holds daily office hours at the college, where students may consult him without charge. A student must report any illness to the college physician, but is free to go for treatment to another doctor if he prefers to do so.

At the time of admission each student must present a brief medical history and health certificate, prepared by the family physician on a form supplied by the college. Pertinent information about such matters as physical reserve, unusual medical episodes, severe allergies, or psychiatric disturbances will be especially valuable to the college Health Service. All new students must have been successfully vaccinated against smallpox within five years, in accordance with Pennsylvania State law.

The college physician gives physical examinations to all students at the beginning of each year. There is close cooperation with the Departments of Physical Education. Recommendations for limited activity are made for those students with physical handicaps. In some cases a student may be excused entirely from the requirements of the Physical Education Departments.

The college health program includes an annual chest x-ray which is compulsory for all students. Should the student fail to meet his x-ray appointment, he is required to have one taken at his own expense.

There are two infirmaries, one for men and one for women. The infirmary for men is in Section F of Wharton Hall; the women's infirmary is at the east end of Parrish Hall. A registered nurse is in charge of each, under the direction of the college physician.

Each student is allowed ten days care in the infirmaries per term without charge unless the services of a special nurse are required. After ten days, a charge of \$2.00 per day is made. Students suffering from a communicable disease or from illness which make it necessary for them to remain in bed, must stay in the infirmary for the period of their illness. A charge is made for special expensive medicines and certain immunization procedures, but ordinary medicines are furnished without cost.

The medical and infirmary facilities of the college are available to students injured in athletic activities or otherwise, but the college cannot assume additional financial responsibility for medical and surgical expenses arising from accidents. Accident insurance coverage is, therefore, required for all students participating in athletics and is recommended for all others. (For details see p. 32.)

The college psychiatric consultants hold office hours by appointment each week. A student may have from one to three interviews. The purpose of this service is to be of help to all types of emotional problems.

Vocational Advising

The college provides vocational information and advice to assist students in their choice of a career. Conferences and field trips are planned periodically and interviews are arranged with prospective employers. Help is offered to students in finding employment. In addition, summer work is planned to give students job experience in various fields.

Alumni Office

The Alumni Office keeps records of the addresses of all living graduates and alumni of the college. It helps edit the Swarthmore alumni magazine, and acts as liaison for the college with all alumni and alumni groups, interpreting to them the present plans and policies of the college.

News Office

The News Office does a two-fold job. It helps prepare the several publications put out by the college known as Swarthmore College Bulletins. These include the alumni magazine, the President's Report, the Catalogue, the Student Handbook, the Viewbook, and other miscellaneous issues. In addition to this, the News Office, through the largely student operated News Bureau, works with the press and other communications media in publicizing news that is of interest to the general public.

Student Advising

The Deans and their assistants hold the primary responsibility for advising all students. However, there are many other advisers available to each student.

Each freshman is assigned to a faculty member who acts as his course adviser until this responsibility falls to the chairman of the student's major department at the end of his sophomore year. Faculty members have also been appointed as advisers for each of the men's varsity athletic teams. They work closely with the team, attending practice as well as all home and away games.

A number of junior and senior students, selected with the approval of the faculty, serve as assistants to the faculty course advisers in helping freshmen with their adjustment to the academic program.

Members of the senior honorary societies, Book and Key and Mortar Board, cooperate with proctors, student advisers, and representatives of other student organizations in helping the Deans with the placement program conducted during freshman week. A group of upperclass women, under the direction of the Women's Student Government Association, serve as counselors for all freshman women, several counselors being assigned to each freshman hall. There are also student proctors in each of the men's dormitory sections.

Special problems may be referred by the Deans to the college physician or to the consulting psychiatrists.

THE STUDENT COMMUNITY

Student Conduct

In general the association of men and women in academic work and social life is to be governed by good taste and accepted practice rather than by elaborate rules. The Society of Friends has historically been conservative in social matters, and its influence within the college community is one of the important factors in making Swarthmore what it is. Certain rules, however, are of sufficient importance to deserve attention here:

1. The possession and use of liquor on the campus is forbidden, as is drunken conduct.
2. No undergraduate may maintain an automobile while enrolled at the College without special permission. The administration of this rule is in the hands of a student-Faculty committee, which authorizes cars for the use of student organizations, and in some cases for special needs such as jobs dependent upon cars. Day students may use cars for commuting to College, but special arrangements for stickers must be made for campus parking. More detailed information may be had from the Office of the Deans.
3. It is college policy to discourage premature marriages by ruling that if two undergraduates marry, only one may remain in college. Some exceptions have been provided in the case of veterans and upperclass students and information about them may be obtained from the Office of the Deans.

College rules which affect the entire college community are discussed and formulated by the Student Affairs Committee, which is composed of members of the college administration, faculty, and student body. This committee delegates to student government agencies as much authority in the administration of rules as they responsibly accept.

Student Council

The semi-annually elected Student Council represents the entire undergraduate community and is the chief body of student government. Its efforts are directed toward the coordination of student activities and the expression of student opinion in matters of college policy.

Committees of the Council include the Budget Committee, which regulates distribution of funds to student groups; the Community Service Committee, which administers welfare projects; the Elections Committee, which supervises procedure in campus elections; and the Social Committee, see below. The Curriculum Committee cooperates with a similar committee of the faculty in the discussion of matters relating to the academic program of the college. In addition to these, there are several joint Faculty-Student Committees, whose student membership is appointed by the Council: Collection, Cooper Foundation, Motion Pictures, Men's Athletics and Student Affairs.

Men's Student Government

The men students of the college are represented by the Men's Executive Committee, a group elected to take responsibility for specified problems which have to do primarily with dormitory life. The Men's Judiciary Committee, selected by the Men's Executive Committee, has jurisdiction over cases where male undergraduates have violated college rules in the dormitories or on the campus, with the exception of the fraternity lodges. The fraternities have established a Fraternity Judiciary Committee to enforce college rules as they pertain to fraternities and fraternity lodges.

Women's Student Government

All women students are members of the Women's Student Government Association, headed by an Executive Board elected to promote a great variety of women's interests. This board includes the officers of the Association, the hall presidents and the chairmen of certain important committees: Conduct, which maintains social regulations; Vocational, which assists the women's Vocational Director; Somerville, which arranges the program for Somerville Day, on which alumnae are invited to return to the College, and fosters student-alumnae relationships.

Social Committee

An extensive program of social activities is managed by the Social Committee appointed by the Student Council. The program is designed to appeal to a wide variety of interests, and is open to all students. At no time is there any charge for college social functions.

Extra-Curricular Activities

In addition to the foregoing organizations, Swarthmore students have an opportunity to participate in a program of extra-curricular activities wide

enough to meet every kind of interest. No credit is given for work in such varied fields as sculpture, play-writing, publishing the college newspaper or playing the cello in the orchestra. However, the college encourages a student to participate in whatever activity best fits his personal talents and inclinations, believing that satisfactory avocations are a necessary part of life for the well-rounded individual.

In music, Professor Sorber of the Department of Modern Languages, is supervisor of the extra-curricular musical activities. The college chorus is led by Professor Swing, and the college orchestra by Professor Reese. There are chamber music groups, madrigal groups, and public performances of the musical works of students in composition. There is an excellent college record collection, there are facilities for private practice, and there are student tickets for the Philadelphia Orchestra. The Cooper Foundation presents a distinguished group of concerts each year.

There are faculty advisers or special instructors for the Little Theatre Club, Print Club, the Camera Club, the Sculpture Group, the drawing and painting groups, the creative writers, and the modern dancers. Many other student groups for the discussion of public affairs, the integration of the sciences, the presentation of student radio programs, and the editing of college publications, conduct their own affairs with occasional advice from the faculty.

A handbook describing more fully all these activities and many others, written by the students themselves, can be had upon request from the Office of the Deans.

THE
EDUCATIONAL PROGRAM
OF
SWARTHMORE COLLEGE

General Statement

Swarthmore College offers the degree of Bachelor of Arts and the degree of Bachelor of Science. The latter is given only in the Division of Engineering; the former, in the Divisions of the Humanities, the Social Sciences, and Mathematics and the Natural Sciences.* Eight semesters of resident study, which are normally completed in four years, lead to a Bachelor's degree.

The selection of a program will depend upon the student's interests and vocational plans. Programs in engineering, pre-medical courses, and chemistry, for example, are the usual preparation for professional work in these fields. Students planning a career in law, business, or government service find majors in the humanities or social sciences of great value.

The purpose of a liberal education, however, is not primarily to provide vocational instruction, even though it provides the best foundation for one's future vocation. Its purpose is to help students fulfill their responsibilities as citizens and grow into cultivated and well rounded individuals. A liberal education is concerned with our cultural inheritance, the world of thought, and the development of aesthetic, moral, and spiritual values.

It is necessary for most students to concern themselves with the problem of making a living. But this concern should not lead them to a specialization that is too early and too narrow. They still have need of broadening the scope of their experience. Particular skills may afford readier access to routine employment, but positions of greater responsibility will be occupied by those who are equipped to think their way through new problems and to conceive of their functions in a larger context of time and place. Liberal education and vocational training may be the joint products of a common process, and the courses here offered should be selected with this large purpose.

For this reason, all students, during the first half of their college program, are expected to complete the general college requirements, to choose their major and minor subjects, and to prepare for advanced work in these subjects by taking certain prerequisites. Five full courses or their equivalent in half courses constitute the normal program for each of the first two years. Each course represents from eight to twelve hours of work a week including class meetings, laboratory periods and individual preparation.

The program for upper class students affords a choice between two methods of study: Honors Work, leading to a degree *with Honors*, and General Courses. An Honors student concentrates on three related subjects which he studies by the seminar method. At the end of his senior year he must take a

* For groupings of departments, see page 17.

battery of eight examinations on the work of his seminars, set by outside examiners. (The system will be explained more fully below.)

A student in general courses has a somewhat wider freedom of election and takes four full courses or their equivalent in each of the last two years. At the end of his senior year he is required to pass a comprehensive examination given by his major department.

The program for engineering students follows a similar basic plan, with certain variations which are explained on page 87. Courses outside the technical fields are spread over all four years.

In addition to scholastic requirements for graduation, all students must meet certain standards of participation in Physical Education as set forth in the statement of those departments (see pp. 129-131) and must attend the Collection exercises of the college (see p. 46).

The course advisers of freshmen and sophomores are members of the faculty appointed by the Deans. They are assisted by a number of student advisers. For juniors and seniors the advisers are the chairmen of their major departments or their representatives.

Program for Freshmen and Sophomores

The curriculum for the first two years is designed primarily to contribute to a student's general education by giving him an introduction to the methods of thinking and the content of knowledge in a variety of fields important to a liberal education.

1. The traditional humanistic studies—those studies through which man learns to understand himself and his relationship to his fellows as individuals, and the enduring values in human experience.
2. The social sciences—those studies through which man learns to understand the nature of organized society, past and present, and his relationship to it.
3. The natural sciences—those studies through which man learns to understand his physical environment, both organic and inorganic, outside of his own individual and social being.

All students must include in their program:

1. One year course in the natural sciences to be selected from Physics 1-2, Chemistry 1-2, Astronomy 1-2, Biology 1-2. By special provisions, students may meet this requirement in 1955-56 by a course consisting of one semester of mathematics (Mathematics 7) and one semester of astronomy (Astronomy 8).
2. One year course in the social sciences, either Economics 1-2 or Political Science 1-2.

3. Two semester courses in the humanities. Students majoring in the Divisions of Engineering and of Mathematics and the Natural Sciences shall select these courses from among philosophy, history, literature (English or foreign), fine arts, music and religion. Students majoring in the Divisions of the Humanities and the Social Sciences shall select from the same subjects, but must include a semester course in literature (English or foreign) and may include any course in philosophy except Philosophy 1, which partially meets the requirement described below.
4. In addition, one year or two semester courses in departments outside the division in which the major work is to be done. Students majoring in the Humanities or the Social Sciences shall fulfill this requirement by Philosophy 1 and Psychology 1. Students majoring in the Division of Mathematics and the Natural Sciences may offer psychology in partial or complete fulfillment of this requirement, as well as any introductory course listed in the catalogue in the Divisions of the Humanities and the Social Sciences.

In addition to these general requirements, there are the following special requirements:

5. All students majoring in the Humanities and the Social Sciences shall take History 1-2.
6. All students except those majoring in engineering must include in their program sufficient work in a modern or classical language to complete course 4 or its equivalent. This may be met in whole or in part by secondary school preparation as measured by the appropriate achievement test of the College Entrance Examination Board.

Not more than one year in any one department will be counted toward the fulfillment of requirements 1-5. Students entering college with special preparation in any one of these subjects may apply for exemption.

In addition to the requirements listed above, prerequisites must be completed for the work of the last two years in major and minor subjects, and sufficient additional electives must be taken to make up ten full courses. In the Divisions of the Humanities and the Social Sciences it is strongly recommended that these electives shall include:

Half courses (preferably in the first semester of an academic year) in at least two of the following: Foreign Literature (classical or modern, either in the original or in translation), Fine Arts, Music.

A full course in whichever social science (Economics or Political Science) is not taken in fulfillment of the general requirements.

A third half course in a natural science or a half course in Mathematics or courses in each of these.

It is expected that, after completion of the minimum courses in the general program of the first two years, the student will devote the remainder of his sophomore year to preparing himself for more advanced study of those subjects which have most interested him and to other courses which will increase the range of his knowledge. He should decide, as early in his sophomore year as possible, upon two or three subjects in which he might like to major and should consult the statements of the departments concerned as to required and recommended courses and supporting subjects. In most cases he is advised to take not more than one semester of work in any subject beyond the first course.

The requirement in foreign language (either classical or modern) is such that an exceptionally well prepared freshman may demonstrate his completion of it before entering college by his rating in an Achievement Test given by the College Entrance Examination Board. The results of the tests indicate, however, that most students need to devote from one to four terms to further language study. The desired standard is normally met on the basis of four years' work in high school, or of three or two years' work in high school followed by one or two terms in college. If a student fulfills the requirement with a language which he begins in college, he will need to study it for four terms. If he fulfills it with a language begun elsewhere, his progress toward the degree of competence demanded is measured by a placement test. This may be one of the achievement tests of the College Entrance Examination Board which he has taken as a requirement for admission. Additional placement tests are given when necessary by the Swarthmore departments of language.

Physical education is required of all students (except veterans) in the first two years. The requirements are stated in full on p. 61 and in the statements of the departments of Physical Education.

Program for Juniors and Seniors

WORK IN COURSE

The work of juniors and seniors in Course includes some intensive, specialized study within a general area of interest. This comprises enough work in a single department (designated as a "major") to make an equivalent of four full courses. Work taken during the first two years may be counted toward fulfillment of the major requirements but not more than six full courses or twelve half courses may be taken in the major field. Before graduation the student must pass a comprehensive examination in his major subject.

A student must choose his major subject at the end of the sophomore year, and apply formally through the Registrar to be accepted by the division concerned. The decision will be based on an estimate of his ability in his

major subject as well as on his record. If a student does not secure divisional approval, he cannot be admitted to the junior class.

A student's course adviser during his junior and senior years is the chairman of his major department (or a member of the department designated by the chairman) whose approval he must secure for his choice of courses each semester.

In addition to major and recommended supporting subjects, juniors and seniors usually have room for at least one elective a year.

The completion of eighteen full courses, with a minimum average of C, normally constitutes the course requirement for a degree. A student may carry extra work after the freshman year with the approval of his course adviser and of the Committee on Academic Requirements, provided that his record in the previous year has been satisfactory.

READING FOR HONORS

The Honors Program, initiated in 1922 by President Frank Aydelotte, is a distinctive part of Swarthmore's educational life. It seeks to free from the limitations of classroom routine those students whose maturity, interest, and capacity suit them for independent work. While the program is designedly flexible and responsive to new needs, it has been characterized from the beginning by three basic elements, which taken together may be said to be the essence of the system.

(1) Honors work involves a concentration of the student's attention during his last two years upon a limited and integrated field of studies. He pursues only two subjects during a semester, thereby avoiding the fragmentation of interest that may result from a program of four or more courses with their daily assignments and frequent examinations. The content of the subject matter field is correspondingly broader, permitting a wide range of reading and investigation and demanding of the student correlations of an independent and searching nature.

(2) Honors work frees the student from periodic examinations, since his thinking is under continual scrutiny by his classmates and instructors. By this program he undertakes to subject himself at the end of two years of Honors work to examinations in all of the eight fields studied. In these he is expected to demonstrate his competence in a field of knowledge rather than simply his mastery of those facts and interpretations which his instructor has seen fit to present. These examinations, consisting of a three-hour paper in each field, are set by examiners from other institutions who read the papers and then come to the campus to conduct an oral examination of each student, in order to clarify and enlarge the basis of their judgment of his command of his material.

(3) Honors work is customarily carried on in seminars of seven students or less or in independent projects leading to a thesis. Seminars meet once a week, in many cases in the home of the instructor, for sessions lasting three hours or more. The exact technique of the seminar varies with the subject matter, but its essence is a cooperative search for truth, whether it be by papers, discussion, or laboratory experiment. Each student has an equal responsibility for the assimilation of the whole of the material and is correspondingly searching in his scrutiny of ideas presented by his fellows or by his instructor. The student is expected to devote half of his working time during a semester to each of his fields of study.

In practice three avenues toward an Honors degree are open:

(1) The standard program consists of eight subjects studied during the last four semesters leading to examinations by the visiting examiners. In the Divisions of the Natural Sciences and of Engineering, where there is a heavy burden of prerequisite courses, the student may offer as few as six fields for examination, subject to the approval of the division. The Divisions of the Humanities and of the Social Sciences allow seven examinations instead of eight only in cases of clear hardship (as in the case of some transfer students); they do not allow such remission in order to permit the student to pursue work of elementary or intermediate level in Course or to accommodate some unrelated subject in his program.

(2) Students who have a special reason to study for one or two semesters abroad or in another American institution must take the normal number of examinations prescribed by their division. Such programs must be worked out in advance, since it may not be possible to provide visiting examiners for work offered elsewhere and since instruction in some fields of the student's choice may not be available in the other institution. In general the student following this avenue to an Honors degree must weigh carefully the advantage of working independently or under tutorial guidance against the loss he incurs by missing both the stimulus and the criticism provided by his fellows in seminar.

(3) Students who at the end of the sophomore year did not elect or were not permitted to read for Honors, but whose work has subsequently shown distinction may be encouraged to take the regular Honors examinations so that they may receive the degree of Honors recommended by the visiting examiners. They shall receive no remission of the number of examinations by reason of their preparation in Course but shall be subject to the regulations governing Honors programs of the division concerned. Such students must before the end of the seventh semester petition the division for permission to take the Honors examinations and must submit an acceptable list of examinations which they are prepared to take.

The normal pattern in Honors programs is four seminars (or examinations) in the major department and two in each of two minor departments.

No student is allowed more than four seminars in his major; in those cases where he offers three seminars in each of two fields, one must be designated as his major. While there is a general belief that two seminars in a minor field are desirable because of the mutual reinforcement they provide, there are by custom certain seminars which are allowed to stand alone. Thus there is a considerable flexibility in Honors programs, each being subject to the scrutiny of the departments and divisions in which the work is done.

A candidate for admission to Honors should consult the chairmen of his prospective major and minor departments during the second semester of his sophomore year and work out a program for the junior and senior years. This proposed program must be filed in the office of the Registrar, who will forward it to the divisions concerned. The acceptance of the candidate by the divisions depends in part upon the quality of his previous work as indicated by the grades he has received but mainly upon his apparent capacity for assuming the responsibility of Honors work. The names of the accepted candidates are announced later in the spring. The major department is responsible for the original plan of work and for keeping in touch with the candidate's progress from semester to semester. The division is responsible for approval of the original program and of any later changes in that program.

At the end of the junior year Honors students are required to take the Honors examinations set at that time for the fields they have studied. These trial papers, however, are read by their instructors, not by the visiting examiners. On the basis of the showing made in these examinations, the student may be advised or even required to return to Course, or he may be warned that he continues in Honors at his own risk. Those students who return to Course under these circumstances or for other reasons will receive grades for the work they have done while reading for Honors, but in no case without taking examinations over the fields covered.

At the end of the senior year the reading of the examinations and the decision of the degree of Honors to be awarded the candidates is entirely in the hands of the visiting examiners. Upon their recommendation, successful candidates are awarded the Bachelor's Degree with Honors, with High Honors, or with Highest Honors. When the work of a candidate does not in the opinion of the examiners merit Honors of any grade, his papers are returned to his instructors, who decide, under rules of the Faculty, whether he shall be given a degree in Course.

PRE-MEDICAL PROGRAM

The pre-medical student's program is planned and his work supervised by the Pre-medical Advisory Committee. There is more than one program of courses by which a student may prepare himself for admission to medical school. In mapping out a program for each student the Committee keeps in mind (a) the particular interest of the student, (b) the entrance require-

ments of the medical schools of the student's choice, (c) the need for an understanding of basic social problems and the cultivation of a sensitiveness for the enduring values in the arts and literature, and (d) the value of intensive work in at least one field.

Students who plan to meet medical school requirements will ordinarily take Biology 1-2; Chemistry 1-2, either 25 or 28-29 (some medical schools require a full course in organic chemistry) and 26; English Composition; Mathematics 1-2; Physics 1-2; Zoology 11 and at least one other half course; a modern foreign language, preferably German, to a point equivalent to the completion of course 4. The work of the junior and senior years may be taken in the Honors program or in course. Intensive work may be carried out in a single field or in closely related departments. Pre-medical students may fulfill the major requirements in any department of their own choice, or they may fulfill the requirements by completing three full courses in each of two related departments in the division of mathematics and the natural sciences. In the latter case the comprehensive examinations will be arranged jointly by the departments concerned.

Although some students have been admitted to medical schools upon the completion of three years of college work, most medical schools strongly advise completion of four years of college.

Faculty Regulations

ATTENDANCE AT CLASSES AND COLLECTION

Members of the faculty will hold students responsible for regular attendance at classes and will report to the Deans the name of any student whose repeated absence is in their opinion impairing the student's work. The number of cuts allowed in a given course is not specified, a fact which places a heavy responsibility on all students to make sure that their work is not suffering as a result of absences. Since freshmen must exercise particular care in this respect and since the faculty recognizes its greater responsibility toward freshmen in the matter of class attendance, it is expected that freshmen, especially, will attend *all* their classes.

When illness necessitates absence from classes the student should report at once to the nurses or to the college physician.

The last meeting before vacation and the first meeting after vacation in each course must be attended. The minimum penalty for violation of this rule is probation.

Absences from Collection are acted upon by the Deans as instructed by the faculty. All students are allowed two absences from Collection each term.

GRADES

Instructors report to the Deans' office at intervals during the year upon the work of students in courses. Informal reports during the semester take the form of comments on unsatisfactory work. At the end of each semester formal grades are given in each course under the letter system, by which *A* means excellent work, *B* good work, *C* fair work, *D* poor work, and *E* failure. *W* signifies that the student has been permitted to withdraw from the course by the Committee on Academic Requirements. *X* designates a condition; this means that a student has done unsatisfactory work in the first half of a year course, but by creditable work during the second half may earn a passing grade for the full course and thereby remove his condition.

Inc. means that a student's work is incomplete with respect to specific assignments or examinations. The Faculty has voted that the grade given in a course should incorporate a zero for any part of the course not completed by the date of the final examination. The grade *Incomplete* should be given only after consultation with the Registrar and only in cases in which it can be shown that illness, military service, or the like made it impossible for the student to complete his work before the deadline, or in cases in which the instructor wishes to insist on the completion of the work before giving a grade with penalties. If an *Inc.* is received, it must normally be made up in the term immediately following that in which it was incurred. A date is set at the end of the first six weeks of each term when make-up examinations must be taken and late papers submitted. Under special circumstances involving the use of laboratories or attendance at courses not immediately available, a student must secure permission to extend the time for making up an incomplete until the second term following. This permission must be given in writing and filed in the Office of the Registrar. Any not made up within a year from the time it was imposed shall be recorded as *E*, a failure which cannot be made up.

Reports are sent to parents and to students at the end of each semester.

For graduation in general courses, a *C* average is required; for graduation in honors work, the recommendation of the visiting examiners.

EXTRA OR FEWER COURSES

A regular student is expected to take the prescribed number of courses in each semester. If more or fewer courses seem desirable, he should consult his course adviser and file a petition with the Committee on Academic Requirements. A student who wishes to take fewer than the normal number of courses should register for the regular program and file a petition to drop one or more courses.

Applications involving late entrance into a course must be received within the first two weeks of the semester. Applications involving withdrawal from a course must be received not later than the middle of the semester.

EXAMINATIONS

Any student who is absent from an examination, announcement of which was made in advance, shall be given an examination at another hour only by special arrangement with the instructor in charge of the course.

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

SUMMER SCHOOL WORK

Students desiring to transfer credit from a summer school are required to obtain the endorsement of the chairman of the department concerned before entering upon the work, and after completing the work are required to pass an examination set by the Swarthmore department.

PHYSICAL EDUCATION

Physical education is required of all women and non-veteran men in the freshman and sophomore years, unless an excuse is granted by the college physician. A minimum of three periods per week shall be required. If any semester's work of the first two years is failed, it shall be repeated in the junior year. No student shall be permitted to enter his senior year with a deficiency in physical education.

EXCLUSION FROM COLLEGE

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

Requirements for Graduation

BACHELOR OF ARTS AND BACHELOR OF SCIENCE

The degree of Bachelor of Arts and Bachelor of Science are conferred upon students who have met the following requirements for graduation:

1. The candidate must have completed eighteen full courses or ten courses and eight seminars with an average grade of C.
2. He must have complied with the course requirements for the first two years.
3. He must have met the requirements in the major and supporting fields during the last two years.
4. He must have passed satisfactorily the comprehensive examinations in his major field or met the standards set by visiting examiners for a degree with honors.
5. He must have completed four terms of study at Swarthmore College, two of which have been those of the senior year.
6. He must have completed the physical education requirements set forth on page 61 and in the statements of the Physical Education Departments.
7. He must have attended the Collection exercises of the College in accordance with the regulations (see page 46).
8. He must have paid all outstanding bills and returned all equipment and library books.

Advanced Degrees

MASTER OF ARTS AND MASTER OF SCIENCE

The degree of Master of Arts or Master of Science may be conferred subject to the following requirements:

Only students who have completed the work for the Bachelor's degree with some distinction, either at Swarthmore or at another institution of satisfactory standing, shall be admitted as candidates for the Master's degree at Swarthmore.

The candidate's record and a detailed program setting forth the aim of the work to be pursued shall be submitted, with a recommendation from the department or departments concerned, to the Committee on the Master's Degree. If accepted by the Committee, the candidate's name shall be reported to the faculty at or before the first faculty meeting of the year in which the candidate is to begin his work.

The requirements for the Master's degree shall include the equivalent of a full year's work of graduate character. This work may be done in courses, seminars, reading courses, regular conferences with members of the faculty, or research. The work may be done in one department or in two related departments. The catalogue statements of departments which offer graduate work indicate the courses or seminars which may be taken for this purpose.

A candidate for the Master's degree shall be required to pass an examination conducted by the department or departments in which his work was done. He shall be examined by outside examiners, provided that, where this procedure is not practicable, exceptions may be made by the Committee on the Master's Degree. The department or departments concerned, on the basis of the reports of the outside examiners, together with the reports of the student's resident instructors, shall make recommendations to the faculty for the award of the degree.

At the option of the department or departments concerned, a thesis may be required as part of the work for the degree.

A candidate for the Master's degree will be expected to show before admission to candidacy a competence in those languages deemed by his department or departments most essential for his field of research. Detailed language requirements will be indicated in the announcements of departments which admit candidates for the degree.

The tuition fee for graduate students who are candidates for the Master's degree is \$600 per year, and the general fee for these students is \$25 per semester.

ADVANCED ENGINEERING DEGREES

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

1. The candidate must have been engaged in engineering work for five 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.
4. The thesis must be submitted for approval 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.

Awards and Prizes

The JOHN W. NASON AWARD, a gift of a friend of the College in honor of the Eighth President, is presented, normally at Commencement, to one or more members of the total staff of the College, or to members of their families, who have made a distinctive contribution, beyond the scope of their normal duties, to the life of the College community. The Award is made by the Instruction and Libraries Committee of the Board of Managers upon the advice of the President of the College and consists of a formal citation and a monetary award of \$1,000.

The IVY AWARD FUND was created by a gift from Owen Moon, '94. The income of the fund is placed in the hands of the faculty for award on Commencement Day to a male member of the graduating class. The qualifications for the Ivy Award are similar to those for the Rhodes Scholarships and include (a) qualities of manhood, force of character, and leadership; (b) literary and scholastic ability and attainments. These have been phrased by the donor in the words "leadership based upon character and scholarship."

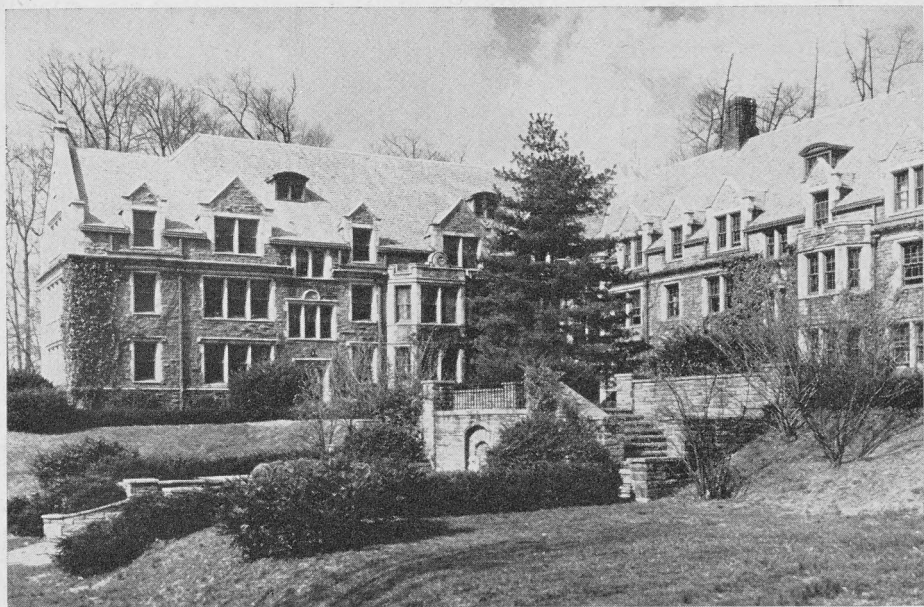
The OAK LEAF AWARD was established by David Dwight Rowlands of the Class of 1909. It was later permanently endowed in memory of him by Hazel C. Rowlands, '07, and Caroline A. Lukens, '98. The award is made by the faculty each year to the woman member of the Senior Class who is outstanding for loyalty, scholarship and service.

The MCCABE ENGINEERING AWARD, founded by Thomas B. McCabe, 1915, is to be presented each year to the outstanding engineering student in the Senior Class. The recipient is chosen by a committee of the faculty of the division of Engineering.

The CRANE PRIZE, a memorial to Charles E. Crane, Jr., of the Class of 1936, is an award of about \$20, given for the purchase of philosophical books, and presented annually to the junior who, in the opinion of the department, has done the best work in Philosophy and Psychology.

The A. EDWARD NEWTON LIBRARY PRIZE of \$50, endowed by A. Edward Newton, to make permanent the Library Prize first established by W. W. Thayer, is awarded annually to that undergraduate who, in the opinion of the Committee of Award, shows the best and most intelligently chosen collection of books upon any subject. Particular emphasis is laid in the award not merely upon the size of the collection but also upon the skill with which the books are selected and upon the owner's knowledge of their subject-matter.

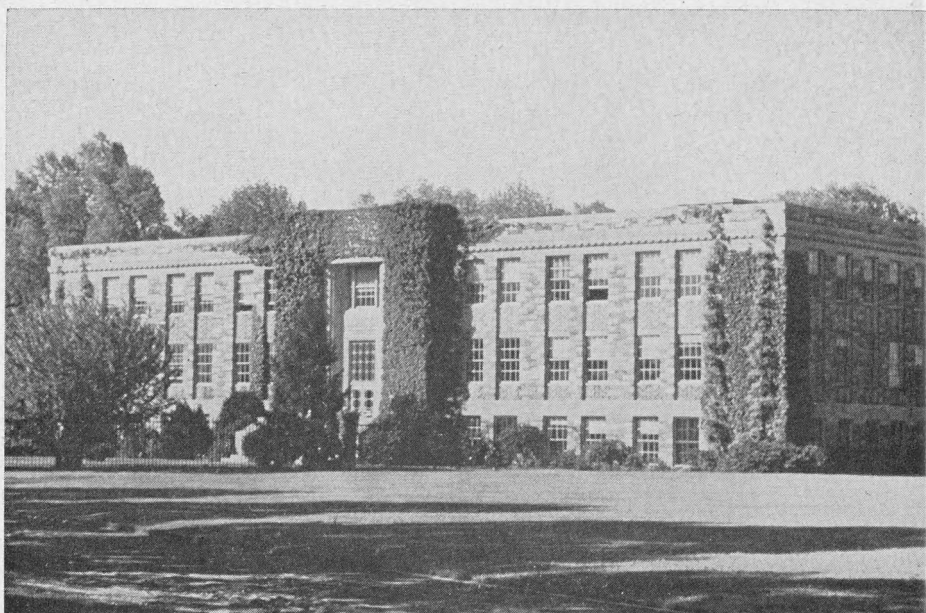
The KATHERINE B. SICARD PRIZE of \$5, endowed by the Delta Gamma Fraternity in memory of Katherine B. Sicard, '34, is awarded annually to the freshman woman who, in the opinion of the department, shows greatest proficiency in English.



Wharton Hall, a Dormitory for Men



Worth Dormitory for Women



Martin Biological Laboratory



Trotter Hall

PUBLIC SPEAKING CONTESTS. Prizes for annual contests in public speaking are provided as follows: The ELLA FRANCES BUNTING EXTEMPORARY SPEAKING FUND awards prizes totaling \$45 for the best extemporaneous short speeches. The OWEN MOON FUND provides the Delta Upsilon Speaking Contest prizes totalling \$25 for the best prepared speeches on topics of current interest.

The WILLIAM PLUMMER POTTER PUBLIC SPEAKING FUND was established in 1907. The income of the fund is used to sponsor three different annual contests: (1) the Potter Public Speaking Contest prizes totalling \$100.00, (2) the Potter Poetry Contest, \$50.00, (3) the One-Act Play Contest, \$50.00. The Potter Fund has also been used to establish a collection of dramatic and poetic records.

The LOIS MORRELL POETRY AWARD, given by her parents in memory of Lois Morrell of the Class of 1946, goes to that student who, in the opinion of the faculty, submits the best original poem in the annual competition for the award. The award, consisting of \$100, is made in the spring of the year. All entries should be submitted by April 1.

The JOHN RUSSELL HAYES POETRY PRIZES, of approximately \$25 for a first prize and \$15 for a second prize, are offered for the best original poem or for a translation from any language. Manuscripts should be ready by April 1 of each year.

Fellowships

Three fellowships are awarded annually by the faculty, on recommendation of the Committee on Fellowships, to graduates of the college for the pursuit of advanced work under the direction of the faculty or with their approval. Applications for fellowships must be in the hands of the committee by April 15. Applicants for any one of these fellowships will be considered for the others as well.

These three fellowships are:

The HANNAH A. LEEDOM FELLOWSHIP of \$500, founded by the bequest of Hannah A. Leedom.

The JOSHUA LIPPINCOTT FELLOWSHIP of \$600, founded by Howard W. Lippincott, of the Class of 1875, in memory of his father.

The JOHN LOCKWOOD MEMORIAL FELLOWSHIP of \$600, founded by the bequest of Lydia A. Lockwood, 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.

Four other fellowships are open to graduates of Swarthmore College under the conditions described below:

The LUCRETIA MOTT FELLOWSHIP, founded by the Somerville Literary Society and sustained by the contribution 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 MARTHA E. TYSON FELLOWSHIP, founded by the Somerville Literary Society in 1913, is sustained by the contributions of life members of the society and yields an income of \$500 or more. It is awarded biennially 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 entered or plans to enter elementary or secondary school work. 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.

SIGMA XI RESEARCH FELLOWSHIP. The Swarthmore Chapter of Sigma Xi appoints, from time to time, as funds are available, Fellows with research grants with a maximum value of \$1,000. The holders of this fellowship are usually associates of the chapter who have shown conspicuous ability in graduate studies. The purpose of the chapter in awarding these fellowships is to relieve worthy students from teaching and other distracting duties so that they may concentrate as much as possible upon their research. Applications for these fellowships should be made to the secretary of the chapter not later than the middle of March. Appointments will be announced about the middle of April.

The PHI BETA KAPPA FELLOWSHIP of \$150, founded by the Swarthmore Chapter of the national honor fraternity, is awarded each year at the discretion of the Committee on Fellowships on the basis of intellectual distinction to a member of the senior class who proposes to pursue graduate study and scholarly work.

COURSES OF INSTRUCTION

NUMBERING OF COURSES AND SEMINARS

A system of uniform numbering is used in all departments. Courses are numbered as follows:

- 1 to 9—introductory courses
- 11 to 49—other courses open to students of all classes
- 51 to 69—advanced courses limited to juniors and seniors
- 101 to 199—seminars for honors students and graduate students

Full courses the numbers of which are joined by a hyphen (e. g., 1-2) must be continued for the entire year; credit is not given for the first semester's work only.

Astronomy

PROFESSOR: PETER VAN DE KAMP, *Chairman and Director of Sproul Observatory*

INSTRUCTOR AND RESEARCH ASSOCIATE: ARNE A. WYLLER

RESEARCH ASSOCIATE: SARAH L. LIPPINCOTT

RESEARCH ASSISTANT: LAURENCE W. FREDRICK

Astronomy deals with the nature of the universe about us and the methods employed to discover the laws underlying the observed phenomena. The elementary courses present the problems in broad outlines and trace the growth of our knowledge of the facts and the development of more comprehensive theories. The advanced courses consider some of these problems in detail; the order in which they may be taken depends upon the extent of the student's mastery of mathematics and physics.

The principal instrument of the Sproul Observatory is the twenty-four-inch visual refractor of thirty-six-foot focal length, used almost exclusively for photography. The instrument has been in continuous operation since 1912 and provides a valuable and steadily expanding collection of photographs. A number of measuring and calculating machines are available for the measurement and reduction of the photographs. The principal program of the Observatory is an accurate study of the distances, motions and masses of the nearer stellar systems.

Advanced study in conjunction with the research program of the Observatory may be arranged in consultation with the Director of the Sproul Observatory. The Students' Observatory contains a six-inch visual refractor, a nine-inch photographic telescope, and a transit instrument. The Sproul Observatory is open to visitors on the second and fourth Tuesday nights of each month, except those Tuesday nights that fall in a vacation period. Visitors thus have an opportunity of seeing, in the course of a year, many celestial objects of various types.

1-2. DESCRIPTIVE ASTRONOMY. Mr. van de Kamp. *Full Course*

These courses provide an introduction to the methods and results of astronomy. Fundamental notions of physics are studied as they are needed to provide an adequate scientific basis for the course. These courses are prerequisite for all further work in astronomy. Three class periods each week, practical work to be arranged.

8. INTRODUCTION TO ASTRONOMY. Mr. Wyller. *Spring Semester*

This course is designed to give the student an acquaintance with some of the problems in astronomy, the methods of investigation, and results obtained. Emphasis is placed on the overlapping of astronomy and the other sciences. Those planning to take additional work in astronomy should enroll in Astronomy 1-2. Three class periods each week.

11. DOUBLE STARS. Mr. van de Kamp.

The two body problem. Theory and observational technique of visual, spectroscopic and eclipsing binaries. Special attention is given to the photographic study of both resolved and unresolved astrometric binaries. The masses of binary components and of unseen companions.

Prerequisite: Mathematics 11-12.

12. PHOTOGRAPHIC ASTROMETRY. Mr. van de Kamp.
The long-focus refractor. Photographic technique, measurement and reduction of photographic plates. Choice of reference stars. Attainable accuracy. Application to the problems of parallax, proper motion, mass-ratio, and perturbations. Resolved and unresolved astrometric binaries; orbital analyses.
Prerequisites: Mathematics 1-2, and Astronomy 1-2.
13. INTRODUCTORY ASTROPHYSICS. Mr. Wyller.
Selected topics in atomic physics and theory of radiation with subsequent applications to the problems of absorption lines and radiative transfer in stellar atmospheres.
Prerequisites: Mathematics 11-12.
14. GALACTIC AND EXTRAGALACTIC STRUCTURE. Mr. van de Kamp. *Spring Semester*
Fundamental data. Interstellar matter, nebulae, stars. Variable stars. Structure and rotation of the galactic system. Extragalactic objects. The concept of populations. Age, origin and evolution of the universe.
Prerequisites: Mathematics 1-2 and Astronomy 1-2.

Students who intend to pursue astronomy as a major subject in course should have Astronomy 1-2 during the freshman or sophomore year; advanced courses in Astronomy selected from the list given above, combined with work in mathematics, constitute the further requirement.

HONORS SEMINARS IN ASTRONOMY

Prerequisites for admission to honors seminars in Astronomy, either as a major or as a minor, are the completion of the following courses: Mathematics 11-12, Astronomy 1-2, a course in general Physics, reading knowledge of French or German.

101. DOUBLE STARS.
102. PHOTOGRAPHIC ASTROMETRY.
103. ASTROPHYSICS.
104. GALACTIC AND EXTRAGALACTIC STRUCTURE.
105. ECLIPSING BINARIES.
106. OPTICS (IDENTICAL WITH PHYSICS 101).

GRADUATE WORK

In conformity with the general regulations for work leading to the Master's degree (see page 62), this department offers the possibility for graduate work.

Candidates for the Master's degree will normally take four honors seminars, selected from those listed in astronomy, mathematics or physics, in consultation with the faculty member under whose direction the work is to be done. A thesis may be substituted for one of the seminars.

Candidates for the Master's degree must have a good reading knowledge of two modern languages.

Biology

PROFESSOR: ROBERT K. ENDERS, *Chairman*

ASSOCIATE PROFESSORS: LAUNCE J. FLEMISTER

LUZERNE G. LIVINGSTON

NORMAN A. MEINKOTH

NEAL A. WEBER †

ASSISTANT PROFESSOR: KURT K. BOHNSACK

INSTRUCTOR: WILLIAM C. DENISON

LECTURER: SARAH C. FLEMISTER

Through its elementary course, the Department of Biology introduces the student to a comprehensive view of those principles, problems and phenomena common to all organisms, with animals and plants interpreted on a comparative basis. The advanced courses in the Biological Sciences (except Genetics) deal specifically with plant biology (botany), or animal biology (zoology) and are listed under these respective headings.

Following the broad review of the plant and animal kingdoms as given in the course in general biology, advanced work is taken up in two different ways: first, specific aspects of the broad subjects are treated in a comparative manner as in anatomy and physiology; second, broader aspects of a specific subject are treated as in entomology, parasitology, embryology, genetics and developmental plant anatomy. The structural and functional consideration is extended to include problems of interdependence of organisms in the structure and function of plant and animal societies and the influence of physical, chemical and biological factors in the survival of those societies.

REQUIREMENTS FOR MAJORS IN COURSE

A student may major in biology, botany, or zoology. Students in course should include the following supporting subjects in their programs, in addition to the four full courses in their major subject: chemistry, including one semester in organic chemistry, one course in physics, one course in mathematics and a modern language (German preferred) through course 4. These courses are required for majors in botany or zoology. The program for biology majors may be modified, but any program must be approved in advance by the department.

Biology

1-2. GENERAL BIOLOGY. Staff.

Full Course

An introduction to the study of living things. A consideration of the properties of protoplasm and the structure of the cell; a brief survey of living forms, both plant and animal. The methods by which animals and plants maintain themselves, grow and reproduce, and a discussion of the mechanism of heredity. Some time will be devoted to the interrelationships of plants and animals in communities, and the place of man in the whole structure. Evidence for and against theories of evolution will be discussed.

Two lectures and one discussion period, one three-hour laboratory per week.

Credit is not given for a single semester of this course.

† Absent on leave, 1955-56.

20. GENETICS. Mr. Denison.

Spring Semester

A study of the fundamental principles of inheritance as they apply to living organisms generally. The course includes a detailed consideration of the principles of Mendelian inheritance, an analysis of the underlying chromosomal mechanisms, the gene theory, and the relationship of the principles of genetics to evolution, to plant and animal improvement, and to man.

Three lectures per week, with assigned problems and laboratory and/or library projects in lieu of formally organized laboratory work.

Prerequisite: Biology 1-2.

Botany

16. DEVELOPMENTAL PLANT ANATOMY. Mr. Livingston.

Alternate Years, Spring Semester

The fundamentals of anatomy of seed plants approached from a developmental standpoint. The structure and behavior of meristems, problems and processes of differentiation, and a detailed analysis of cellular, tissue and organ structure in higher plants.

Two lectures and two three-hour laboratory periods per week.

Prerequisite: Biology 1-2.

18. SURVEY OF THE PLANT KINGDOM. Mr. Livingston.

Alternate Years, Fall Semester

A comparative study of the structure, reproduction, and life habits of the algae, fungi, mosses, and lower vascular plants from a phylogenetic viewpoint. Particular attention is given to current concepts of evolutionary relationship from the standpoints of both comparative morphology and paleobotanical evidence.

Two lectures and two laboratories or field trips per week.

Prerequisite: Biology 1-2.

67. PLANT PHYSIOLOGY. Mr. Livingston.

Alternate Years, Spring Semester

An integrated study of the physiological processes of higher plants, including general cellular physiology, water relations, mineral nutrition, enzyme action, photosynthesis, metabolic processes, translocation, the physiology of growth and development, and related topics.

Two lectures, one discussion period, and one laboratory period per week.

Prerequisites: Biology 1-2, Chemistry 1-2, Organic Chemistry desirable.

68. BIOLOGY OF BACTERIA. Mr. Livingston.

Alternate Years, Fall Semester

An approach to the study of bacteriology with principal emphasis on the consideration of bacteria as organisms, rather than as causative agents of disease, etc. The morphology, physiology and biochemistry, and classification of bacteria.

Two lectures and two laboratory periods per week.

Prerequisites: Biology 1-2, Chemistry 1-2, Organic Chemistry desirable.

69. TAXONOMY OF SEED PLANTS. Mr. Livingston.

Alternate Years, Spring Semester

A study of the classification and evolutionary relationships of seed plants, including a detailed consideration of the characteristics of the more important families of flowering plants. A study of the methods of identification and recognition of the local flora, both native and horticultural.

Two lectures and two laboratories or field trips per week.

Prerequisite: Biology 1-2.

HONORS WORK

The seminars given each year vary according to the choices of the students and the convenience of the department.

111. PLANT PHYSIOLOGY.

An extension of the area covered in course 67, with particular emphasis on a critical study of original sources, both classical and current. The seminar discussion is accompanied by a full day of laboratory work each week.

112. PROBLEMS OF GROWTH AND DEVELOPMENT.

A correlated anatomical and physiological approach to developmental plant anatomy and morphogenesis. The seminar discussion is accompanied by a full day of laboratory work each week.

113. GENETICS.

An extension of the area covered in course 20, with particular emphasis on current research in the field of inheritance in all its aspects. The seminar discussion is accompanied by a full day of laboratory work each week.

114. TAXONOMY AND DISTRIBUTION OF FLOWERING PLANTS.

An extension of the area covered in course 69, integrated with a study of plant geography and distribution. Seminar discussions and field work, supplemented by laboratory work.

Zoology

11. COMPARATIVE VERTEBRATE ANATOMY. Mr. Meinkoth.

Fall Semester

This course normally follows General Biology. It deals with the comparative and unique aspects of the anatomy of the integument, skeleton, muscular, digestive, respiratory, circulatory, excretory, reproductive and nervous systems of the various vertebrate types. Classification, phylogeny and adaptive radiation are considered with stress placed on anatomical adaptations to the various habitats. The protochordates, lamprey, dogfish, necturus and cat are studied as representative forms in the laboratory. The course has three lecture and two laboratory meetings per week. This course is among those required by medical schools.

12. ELEMENTARY PHYSIOLOGY. Mr. Flemister.

Spring Semester

A general consideration of the functional processes in animals with emphasis placed on mammals and other vertebrates. The aspects of adaptation of the animal to environmental stress are treated in such a way as to serve the individual student's area of concentration. In preparation the introductory course in Biology is desirable. Two lectures, one conference and one laboratory period per week.

51. HISTOLOGY. Mrs. Flemister.

Fall Semester

This course consists of a detailed study of the microscopic structure of vertebrate tissues, together with the functions of such tissues. In the laboratory the student examines both prepared and living material, and becomes familiar with the principles of microtechniques. Three lectures and two laboratory periods per week.

Prerequisites: 1-2, 11.

52. EMBRYOLOGY. Mrs. Flemister.

Spring Semester

A study of development of vertebrate anatomy. The lectures are concerned with an investigation of the events which precede development, an analysis of the development processes, and a brief survey of the contributions of the field of experimental embryology. Laboratory periods are devoted to the embryology of the frog, chick and pig. Three lectures and two laboratory periods per week.

53. ENTOMOLOGY. Mr. Bohnsack. *Spring Semester*
The study of insects and their relatives, their morphological and physiological adaptations and their effect on man. Each student will prepare a study collection from field trips.
54. BIOLOGY OF PARASITISM. Mr. Meinkoth. *Alternate Years, Spring Semester*
A consideration of parasitology with reference to evolution and adaptation to the parasitic habit. Surveys are made of parasites in native animals. Classification, life cycles and epidemiology are reviewed.
Prerequisite: 11 Comparative Vertebrate Anatomy.
55. FIELD ZOOLOGY. Mr. Bohnsack. *Fall Semester*
Emphasis is on the living animals as they occur in nature, their systematics, relationships to the environment, habits and distribution. Most of the work will be done on field trips.
56. INVERTEBRATE ZOOLOGY. Mr. Meinkoth. *Alternate Years, Fall Semester*
A course designed to acquaint the student with the fundamental morphology, classification, phylogeny and special problems of the invertebrate phyla.
Three lectures and two laboratories per week. Occasional field trips.
Prerequisite: 11 Comparative Vertebrate Anatomy.
57. COMPARATIVE PHYSIOLOGY. Mr. Flemister. *Fall Semester*
A course of lectures and laboratory experiments treating functional processes from the standpoint of adaptation of the animal to its environment. These processes in representative animals are compared in order to follow their elaboration from the more general to the more specialized.
Two lectures, one conference and two laboratory periods per week.
Prerequisites: Comparative Anatomy and Organic Chemistry.
58. PHYSIOLOGICAL ECOLOGY. Mr. Flemister. *Spring Semester*
A course of lectures, discussions and experiments concerning the physiological adaptations of representative animals to environmental stress. Requirements and availability of optimum conditions of temperature, oxygen, food-stuffs and the maintenance of ionic independence are critically appraised.
Two lectures, one conference and two laboratory periods per week.
Prerequisite: 57 Comparative Physiology. Offered Spring term of even years.
61. BIOLOGY FOR SENIORS. Mr. Enders. *Spring Semester*
A course designed to integrate the student's knowledge in abstract sciences with living animals, both captive and wild, and to give an opportunity to work on some phase of Biology of interest to him.
- 63, 64. SPECIAL TOPICS. Staff. *Full or Half Course*
For advanced students. Open to those who, on account of fitness, have arranged a program of special work in the department.
- 70-71. FUNDAMENTALS OF SYSTEMATICS. Academy of Natural Sciences.
This course presents the study of variation, speciation, and the evolution of taxonomic categories. It acquaints the student with the use of the methods and techniques of cytology, genetics, statistics, and plant and animal distribution in solving taxonomy problems. Each student will attack an individual problem in the taxonomy of some group of plants or animals.
One hour lecture, 4 hours laboratory. Saturdays 8-1.

HONORS WORK

Honors students majoring in Zoology must take four seminars in the department and a minor of two seminars in another department within the division. Some freedom is offered in the selection of the two seminars, or four half courses, which normally would fulfill a second minor.

Students anticipating an honors program in Zoology must complete in the first two and a half years the following: Biology 1-2 and Zoology 11, Chemistry 1-2 and Chemistry 25, Mathematics 1-2, and Physics 1-2. In addition, the following must be completed before admission to Honors to qualify for a minor in the departments indicated: Mathematics: Mathematics 11-12; Physics: Mathematics 11-12 and Physics 11-12; Psychology: Psychology 1, 2, and 3; Chemistry: Mathematics 11-12. A minor in Chemistry is fulfilled by the completion of Chemistry 55-56 and Chemistry 61-62 during the junior year and the submission of these two as papers for external examination.

Prerequisites for students in the Honors Program with a minor in Zoology consist of three half courses in Biology and Zoology (including 1-2). In addition, 104 requires a full course in Physics and a half course in Organic Chemistry.

Seminars: The following seminars prepare students for examinations for a degree with Honors.

101. **BIOLOGY OF PARASITISM.** Mr. Meinkoth.
An intensified version of course 54 with emphasis on individual student projects, and an acquaintance with both the classic problems and the current literature dealing with the phenomenon of parasitism.
102. **CYTOLOGY.** Mrs. Flemister.
A study of the structure and function of the cell. Living material will be examined and the modern microscopical techniques employed in the laboratory.
103. **EMBRYOLOGY.** Mr. Enders.
An analysis of reproduction and development. The laboratory work includes individual projects by the students, a study of developmental anatomy of the chick, pig and frog, and the observation of living material under normal and experimental conditions.
104. **COMPARATIVE PHYSIOLOGY.** Mr. Flemister.
An intensive consideration of the physical and chemical phenomena underlying the function of animals. A comparative approach is maintained in order to consider the progression from more general to the more specialized adjustments, acclimatizations and adaptations of animals to physical, chemical and biological stresses in the environment. The terminal portion of the laboratory program is devoted to the pursuit of original, independent work by the student. Prerequisites for this seminar are courses in Comparative Anatomy and Organic Chemistry. Offered in the Fall term.
106. **ENTOMOLOGY.** Mr. Bohnsack.
Following a survey of insects in general, a detailed study of one aspect of the field will be undertaken. This will involve use of a scientific library and independent work on one topic.
107. **INVERTEBRATE ZOOLOGY.**
A study of the morphology, taxonomy, natural history, distribution and adaptation of invertebrate phyla with special emphasis on evolutionary trends, ecological relations, and problems peculiar to each group.
110. **SPECIAL TOPICS.** The Staff.
Open to students who, having satisfied all requirements, desire further work in the department. Frequently this will include acting as junior assistants in the research of staff members.

Chemistry

PROFESSORS: EDWARD H. COX, *Chairman*

WALTER B. KEIGHTON, JR.

ASSOCIATE PROFESSORS: DUNCAN G. FOSTER

GILBERT P. HAIGHT, JR.

ASSISTANT PROFESSOR: EDWARD A. FEHNEL

The aim of the Department of Chemistry is to provide a sound training in the fundamental theories and basic techniques of the science rather than to deal with specialized branches of the subject.

Both lecture and seminar approaches are used in presenting the subject matter. The techniques and practices of the science are dealt with during the laboratory periods. Usually the seminar and course laboratory periods last from three to four hours.

The various courses and seminar offerings are designed to meet the needs of three classes of students:

1. Students with a primary interest in the humanities or social sciences, who turn to chemistry as a scientific study of general educational value. Chemistry 1, 2 offers training in the scientific approach to problems, experience with the laboratory method of investigation, and a presentation of some of the major intellectual achievements of chemistry.
2. Students who seek training in chemistry as a supplement to their study of astronomy, botany, engineering, mathematics, medicine, physics, or zoology. These students should consult with their major department and with the chemistry department concerning the chemistry courses most suitable to their needs.
3. Students who consider chemistry their major interest. These students will take Chemistry 1, 2 and Mathematics 1, 2 in their freshman year; Chemistry 28 and 29, Mathematics 11, 12 and Physics 1, 2 in their sophomore year; Chemistry 26, 27 in their junior year, and Chemistry 61, 62 in their senior year. Some students interested in chemistry as a scientific study of general educational value, but with no intention of pursuing chemistry as a profession, will find these basic courses sufficient for their needs. Others, including those who expect to practice chemistry as a profession, will take, in addition to the above courses, Mathematics 51, 52 and Physics 11, 12 in their junior year, and in the senior year, Chemistry 56 and 65. This latter curriculum—together with the general college requirements outlined on pages 52 to 56—satisfy the minimum requirements of the American Chemical Society for professional training in chemistry. Major students are expected to have a reading knowledge of German before graduation.*

* Students who have completed the foreign language requirement in another language may satisfy this requirement by taking German 7-8.

1. **INTRODUCTORY CHEMISTRY.** Mr. Haight and Staff. *Fall Semester*
 A study of the central concepts and basic principles of chemistry, including atomic theory, kinetic-molecular theory, atomic structure, the kinds of chemical change and the laws governing them. The Chemistry of the non-metals will be introduced. No previous training in chemistry required. Students who enter college with exceptional training in chemistry are encouraged to take a placement examination during freshman orientation week. If found to be sufficiently well prepared they may omit Chemistry 1 and start with Chemistry 2 in the spring term.
 One semester. Prerequisite for all other courses in Chemistry.
 Three lectures or recitations and one laboratory period weekly.
2. **INTRODUCTORY CHEMISTRY.** Mr. Haight and Staff. *Spring Semester*
 This course is a continuation of Chemistry 1, with particular attention to the development and application of the principles studied in Chemistry 1. Emphasis will be laid on the use of the periodic classification of the elements and the chemistry of the metallic elements. The laboratory will be given over to the application of the principles of chemical equilibrium to qualitative analysis.
 One semester. Prerequisite: Chemistry 1.
 Three lectures or recitations and one laboratory period weekly.
11. **ELEMENTARY PHYSICAL CHEMISTRY.** Mr. Keighton. *Fall Semester*
 This is a one-semester course dealing with elementary kinetics, equilibrium, the chemistry of solutions and the colloidal state. This course is terminal, designed for students who are not majoring in chemistry or who do not require the more intensive study of physical chemistry provided by Chemistry 61-62.
 One semester. Prerequisite: Chemistry 2, Mathematics 2.
 Three lectures or recitations weekly.
25. **ORGANIC CHEMISTRY SURVEY.** Mr. Cox. *Spring Semester*
 A one-semester survey of the field of organic chemistry with special emphasis on nomenclature, structural relationships and general reactions of the more important classes of aliphatic and aromatic compounds. No attempt is made to solve intricate problems in syntheses. This course is terminal, designed for students who are not majoring in chemistry or for students who do not require the more intensive study of organic chemistry provided by Chemistry 28-29.
 One semester. Prerequisite: Chemistry 2.
 Two lectures, one conference and one laboratory period weekly.
26. **QUANTITATIVE ANALYSIS I.** Mr. Foster. *Fall Semester*
 The theory and practice of volumetric analysis. Acid-base, oxidation-reduction, precipitation and complex formation methods are studied, and the application of the laws of chemical equilibrium to analytical methods. Laboratory work consists in the analysis of unknowns illustrating these principles.
 This course may be taken as a terminal course by students for whom only one semester of analytical chemistry is required (e. g., pre-medical students).
 One semester. Prerequisite: Chemistry 2.
 Two lectures or conferences and two laboratory periods weekly.
27. **QUANTITATIVE ANALYSIS II.** Mr. Foster. *Spring Semester*
 The theory and practice of gravimetric analysis. Separation methods, coprecipitation, electrolysis, photometry, some aspects of instrumentation and an introduction to gas analytical methods are studied, with illustrative unknowns and laboratory exercises.
 One semester. Prerequisite: Chemistry 26.
 Two lectures or conferences and two laboratory periods weekly.

28-29. ORGANIC CHEMISTRY. Mr. Cox and Mr. Fehnel. *Full Course*

This course is designed for chemistry majors and others who require more thorough training in the principles and practice of organic chemistry than is given by Chemistry 25. It is a prerequisite for admission to the Honors Seminar in Organic Chemistry. The first semester is devoted largely to a consideration of aliphatic compounds and the second to aromatic compounds. In addition, some elementary aspects of the chemistry of alicyclic and heterocyclic compounds, biologically interesting materials, dyes and plastics are included. Synthetic methods in organic chemistry are emphasized.

Two semesters. Prerequisite: Chemistry 2.

Three lectures and one laboratory period weekly.

56. ADVANCED ORGANIC CHEMISTRY. Mr. Fehnel. *Fall Semester*

Selected topics in organic chemistry, including resonance theory, reaction mechanisms, molecular rearrangements, free radicals and other topics of current interest. The laboratory periods are devoted to qualitative organic analysis and to library and problem work in connection with the identification and characterization of organic compounds.

One semester. Prerequisite: Chemistry 29 with a minimum grade of C.

Three lectures or conferences and two laboratory periods weekly.

61-62. PHYSICAL CHEMISTRY. Mr. Keighton. *Full Course*

The principles of theoretical chemistry are studied and a number of numerical exercises are worked; the gaseous, liquid and solid states, solutions, colloids, elementary thermodynamics, chemical equilibria, electrochemistry, the kinetics of chemical reactions. In the laboratory the student uses a variety of physical-chemistry apparatus.

Prerequisites: Quantitative analysis, calculus, and general physics.

Three lectures and one laboratory period weekly.

65. ADVANCED INORGANIC CHEMISTRY. Mr. Haight. *Spring Semester*

The periodic classification of elements is studied from the point of view of correlation of structure and properties. Consideration is given to such topics as atomic and molecular structure, coordination complexes, metal carbonyls, intermetallic and interstitial compounds, modern concepts of acids and bases, chemistry of the transition metals and rare earths and other phases of inorganic chemistry.

One semester. Prerequisite: Chemistry 61 either previously or concurrently.

Three lectures or conferences weekly.

69. SPECIAL TOPICS. Staff. *Fall and Spring Semesters*

An elective half-course which provides an opportunity for qualified advanced students to undertake original investigations in the field of chemistry. The course is designed to give the student practical experience in the application of the scientific method to the solution of a research problem, to develop facility in the use of advanced laboratory techniques, and to stimulate interest in current developments in chemical research. A thesis is required in lieu of a final examination. Students who propose to take this course should consult the appropriate instructor.

One semester.

Approximately ten hours of laboratory and three conferences weekly.

HONORS WORK

Before admission to honors work the chemistry major will have completed Chemistry 1, 2, 28, 29, Mathematics 1, 2, 11, 12, and Physics 1, 2. The honors program includes Chemistry 101, 105 in the junior year and Chemistry 102 or 107, 106 in the senior year, with four other seminars usually in biology, mathematics, or physics.

101. PHYSICAL CHEMISTRY. Mr. Keighton. *Spring Semester*
The gaseous, liquid, and solid states, solutions, colloids, elementary thermodynamics, chemical equilibria, electrochemistry, the kinetics of chemical reactions. Prerequisites: Quantitative analysis, calculus, and general physics. One four-hour seminar and one eight-hour laboratory period weekly for one semester.
Course 61-62 may in special cases be used in preparation for the honors examinations.
102. ADVANCED PHYSICAL CHEMISTRY. Mr. Keighton. *Spring Semester*
Topics such as the following: thermodynamics, the Debye-Hückel theory of strong electrolytes, the structure of matter, chemical kinetics including photochemistry and acid-base catalysis. Prerequisite: Physical Chemistry 61-62, or 101. One four-hour seminar and one eight-hour laboratory period weekly.
105. QUANTITATIVE ANALYSIS. Mr. Foster. *Fall Semester*
Essentially the content of courses 26 and 27, designed to prepare honors candidates for an honors examination. Prerequisite: Chemistry 2. One seminar and twelve hours of laboratory weekly.
106. ADVANCED ORGANIC CHEMISTRY. Mr. Fehnel. *Fall Semester*
A more intensive study of the same general area covered in Chemistry 56, including laboratory work in qualitative organic analysis. Prerequisite: Chemistry 29. One seminar and one six hour laboratory period weekly.
107. ADVANCED INORGANIC CHEMISTRY. Mr. Haight. *Spring Semester*
A more intensive study of the same general area covered in Chemistry 65. Prerequisite: Physical Chemistry either previously or concurrently. One seminar and six hours of laboratory weekly.

Classics

PROFESSORS: L. R. SHERO, *Chairman* *

SUSAN P. COBBS

ASSOCIATE PROFESSOR: HELEN F. NORTH, *Acting Chairman, 1st Semester*

The Department of Classics offers courses in Greek and Latin that are designed to develop a capacity for the fruitful study of works written in those languages. A knowledge of Greek is particularly valuable for students of modern literature, philosophy, or the Christian religion; a knowledge of Latin, for students of the romance languages, mediaeval history, or law. Study in either field is helpful for the broadening and deepening of a student's educational experience.

Another group of courses (numbered from 31 on) deals with the history of the Greeks and Romans and with various aspects of their culture that have been of special significance for the modern world. These courses presuppose no knowledge of the Greek or Latin languages and are open without prerequisites to all students.

REQUIREMENTS AND RECOMMENDATIONS FOR MAJORS

Greek or Latin may be offered as the major subject either in course or in honors work. Major students in course are normally required to complete during the first two years either Intermediate Greek (course 11-12) or Introduction to Latin Literature (course 11-12). Both of these courses are prerequisite for honors seminars for a major student and one of them for honors seminars for a minor student. The course in Ethics (Philosophy 11) and a course in the history of either Greek or Rome are also recommended for major students either in Course or in Honors work.

Major students in Honors work may substitute for one of the four seminars normally required in this department either the seminar in Plato given by the Department of Philosophy or a thesis. Students of Latin may substitute a seminar in Greek for one of their seminars in Latin (or vice versa).

Greek

- 1-2. ELEMENTARY GREEK. Miss Cobbs. *Full Course*
The essentials of Greek grammar are covered and easy selections from Greek literature are read.
- 11, 12. INTERMEDIATE GREEK. Miss North, Mr. Shero. *Full Course*
Selections from Homer, a play of Euripides, and Plato's *Apology* are read.
- 13, 14. GREEK READING. Miss North. *Full Course*
The reading of some of the masterpieces of poetry and of prose, including selections from lyric poetry and from Herodotus and a play of Aeschylus or Sophocles, is supplemented by a survey of the history of Greek Literature. Credit is given for each semester. The course will be offered only when required.
- 15, 16. ADVANCED GREEK READING. Mr. Shero. *Full Course*
The works read are determined by the interests and needs of the members of the class but will usually include portions of Thucydides, some speeches of the Attic orators, and a comedy of Aristophanes. Credit is given for each semester. The course will be offered only when required.

* Absent on leave, first semester, 1955-56.

Latin

- 1-2. ELEMENTARY LATIN. Mr. Shero. *Full Course*
The course is designed for students who begin Latin in college or who are not prepared to enter Intermediate Latin, and it normally covers the equivalent of two years' work in secondary school. The course will be offered only when required.
- 3, 4. INTERMEDIATE LATIN. Miss North. *Full Course*
The course is primarily concerned with the reading of Virgil's *Aeneid*. For the benefit of students who have had only two years of preparatory Latin, a brief introductory period is devoted to a review of the fundamentals of Latin grammar. Credit is given for each semester.
- 11, 12. INTRODUCTION TO LATIN LITERATURE. Miss Cobbs, Miss North. *Full Course*
The course aims to give some conception of the scope and characteristic qualities of Latin literature. The reading includes selections from comedy and from Cicero's essays in the first semester and the *Odes* of Horace in the second. Credit is given for each semester. It is open to students who have had four years of preparatory Latin or who have completed Intermediate Latin.
13. CATULLUS AND ELEGY. Miss North. *Fall Semester*
A study of the poems of Catullus and the elegiac poets.
14. MEDIAEVAL LATIN. Miss North. *Spring Semester*
The reading done in this course consists of prose and verse selected chiefly from the writings of mediaeval Latin authors, with particular emphasis on history, philosophy, satire, and poetry. Some attention is given, early in the course, to Christian authors, such as Minucius Felix, St. Jerome, and St. Augustine, in order to clarify the transition from ancient to mediaeval modes of thought and expression.

Ancient History and Civilization

31. HISTORY OF GREECE. Mr. Shero. *Fall Semester*
The course is devoted to the study of the political and social history of the Greek states to the time of the Hellenistic kingdoms. This is preceded by a brief survey of the Oriental civilizations by which the Greeks were influenced. Special attention is given to the 6th and 5th centuries B. C. Considerable reading is done in the primary sources in translation. The course is normally given in alternate years and will be offered in 1956-57.
33. GREEK CIVILIZATION. Mr. Shero. *Fall Semester*
Special stress is laid on those aspects of Greek culture which have had most significance for the modern world, and a detailed study is made of some of the masterpieces of Greek art and of Greek literature (in translation). The course is given when there is sufficient demand.
34. HISTORY OF ROME. Mr. Shero. *Spring Semester*
The course is devoted to the study of the political and social history of Rome to the time of Constantine. Special attention is given to the last century of the Republic and the first century of the Empire. Considerable reading is done in the primary sources in translation.

35. CLASSICAL ARCHAEOLOGY. Mr. Shero.

The methods of archaeological investigation in general and the contributions of archaeology to our knowledge of Greek and Roman life and art are studied. A visit is paid to the University of Pennsylvania Museum. The course is given when there is sufficient demand.

36. GREEK LITERATURE IN TRANSLATION. Miss North. *Spring Semester*

The works read in this course include the *Iliad* and the *Odyssey*, much of Greek tragedy and comedy, selections from the historians, the lyric and elegiac poets, and the Ionian physicists, and, in its entirety, the *Republic* of Plato. These works are considered both from the point of view of literary criticism and in relation to their influence on the development of western thought.

37. LATIN LITERATURE IN TRANSLATION—CLASSICAL AND MEDIAEVAL. Miss North. *Fall Semester*

The works studied in this course range in time from the age of the Roman Republic to the twelfth century after Christ and are selected from those masterpieces written in the Latin language, which possess significance for the history and literature of Western Europe, and which retain their value when read in translation. They include, from the classical period, such major authors as Cicero, Lucretius, Virgil, Livy, and Seneca; from the Latin Fathers, St. Jerome and St. Augustine; and from the Middle Ages, Boethius, Prudentius, Bede, the chief figures of the Carolingian Renaissance, and the writers of Mediaeval Latin hymns and secular poetry. The course is given when there is sufficient demand.

39. CLASSICAL MYTHOLOGY IN LITERATURE AND ART. Mr. Shero. *Fall Semester*

The course is designed to give familiarity with those myths and legends that have served as material for writers and artists from ancient times to the present. Plays, both ancient and modern, based on the more influential myths are read, and a study is made of the manner in which the themes have been handled in painting and sculpture of various periods. Special attention is given to the use made of stories from mythology by recent writers. The course is given when there is sufficient demand.

X. GREEK AND LATIN NOMENCLATURE. Miss North. *Fall Semester*

This course is designed to assist students of the biological sciences in understanding terminology derived from Greek and Latin. Principles of word formation, the meaning of common roots, the nature of combining forms, and rules for English pronunciation are stressed. The class meets one hour a week and is not counted towards a degree.

HONORS SEMINARS

101. LATIN LANGUAGE. Miss North.

This seminar serves as an introduction to classical philology, stressing the study of the Latin language in its development from Indo-European to the Vulgar Latin period. It also includes practice in reading and writing Latin, and an introduction to epigraphy and palaeography. The seminar is given in the fall semester.

102. LATIN HISTORIANS. Mr. Shero.

This seminar combines a survey of Latin historical writing to the end of the Silver Age with intensive study of selected books of Livy and Tacitus. The seminar is given in the spring semester.

103. LATIN EPIC. Miss North.

This seminar traces the development of Roman epic poetry, with particular emphasis on the *De Rerum Natura* of Lucretius and the *Aeneid* of Virgil. Some attention is also given to early Roman epic, as represented by the *Annales* of Ennius, and to the period of its decline, typified by Lucan's *Pharsalia*. The seminar is given in the fall semester.

104. LATIN COMEDY AND SATIRE. Mr. Shero.

Representative comedies of Plautus and Terence are read, and a study of the *Satires* and *Epistles* of Horace and the *Satires* of Juvenal is supplemented by a general survey of the development of Roman satire. The seminar is given in the spring semester and will be offered in 1955-56.

In addition, seminars in Greek literature and in particular periods of ancient history will be offered when required.

Economics

PROFESSORS: CLAIR WILCOX, *Chairman* †

EDWARD K. CRATSLEY

FRANK C. PIERSON

ASSOCIATE PROFESSOR: JOSEPH W. CONARD

ASSISTANT PROFESSORS: WILLIS D. WEATHERFORD *

WILLIAM H. BROWN, JR.

LECTURER: HELEN M. HUNTER

The courses in economics are designed: first, to acquaint the student with the institutions and the processes through which the business of producing, exchanging, and distributing goods and services is organized and carried on; second, to train him in the methods by which the operation of these institutions and processes may be analyzed; and third, to enable him to arrive at informed judgments concerning relevant issues of public policy.

Course 1-2 is prerequisite to all other work in the department except course 3. Students intending to major in economics are normally required to take course 3 and are also advised to take Political Science 1-2. Sophomores are not permitted to take courses 50 to 60, inclusive, unless they will be unable to fit them into their programs during the last two years. Majors in course are required to take courses 50 and 51 in the junior year. Majors in honors are advised to take seminar 103 and either 101 or 102.

1-2. INTRODUCTION TO ECONOMICS. Messrs. Brown, Conard, Pierson, Weatherford, Wilcox and Mrs. Hunter. *Full Course*

This course is designed both to afford the general student a comprehensive survey of the field and to provide students doing further work in the department with a foundation upon which to build. It explains the organization and operation of free, planned, and mixed economies and analyzes the major problems involved in the allocation of resources, the distribution of income, the maintenance of industrial stability, and the provision of social security, and in international economic relationships.

3. INTRODUCTION TO ACCOUNTING AND STATISTICS. Mr. Cratsley and Mrs. Hunter. *Spring Semester*

It is the purpose of this course to equip the student with the rudiments of accounting that he will need to employ in his advanced courses and seminars in economics, and to provide him with an elementary knowledge of statistical methods in order to enable him to appraise the statistical materials that he will encounter in his later work.

11. ECONOMIC DEVELOPMENT. Mr. Wilcox. *Fall Semester*

An analysis of the factors affecting economic growth: natural resources, labor, technology, capital formation, economic organization, cultural influences, and political and social institutions. An examination of the process of economic development, in the past, in Great Britain, in Western Europe, in the United States, in Japan, and in the Soviet Union. A study of the means of promoting the future economic development of underdeveloped countries. An appraisal of the prospects for continued economic growth in the United States.

† Absent on leave, second semester, 1955-56.

* Absent on leave, first semester, 1955-56.

50. ECONOMIC THEORY. Mr. Conard. *Fall Semester*
The determination of prices in economic theory and in business practice. The distribution of income. Determinants of the level of income and employment.
51. MONEY AND BANKING. Mrs. Hunter. *Spring Semester*
The organization and operation of the commercial banking system in the United States. Central banking and the Federal Reserve system. Monetary policy and economic stability.
52. PUBLIC FINANCE. Mr. Brown. *Fall Semester*
The revenues and expenditures of Federal, state, and local governments. The principles of taxation and borrowing. Budgetary control and debt management. Fiscal policy and economic stability.
Not offered in 1955-56.
53. BUSINESS ADMINISTRATION. Mr. Cratsley. *Fall Semester*
The problems which confront the business executive. Internal organization and management. Marketing and merchandising. Risk, speculation, and insurance. Case studies of business policy.
54. BUSINESS FINANCE. Mr. Brown. *Spring Semester*
Corporate organization and finance. Investment banking and the securities markets. Financial policy and economic stability.
55. LABOR PROBLEMS. Mr. Pierson. *Fall Semester*
The structure and functions of labor unions. Employer approaches to labor relations. Analysis of wage policies. Governmental control of labor relations.
56. SOCIAL ECONOMICS. Mr. Weatherford. *Spring Semester*
An examination of the extent, consequences, and causes of poverty, insecurity, and inequality. An appraisal of economic reforms; social insurance, medical care, housing, the social use of the taxing power, the "welfare state."
- 57, 58. PUBLIC CONTROL OF BUSINESS. Mr. Wilcox.
Fall semester: competition and monopoly in American industry, enforcement and interpretation of the anti-trust laws, delivered pricing, the patent system, regulation of extractive industries and distributive trades. *Spring semester:* regulation of municipal utilities, transportation, communications; American agricultural policy; control of prices in war-time; public ownership and operation of industry.
Not offered in 1955-56.
59. BUSINESS CYCLES. Mr. Pierson. *Spring Semester*
Theories of business fluctuations. Applications of modern income theory to business cycles. Patterns of cyclical behavior and of long-term economic change. Implications for public policy. Prerequisite: Economics 51.
60. INTERNATIONAL ECONOMICS. Messrs. Conard and Wilcox. *Fall Semester*
The theory and practice of international trade. The balance of payments, foreign exchange, national commercial policies, international investment; relations between free and controlled economies.

HONORS WORK

101. FINANCE AND FISCAL POLICY. Mr. Brown. *Spring Semester*
Corporation finance, investment banking, insurance, the securities and commodities exchanges, public regulation of financial practices. The expenditures and revenues of federal, state, and local governments, the principles of taxation and borrowing. Fiscal policy and economic stability.
102. MONETARY ECONOMICS AND BUSINESS FLUCTUATIONS. Mr. Pierson. *Fall Semester*
The monetary framework of capitalism. Theories of commercial and central banking. Income and employment in the Keynesian system. Causes of cyclical instability and long-term change.
103. ECONOMIC THEORY. Messrs. Conard and Brown. *Each Semester*
Contemporary economic theory: price determination, the functional distribution of income, the level of employment. The function served by economic theory for Smith, Marx, and contemporary students. Criticism of theory in the light of empirical studies and simplifying assumptions.
104. PUBLIC CONTROL OF BUSINESS. Mr. Wilcox. *Fall Semester*
The anti-trust laws, the patent system, price discrimination, delivered price systems, resale price maintenance. The control of prices and production in agriculture, bituminous coal, petroleum and urban markets for fluid milk. Public regulation of municipal utilities, transportation and communications. Price control in war-time. The public ownership and operation of industry.
105. INTERNATIONAL ECONOMICS. Messrs. Conard and Wilcox. *Fall Semester*
The theory of international trade. Monetary problems, cyclical fluctuations, and international monetary cooperation. Restrictionism and discrimination, cartels, commodity problems, shipping, aviation and telecommunications. Relations between free and controlled economies. Post-war reconstruction, economic development and international investment. International economic organization.
106. LABOR AND SOCIAL ECONOMICS. Mr. Weatherford. *Spring Semester*
Poverty, inequality, and insecurity. Labor legislation, organization, collective bargaining, wage-policy and the public control of labor relations. Public assistance, social insurance, medical care, housing, free income and the social use of the taxing power. Regional planning. The "welfare state."

THESIS

A thesis may be substituted for a course or a seminar under exceptional circumstances and by special arrangement.

Division of Engineering

JOHN D. MCCRUMM, *Chairman*

*(The staff members of the Division of Engineering
are listed under their respective departments)*

The engineering profession of today requires of its followers skill and resourcefulness as well as an integrated and thorough education in the natural and social sciences. The educational plan of the Division has been prepared with these requirements in mind. The objective of our program is to train the student professionally while providing the foundation of a liberal education. This is accomplished by educating the student in the professional disciplines of the engineer, such as critical analysis, humanistic studies, and the communication of ideas, as well as training in the techniques of the engineering sciences. Specifically, the three Engineering Departments intend that each student shall (1) master the fundamental concepts of Engineering; (2) extend this mastery in the field of Civil, Electrical or Mechanical Engineering with a view to later professional practice; (3) obtain a sufficient amount of general education to enable him to understand how his engineering activities fit into the great purposes of society.

A student who intends to major in Engineering * follows a common course of study for the first two years. This course adheres as far as possible to the general college program for freshmen and sophomores (see page 53), and prepares the student for his professional work of the junior and senior years. At the end of the sophomore year, the student may enter his major field of Civil, Electrical, or Mechanical Engineering. The last two years are largely spent in his major field. The three curricula of the Engineering Departments lead to the degree of Bachelor of Science; these curricula are accredited by the Engineers' Council for Professional Development.

Each curriculum provides that the student of Engineering will take about one-fifth of his work in the Divisions of the Humanities and Social Sciences, one-fourth of his work in the Departments of Chemistry, Mathematics, and Physics, and the remainder of his work in the three Departments of Engineering. All students devote their last two years: (1) to certain basic courses required of all engineers; (2) to fulfilling the major requirements of one of the departments of Engineering; (3) to developing their special interests. It is possible for students in any of the three departments whose interests lie also in the field of administration, physics, mathematics, chemistry, etc., to follow a special program integrating the two areas of study, as for example, Engineering and Physics or Engineering and Pre-medical studies.

The basic engineering program is outlined on the pages following. First is given the detail of the curriculum for the freshman and sophomore years. Modifications in this program may be made in individual cases, but it is essential that this body of work be completed before the junior year. Next follows a description of certain general courses in engineering open to all students. This is followed by an outline of the curriculum and a description of the courses offered by each major department.

* High school students intending to enter Engineering should take algebra, advanced algebra, plane and solid geometry, and trigonometry in secondary school.

OUTLINE OF THE BASIC ENGINEERING CURRICULUM FOR THE FIRST TWO YEARS

First Semester

English Literature
Chemistry
First Year Mathematics
Engineering Drawing
Surveying I
Social Science Elective

Second Semester

Freshman Year

English Composition
Chemistry
First Year Mathematics
Descriptive Geometry
Surveying II
Social Science Elective

Sophomore Year

Physics
Calculus
Statics
Materials & Shop Processes
Non-technical Elective

Physics
Calculus
Dynamics
Electric & Magnetic Circuits
Non-technical Elective

GENERAL COURSES

- GE1. ENGINEERING DRAWING. Mr. Morrill and Mr. Prager. *Fall Semester*
Instruction in the use of drafting equipment; study of fundamental principles of engineering drawing; practice through rendering of detailed elements and machine assembles; lettering and sketching. Required for freshman engineers. Open to all students.
Two three-hour periods per week.
- GE2. DESCRIPTIVE GEOMETRY. Mr. Morrill and Mr. Prager. *Spring Semester*
An extension of the basic conception of orthographic projection as applied to the location and definition in space of three-dimensional structures; analysis of the geometric relation of distances, angles, intersections of lines and planes; development of surfaces; emphasis upon practical applications of descriptive geometry in the various fields of engineering. Required for freshman engineers. Open to all students who have had GE1 or equivalent.
Two three-hour periods per week.
- GE11. MATERIALS AND SHOP PROCESSES. Staff. *Each Semester*
Study of elementary metallurgy of ferrous and non-ferrous materials; investigation in the laboratory of various engineering materials as they are affected by stress, temperature, and heat treatment; analysis of purposes and practice in use of machine tools with emphasis on their performance with the variety of materials used in manufacturing processes.
Three class periods per week; two three-hour laboratories each week.
- GE51. INDUSTRIAL MANAGEMENT. Mr. Cope. *Spring Semester*
Study of organization and management of industrial enterprises; historical background and evolution of present-day scientific practices; significance of arrangement of physical plant, production control, financial policies, wage payment, and personnel relations. Open to all students.
Three class periods per week; one three-hour laboratory each week.
- GE57. ENGINEERING ECONOMY. Mr. Carpenter. *Spring Semester*
A study of the methods of determining the relative economy of engineering alternatives; compound interest and the calculation of annual cost, present worth and prospective rates of return. A method of analysis which the engineer uses when he investigates a proposed course of action to decide whether it will prove to be economical. Open to all students.
Three class periods per week; one three-hour laboratory each week.

Civil Engineering

PROFESSOR: SAMUEL T. CARPENTER, *Chairman*

ASSISTANT PROFESSORS: ROY F. LINSENMEYER

CHARLES W. NEWLIN

MERTON J. WILLIS †

INSTRUCTOR: CLARK P. MANGELSDORF

The work of the Civil Engineer involves design, research, management, and construction, in the following fields: buildings, bridges, aircraft, soils and foundations, hydraulics and hydroelectric power, city and regional planning, sanitation and public health, highways, airports, railways, and other projects of a public or private nature, with their economic justification. The basic curriculum also provides a foundation for those interested in aeronautical structures, architectural engineering, and naval architecture.

Emphasis is placed on the broad scientific and humanistic education required for an understanding of fundamental principles, based on the conviction that those possessing such a background will contribute most to the future progress of the profession.

Students may elect to enter the Civil Engineering honors program at the beginning of the junior year, although the establishment of an honors seminar depends upon the number of students who wish to enroll. Excellent facilities and opportunities are available to students who may wish to do research as part of their educational program.

STANDARD PROGRAM FOR COURSE STUDENTS

<i>Fall Semester</i>	<i>Junior Year</i>	<i>Spring Semester</i>
CE51 Mechanics of Materials	CE52 Structural Theory	
EE51 Electrical Apparatus	EE52 Instrumentation and Control	
ME51 Thermodynamics I Elective	ME54 Fluid Mechanics Elective	
	<i>Senior Year</i>	
CE53 Civil Engineering Design I	CE54 Adv. Structural Theory	
CE55 Soil Mechanics and Foundations	CE57 Civil Engineering Design II	
CE56 Sanitary Engineering Elective or Thesis	GE57 Engineering Economy Elective or Thesis	
CE1 SURVEYING, I. Mr. Newlin, Mr. Mangelsdorf.		<i>Fall Semester</i>
A study of the basic procedures used in making surveys for engineering work, including the use, care, and adjustment of instruments, note keeping, linear and angular measurements, leveling, traversing, stadia surveys, topographic mapping, calculation of areas, and drafting room methods. Open to all students who have had trigonometry in high school or college. (1 recitation and 1 3-hour laboratory per week.)		
CE2 SURVEYING, II. Mr. Newlin, Mr. Mangelsdorf.		<i>Spring Semester</i>
A continuation of CE 1, covering celestial observations, preparation of profiles and maps from field notes, elements of photogrammetry, highway curves and earthwork, plane table surveys, and land surveying.		
Prerequisite: CE 1. (1 recitation and 1 3-hour laboratory per week.)		

† Absent on leave, 1955-56.

CE11 STATICS. Mr. Carpenter, Mr. Mangelsdorf. *Fall Semester*

Concept and definition of force, scalar, and vector quantities; combination and resolution of forces; principle of moments and couples; graphical and analytical conditions for equilibrium; stress diagrams, cables; centroids of areas, volumes, and masses; area and volume theorems. Open to students who have taken Mathematics 1 and 2. (3 recitations and 1 3-hour laboratory per week.)

CE12 DYNAMICS. Mr. Linsenmeyer, Mr. Newlin. *Spring Semester*

Principles of dynamics, motion of a particle, Newton's laws, general equation of motion, rectilinear motion, displacement, velocity, speed, and acceleration; simple harmonic motion, free and forced vibration; inertia forces, work and energy, momentum and impulse; curvilinear motion; kinetic energy of rotation; balancing of rotating bodies; relative motion, angular momentum; combined translation and rotation.

Prerequisite: CE11 and Mathematics 11. (3 recitations and 1 3-hour laboratory per week.)

CE51 MECHANICS OF MATERIALS. Mr. Carpenter, Mr. Linsenmeyer, Mr. Newlin. *Fall Semester*

This course deals with the internal stresses and changes of form which always occur when forces act upon solid bodies. The mechanics involved in the design of simple engineering structures is presented so that the student may realize the problems which must be solved in order to secure the required strength and stiffness in such structures. The laboratory work of this course is planned to clarify the theoretical considerations of beams, columns, combined stress, torsion and methods of strain measurement.

Prerequisite: CE11, Statics, and Mathematics 12. (3 recitations and 1 3-hour laboratory per week.)

CE52 STRUCTURAL THEORY. Mr. Linsenmeyer, Mr. Newlin. *Spring Semester*

Analysis of determinate and indeterminate structures. A study of stresses in truss and rigid frame systems, influence lines.

Prerequisite: CE51 Mechanics of Materials. (3 recitations and 1 3-hour laboratory per week.)

CE53 CIVIL ENGINEERING DESIGN—I. Mr. Carpenter, Mr. Linsenmeyer. *Fall Semester*

An introduction to the design of structures. Fundamental stress analysis, considerations of structural members and connections for metallic, concrete, and timber structures, including buildings, bridges, and aircraft.

Prerequisite: CE52 Structural Theory or equivalent. (3 recitations and 1 3-hour laboratory per week.)

CE54 ADVANCED STRUCTURAL THEORY. Mr. Carpenter. *Spring Semester*

A study of complex indeterminate structural systems and advanced mechanics of materials. Photoelasticity and the study of structural models.

Prerequisite: CE52 Structural Theory. (3 recitations and 1 3-hour laboratory per week.)

CE55 SOIL MECHANICS AND FOUNDATIONS. Mr. Linsenmeyer, Mr. Newlin. *Fall Semester*

The principles of soil mechanics as related to the structural stability of soils under internal and external force systems. Foundations for buildings, bridges, highways, and airports are extensively treated. Research in soil mechanics. (3 recitations and 1 3-hour laboratory per week.)

CE56 SANITARY ENGINEERING. Mr. Linsenmeyer. *Fall Semester*

The activities of the sanitary engineer, including the development and purification of water supplies; sewerage and sewage disposal. Also relates sanitary engineering to the broad field of public health, and includes subjects dealing with hydrology and advanced hydraulics.

Prerequisite: ME54 Fluid Mechanics. (3 recitations and 1 3-hour laboratory per week.)

CE57 CIVIL ENGINEERING DESIGN—II. Mr. Carpenter, Mr. Linsenmeyer, Mr. Newlin. *Spring Semester*

A continuation of Civil Engineering Design I. Planning, analysis, and design of engineering structures and foundations. Additional topics in concrete with ordinary and pre-stressed reinforcement. Stress analysis.

Prerequisite: CE53 Civil Engineering Design—I. (3 recitations and 1 3-hour laboratory each week.)

CE58 CIVIL ENGINEERING ELECTIVE. Staff. *Spring Semester*

Elective course with subject dependent on a group need or interest. Past groups have studied advanced soil mechanics, theory of elasticity, transportation, or advanced hydraulics. Available only on request, and as deemed practicable, to second semester senior students.

CE69 CIVIL ENGINEERING THESIS. Staff.

The time allotted to a civil engineering thesis is generally one semester. The subject matter of the thesis must be approved by the department chairman six weeks before the beginning of the semester. Excellent facilities exist for independent investigations in structures, soils, and materials.

Electrical Engineering

PROFESSORS: HOWARD M. JENKINS, *Chairman*
JOHN D. MCCRUMM

ASSISTANT PROFESSOR: CARL BARUS

INSTRUCTOR: GARWOOD M. RODGERS

Electrical Engineering deals largely with the development and application of precise notions of electricity and its allied physical sciences in the broad field of the conversion, transmission, control, and utilization of electrical energy for the purposes of transmitting power and communicating intelligence. The program in Electrical Engineering gives full recognition to the natural sciences basic to the profession, and includes considerable work in the Humanities and Social Sciences, since the needs of the profession are best served by engineers who are vitally aware of the society in which they work.

The educational objectives of the Department are to provide the student with a thorough understanding of the fundamental principles of the natural sciences related to Electrical Engineering, and to inculcate in the student the confidence to apply these principles to new situations. Considerable emphasis is placed on the experimental evidence underlying these fundamentals, and mathematical methods are used to facilitate the application of these principles. Since most engineering problems can be solved only by making certain simplifications, the student is encouraged to examine problems critically and to make such simplifying assumptions as are possible without destroying the significance of the results. The importance of the presentation of work is also stressed, the student being required to gain some proficiency in communicating the results of his work clearly, completely, and in a well organized form.

The courses in Electrical Engineering are such a series of inquiries dealing with fundamental concepts of electrical phenomena. The common aim is to carry the student to such a point that he will understand the basic sciences involved and can apply this knowledge to the problems of his later professional practice.

Unless specifically modified, the requirements for course students are listed below; it is expected that majors will maintain a "C" average or better in the required electrical courses.

STANDARD PROGRAM FOR COURSE STUDENTS

First Semester

EE53 A. C. Circuit Theory
EE55 Engineering Analysis I
CE51 Mechanics of Materials
ME51 Thermodynamics I

Second Semester

EE54 Electrical Machinery I
EE56 Engineering Analysis II
ME54 Fluid Mechanics
Elective

Junior Year

Senior Year

EE57 Electrical Machinery II
EE59 Electronics I
EE61 Network Theory
Elective

EE60 Electronics II
EE62 Field Theory
Technical Elective
Elective

EE12 ELECTRIC AND MAGNETIC CIRCUITS.

Spring Semester

The experimental basis of electricity and magnetism; elementary electrostatics and magnetostatics; voltage, current power, energy. Bilateral and linear networks with constant driving voltages. Induced electromotive forces; capacitance and inductance; elementary problems in ferro-magnetism.

Three class periods per week; one laboratory each week.

Prerequisites: Physics 1 and to be preceded or accompanied by Integral Calculus.

EE51 ELECTRICAL APPARATUS.

Fall Semester

Theory of direct-current generators and motors; fundamentals of control for direct current machines. Topics include flux, generated voltage, armature reaction, commutation, torque, speed, voltage and speed regulation, losses, efficiency, and effects of control on motor characteristics. Relations of simple harmonic electromotive forces and currents, power, power factor; single phase circuits; polyphase circuits, balanced and unbalanced. The construction, characteristics, and operation of alternators, induction motors, transformers, synchronous motors.

Three class periods per week; one laboratory each week.

Prerequisite: EE12 Electric and Magnetic Circuits.

EE52 INSTRUMENTATION AND CONTROL.

Spring Semester

A study of the fundamentals of electronics and electronic circuits, control and regulation devices, particularly those involved in measuring systems and in servo-mechanisms; designed primarily for engineering majors.

Three class periods per week; one laboratory each week.

Prerequisite: EE51 Electrical Apparatus.

EE53 ALTERNATING CURRENT CIRCUIT THEORY.

Fall Semester

A systematic study of single and polyphase electric circuits under steady state conditions.

Three class periods per week; one laboratory each week.

Prerequisite: EE12 Electric and Magnetic Circuits.

EE54 ELECTRICAL MACHINERY I.

Spring Semester

Physical aspects of electromechanical energy conversions; conversions and principles of such conversions; basic concepts of machine performance and the analysis of rotating electrical machinery and transformers; D-C machines, analysis of performance and applications.

Three class periods per week; one laboratory each week.

Prerequisite: EE53 A.C. Circuit Theory.

EE55 ENGINEERING ANALYSIS I.

Fall Semester

Formulation and application of the method of engineering analysis based upon fundamental physical laws, mathematics, and practical engineering considerations. Emphasis is placed on the professional approach to the analysis of new, bona fide engineering problems. A study is made of the common physical and mathematical aspects shared by different systems such as mechanical, thermal, electrical and acoustical. The theory and application of ordinary differential equations is systematically covered.

Three class periods per week; one laboratory each week.

Prerequisites: EE12 Electric and Magnetic Circuits, and Integral Calculus.

EE56 ENGINEERING ANALYSIS II.

Spring Semester

Further analysis of physical systems, employing the following branches of mathematics: Gamma and Bessel functions, Fourier series and other infinite series, partial differential equations, and boundary value problems, conformal mapping, dimensional analysis, the Laplace transform.

Three class periods per week.

Prerequisite: EE55 Engineering Analysis I.

EE57 ELECTRICAL MACHINERY II.

Fall Semester

Synchronous machines, performance, effects of saturation and saliency; poly-phase induction machines; fractional horsepower motors; rotating control devices; self-synchronous machines; electrical transients and the dynamics of coupled systems.

Three class periods per week; one laboratory each week.

Prerequisite: EE54 Electrical Machinery I.

EE59 ELECTRONICS I.

Fall Semester

A study of the physical principles and circuit behavior of electronic devices, including vacuum tubes, semiconductor devices, gas tubes, photoelectric devices, etc.

Three class periods per week; one laboratory each week.

Prerequisite: EE53 A.C. Circuit Theory, or equivalent.

EE60 ELECTRONICS II.

Spring Semester

Further study of the analysis and design of electronic circuits.

Three class periods per week; one laboratory each week.

Prerequisite: EE59 Electronics I.

EE61 NETWORK THEORY.

Fall Semester

General network analysis; network theorems; four-terminal networks; filters; introduction to network synthesis; transmission lines.

Three class periods per week; one laboratory each week.

Prerequisites: EE53 A.C. Circuit Theory, and EE56 Engineering Analysis II, or equivalents.

EE62 FIELD THEORY.

Spring Semester

An analytical study of static electric and magnetic fields, time-varying electromagnetic fields, wave propagation and reflection, wave guides, antennas.

Three class periods per week; one laboratory each week.

Prerequisites: EE53 A.C. Circuit Theory, and EE56 Engineering Analysis II, or equivalents.

EE63 ELECTRICAL INSTRUMENTATION.

Fall Semester

Designed primarily for students in chemistry, biology, psychology, and other non-engineering fields who may have occasion to use electrical techniques in their work. Subject matter includes an introduction to the fundamental concepts of electricity, electric circuit analysis, electrical measurements, electronic devices and their application in measurement and control circuits.

Three class periods per week; one laboratory each week.

Prerequisite: Physics 1-2.

EE71 ELECTRICAL ENGINEERING THESIS. Staff.

An engineering thesis may be substituted for a course or for the examination on the subject matter covered in a seminar, by special arrangement with the staff.

HONORS

The four following seminars are offered by the Department to prepare in part for examinations for a degree with Honors. Students who plan to take honors seminars in Electrical Engineering should note that Circuit Theory is a desirable preparation for Electronics (although not a prerequisite if a Seminar in Electricity and Magnetism has been taken). Adequate training in electrical machinery, and the Circuit Theory seminar or its equivalent, are prerequisites for the seminar in Servomechanisms. Some knowledge of A.C. Circuit Theory is a prerequisite for the Machinery Seminar.

101. CIRCUIT THEORY.

Transient and steady-state analysis of electrical networks. Mathematical tools such as complex algebra, matrix algebra, and the Laplace transformation are used in the study of single and polyphase circuits, network theorems, the general four-terminal network, electric filters, and transmission lines. An introduction to network synthesis from pole and zero locations in the complex plane is included. The seminar is accompanied by a full-day laboratory.

102. ELECTRONICS.

A study of electronic devices and circuits. Subject matter includes physical theory of electron tubes, semiconductor devices, and other electronic circuit elements; design of electronic circuits applicable to communications, instrumentation, information processing systems, etc.; transient and steady-state analysis of electronic circuits and systems; introductory topics in the theory of communication and information; microwave tubes. The seminar is accompanied by a full-day laboratory.

103. SERVOMECHANISMS.

A systematic investigation of the characteristics of closed cycle control systems and their components. The mechanisms may be any combination of electrical, thermal, mechanical or hydraulic systems. Synthesis rather than analysis is stressed thus requiring use of the more powerful methods of the Laplace transform, and a study of transfer function loci and equations in the complex domain. Modern techniques are employed; extensive reading in the literature is expected of each student. There is one full-day laboratory per week, in addition to the seminar.

104. MACHINERY.

An intensive study of the basic aspects shared in common by transformers and rotating electrical machinery. A further study of the operating characteristics and the engineering application of electrical machines as specific direct current and alternating current devices. There is one full-day laboratory per week, in addition to the seminar.

Mechanical Engineering

PROFESSOR: WILLIAM J. COPE, *Chairman*

ASSOCIATE PROFESSOR: BERNARD MORRILL

ASSISTANT PROFESSORS: FREDERICK S. BURRELL

PHILIP C. PRAGER

The curriculum in Mechanical Engineering is planned to develop the student through scientific training for positions in manufacturing industries, with organizations engaged in power production, and in the field of transportation. Based upon the fundamental sciences of physics, chemistry, and mathematics, the program aims to provide a background for the solution of the variety of problems related to the design, construction and operation of engineering equipment used in industrial establishments. The arrangement of courses is intended also to prepare mechanical engineers for such activities as those which deal with fabrication of products and the eventual assumption of managerial responsibilities, as well as research and development work leading to new products.

Coincident with the need for a broad and fundamental technical training, all of the engineering profession should be conscious of the impact upon society resulting from their efforts. To stimulate this awareness, students are encouraged to choose electives in the Humanities and Social Sciences throughout their undergraduate careers.

STANDARD PROGRAM FOR COURSE STUDENTS

Fall Semester

Spring Semester

Junior Year

CE51 Mechanics of Materials
EE51 Electrical Apparatus
ME51 Thermodynamics I
EE55 Engineering Analysis

EE52 Instrumentation and Control
ME52 Thermodynamics II
ME54 Fluid Mechanics
Elective

Senior Year

ME53 Thermodynamics III
ME55 Adv. Fluids and Heat Transfer
ME63 Kinematics and Design
Elective

ME62 Adv. Strength of Materials
ME64 Engineering Design
GE51 Industrial Management
Elective

ME51 THERMODYNAMICS I. Mr. Prager, Mr. Burrell.

Energy and first law of thermodynamics; application of general energy equation to steady-flow and non-flow processes; properties of liquids; vapors, gases, mixtures; reversible cycles; second law of thermodynamics; entropy.

Three class periods per week; one three-hour laboratory each week.

Prerequisite: Integral Calculus.

ME52 THERMODYNAMICS II. Mr. Cope.

Extension of ME51; analysis of steam cycles basic to modern power plant practice; heat balance calculations; flow of elastic fluids through nozzles and orifices; combustion; air-conditioning; refrigeration. Study of application of fundamental principles as exemplified in steam power stations with emphasis upon design and test of fuel firing equipment, furnaces, boilers, air preheaters, economizers; auxiliary equipment such as pumps, condensers, fans. Class and laboratory investigations supplemented by field trips.

Prerequisite: ME51.

ME53 THERMODYNAMICS III. Mr. Prager.

Extension of ME51 and ME52; analysis of gas cycles basic to internal combustion engine practice; behavior of real gases and mixtures; general thermodynamic equations; combustion of liquid and gaseous fuels; gas compression. Study of application of fundamental principles as demonstrated in design, test and operation of spark-ignition and compression-ignition engines, gas turbines and compressors. Class and laboratory investigations supplemented by field trips.

Prerequisites: ME51 and ME52.

ME54 FLUID MECHANICS. Mr. Prager, Mr. Burrell.

An introductory course in fluid statics; kinematics; equation of continuity; steady flow energy and momentum; dynamics of an ideal fluid; dimensional analysis and similitude; incompressible flow in closed conduits and compressibility phenomena. Three class periods per week; one three-hour laboratory each week.

Prerequisites: Integral Calculus, ME51 Thermodynamics.

ME55 ADVANCED FLUID MECHANICS AND HEAT TRANSFER. Mr. Burrell.

Theory of fluid mechanics in turbines, pumps, fans, jets, fluid couplings, fundamental principles of heat transfer by conduction, free and forced convection, radiation; parallel and counterflow heat exchangers; insulated pipes and related equipment; relation to practical engineering problems.

Three class periods per week; one three-hour laboratory each week.

Prerequisite: ME54 Fluid Mechanics.

ME62 ADVANCED STRENGTH OF MATERIALS. Mr. Burrell.

Review of stress and strain; torsion; bending; beams on elastic foundations; thick cylinders; failure of metals under stress; plastic flow; influence of stress concentration and working stresses.

Three class periods per week; one three-hour laboratory each week.

Prerequisite: EE55 Engineering Analysis.

ME63 KINEMATICS AND DESIGN. Mr. Morrill.

A study of the complex motions and velocities of machine linkwork and gearing; design of cams, screws, fastenings, belts, straight and curved frames, gears and shafting.

Three class periods per week; one three-hour laboratory each week.

Prerequisite: EE55 Engineering Analysis.

ME64 ENGINEERING DESIGN. Mr. Morrill.

Design of elements under rotational stress; various classifications of fits; vibration analysis leading to isolation and engine balancing; lubrication and bearing design; design of machine assemblies.

Three class periods per week; one three-hour laboratory each week.

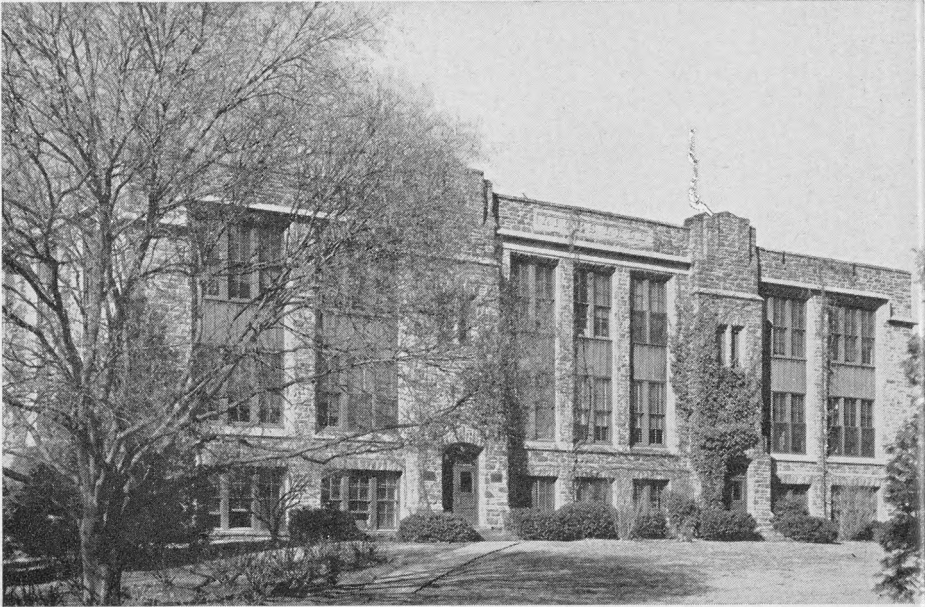
Prerequisite: ME63 Kinematics and Design.

ME71 MECHANICAL ENGINEERING THESIS. Staff.

With departmental approval, an undergraduate may undertake a thesis project as a portion of the program in the senior year.



Friends Meeting House



Hicks Hall, An Engineering Building



Commencement in Arthur Hoyt Scott Auditorium

HONORS

The following five seminars are offered by the Department of Mechanical Engineering as part of the students' preparation for examinations for a degree with Honors. Students who plan to take Honors seminars should note that Engineering Analysis is a desirable preparation for the seminars in Strength of Materials, Design, and Fluid Mechanics, and that the seminar in Thermodynamics is also a prerequisite for that in Fluid Mechanics.

ME101 THERMODYNAMICS.

A study of energy and the laws of thermodynamics with emphasis on the broader aspects of the subject and with applications to a wide variety of systems. The properties of liquids, vapors, gases and mixtures. Reversible cycles. Analysis of actual cycles and engineering machines. The seminar is accompanied by a full day laboratory each week.

ME102 STRENGTH OF MATERIALS.

A comprehensive study at both elementary and advanced levels of stress and strain in bending, shear and torsion. Elastic deformation; failure under stress, stress concentration, working stress and limit design. The seminar is accompanied by a full day laboratory each week.

ME103 MECHANICAL ENGINEERING DESIGN.

Motion, velocity and acceleration in linkwork and gearing. Design of cams, fastenings, gears, shafting and frames. Design of elements under rotational stress. Vibration analysis. Fundamentals of lubrication. Design of machine assemblies. The seminar is accompanied by a full day laboratory each week.

ME104 FLUID MECHANICS.

Compressible and incompressible subsonic and supersonic fluid flow. Energy and momentum. Dimensional analysis and similitude. Dynamics of an ideal fluid. Shock phenomena. Theory of fluid flow in turbines, pumps, fans, and jets. Free and forced convection in heat exchangers. The seminar is accompanied by a full day laboratory each week.

ME106 THESIS.

An individual thesis project involving some original investigation, analysis, or experimentation and a report. The exact program to be adjusted to individual needs.

English Literature

PROFESSORS: GEORGE J. BECKER, *Chairman*
EVERETT L. HUNT
ELIZABETH COX WRIGHT

ASSOCIATE PROFESSORS: BRUCE DEARING
FREDERIC S. KLEES
STEPHEN E. WHICHER †

ASSISTANT PROFESSORS: DAVID COWDEN
SAMUEL L. HYNES

INSTRUCTOR: LEE F. GERLACH

LECTURER: BARBARA PEARSON LANGE

This department might more properly be called the Department of Literature in English, since it offers a study both of literature originally written in the English language and of works translated from other tongues. Literature is considered as a fine art, as a cultural record, and as a guide to the student's interpretation of his own experience in life. The program of courses and seminars comprises four approaches to the subject: the intensive study of the work of major writers, examination of the literature produced in certain limited periods, the historical development of the major literary types, and the grouping of various types or forms on the basis of their subject matter or point of view. The general purposes of this study are the broadening of the student's understanding and enjoyment of literature, the development of a basis for intelligent criticism, and the provision of a foundation for further study in the field. Stress is also laid upon accurate reading and writing through critical explication of texts and criticism of student papers.

REQUIREMENTS FOR MAJORS IN COURSE

The work of the major in this department in course normally consists of at least four full courses in the department, including Modern Literature in the first year, either Chaucer or Milton in the second year, a full course or two half courses in one of the types (numbers 21-26 below) in the third year, and Shakespeare and the Senior Conference in the final year. The comprehensive examination at the close of the senior year is based on this work, but also includes questions on other courses offered by the department for those prepared in these fields. A reading list in English and American literature is given to all majors to act as a guide in the selection of courses and to independent reading in preparation for the Senior Conference. Majors are expected to take a semester's work in either Fine Arts or Music and are advised to take a semester's work in some foreign literature. Students expecting to do graduate work should acquire a reading knowledge in the languages required by the schools they propose to attend.

† Absent on leave, 1955-56.

COURSES

1. MODERN LITERATURE: Introduction to Literary Study. Staff. *Each Semester*
An introduction to the critical study of the four principal types of literature: poetry, drama, novel, and non-fictional prose. The materials are drawn chiefly from modern American literature for the purpose of emphasizing the relationship of literature to life through the study of works produced from backgrounds familiar to the student in terms of his own experience.
Prerequisite to all other literature courses offered by the department.
5. COMPOSITION. Staff. *Each Semester*
Training in the writing of non-fictional prose. Designed to meet the requirements of Engineering and Pre-Medical students. Other students admitted on the basis of need for this work.
6. ARGUMENT. Mr. Becker and Mr. Hunt.
The analysis and orderly presentation of large bodies of material in speech and writing. The work comprises a series of short analytical papers, a research paper of some magnitude, and a series of argumentative speeches. Admission only with consent of the instructor.
11. MILTON AND THE 17TH CENTURY. Mr. Hunt and Mrs. Wright. *Each Semester*
Paradise Lost, selections from Milton's shorter poems, *The Old Testament*, Bunyan's *Pilgrim's Progress*, and the lyrics of John Donne are read. Study is made of narrative, epic, and lyric writing, and the relationship of the literature to the thought of the period.
12. CHAUCER. Mr. Klees. *Each Semester*
Reading of *Troilus and Criseyde*, *The Canterbury Tales* and some of the minor poems in the original Middle English, with greater attention to the literary than to the linguistic aspects.
16. SATIRE. Mr. Dearing. *Spring Semester*
An historically oriented consideration of some of the principal satires in world literature, with emphasis upon interpretation and evaluation as literature.
17. SOCIAL CRITICISM. Mr. Becker. *Fall Semester*
The reactions of such major figures as Carlyle, Mill, Henry Adams, Bellamy and Morris to the changed conditions of life after the Industrial Revolution. An attempt is made both to analyze the social comment or protest in individual works and to explore the part that social forces play in modern literature.
- 21-22. ENGLISH POETRY. Mrs. Wright. *Full Course*
A survey of English poetry from its beginnings, with a study of the principles of poetic criticism and a detailed examination of the work of two or three poets. The first semester may stand alone, but new students are not admitted in the middle of the year. For upperclassmen only.
- 23, 24. THE ENGLISH NOVEL. Mr. Cowden.
The first semester covers the development of the English novel from Fielding to Trollope with emphasis on the chronicle form prevalent during this period. In contrast, the second semester emphasizes developments in technique and content from Meredith to the present day. Credit given for either semester, but students desiring both should take them in the regular sequence.
25. COMEDY. Mr. Klees. *Fall Semester*
Dramatic comedy in its various forms, English and American, with particular attention to the Elizabethan, Restoration, and modern periods.

26. TRAGEDY. Mr. Klees. *Spring Semester*
Dramatic tragedy from the *Agamemnon* trilogy to *Death of a Salesman*, with emphasis on Elizabethan and modern American tragedy.
30. MAIN CURRENTS OF AMERICAN THOUGHT. Mr. Whicher and Mr. Gerlach. *Fall Semester*
Texts such as Thoreau's *Walden*, essays by Emerson, and *The Education of Henry Adams* will provide a background in American ideas.
31. AMERICAN FICTION. Mr. Whicher and Mr. Gerlach. *Spring Semester*
Reading will include *The Scarlet Letter*, *Moby Dick*, *Huckleberry Finn*, *The American*, and *The Sound and the Fury*. English 30 a prerequisite.
32. AMERICAN POETRY. Mr. Whicher. *Spring Semester*
Major figures in the field such as Whitman, Dickinson, Robinson and Eliot. Prerequisite: English 30. Not offered in 1955-56.
33. CLASSICISM. Mr. Dearing. *Fall Semester*
A study of the nature and the implications for society of the system of values embodied in the literature of the late seventeenth and early eighteenth centuries. Chiefly English materials will be used, with appropriate reference to Horace and the French classicists.
34. ROMANTICISM. Mr. Becker. *Fall Semester*
The general modification of European sensibility as reflected in the literature of the late eighteenth and early nineteenth centuries. Not offered in 1955-56.
35. REALISM. Mr. Becker. *Spring Semester*
A study of realism as a literary movement. Beginning with *Madame Bovary*, the course traces the development of realistic techniques and concepts in Zola, in the Russians, and in American writers such as Norris and Dreiser.
42. SHAKESPEARE. Mr. Hynes. *Each Semester*
A study of the major plays. Not open to majors in this department.
43. MODERN POETS. Mr. Hynes. *Spring Semester*
An intensive study of the poetry of Yeats, Pound, and Eliot. Open only to upperclassmen.
44. HARDY, CONRAD, AND JOYCE. Mr. Cowden. *Spring Semester*
An intensive study of these three novelists.
Offered as an alternative to course 24 to upperclassmen who have had course 23.
- 51-52. SHAKESPEARE. Staff. *Fall Semester*
A study of the complete works of Shakespeare, tracing the development of his craftsmanship and ideas. Required of majors in this department, who meet weekly in small groups during the first semester of the senior year.
- 53-54. SENIOR CONFERENCE. Staff. *Spring Semester*
Group meetings of departmental majors held in the second semester of the senior year for the purpose of reviewing, integrating, and supplementing the student's course program.
56. LITERARY CRITICISM. Mr. Hunt. *Fall Semester*
The theories and doctrines of English literary criticism and their background.
- GREEK LITERATURE IN TRANSLATION (Greek 36).
- LATIN LITERATURE IN TRANSLATION (Latin 37).

WRITING AND SPEAKING

Students in need of training in Composition may be required to take tutorial work or to complete Course 5 before entering the junior year.

Instruction in Public Speaking is given weekly, by Mrs. Lange, in a non-credit course. Students are asked to prepare and deliver formal and informal speeches, introductions, presentations, and to take part in roundtable discussions. Frequent recordings of each student are made to aid in self-criticism.

Extra-curricular student groups for practice in creative writing, acting, and debating meet with members of the departmental faculty.

HONORS WORK

Prerequisites: The course requirements for a major in Honors are the same as for a major in course, Modern Literature and either Chaucer or Milton. The election of an additional course in the sophomore year is advised when the schedule permits it, and The History of England is also recommended.

For admission with a minor in this department, the requirement is one year of work, including Modern Literature.

Program: Majors in Honors must take four seminars in the department, including Shakespeare and one of the types seminars from Group II. Minors in Honors may enroll in any two or three of the seminars offered as may seem best suited to the purposes of their whole program.

Seminars: The following seminars prepare for examinations for a degree with Honors.

Group I

101. SHAKESPEARE. Mr. Becker, Mr. Cowden, Mr. Dearing, and Mr. Hynes.
Each Semester
A study of the mind and art of Shakespeare as dramatist and poet. The emphasis is on the major plays, with a more rapid reading of the remainder of his work. Students are advised to read through all of the plays before entering the seminar.
102. MILTON AND THE 17TH CENTURY. Mr. Hunt.
Fall Semester
Milton, Donne, and the poetry of the Bible.
103. CHAUCER. Mr. Klees.
Fall Semester
A study of Chaucer's poetry and age.

Group II

104. VICTORIAN POETRY. Mrs. Wright.
Spring Semester
The basic elements of poetic expression, thought, imagery, and sound are studied separately, and then brought together in the examination of four long poems.
105. CONTEMPORARY POETRY. Mr. Dearing.
Spring Semester
The poetic tradition since Yeats. Representative problems include contemporary poetic idiom, the restoration of the dimension of sound, and the alleged alienation of the poet from his society.
106. DRAMA. Mr. Klees.
Spring Semester
Survey of the development of the drama in England and America following a preliminary study of classic drama.

107. NOVEL. Mrs. Wright and Mr. Cowden. *Each Semester*
 Chiefly late 19th century. Principles of aesthetics applied to the novel form are developed from the study of selected novels outside the Victorian tradition.
109. RENAISSANCE POETRY. Mrs. Wright. *Spring Semester*
 The method of the seminar is the same as that of the Victorian Poetry seminar, which is given in alternate years. The poems studied are chosen from the Spenserian and Metaphysical strains, chiefly of the early seventeenth century.
 Not offered in 1955-56.

Group III

110. MODERN COMPARATIVE LITERATURE. Mr. Becker. *Fall Semester*
 Using the realistic movement as a starting point, this seminar considers some of the major themes and philosophic attitudes embodied in recent literature. The chief figures studied are Flaubert and Zola, Tolstoy and Dostoevsky, Kafka and Mann, Joyce and Faulkner.
114. ROMANTICISM. Mr. Whicher. *Fall Semester*
 The philosophic strain of romanticism as it moves from Continental writers through such English figures as Wordsworth, Coleridge and Carlyle, and such Americans as Emerson, Melville, and Whitman.
 Not offered in 1955-56.
115. AMERICAN LITERATURE SINCE 1860. Mr. Whicher. *Spring Semester*
 A study of the major writers in this field.
120. THESIS. Mrs. Wright. *Fall Semester*
 This seminar gives training in bibliography, selection of problems for critical writing, and leads to the presentation of a thesis. Students read and criticise each other's work at intervals and confer individually with the instructor.
130. LINGUISTIC SCIENCE. Mr. Reuning. (German.)
 Admitted as a seminar in English for majors who concentrate on English or American language problems; may also be considered as a minor for students majoring in the department.

Fine Arts

PROFESSOR: ROBERT M. WALKER, *Chairman*

ASSOCIATE PROFESSOR: HEDLEY H. RHYS

The aim of the Department is to study the historical-cultural significance and aesthetic value of architecture, sculpture, painting and graphic art (prints and drawings). Methods and problems of criticism are considered: observation, analysis, interpretation and evaluation. Instruction is given by means of original works of art as well as by the usual visual aids. Field trips are made to public and private collections in New York, Philadelphia, Baltimore and Washington and to significant examples of architecture in those areas.

Since it is the objective of the Department to foster an intelligent comprehension of the visual arts rather than to train professional artists, no courses in drawing, painting and sculpture are offered for credit. However, instruction in such work is available under the extracurricular Arts and Crafts Program.

REQUIREMENTS AND RECOMMENDATIONS

Prerequisites: Majors in course and majors and minors in honors must take the two half courses, Fine Arts 1 and 2. For other students the prerequisite for all advanced courses is one semester of the Introduction to Art History, either Fine Arts 1 or 2. Fine Arts 11, Design in Drawing and Painting, while not a prerequisite, is recommended as a foundation course for other Fine Arts courses and seminars.

Sequence of Courses: Whenever possible, majors will take courses in their numerical order. For other students courses need not be taken in numerical sequence.

Majors in Course: The program of a major consists of at least eight half courses (including Fine Arts 1-2) in the Department. The courses supporting this program depend on the needs of the individual student and may be found in both the Division of the Humanities and the Division of the Social Sciences.

Majors and Minors in Honors: Majors in honors take four seminars in the Department. In special cases the seminar in Aesthetics may be substituted for one in Fine Arts. A minor in honors usually consists of two seminars. The seminars offered in any one semester vary according to the requirements of the students and the convenience of the Department.

Language Requirements for Graduate Schools: Students are advised that graduate work in Fine Arts requires a knowledge of French or German.

COURSES

1. INTRODUCTION TO ART HISTORY. Mr. Rhys and Mr. Walker. *Fall Semester*
Consideration is given in the first four weeks to the basic problems of the nature of the work of art, the factors of influence upon its conception, formation, and development (geographic, social, economic, etc.), the principles of value judgments, and methods of analysis. A limited number of representative examples of architecture, sculpture, and painting are studied within the historical context of the civilizations and cultural epochs which produced them: Ancient Egypt, Greece and Rome, and Medieval France.
Three hours of lecture a week and one bi-weekly conference hour.

NOTE: Students other than majors in Fine Arts in course and majors and minors in Fine Arts in honors may take one semester of the Introduction to Art History, either Fine Arts 1 or 2, as a prerequisite for advanced courses.

2. INTRODUCTION TO ART HISTORY. Mr. Rhys and Mr. Walker. *Spring Semester*
European and American architecture, sculpture, and painting from the fifteenth century to the present day are studied from the same points of view and with the same methods as in the first semester.
Three hours of lecture a week and one bi-weekly conference.
11. DESIGN IN DRAWING AND PAINTING. Mr. Rhys. *Fall Semester*
The basic elements of design and their function in drawing and painting. Types of harmony, sequence and balance such as linear, tonal and spacial. The methods of design and representation that characterize the various historical styles. Practical exercises required demand no special technical aptitude, since the purpose of the course is to develop a critical understanding of drawing and painting and not technical skill.
51. ANCIENT ART. Mr. Walker. *Fall Semester*
The development of the forms of architecture, sculpture and painting as expressing various cultural patterns of ancient civilizations: Egypt, Iran, Mesopotamia, Greece and Rome.
52. MEDIEVAL ART. Mr. Walker. *Spring Semester*
A study of the relationship between art and society in Europe and the Near East from the fourth through the fourteenth centuries. The ideas and institutions which were instrumental in shaping Christian art during its formative stages of development. Special emphasis is placed on the Romanesque and Gothic periods in France: the abbey and the cathedral.
53. ITALIAN RENAISSANCE ART. Mr. Rhys. *Fall Semester*
A study of certain aspects of the art of the Renaissance in Italy as expressed in architecture, sculpture and painting. Emphasis is placed on such great masters as Donatello, Masaccio, Alberti, Leonardo da Vinci, Raphael, Michelangelo and Titian.
Not offered in 1955-56.
54. NORTHERN RENAISSANCE AND BAROQUE PAINTING. Mr. Walker. *Spring Semester*
Developments in painting and drawing during the fifteenth, sixteenth and seventeenth centuries in France, the Netherlands, Germany and Spain through the study of individual artists such as the Van Eycks, Roger van der Weyden, Jean Fouquet, Dürer, Gruenewald, Holbein, El Greco, Rubens, Rembrandt, Vermeer, Poussin and Velasquez.
Not offered in 1955-56.
55. MODERN PAINTING. Mr. Rhys. *Fall Semester*
Important stylistic developments in European painting from the French Revolution through Matisse and Picasso: the meanings of the various movements and their relationship to changing social and political attitudes.
Not offered in 1955-56.
56. AMERICAN ART. Mr. Rhys. *Fall Semester*
Architecture, sculpture and painting in North America from the Colonial Period to the present day, their connection with European art and their significance as a reflection of American culture.

57. MODERN BUILDING. Mr. Walker.

Spring Semester

An introduction to the nature of architecture and the function of the architect through a study of developments in European and American building during the late nineteenth and twentieth centuries. The specific influence of economic, technological and social changes upon design and structure. Emphasis placed on the study of original examples in the Philadelphia area and on the work of such men as Sullivan, Wright, Mies van der Rohe, Gropius and Le Corbusier. The prerequisite of Fine Arts 1-2 is waived for students in Engineering.

60-61. SENIOR CONFERENCE. Mr. Walker.

Spring Semester

HONORS SEMINARS

100. MEDIEVAL ART. Mr. Walker.

Fall Semester

The development of the forms of Christian art during the Middle Ages, with special emphasis on the Romanesque and Gothic periods in France: the abbey and the cathedral.

101. ITALIAN RENAISSANCE PAINTING. Mr. Rhys.

Fall Semester

A study and analysis of painting in Italy from Giotto to Titian: the decisive contributions of the outstanding masters to its stylistic development and its relationship to the Renaissance movement as a whole.

102. NORTHERN RENAISSANCE. Mr. Walker.

Spring Semester

Developments in painting and the graphic arts of drawing and print making during the fifteenth century in England, France, the Netherlands, Germany, and Spain through an intensive study of individual masters such as the Van Eycks, Roger van der Weyden, Jerome Bosch, Pieter Brughel, Jean Fouquet, Martin Schongauer, Albrecht Dürer, Hans Holbein, and El Greco. Emphasis is placed on the study of original material, such as the graphic art in the Lessing J. Rosenwald Collection in Jenkintown.

103. THE BAROQUE. Mr. Walker.

Fall Semester

Developments in painting and the graphic arts of drawing and print making during the seventeenth century in Western Europe. Although the role of Italy in the formation of the Baroque as an international style is studied, special orientation is found in the individual work of such great masters as Rubens, Rembrandt, Vermeer, Velasquez, and Poussin. Opportunity is taken to work with original paintings as well as with the graphic art of the Lessing J. Rosenwald Collection.

104. MODERN PAINTING. Mr. Rhys.

Spring Semester

Important stylistic developments in European painting from the French Revolution through Matisse and Picasso: the meanings of the various movements and their relationship to changing social and political attitudes.

105. MASTER PRINT MAKERS. Mr. Walker.

Spring Semester

A consideration of certain problems in the history of the graphic arts. A study of the significance of the work of such men as Schongauer, Dürer, Rembrandt, Goya, Daumier, Munch and Rouault for the development of expression in the media of the woodcut, engraving, etching, aquatint and lithography. Students work almost exclusively with original material in the Print Room of the Philadelphia Museum and the Lessing J. Rosenwald Collection in Jenkintown.

History

PROFESSORS: MARY ALBERTSON, *Chairman* *

FREDERICK B. TOLLES

ASSOCIATE PROFESSORS: PAUL H. BEIK

JAMES A. FIELD, JR.

LAURENCE D. LAFORE

ASSISTANT PROFESSORS: ROBERT D. CROSS

PHILIP D. CURTIN †

INSTRUCTOR: PETER N. RIESENBERG

LECTURER: F. HILARY CONROY

The Introductory courses (1 through 6) as well as some of the more advanced courses are designed to familiarize students with contemporary American civilization: its European backgrounds; England's influence, particularly through her literature, her law, and her constitution; and the heritage and the place in the world of the United States itself. There is another group of courses (11 through 17) which are intended to introduce history majors as well as majors in other departments to the understanding of a foreign culture.

REQUIREMENTS AND RECOMMENDATIONS

FOR MAJORS AND MINORS

History 1-2 should be taken in the freshman year if possible. The work of the major in course normally consists of at least six additional half courses in the department, including one or two half courses in American history in the sophomore year, at least one half course in English history, and Special Topics in the senior year. The comprehensive examination includes a choice of questions on the fields of European, English, and American history. Sensibly planned election of related courses in other departments should begin in the sophomore year, particularly with reference to the prerequisite requirements of these departments for honors seminars. Languages which are most useful to students of history and which are required by many graduate schools are French and German. French 7-8 or German 7-8 may be taken by those who wish a second foreign language.

The only requirement for acceptance as a major in history at the end of the sophomore year is successful completion of course 1-2.

The department recommends that a course major in the junior and senior years group his electives in such a way as to make a coherent program. The department records the field of special competence of its majors so that the information can be given in letters of recommendation, etc., when it is desirable; and selection of questions in the comprehensive examination may be guided by these interests. A major in history may, for example, be described as a major in history with emphasis on the social sciences, on American civilization, on international relations, or on Russian studies.

* Absent on leave, spring semester, 1955-56.

† Absent on part-time leave, 1955-56.

The student planning to apply for work leading to an Honors degree either as a major or minor should follow in general the same program as the course major during his first two years. He should normally, if he has room for history in his program during his sophomore year, choose either a half course in American history (4, 5, 4x, or 5x) or a half course in English history (6), as background for later work in honors seminars in those fields. If the choice has to be made between a second course in American history and a first course in English history, the latter should be chosen.

COURSES

- 1-2. EUROPE. All members of the department. *Full Course*
One of the basic courses in the curriculum. It is intended to be an introduction to the study, understanding, and use of history. It is a requirement for graduation for all students in the divisions of the humanities and the social sciences, and it is a prerequisite to all other work in history except courses 21 and 59. It begins with the classical backgrounds of European civilization and ends with post-war Europe. Sections are small enough for discussion.
- 4, 5. THE UNITED STATES. Mr. Cross or Mr. Field.
A general course beginning with the history of the colonies, bringing the narrative to 1865 at the end of the first half. Either half may be taken separately.
- 4x, 5x. AMERICAN INTELLECTUAL HISTORY. Mr. Cross.
A course paralleling 4, 5 in chronology, recommended for those who have had a good school course in American history.
6. ENGLAND. Miss Albertson.
A survey of the history of the English people. The greater part of the course is devoted to the periods before 1714. It may be followed by course 52 or seminar 109 for those who wish fuller treatment of modern England. Course 6 is a prerequisite to seminars 108 and 109.
11. THE OTHER AMERICAN REPUBLICS. Mr. Lafore.
The development of Latin America with its European and colonial background. The emphasis is on Mexico, Brazil, and Argentina. This is recommended for majors in Spanish as well as for majors in history, and as a general elective. Not offered in 1955-56.
12. FRANCE. Miss Albertson and Mr. Lafore.
The history of France from Roman times to the present day. This is recommended for majors in French as well as for majors in history and as a general elective. Not offered in 1955-56.
14. RUSSIA. Mr. Beik. *Fall Semester*
The history of modern Russia. The course begins with the reign of Peter and gives half its time to the period since the Revolution.
15. THE EXPANSION OF EUROPE. Mr. Curtin.
Topics in different aspects of European expansion from the sixteenth century to the present, with emphasis on the relation between European and non-European factors. The following topics are included: the origins of expansion, the rise and fall of African slavery in the Americas, four case-studies in the dynamics of imperialism in the nineteenth century, and the rise of colonial nationalism in the twentieth century. Not offered in 1955-56.
- 16, 17. THE FAR EAST. Mr. Conroy.
A general course concerned chiefly with China in the first half, with Japan in the second half.
21. QUAKERISM. Mr. Tolles. *Fall Semester*
The history of the Society of Friends to the present day. The characteristic religious and social ideas of the Quakers are considered in their historical setting.

52. MODERN BRITAIN. Mr. Lafore.
The development of a modern industrial society and welfare state.
53. THE FRENCH REVOLUTION AND NAPOLEON. Mr. Beik.
The significance of the period 1789-1815 in the development of modern European social theories and political institutions.
54. MEDIEVAL EUROPE. Mr. Riesenberg.
The history of western Europe from the decline of the Roman empire through the thirteenth century. Open to sophomores with special permission.
55. THE RENAISSANCE. Miss Albertson.
The history of the period of the Renaissance in Europe. Open to sophomores with special permission.
56. AMERICAN DIPLOMATIC HISTORY. Mr. Field.
Official United States foreign policy considered as a part of the larger problem of American participation in world affairs.
57. MODERN EUROPE. All members of the department.
Recent European problems and institutions examined primarily through the experiences of one nation in the nineteenth and twentieth centuries. In 1955-56 Germany will serve as a case study.
59. TOPICS IN AMERICAN HISTORY. Mr. Cross.
The history of the United States with particular reference to European backgrounds. A course designed for students who do not intend to take more than one half course in history. It cannot be substituted for the college requirement in history (course 1-2) and is not open to majors in the divisions of the social sciences and the humanities.
- 65, 66. SPECIAL TOPICS. All members of the department. *Spring Semester*
For seniors. Individual programs are planned to prepare majors in history for the comprehensive examinations. The discussion of review problems, of papers, and of reading is conducted in groups and in individual conferences with members of the department. This may be elected as a single one-semester course or as a double one-semester course.

HONORS SEMINARS

The following seminars are offered by the department to juniors and seniors to prepare for the examinations for a degree with Honors. They may be taken in any combination. The only prerequisite is History 1-2 except in the seminars for which an additional prerequisite is indicated.

Those who wish to specialize in international relations with a major in history (see p. 110, last paragraph) should include in their programs at least three of the following seminars: numbers 103, 110, 116, 117.

American History

101. EARLY AMERICAN HISTORY. Mr. Tolles. *Spring Semester*
Political, economic, social, and cultural aspects of the period from the explorations to the end of the American Revolution.
102. PROBLEMS IN AMERICAN HISTORY. Mr. Cross or Mr. Field.
Selected topics in the history of the United States.
103. PROBLEMS IN AMERICAN HISTORY: FOREIGN. Mr. Field.
A study of the United States in the world community. It takes into account wars, industrial, technological and population changes, and changes in national attitudes, with special reference for instance to the Louisiana Purchase, the Monroe Doctrine, the Mexican war, the problem of the Pacific, and the world wars.

104. THE SUPREME COURT. Mr. Cross.

A history of the role played by the Supreme Court in American political, economic, and social life. The seminar is not designed to anticipate or overlap the courses in constitutional law offered in law schools. A general knowledge of American history is required as a prerequisite.

English History

106. MEDIEVAL ENGLAND. Miss Albertson.

The period from 1066 to 1485. Not offered in 1955-56.

108. TUDOR AND STUART ENGLAND. Miss Albertson.

The period from 1485 to 1688. Open only to students who have taken course 6 or an equivalent approved by the instructor. Not offered in 1955-56.

109. MODERN ENGLAND. Mr. Curtin or Mr. Lafore.

The nineteenth century. Open only to students who have taken course 6 or an equivalent approved by the instructor.

110. THE BRITISH EMPIRE. Mr. Curtin.

A study of the empire from sixteenth century origins to the present. Special attention is paid to the growth of the "second empire" and the internal history of the members of the present commonwealth.

European History

111. MEDIEVAL EUROPE. Mr. Riesenberg.

The civilization of the twelfth and thirteenth centuries.

112. THE RENAISSANCE AND REFORMATION. Miss Albertson.

Europe from the fourteenth to the seventeenth centuries.

114. EUROPE 1760 TO 1870. Mr. Beik.

The disintegration of the old regime and the rise of liberalism.

115. EUROPE 1870 TO 1939: MODERN EUROPE. Mr. Lafore.

Political and social changes which preceded the second world war.

116. EUROPE SINCE 1870: DIPLOMATIC HISTORY. Mr. Lafore.

The management of international affairs and problems.

117. EUROPE 1870 TO 1939: EASTERN EUROPE. Mr. Beik.

The origins and consequences of the Russian Revolution and of the formation of the succession states.

THESIS (120)

A thesis may be substituted for one of the Honors examinations by special permission of the department. The topic should be selected and approved by the end of the junior year. It must be finished and a copy filed in the Library by the middle of the senior year.

GRADUATE WORK

The department of History offers work leading to the Master's degree for graduate students who wish to use the research resources of the Friends Historical Library for a thesis. In addition to the thesis the candidate normally takes three honors seminars. For the general regulations concerning the Master's degree see p. 62.

International Relations

Students who plan to enter upon a career in the field of international relations should include in their programs, during the first two years, the introductory courses in economics, history, and political science and should complete the intermediate course in one or more modern languages.

Advanced courses selected from the groups listed below may be incorporated in the programs of students who do their major work in economics, history, political science, or a modern language.

Those students who wish to concentrate in international relations may take their Senior Comprehensive Examination in this field. Students preparing for this examination should take eight, nine, or ten half courses from among those listed below, including all of those listed in Group I, one or more in Group II, and one or more in Group III. The examination is administered by a committee appointed by the chairmen of the Departments of Economics, History, and Political Science, under the Chairmanship of the Department of Political Science.

Group I

- Political Science 12. INTERNATIONAL POLITICS.
- Political Science 13. INTERNATIONAL LAW AND ORGANIZATION
- Political Science 57-58. AMERICAN FOREIGN POLICY
- Economics 60. INTERNATIONAL ECONOMICS

Group II

- History 11. THE OTHER AMERICAN REPUBLICS
- History 14. RUSSIA
- History 20. MODERN BRITAIN.

Group III

- Political Science 15. COMPARATIVE GOVERNMENT
- Political Science 18. THE BRITISH WELFARE STATE
- Political Science 19. THE SOVIET SYSTEM
- Political Science 20. FAR EASTERN POLITICS
- Political Science 59. MODERN POLITICAL THEORY

Students who plan to enter the Honors program will find it possible to select a similar combination of courses and seminars in the field of international relations. In planning such programs, they should consult with the chairmen of their prospective major departments.

Mathematics

PROFESSOR: HEINRICH BRINKMANN, *Chairman*

ASSOCIATE PROFESSOR: PHILIP W. CARRUTH

ASSISTANT PROFESSORS: EDGAR R. MULLINS, JR.
DAVID ROSEN

Pure mathematics is an abstract subject and may be looked upon as the model of a deductive science. On the other hand, the subject matter of mathematics has for the most part arisen out of concrete applications to the physical sciences, among which geometry occupies a central position. The courses offered in the department of Mathematics attempt to combine these points of view and to give a picture of the power and beauty of the subject when studied for its own sake, as well as its many relations to other fields of thought. The study of mathematics is essential as a tool for the understanding of the principles of the physical sciences and engineering; a knowledge of its techniques is indispensable for a successful pursuit of these subjects. The same is becoming increasingly true in the biological sciences and in some of the social sciences.

For students who intend to major in mathematics in course, the normal sequence of courses is the following: Freshman year, courses 1-2; Sophomore year, courses 11-12; Junior and Senior years, two half-courses selected each year from courses 13, 14, 51, 52, 54. The completion of Physics 1-2 is strongly recommended.

In order to be admitted to honors seminars in mathematics, either as a major or as a minor, a student must have completed courses 1-2 and 11-12. An honors student whose major is mathematics must also take Physics 1-2; it is furthermore highly desirable that he have a reading knowledge of French or German. A junior honors student will normally take the seminars in Advanced Calculus and Differential Equations; these seminars are offered each year. The remaining seminars are usually taken by senior students and are offered as they are required.

1-2. FIRST YEAR MATHEMATICS.

Full Course

The subject matter studied in these courses constitutes an introduction to mathematical analysis. The principles and applications of elementary calculus are studied as well as the relevant material from Algebra, Trigonometry and Analytical Geometry. This course is required as a prerequisite for any further work in mathematics; it will also give a student who intends to take no such further work an introduction to mathematical principles and methods. It will not be possible to take Courses 1 or 2 as separate half-courses.

7. INTRODUCTION TO MATHEMATICS.

Fall Semester

The purpose of this course is to acquaint the student with the principles and some of the fundamental concepts of mathematics. The course is planned for students who do not intend to take further work in mathematics or natural science and cannot be used as a prerequisite for other courses in mathematics.

11-12. CALCULUS.*Full Course*

In this course the student continues the study of the calculus begun in Mathematics 1-2; certain topics from algebra and analytic geometry are also included. The course forms a necessary basis for any further work in mathematics and is essential for an understanding of the fundamentals of physics and other sciences, as well as engineering. The two halves of this course cannot be taken separately.

Prerequisite: Courses 1-2.

13. HIGHER GEOMETRY.*Fall Semester*

Various kinds of geometry (mostly in the plane) will be studied in this course, using both analytic and synthetic methods. A large part of the work will deal with projective geometry and its relation to metric and other geometries. The conic sections will be studied in some detail.

Prerequisites: Courses 1-2, 11-12.

14. HIGHER ALGEBRA.*Spring Semester*

The purpose of this course is to introduce the student to some of the abstract ideas that are fundamental in the subject of algebra as well as to extend his knowledge of certain algebraic techniques. Among the subjects studied are: Number systems, fields and their algebraic extensions, matrices and determinants, the solution of algebraic equations, systems of linear equations.

Prerequisites: Courses 1-2, 11-12.

51. ADVANCED CALCULUS.*Fall Semester*

This course deals with the differential calculus of functions of several variables and its geometric applications, multiple integrals, line and surface integrals, improper integrals and infinite series. The treatment is sufficiently rigorous to strengthen the student's understanding of the principles of the calculus. Applications to the physical sciences are given whenever possible.

Prerequisites: Courses 1-2, 11-12.

52. DIFFERENTIAL EQUATIONS.*Spring Semester*

This course is a continuation of Mathematics 51. Some of the topics studied are: Ordinary Differential Equations, with applications; Infinite Series; Improper Integrals and the Gamma Function.

Prerequisites: Courses 1-2, 11-12, 51.

54. PROBABILITY AND STATISTICS.*Spring Semester*

This course deals with the mathematical theory of statistics, based upon a study of the theory of probability. An introduction to the theory of sampling and statistical inference will be given.

Prerequisites: Courses 1-2, 11-12, 51 (Course 51 may be taken concurrently).

60. READING COURSE IN MATHEMATICS.

This course is to provide an opportunity for students to do special work in fields not covered by the undergraduate courses, listed above. The work consists in the preparation of papers requiring extensive and detailed examination of the literature of a problem.

Note: Courses 51 and 52 may be presented for an Honors examination as part of an Honors program.

HONORS SEMINARS IN MATHEMATICS**101. ADVANCED CALCULUS.***Fall Semester*

The subject matter of this seminar includes the differential calculus of functions of several variables, the elements of vector analysis, multiple integrals, line and surface integrals, improper integrals, infinite series, uniform convergence of infinite processes. The treatment of these various subjects is sufficiently detailed to give the student an introduction to the rigorous processes of analysis.

102. DIFFERENTIAL EQUATIONS.

Spring Semester

This seminar begins with a formal treatment of ordinary differential equations and their applications to various types of problems. This is followed by a study of existence theorems for ordinary differential equations, certain classical linear differential equations, Fourier series and a brief introduction to boundary value problems of certain partial differential equations of the second order.

103. STATISTICS AND PROBABILITY.

The purpose of this seminar is to give the mathematical background necessary for an understanding of the mathematical analysis of statistical data. In addition, the modern development of this subject provides a valuable application of the concepts and techniques acquired in the study of advanced calculus. The topics treated include: the axiomatic approach, the use of Stieltjes integrals, correlation and regression, some special distributions, sampling theory and a short introduction to the theory of statistical estimation.

104. MODERN ALGEBRA.

This seminar deals with the theoretical properties of such formal systems as groups, rings, fields and vector spaces. While these concepts will be illustrated by many concrete examples, the emphasis will be on the abstract nature of the subject; the student will thus be introduced to an important aspect of modern mathematics. Among the specific topics to be studied are the algebra of matrices, of classes and of ideals.

105. THEORY OF FUNCTIONS OF A COMPLEX VARIABLE.

A brief study of the geometry of complex numbers is followed by a detailed treatment of the Cauchy theory of analytical functions of a complex variable. Various applications are given and some special classes of functions, such as elliptic functions, are studied. Analytic continuation and the theory of Weierstrass are briefly considered.

106. THEORY OF NUMBERS.

Among the subjects studied in this seminar are: Elementary properties of integers, the congruence relation, quadratic residues, quadratic forms, certain classical Diophantine equations, simple examples of fields of algebraic numbers.

107. DIFFERENTIAL GEOMETRY.

The subject of this seminar is the metric differential geometry of curves and surfaces in three dimensional space.

108. SYMBOLIC LOGIC.

This seminar is given by the Department of Philosophy. A description of it will be found under the offerings of that department. It may be presented as part of the Mathematics program in Honors.

Modern Languages and Literatures

PROFESSORS: EDITH PHILIPS, *Chairman* (French)

HAROLD MARCH (French)

ASSOCIATE PROFESSORS: HILDE D. COHN (German)

FRANZ MAUTNER (German)

KARL REUNING (German)

JAMES D. SORBER (Spanish)

ASSISTANT PROFESSORS: FRÉDÉRIC GROVER (French)

ELISA ASENSIO (Spanish)

JEANNE THEIS (French)

INSTRUCTOR: OLGA LAMKERT (Russian)

The department of modern languages and literatures aims to give its majors a comprehensive view of the literature and culture represented by these languages, in relation to other humanistic studies. Courses are conducted in the language of the literature being studied, and progress in the language is always one of the aims.

The elementary and intermediate courses are designed to prepare the students for advanced work in literature as well as to meet college and departmental requirements. It is not impossible, with some extra reading, to major or to enter honors seminars in a language started in college. Prerequisites and recommended subjects for majors are noted under the listing of each language section.

French

All students offering French for entrance are placed at the level where they will presumably profit best by the course, according to their rating in the College Entrance Examination or a test given by the department.

French may be offered as a major in course or as a major or minor in honors work. Prerequisites and recommended supporting subjects are the same for both course and honors students and are as follows:

Required:

French 11, 12 Introduction to Literature, or evidence of equivalent work.

French 5 Advanced Composition and Diction.

Recommended supporting subjects:

History of France, History of Modern Philosophy, Psychology, courses in other literatures, Fine Arts.

Majors are expected to speak French with sufficient fluency to take part in discussion in courses and seminars in the language and to pass an oral comprehensive or oral honors examination in French.

Note: All advanced courses are not offered every year. Students wishing a major or minor in French should plan their course carefully in advance with the department in order to get a well rounded program.

COURSES

1-2. ELEMENTARY FRENCH.

For students who begin French in College. Equivalent to two years' French in high school. The initial approach is oral but a foundation is laid for a reading knowledge. No credit is given for French 1 alone. Both courses offered each semester.

3, 4. INTERMEDIATE FRENCH.

For students who have had French 1-2 or its equivalent (2 years' French in high school). Students who have had three years in high school usually enter French 4. Grammar is reviewed. Reading is from contemporary literature in French editions without notes or vocabulary. Every effort is made to help the student to increase his vocabulary and to discuss what he has read in the French language. Completion of French 4 satisfies the language requirement. The normal course to follow French 4 is French 11. (Both courses are offered each semester.)

5, 6. ADVANCED COMPOSITION AND DICTION. Miss Theis.

For those who intend to major in French or who wish an advanced course in which the emphasis is not primarily literary. An effort is made to correct faulty pronunciation and to improve self-expression in the language, both oral and written.

7-8. ELEMENTARY FRENCH (Special Reading Course).

A special course designed for students who wish to acquire a reading knowledge of French in a single year. French 7-8 may be used to fulfill the requirements of certain departments or graduate schools, but not to satisfy the college foreign language requirement.

11, 12. INTRODUCTION TO LITERATURE.

In Course 11 the transition is made from reading as an aid to language learning to the consideration of literary values. The material is selected from classics of the nineteenth century, but it is not a systematic survey course. Prerequisite: French 4 or equivalent.

In Course 12 the treatment is more historical with selected readings in Larousse editions from Rabelais to Rousseau. (Both courses are offered each semester.)

14. PROSE DE LA RENAISSANCE.

Readings from Rabelais, Calvin, Montaigne.

15. L'ÂGE DE LOUIS XIV.

Selected prose and poetry of the seventeenth century exclusive of the theater.

16. LES "PHILOSOPHES."

Montesquieu, Voltaire, Diderot and Rousseau; their contribution to the development of the ideas on art, literature and society which characterize the French eighteenth century.

17. THÉÂTRE CLASSIQUE.

The plays of Corneille, Racine and Molière and the growth of the classic ideal in French literature.

18. THÉÂTRE MODERNE.

The development of the French theater from the breaking down of the dominance of the classical ideal in the eighteenth century. Plays of Marivaux and Beaumarchais. Theories of Diderot. Characteristic examples of the theater of the nineteenth and twentieth centuries.

20. POÉSIE MODERNE.

Baudelaire, the Symbolists, modern tendencies.

21. LITTÉRATURE DU MOYEN AGE.

Readings from medieval literature in modern French translations.

22. ROMAN MODERNE.

Representative novelists from Balzac to Proust.

24. SAINT-EXUPÉRY, MALRAUX, SARTRE, CAMUS.

Neo-humanism and contemporary tendencies.

25. LE ROMAN AU 17^e ET 18^e SIÈCLES.

Selected novels before Balzac.

30. HISTORY OF IDEAS.

Ideological background of modern literature. (Given in English.)

51. SPECIAL TOPICS. (For senior majors).

Readings selected to fit the needs of individual seniors and to supplement their selection of courses. Not designed to prepare for any specific type of comprehensive examination but to give an opportunity in the senior year for the student to see his courses in perspective and to see possible relationships with work in other fields.

HONORS SEMINARS

100. LITTÉRATURE DU MOYEN AGE.

Old French readings in lyric poetry, theater and fiction.

101. LA RENAISSANCE EN FRANCE.

Rabelais, Calvin, Montaigne, Ronsard et la Pléiade.

102. LE THÉÂTRE CLASSIQUE.

Corneille, Racine, Molière.

103. LESS "PHILOSOPHES."

Montesquieu, Voltaire, Diderot, Rousseau.

104. BALZAC, STENDHAL, FLAUBERT, PROUST.

106. POÉSIE MODERNE.

Baudelaire, Rimbaud, Verlaine, Mallarmé, Claudel, Verlaine, Valéry.

107. MODERN EUROPEAN LITERATURE. (Given in English.)

Four or five selected authors from German, French, English and Russian literature.

While some honors seminars treat the same subject matter as the courses, the reading required is more extensive both in the texts and in critical material. The work of a seminar corresponds to two half courses.

German

ASSOCIATE PROFESSORS: HILDE D. COHN
FRANZ MAUTNER
KARL REUNING

All students offering German for entrance are placed at the level where they can presumably profit best by the course, according to their rating in the College Entrance Examination or a test given by the department.

German may be offered as a major in course or as a major or minor in honors work. Prerequisites and recommended supporting subjects are the same for both course and honors students and are as follows:

Required:

German 11-12. Introduction to German Literature.

Recommended supporting subjects:

An advanced course in German literature, Shakespeare, Modern Philosophy, Psychology, Fine Arts, courses in other literatures, History of Germany.

As far as possible German is the language of the classroom in all advanced courses and seminars. Since not all advanced courses and seminars are offered every year, students wishing a major or minor in German should plan their courses carefully in advance with the department in order to get a well rounded program.

1-2. ELEMENTARY GERMAN.

Full Course

For students who begin German in college. Equivalent of two years' secondary school preparation. Fundamentals of German and simpler text such as Schnitzler: *Der blinde Geronimo*.

3. INTERMEDIATE GERMAN.

Prerequisite: German 1-2 or two years' secondary school preparation. Review grammar and texts of average difficulty such as Hesse: *Knulp*; Schweitzer: *Leben und Denken*.

4. INTERMEDIATE GERMAN.

Fulfills the college requirement for all students who wish to learn reading through the medium of literary and cultural material, of the type of Von der Vring: *Magda*; Wiechert: *Zwei Novellen*.

Prerequisite: German 3 or equivalent.

6. WRITING AND SPEAKING GERMAN.

Composition and conversation. Introduction to *Volkskunde*: the social and cultural backgrounds of modern Germany.

Prerequisite: Course 3-4 or equivalent.

7-8. ELEMENTARY GERMAN (SPECIAL READING COURSE).

Full Course

A special reading course designed for those who wish to acquire a reading knowledge of German in a single year. German 7-8 may be used to fulfill the requirements of certain departments or of graduate schools, but not to satisfy the college foreign language requirement. German 7-8 supplants the former Half Course in Scientific German (German 5).

11, 12. INTRODUCTION TO GERMAN LITERATURE.

Either half or both may be taken for credit. Prerequisite for majors and minors. A study of representative German authors from the classical period to the present; reading and discussion of dramas, stories, and lyric poems. Writing of critical reports.

Prerequisite: Course 3-4 or equivalent.

13. DIE DEUTSCHE ROMANTIK.

Half Course

An introductory study of the romantic movement in Germany, with illustrative readings from representative authors such as Novalis, Tieck, Arnim, Brentano, Eichendorff. Lectures, discussion, papers in German.

Prerequisite: Course 11-12 or equivalent.

14. DIE DEUTSCHE NOVELLE VON GOETHE BIS THOMAS MANN.

Significant examples of this typically German genre will be read and interpreted as to contents, form and historical importance, as well as its relations to other European literatures. Authors: Goethe, Eichendorff, Kleist, Stifter, Meyer, Keller, Storm, Thomas Mann.

15-16. DIE GOETHE ZEIT.

Goethe, Schiller and their contemporaries in relationship to their times. Their ideas and aesthetic problems discussed and reflected in their work.

18. MODERNE DEUTSCHE LITERATUR.

Half Course

A study of four or five leading German writers of the twentieth century, including Thomas Mann, Gerhart Hauptmann, Rainer Maria Rilke. Lectures, discussion, papers.

Prerequisite: Course 11-12 or equivalent.

19. GERMAN AUTHORS IN TRANSLATION.

Half Course

Lectures in English; discussion; frequent book reports in English by students. Open to all students.

20. DIE DEUTSCHE LYRIK.

Half Course

A study of German lyric poetry from the classical age to the present. Discussion of "Gehalt und Gestalt" of important types; authors such as Goethe, Schiller, Hölderlin, Heine, Mörike, Meyer, George, Rilke.

HONORS WORK

The following seminars prepare for examinations for a degree with Honors. Those actually given in any year vary according to the choices of the students and the convenience of the department.

101. MIDDLE HIGH GERMAN LITERATURE AND PHILOLOGY.

Introduction into Indo-European and Germanic philology and phonetics. Outline of development of the German language. Middle High German grammar. Brief survey of Old and Middle High German literature. Reading of MHG texts in the original, especially *Nibelungenlied*, Wolfram's *Parzival*, and Walther von der Vogelweide.

102. THE AGE OF LUTHER.

Study of literary, historical, sociological and religious problems of the sixteenth century. Reading of outstanding authors of the period, such as Luther, Hans Sachs, Brant, Hutten, Fischart. A course or seminar in History of the Reformation is recommended as preparation for this seminar.

103. DEUTSCHES BAROCK UND AUFKLAERUNG.
A study of German literature in the seventeenth and early eighteenth centuries. The reforms of Opitz, the lyric poetry of the period, the mysticism of Angelus Silesius and Jakob Böhme, the plays of Gryphius, and the prose of Grimmlshausen; a study of Lessing in his most important dramas and critical writing.
104. GOETHE.
Goethe's life and work in the classical age of German literature, in its chief phases.
105. DIE DEUTSCHE ROMANTIK.
Romanticism as the dominant movement in German literature of the first half of the nineteenth century.
106. POETISCHER REALISMUS.
Studies in the works of Grillparzer, Hebbel, Ludwig, Keller, Meyer, and Storm, and other writers of the drama, novel, and "Novelle" in the second half of the nineteenth century.
107. DEUTSCHE LITERATUR SEIT 1900.
The chief writers of "Neuromantik" and impressionism: Gerhart Hauptmann's dramas; Thomas Mann's epic prose; Rainer Maria Rilke's poetry; Hugo von Hofmannsthal's lyric prose and poetry.
130. LINGUISTIC SCIENCE. (In cooperation with other departments in the Division of the Humanities.)
The most important problems of Linguistics, e.g., sound change, changes in accidence and syntax, semantic changes, geographical distribution and relation of languages. Indo-European, English, and American language problems. Relationship between linguistics and psychology. Some knowledge of German, French, Latin, or Greek is desirable, reading knowledge of at least one foreign language required. Students who know non-Indo-European languages are especially welcome. The seminar is conducted in English.
(See also schedules of Honors Seminars in English and Psychology.)

Russian

INSTRUCTOR: OLGA LAMKERT

Courses in the Russian language may be used to fulfill the college's foreign language requirement. A major in Russian language and literature may be obtained by taking the courses listed below and additional courses offered at Bryn Mawr College. These courses are part of the Russian Studies program offered at Bryn Mawr, Haverford, and Swarthmore Colleges (see p. 144).

- 1-2. ELEMENTARY RUSSIAN. Miss Lamkert. *Full Course*
Vocabulary and grammar. Oral and written translations from English into Russian and vice versa. Vocabulary building. Reading of short stories. Books: *Essentials of Russian* (Prentice-Hall), Stories by Lermontoff and Pushkin (Heath series). Five hours a week.
- 3, 4. INTERMEDIATE RUSSIAN. Miss Lamkert.
Review of grammar with special emphasis on use of prepositions, verb forms, numerals. Short area study, geography and history of Russia to the revolution of 1917. Advanced reading and composition. Books: *Essentials of Russian* (Prentice-Hall), *Russian Area Reader* (Ronald Press).

- 11, 12. INTRODUCTION TO RUSSIAN LITERATURE: PROSE. Miss Lamkert.
A short survey of the Russian literature of the 18th and 19th centuries. Books: *Russian Area Reader* (Ronald Press) and other books to be selected by the class.
- 13, 14. POETRY AND CONTEMPORARY AUTHORS. Miss Lamkert.
Books: *Eugene Onegin* by Pushkin. Readings from Chekov and Gorky.
Not offered in 1955-56.
- 51, 52. SENIOR CONFERENCE. Miss Lamkert.
Writings of Gogol and Turgenev.

Spanish

ASSOCIATE PROFESSOR: JAMES D. SORBER

ASSISTANT PROFESSOR: ELISA ASENSIO

All students offering Spanish for entrance are placed at the level where they will presumably profit best by the course according to their rating in the College Entrance examination or a test given by the department.

Spanish may be offered as a major in course or as a major or minor in honors work. Prerequisites and recommended supporting subjects are the same for both course and honors students and are as follows:

Required: Spanish 11-12 Introduction to Literature.

Recommended supporting subjects:

Introduction to Philosophy, Psychology, English or other foreign or classic literature, Fine Arts, South American History.

Majors are expected to speak Spanish with sufficient fluency to take part in discussion in courses and seminars in the language and to pass an oral comprehensive or oral honors examination in Spanish.

COURSES

1-2. ELEMENTARY SPANISH.

For students who begin Spanish in college. Equivalent to two years' Spanish in high school. The emphasis is both on the spoken language and on reading.

3, 4. INTERMEDIATE SPANISH.

For students who have had Spanish 1-2 or its equivalent (two years in high school). Students who have had three years usually enter Spanish 4. Grammar is reviewed. Reading is from Spanish and South American literature with emphasis on increasing the student's vocabulary and his ability to discuss his reading in oral and written Spanish.

9. ADVANCED COMPOSITION AND DICTION.

For majors and others who wish an advanced course in which the emphasis is not primarily literary. An effort is made to correct faulty pronunciation and to improve self expression in the language both oral and written.

- 11, 12. INTRODUCTION TO SPANISH LITERATURE.
Representative texts of modern Spanish and Latin American writers. Conducted in Spanish with frequent written work in Spanish.
13. EL TEATRO MODERNO.
Plays of the major Spanish writers in the nineteenth and twentieth centuries.
14. LA NOVELA HISPANOAMERICANA.
Representative novelists from Mármol in Argentina to Revueltas in Mexico.
- 15, 16. LAS OBRAS DE CERVANTES.
Novelas ejemplares. The *Quixote*. (A year course giving a thorough study of Cervantes. The first semester may stand alone.)
18. DESARROLLO DE LA NOVELA ESPAÑOLA MODERNA EN LOS SIGLOS XIX Y XX.
Outstanding novelists from Romanticism to the present.
20. SPECIAL TOPICS FOR SENIOR MAJORS.
Readings selected to fit the needs of seniors and to supplement their selection of courses. Not designed to prepare for any specific type of comprehensive examination, but to give an opportunity in the senior year for the student to see his courses in perspective and to see possible relationships to work in other fields.

SEMINARS

101. LA NOVELA HISPANOAMERICANA.
102. LA NOVELA ESPAÑOLA DEL SIGLO XIX.
103. LAS OBRAS DE CERVANTES.
104. EL TEATRO MODERNO.
105. TENDENCIAS LITERARIAS EN LA POESIA, EL TEATRO Y LA NOVELA DEL SIGLO DE ORO.

NOTE: While the titles of seminars in Spanish correspond to the titles of courses, honors students read more extensively both in the texts and critical work. The work of a seminar corresponds to that of two half courses.

Music

PROFESSOR: ALFRED J. SWAN, *Chairman*

ASSISTANT PROFESSOR AND DIRECTOR OF THE CHORUS: PETER GRAM SWING

LECTURER AND DIRECTOR OF THE ORCHESTRA: WILLIAM H. REESE

The Department of Music is concerned with a broad outlook on the history of music, an appreciation of music based on intelligent listening, a knowledge of the music of particular periods and forms, and a stimulation of creative work by classes in elementary composition and by the supervision of free composition by more advanced students. Such compositions are presented in public, usually with professional performers.

REQUIREMENTS AND RECOMMENDATIONS

If, in the course of his first two years in college, the student has shown an exceptional aptitude for either composition, or musicology, or both, he may elect to major in music. It is also desirable that he show a certain gift, or at least skill, in handling the piano.

A student may also elect music as a major or minor in Honors. For a major, Course 11-12 is a prerequisite; for a minor either Course 1, 2 or Course 11-12.

Seminars will be organized to meet the needs of students electing music in Honors.

1, 2. THE HISTORY OF MUSIC IN WESTERN CIVILIZATION. Mr. Swing.

This course has two main objectives: to teach students to listen intelligently to music and to acquaint them with representative works from successive periods of music history, thereby furnishing the basis for a growing and life-long interest in music. Open to all students.

11-12. ELEMENTARY MUSIC THEORY. Mr. Reese.

Full Course

This course deals with the general foundations of the musical language—scales, intervals, rhythm, formation of melodic patterns and their notation—and leads to elementary chord formation. Ear training is an important factor throughout the course.

21, 22. ELEMENTARY MUSIC COMPOSITION. Mr. Swan.

After practice in melodic patterns—the invention of his own *canti fermi*—the student applies to them imitational devices (two and three part imitation). Harmonization is taken up simultaneously. From short vocal compositions in motet form the student passes to trios for strings or wind, or combinations with piano. A pianistic exposition in abbreviated sonatina form may be attempted at the end of the year.

25. THE HISTORY OF RUSSIAN MUSICAL CULTURE. Mr. Swan.

This semester course is given, from time to time, for students who have taken Music 1-2, or those who are generally interested in the Russian Studies Program.

27. MOTET AND MADRIGAL IN TUDOR ENGLAND. Mr. Swing. *Fall Semester*

This course has as its objective the study of form and style as applied to a particular corpus of music. It aims to train the student in analytical procedures that can be used in the study of all choral music. While examples will be drawn primarily from Tudor sources, contemporary Italian and Flemish compositions will also be examined. Major emphasis will be given to performance in class; therefore students will be expected both to read vocal scores and to sing (or play) parts with proficiency. The course is open to students with the consent of the instructor.

28. MOZART. Mr. Swing. *Spring Semester*

The life and works of Mozart in the light of modern criticism. A study of Mozart's letters and the scores of representative works in all fields.

31-32. ADVANCED MUSICAL COMPOSITION AND HISTORY. Mr. Swan. *Full Course*

This course is conducted as a seminar jointly with Haverford College. Historical forms of music, such as the sonata, are projected from their beginnings into Modern Music, and their use by contemporary composers illustrated. Wherever possible the students are encouraged to tackle source material and present reports on figures and works of the 20th century. Along with this the students' own composing is supervised and criticized for inclusion in the annual concerts.

Philosophy and Religion

PROFESSORS: RICHARD B. BRANDT, *Chairman*

JOHN M. MOORE

ASSOCIATE PROFESSORS: MONROE C. BEARDSLEY

WILLIAM HORDERN

ASSISTANT PROFESSOR: RICHARD S. RUDNER

INSTRUCTOR: JEROME A. SHAFFER

LECTURER: GILMORE STOTT

The study of philosophy consists in examining the beliefs to which one is committed by accepting scientific knowledge and common-sense views of the world; clarifying basic concepts; determining the circumstances under which statements may properly be said to be true in all fields of human inquiry and concern, including ethical and aesthetic discourse; and drawing the outlines of an account of human experience coherent with the evidence of the sciences. Because of the role of philosophy in the history of human thought, and because of the relation of philosophical ideas to problems in other fields, philosophy may be studied as instrumental to the understanding of wider areas of history or thought.

Religion is studied primarily as a system of ideas, both ethical and theological: systematically, through a consideration of representative forms of contemporary religious thought; and historically, through an examination of the great religions and the development of religion, particularly of the Judaeo-Christian tradition.

REQUIREMENTS AND RECOMMENDATIONS FOR MAJORS AND MINORS

The minimum prerequisite to admission as a major in either philosophy or religion will normally be the completion of one year's work in the department. Students who major in philosophy must obtain permission in order to count for credit in fulfillment of their major requirement more than one course in religion; and students who major in religion must obtain permission in order to count for credit in fulfillment of their major requirement more than one course in philosophy. (Course 25 may be counted either as a course in philosophy or as a course in religion.) As supporting material for a major program in philosophy, the department recommends work in psychology.

1. INTRODUCTION TO PHILOSOPHY. All instructors.

Each Semester

Several of the most important problems of philosophy, and alternative answers to them, are discussed. The nature and criteria of knowledge are emphasized, and implications of this issue for traditional problems are analyzed. Stress is laid on the writing of philosophical essays.

3-4. PHILOSOPHICAL CLASSICS. Mr. Beardsley and Mr. Shaffer. *Full Course*

The major problems of philosophy are approached through study of some of the great philosophical literature of the West. Plato's *Republic*, Descartes' *Meditations*, and Hume's *Dialogues Concerning Natural Religion* will be read in their entirety; and selections will be read from Aristotle, Lucretius, Aquinas, Hobbes, Berkeley, Locke, J. S. Mill, and others. Students who take Course 1 may *not* elect Course 3-4.

Note: Either Course 1 or Course 3-4 is a prerequisite for any other course in philosophy. Other courses may be taken in any order that is convenient. Members of the department will offer advice on request concerning an order of courses to suit individual needs. Students planning to do honors work should not take courses dealing with material to be covered in honors seminars.

11. ETHICS. Mr. Stott. *Each Semester*

A systematic study of the principal ethical theories, historical and contemporary, absolutistic and relativistic, with the object of developing an understanding of the nature and scope of rational criticism in ethics and of the principles and problems involved in the analysis of ethical issues. Psychological, anthropological, metaphysical and religious issues are examined where they are relevant.

12. LOGIC. Mr. Beardsley. *Fall Semester*

An introduction to applied semantics and applied logic, both formal and inductive. The emphasis is on principles and distinctions that are useful in ordinary reading and writing.

13. SELECTED MODERN PHILOSOPHERS. Mr. Rudner. *Spring Semester*

A history of modern philosophy with primary emphasis on Descartes, Hume, and Schopenhauer, considered as representatives of three great traditions of modern thought. This course may appropriately be combined with work in any of the three divisions.

14. ANCIENT PHILOSOPHY. Mr. Shaffer. *Fall Semester*

A study of ancient philosophy in all its aspects: ethics, political theory, metaphysics, and aesthetics. Primary emphasis is placed on the dialogues of Plato; briefer attention is given to the pre-Socratics, Plato's contemporaries, and Aristotle. Recommended for students of literature and the social sciences.

15. PHILOSOPHY OF SCIENCE. Mr. Rudner. *Spring Semester*

A consideration of scientific knowledge, its scope and limitations; of problems resulting from theory construction and the validation of scientific assertions; of probability and induction.

16. CONTEMPORARY PROBLEMS. Mr. Brandt. *Fall Semester*

Contemporary answers to fundamental problems, such as the functions of language, the definition of truth, the foundations of knowledge, the nature of the self, and the perception of physical things. Readings in the works of the leading philosophers, such as Russell, Lewis, Ayer, and Dewey.

17. AESTHETICS. Mr. Beardsley. *Spring Semester*

A study of some problems that arise in describing and evaluating works of art. The course involves: (1) clarifying such basic terms of criticism as "form," "style," and "meaning"; (2) examining the principles and underlying assumptions of criticism; and (3) analyzing the nature of aesthetic value, especially the claim that works of art are "good," "beautiful," and "true."

18. SOCIAL PHILOSOPHY. Mr. Rudner. *Fall Semester*
 A study of the methods of the social sciences, and of philosophical problems arising in this domain. Attention will be given to certain problems facing both social scientist and natural scientist, and to some problems primarily of interest to the social scientist.
25. PHILOSOPHY OF RELIGION. Mr. Moore. *Spring Semester*
 The nature of religion; the psychology and interpretation of religious experience; the problem of religious knowledge; the validity and difficulties of Christian theology and ethics.
32. BIBLICAL RELIGION AND ETHICS. Mr. Moore. *Fall Semester*
 Important parts of the Old and New Testament are examined, in order to trace the growth of Hebrew and Christian religions and the development of the ideas of the Judaeo-Christian tradition, both ethical and theological.
33. EARLY CHRISTIAN THOUGHT. Mr. Hordern. *Fall Semester*
 The rise and development of Christian thinking to the 13th century, the influence of Judaism and Greek philosophy, the formation of the creeds, Scholasticism, Augustine and Aquinas.
34. MODERN CHRISTIAN THOUGHT. Mr. Hordern. *Spring Semester*
 The development of Christian thought from the Reformation to the twentieth century, with emphasis upon the relationship between Christian and secular thinking; the main ideas of the Reformation, church and sect in the Reformation, Roman Catholic development, Protestant orthodoxy, Protestant liberalism.
35. HISTORY OF RELIGIONS. Mr. Moore. *Fall Semester*
 An historical and comparative study of the world's religions: primitive religions, Hinduism, Buddhism, Chinese and Japanese religion, Islam. Stress will be placed upon the ethical and philosophical teaching of these religions and their role in the interaction of modern cultures. Comparisons and contrasts will be made between these religions and Judaism and Christianity.
36. PROBLEMS OF CHRISTIANITY TODAY. Mr. Hordern. *Each Semester*
 The purpose of this course is to study various answers to the chief religious problems of the twentieth century. Problems include: the nature of the Bible, science and religion, the existence of God, religion and social problems, religion and education, the meaning of history. Answers include: fundamentalism, liberalism, humanism, Christian orthodoxy and neo-orthodoxy. The student will be urged to find his own answers and to work out his own religious beliefs.
37. RELIGIONS OF AMERICA. Mr. Hordern. *Spring Semester*
 A study of some of the more important American religious groups with regard to their history, teaching and present status. Visits will be made to representative churches and synagogues.
- HISTORY 21. QUAKERISM. Mr. Tolles.
 The history of the Society of Friends to the present day. The characteristic religious and social ideas of the Quakers are considered in their historical setting. (May be counted toward a major in religion.)

HONORS WORK

For admission to honors in philosophy, the requirement is normally two semester courses drawn from those numbered from 1 to 25. For admission to honors work in religion, the requirement is normally two semester courses selected from among courses numbered 1, and 25 to 45.

101. MORAL PHILOSOPHY. Mr. Brandt and Mr. Shaffer.

A seminar in ethics, both systematic and historical. The first part of the semester is devoted to the basic theory of value and obligation; the second part to problems concerning justice, liberty, reward, punishment, human rights, and other issues of social ethics.

102. PLATO. Mr. Shaffer.

Reading and interpretation of all the major and some of the minor dialogues of Plato in an effort to understand his contributions to metaphysics, the theory of knowledge, ethics and politics, and to appreciate his importance for Western thought. Attention will be paid to the pre-Socratic elements of his philosophy, to his scientific and social background, and to the germs of future developments contained in his work.

103. HISTORY OF MODERN PHILOSOPHY. Mr. Beardsley and Mr. Shaffer.

The development of modern thought from Bacon and Descartes to Kant. This seminar may appropriately be combined with work in any of the three divisions.

104. CLASSIC PROBLEMS IN PHILOSOPHY. Mr. Brandt and Mr. Shaffer.

A systematic study of some basic problems such as the theory of meaning, universals and particulars, the nature and criteria of truth, the justification of memory knowledge and induction, theories of perception and the nature of the self and its relation to material nature. The reading is in the works of contemporary writers such as Broad, Russell and Lewis.

105. PHILOSOPHY OF SCIENCE. Mr. Rudner.

An investigation into the nature of scientific knowledge, the distinctions between sciences, the methods appropriate to them. Analyses of the concepts of probability, induction, verifiability, explanation, space, time, causality, as these are used in science.

106. AESTHETICS. Mr. Beardsley.

A systematic examination of the philosophy of art and the methodological foundations of criticism. Recommended for students of literature, music and the fine arts.

107. SOCIAL PHILOSOPHY. Mr. Rudner.

A study of the methods of the social sciences, and of philosophical problems arising within this domain. Attention will be given to certain problems facing both social scientist and natural scientist and to some problems primarily of interest to the social scientist. Materials will be drawn from the social sciences with which members of the seminar are most familiar.

108. SYMBOLIC LOGIC.

This seminar will present enough of the basic technique of symbolic logic to use it in investigating the logical basis of mathematics. Among the topics to be studied are: the definition of natural, rational, and real numbers; the logical paradoxes; problems about infinity; alternative philosophies of mathematics; problems encountered in developing adequate and consistent logical systems for mathematics.

109. THE THEORY OF VALUES. Mr. Brandt, Mr. Asch, and Mr. Madison.

An examination of the major problems concerning values, as they arise in the fields of philosophy, psychology, and anthropology. Literature representing the influential positions will be discussed. The emphasis will be on theoretical issues, especially the philosophical ones.

110. MEDIEVAL PHILOSOPHY.

Philosophical thought from Augustine to the fifteenth century. Attention will be paid both to specific problems such as universals, analogy, and epistemology and to outstanding thinkers such as Anselm, Aquinas, Scotus and Ockham. Although the primary emphasis will be historical, attention will be paid to the contemporary relevance of medieval thought.

111. THE IDEA OF GOD IN WESTERN THOUGHT. Mr. Hordern.

An examination will be made of writings which have contributed most to Western concepts of God. The study will include Plato, Aristotle, the Bible, Athanasius, Augustine, Thomas Aquinas, Luther, Calvin, Kant, Schleiermacher, Rudolf Otto, C. S. Lewis and others.

112. MODERN RELIGIOUS PHILOSOPHERS. Mr. Hordern.

This seminar will concentrate on representative religious thinkers or schools of thought in the present century. These will include Jacques Maritain, Anglo-Catholicism, Brunner, Liberalism, Reinhold Niebuhr, John Bennett, A. J. Muste, Paul Tillich and Will Herberg.

120. THESIS.

A thesis may be submitted by majors in the department in place of one of the seminars, upon application by the student and at the discretion of the Department.

Physical Education for Men

DIRECTOR OF ATHLETICS AND PHYSICAL EDUCATION FOR MEN AND ASSOCI-

ATE PROFESSOR: WILLIS J. STETSON

ASSOCIATE PROFESSORS: ROBERT H. DUNN

LEWIS H. ELVERSON

EDWIN J. FAULKNER

ASSISTANTS: AVERY F. BLAKE

GOMER DAVIES

JAMES J. McADOO

JAMES H. MILLER

PAUL STOFKO

COLLEGE PHYSICIAN: DR. MORRIS A. BOWIE

The course in Men's Physical Education is designed to acquaint each participant with both team and individual sports. The value of team play is developed while emphasis is also placed on the so-called "carry over" sports which one can enjoy after graduation. Each individual, while benefiting from the physical exercise, also becomes better acquainted with the fundamentals, rules, etc., of the various sports and so is better able to enjoy these activities as a spectator.

The intercollegiate athletic program is a comprehensive one with varsity schedules in eleven different sports. In many of these activities there are contests arranged for junior varsity and freshman teams, thus providing ample opportunity for large numbers of men to engage in intercollegiate competition.

FACULTY REQUIREMENTS

Physical education is required of all non-veteran freshmen and sophomores unless excused by the College physician. During this two-year period, men students must attend a minimum of three classes per week.

All men not excused for medical or other reasons are expected to fulfill this requirement. A semester's work failed in the first two years must be repeated in the Junior year. No man with a deficiency in physical education will be permitted to enter his Senior year.

FALL ACTIVITIES

Badminton	Golf	Tennis
*Cross Country	*Soccer	Touch Football
*Football	Swimming	

WINTER ACTIVITIES

Badminton	Lacrosse	Track
*Basketball	*Swimming	Volley Ball
Boxing	Tennis	*Wrestling

SPRING ACTIVITIES

*Baseball	*Lacrosse	*Tennis
*Golf	Softball	*Track

* Indicates intercollegiate competition.

Physical Education for Women

ASSOCIATE PROFESSOR: VIRGINIA RATH, *Chairman*

ASSISTANT PROFESSORS: IRENE MOLL

MAY E. PARRY

ASSISTANTS: SUSAN STERN (part-time)

ALICE WILLETTS (part-time)

COLLEGE PHYSICIAN: DR. MORRIS A. BOWIE

The aim of this Department is to contribute to the education of all women students through the medium of physical activity. We believe this contribution can best be achieved through participation in a broad program of recreational, rhythmic and developmental activities. Therefore the program provides: instruction and experience in sports and dancing; swimming ability for all; corrective and developmental exercises. It is our hope that the student will also acquire: appreciation of the dance as a fine art; the meaning of good sportsmanship; added endurance; good posture; leadership training; joy in outdoor exercise; and a program of interests and skills that will carry over for the individual and her community after college.

Classes are kept small to insure individual attention, and students are grouped according to ability. Ample opportunities are given for intramural and intercollegiate competition, as well as for public performances and demonstrations.

Freshmen and sophomores take three periods of activity each week. These may be elected from classes listed below with the stipulation that they take swimming until a test is passed; take a rhythmic activity; take a team sport; take Body Mechanics if the posture grade indicates a need for it.

Regulation costumes should be ordered before college opens. Blanks for this purpose will be sent out from the Office of the Dean to all incoming students.

SPORTS

HOCKEY. Miss Parry, Mrs. Willetts.

Fall Term

Class and Varsity.

ARCHERY. Miss Rath.

Fall and Spring

Class and Varsity.

TENNIS. Miss Parry, Miss Rath, Mr. Faulkner, Miss Moll. *Fall, Winter and Spring*

Class and Varsity, Winter and Spring.

GOLF. Miss Moll.

Fall and Spring

Class and Varsity.

SWIMMING. Miss Rath, Miss Parry.

Fall, Winter and Spring

Beginner, intermediate and advanced classes in strokes and diving.

Class and Varsity.

BASKETBALL. Miss Moll, Miss Parry, Mrs. Willetts. *Winter*
Class and Varsity.

BADMINTON. Miss Parry, Miss Rath, Mr. Faulkner. *Winter*
Class and Varsity.

SOFT BALL. Miss Moll. *Spring*
Class and Varsity.

LACROSSE. Mrs. Willetts. *Spring*
Class and Varsity.

VOLLEY BALL. Miss Moll, Miss Parry. *Winter*
Class and Varsity.

RHYTHMIC ACTIVITIES

DANCING. Mrs. Stern. *Fall, Winter and Spring*
Class and Club.

FOLK AND SQUARE DANCING. Miss Moll. *Fall, Winter and Spring*
Open to men students also.

DEVELOPMENT AND SERVICE ACTIVITIES

BODY MECHANICS. Miss Rath. *Winter*
Required of all first-year students whose posture indicates a need for it.

RECREATIONAL LEADERSHIP. Miss Moll, Miss Rath. *Winter and Spring*
Theory and practice teaching in recreational activities of all kinds. Given in alternate years.

RED CROSS LIFE SAVING. Miss Rath and members of Instructor Training Board. *Winter and Spring*
Senior and Instructors' courses.

Physics

PROFESSOR: WILLIAM C. ELMORE, *Chairman*

ASSOCIATE PROFESSORS: DENNISON BANCROFT †
MILAN W. GARRETT

INSTRUCTOR: DANIEL WILLARD

The physics department, through its introductory course in general physics, endeavors to give an integrated account of basic physics. In this course, as well as in the advanced work of the department, emphasis is placed on quantitative, analytical reasoning, as distinct from the mere acquisition of facts and skills. The introductory course makes no pretense of covering all material of interest to physicists, but rather comprises a selection of topics which form a coherent group.

Advanced work in the department involves a more intensive study of topics covered at the introductory level, and of many phases of modern physics which require a considerable background in mathematics and electricity. In all courses and seminars particular importance is attached to laboratory work, inasmuch as physics is primarily an experimental science.

REQUIREMENTS AND RECOMMENDATIONS FOR MAJORS AND MINORS

Students who intend to major in physics normally take Course 1, 2 in the freshman year and Course 11, 12 in the sophomore year. In addition they should complete Course 12 in mathematics and Course 2 in chemistry by the end of the sophomore year. In view of graduate school requirements, and of the extensive literature of physics in German, it is strongly recommended that the student fulfill his language requirement in German. A grade of C or better in Course 1, 2 is prerequisite for all further work in the department.

The work of the last two years normally involves an honors program, and includes three seminars in physics and three seminars in mathematics. Other seminars in the program are usually chosen from electrical engineering, chemistry, or philosophy. Such a program is a particularly satisfactory way of preparing for graduate or other professional work in physics or in mathematics. However, it constitutes in itself an effective educational program, since the aim throughout is to achieve an understanding of fundamental ideas and concepts, as distinct from the mastery of information, skills and techniques in a limited segment of science.

COURSE STATEMENT

1, 2. GENERAL PHYSICS. Staff.

Full Course

An introductory course in basic physics open to all students. No prerequisite other than those for college entrance is assumed. This course or its equivalent must precede any advanced courses or seminars in physics. It is required of most science majors. Three lectures, a conference and a laboratory period weekly. Separate credit given for each semester's work.

† Absent on leave, 1955-56.

11, 12. MECHANICS, HEAT AND SOUND. Mr. Willard.

The material for this course is drawn from the fields of mechanics, elasticity, wave motion, kinetic theory, thermodynamics, and statistical mechanics. Since extensive use is made of the calculus, a course in this subject must precede or be taken concurrently. This course is recommended for physics majors and should meet the needs of other students desiring a second course in physics. Three conference hours and one laboratory period weekly.

HONORS WORK

101. OPTICS, SPECTRA AND ATOMIC STRUCTURE. Mr. Wyller. *Fall Semester*

This seminar covers those aspects of physics directly connected with light, radiation and atomic structure. Topics include geometrical optics, physical optics, spectroscopy, spectral series, X-rays, and elementary quantum theory. In so far as practicable all theoretical conclusions are directly supported by laboratory work. Prerequisite: Physics 1, 2 and Mathematics 11, 12.

102. ELECTRICITY AND MAGNETISM. Mr. Garrett. *Fall Semester*

Based primarily on Page and Adams' *Principles of Electricity and Harnwell's Principles of Electricity and Electromagnetism*. It covers static and dynamic electricity, magnetism and electromagnetism, with some electronics. The emphasis throughout is on fundamental analysis rather than application. The laboratory includes measurements in direct and alternating currents and in magnetism, together with some fundamental experiments in electronics. Mathematics seminars in advanced calculus and differential equations are normally prerequisite.

103. MODERN PHYSICS. Mr. Elmore. *Spring Semester*

The topics covered in this seminar include electromagnetic theory of radiation, special relativity, wave mechanics, isotopes, nuclear physics and high-energy particle physics. The seminar discussions are accompanied by a full-day laboratory period each week. This seminar must be preceded by that in electricity and magnetism.

104. THEORETICAL PHYSICS. *Spring Semester*

A study of selected topics, mostly drawn from classical physics. Little duplication occurs of theoretical material covered in the other seminars offered by the department. Based for the most part on Page's *Introduction to Theoretical Physics*. Not accompanied by laboratory.

Prerequisites: Physics 11, 12 and Mathematics 101, 102. Not offered regularly.

Political Science

PROFESSOR: J. ROLAND PENNOCK, *Chairman*

ASSOCIATE PROFESSORS: GERARD J. MANGONE
MURRAY S. STEDMAN, JR.

ASSISTANT PROFESSORS: CHARLES E. GILBERT
CHARLES B. McLANE

LECTURER: HENRY J. ABRAHAM

The aim of the Department of Political Science is to study, both in ideal and in reality, the place of the state in society and to contribute to an understanding of the purposes, organization, and operation of political institutions, domestic and international. For the beginning student, the Department offers an introduction to the nature of politics and to the problems of various political systems. For those who become majors or for others who take additional work in political science, courses are provided which will permit giving special attention to the areas of political theory, comparative government, government in the United States, and international political institutions.

REQUIREMENTS AND RECOMMENDATIONS FOR MAJORS

Course 1-2 is prerequisite to all other work in the department. Students who intend to major in political science should, preferably, take Course 1-2 in the freshman year and Course 11 in the sophomore year. Students who desire to concentrate on international affairs without taking the full International Relations Program referred to below may substitute Comparative Government (Political Science 15) or The Soviet System (Political Science 19) for Course 11. Majors are also required to take Economics 1-2. Courses in Accounting and Statistics (Economics 3) and in American history are recommended. Political Theory, either in seminar or in course, is required of all majors; course majors should take Course 60.

PROGRAM IN INTERNATIONAL RELATIONS

Students who plan to enter upon a career in the field of international relations should include in their programs, during the first two years, the introductory courses in economics, history and political science and should complete the intermediate course in one or more modern languages.

Advanced courses selected from the groups listed below may be incorporated in the programs of students who do their major work in economics, history, political science, or a modern language.

Those students who wish to concentrate in international relations may take their Senior Comprehensive Examination in this field. Students preparing for this examination should take eight, nine, or ten half courses from among those listed below, including all of those listed in Group I, one or more in Group II, and one or more in Group III. The examination is administered by a committee appointed by the chairmen of the Departments of Economics, History, and Political Science, under the Chairmanship of the Department of Political Science.

GROUP I

- Political Science 12—International Politics
- Political Science 13—International Law and Organization
- Political Science 57-58—American Foreign Policy
- Economics 60—International Economics

GROUP II

- History 11—The Other American Republics
- History 14—Russia
- History 52—Modern Britain

GROUP III

- Political Science 15—Comparative Government
- Political Science 18—The British Welfare State
- Political Science 19—The Soviet System
- Political Science 20—Far Eastern Politics
- Political Science 59—Modern Political Theory.

Students who plan to enter the honors program will find it possible to select a similar combination of courses and seminars in the field of international relations. In planning such programs, they should consult with the chairmen of their prospective major departments.

COURSES

1-2. INTRODUCTION TO POLITICAL SCIENCE. All members of the department.

Full Course

The foundations of politics—sociological, psychological, and economic; nature and development of political institutions; types of government. A study of examples of the major forms of government, followed by a more detailed study of the national government of the United States. Political Science 1-2 is open to all students and is prerequisite to all other courses offered by the department. Credit is not given for a single semester of this course.

11. PROBLEMS IN COMMUNITY GOVERNMENT. Mr. Gilbert.

Spring Semester

Study of selected problems in community life and government, at both local and state levels. Includes topics such as centralization and home rule; governmental reorganization; corruption, bossism and reform; urban and rural planning and development. Emphasis is placed on field work and original research, using one of the nearby communities as a laboratory.

12. INTERNATIONAL POLITICS. Mr. Mangone.
(Not offered in 1955-56.)

Alternate Years, Fall Semester

An introduction to the principles and problems of international politics—including the study of political geography, the composition and balance of international power, such worldwide phenomena as nationalism and imperialism, and the techniques of diplomacy.

13. INTERNATIONAL LAW AND ORGANIZATION. Mr. Mangone.

Alternate Years, Spring Semester

(Not offered in 1955-56.)

The development of international law and organization—including a study of the major problems of international law and world government, the organization and work of the League of Nations, the United Nations, regional agencies, and international administration.

Prerequisite: Political Science 12.

15. COMPARATIVE GOVERNMENT. Mr. Stedman. *Alternate Years, Fall Semester*
 A critical study of the political systems of major foreign democracies. During the year 1955-56 special emphasis will be placed on France. The ability to read French is desirable but not essential.
16. DEMOCRACY AND DICTATORSHIP. Mr. Pennock. *Spring Semester*
 (Not offered in 1955-56.)
 Analysis of the crisis of political liberalism. Reconsideration of the bases of representative government in the light of changed economic and social conditions in the modern State; examination of such alternative principles as those offered by Communism and Fascism; investigation of the problem of planning in a democracy; and an appraisal of present tendencies in political development.
18. THE BRITISH WELFARE STATE. Mr. Gilbert. *Fall Semester*
 (Not offered in 1955-56.)
 Development of social and economic policy in Great Britain, especially since 1940. Britain as a case study in the politics and problems of economic planning.
19. THE SOVIET SYSTEM. Mr. McLane. *Spring Semester*
 (Also listed as Russian Studies 19.)
 The structure and operation of the economic and political institutions of the Soviet Union, described and analyzed in the light of their theoretical and historical background. Soviet foreign policy is also treated.
20. FAR EASTERN POLITICS. Mr. McLane. *Fall Semester*
 A study of Far Eastern politics with the chief emphasis on China and the rise of communism. Government and politics in Japan, Korea, and Southeast Asia will also be studied.
51. PUBLIC ADMINISTRATION. Mr. Gilbert. *Fall Semester*
 An analysis of administration in modern governments with illustrative material drawn chiefly from the national government of the United States and with particular reference to recent developments. Problems of administrative organization, conduct of regulatory and managerial activities, financial administration, personnel, public relations, administrative law, politics and administration.
 Open to juniors and seniors only, except by special arrangement.
52. AMERICAN CONSTITUTIONAL LAW. Mr. Pennock. *Fall Semester*
 (Not offered in 1955-56.)
 The Constitution as developed by the Court; and the Court as seen through the cases. Stressing (a) the extent of national power, (b) constitutional limitations upon state legislation, (c) the nature of the judicial process in the American system of government.
 Sophomores may be admitted by special arrangement.
53. AMERICAN PARTY POLITICS. Mr. Stedman. *Alternate years, Fall Semester*
 (Not offered in 1955-56.)
 An historical and functional analysis of American political parties, including a study of interest groups, public opinion, electoral devices, political leaders, and proposals for the reorganization of the existing party structure.

54. HISTORY OF POLITICAL THEORY. Mr. Pennock. *Fall Semester*
 The development of thought on the nature of the state and of individual rights and duties, based largely on readings of the chief political philosophers from Plato to Rousseau. Topics studied include: Greek and Roman political thought; medieval universalism and the divine right of kings; the Reformation and the development of contractual theory; natural law and natural rights.
 Open to juniors and seniors only, except by special arrangement.
55. AMERICAN POLITICAL THOUGHT. Mr. Stedman. *Alternate years, Spring Semester*
 (Not offered in 1955-56.)
 A study of the development of American political thought: the colonial period; the Revolution; Jeffersonian Democracy; Jacksonian Democracy; the nature of the Union; newer currents, including the progressive movement, labor, and conflicts between church and state.
56. JURISPRUDENCE. Mr. Pennock. *Spring Semester*
 A study of the sources and nature of law; historical, sociological and philosophic approaches to legal theory; the nature of the judicial process; key problems of jurisprudence illustrated by case study in selected areas of American constitutional law.
- 57-58. AMERICAN FOREIGN POLICY. Mr. Mangone. *Alternate years, Full Course*
 A full-year's course in the study of contemporary American foreign policy towards selected areas of the world. The agencies which determine foreign policy within the United States are examined and close attention is given to the history, economy, and local problems of the regions in which American foreign policy operates. Open to juniors and seniors only.
59. MODERN POLITICAL THEORY. Mr. Pennock or Mr. Gilbert. *Spring Semester*
 Political theory from the Enlightenment to the present. Utilitarianism, Idealism, and Neo-idealism; anarchism, Marxism, and later socialist doctrines; monistic and pluralistic theories of sovereignty. Considerable time will be devoted to analysis of democratic and totalitarian theories, and to the political problems of democratic economic planning.
60. SPECIAL TOPICS IN POLITICAL SCIENCE. Mr. Stedman. *Spring Semester*
 This course, conducted in seminar fashion, is designed for senior majors. By means of papers and assigned readings it covers aspects of political science not elsewhere intensively developed and helps the students to integrate materials studied previously.

HONORS WORK

Prerequisite: Political Science 1-2. The following seminars prepare for examination for a degree with Honors:

101. POLITICAL THEORY. Mr. Pennock. *Each Semester*
 The nature of the state, the basis of political obligation, sovereignty and the nature of law, problems of freedom and authority, theoretical analysis of forms of government, theories of revolution—all in the light of the theories set forth by writers on these subjects from Plato to the present.
102. POLITICS AND LEGISLATION. Mr. Stedman. *Each Semester*
 A study of the political process: purposes of the state; the relation of the general welfare to special interest; public opinion; voters and electoral systems; parties and politicians; the functions and organization of the legislature.

103. PROBLEMS IN GOVERNMENT AND ADMINISTRATION. Mr. Gilbert. *Each Semester*
 A detailed study of the forms and functions of modern government, particularly on the administrative side. Problems of administrative organization, policy-making and responsibility in the light of democratic political purposes and processes and the legal, sociological and economic setting. Emphasis is on United States experience, although relevant experience abroad is examined.
104. INTERNATIONAL POLITICS, LAW, AND ORGANIZATION. Mr. Mangone. *Fall Semester*
 A comprehensive inquiry into the principles and problems of international politics, international law, and international organization.
105. AMERICAN FOREIGN POLICY. Mr. Mangone. *Spring Semester*
 An investigation of contemporary American foreign policy throughout the world; how foreign policy is determined, the agencies which implement it, and an evaluation of the U. S. national interest in key areas of Europe, Latin America, the Middle East, and Asia.
106. PUBLIC LAW AND JURISPRUDENCE. Mr. Pennock. *Spring Semester*
 Sources and nature of law; historical, sociological, philosophic, and "realistic" approaches to law; key problems of jurisprudence illustrated by study of the fields of federalism and civil liberties in American constitutional law.
107. THE SOVIET SYSTEM. Mr. McLane. *Spring Semester*
 A study of Soviet economic and political development with special attention to the problems involved in the operation of a totalitarian political system and a centralized planned economy.
120. THESIS. All members of the department.
 Approval must be secured early in the student's junior year.

Psychology and Education

PROFESSORS: WILLIAM C. H. PRENTICE, *Chairman*

SOLOMON E. ASCH †

WOLFGANG KÖHLER, *Research Professor Emeritus of Philosophy and Psychology* (on special research grant).

JOSEPH B. SHANE, *Vice-President and Professor of Education*

HANS WALLACH

ASSISTANT PROFESSORS: ARTHUR I. GLADSTONE

HENRY GLEITMAN

PETER MADISON

ALLEN PARDUCCI

LECTURER: ALICE K. BRODHEAD

The work of the Department of Psychology deals with the scientific study of human behavior and experience: the basic processes of perception, learning, thinking and motivation, and consideration of their relation to development of the individual personality; and the social relations of the individual to other persons and to groups. For those students planning for graduate and professional work in psychology the courses and seminars of the department are designed to provide a sound basis of understanding of psychological principles and a grasp of research method. Other students learn the nature of psychological inquiry and the psychological approach to various problems encountered in the humanities, the social sciences and the life sciences.

REQUIREMENTS AND RECOMMENDATIONS

Courses 1 and 2 are prerequisite to all further courses and seminars in psychology. Course majors are required to take Courses 3, 52, and 53. Course 63 is recommended.

Honors majors are required to take courses 1, 2, 3, and advised to take during their freshman and sophomore years introductory work in zoology and, if possible, work beyond the introductory course in philosophy. A reading knowledge of German is useful.

Courses in education—11, 12, 13, 14, 15 and 16 will not be credited toward a major in psychology. Education alone may not be elected as a major subject, and not more than two full courses in education will be accepted for credit toward the bachelor's degree.

Swarthmore students may fulfill the Pennsylvania requirements for the certification of secondary school teachers by taking:

1. Psychology 1—Introduction to Psychology.
2. Education 11—Educational Psychology.

† Absent on leave, 1955-56.

3. Education 14—Introduction to Teaching.
4. Two courses to be chosen from among:
 - a. Education 12—Principles of Secondary Education.
 - b. Education 13—Methods of Secondary Education.
 - c. Education 15—History of Education.
5. History 4, 5—The United States (arrangements must be made for special work in the History of Pennsylvania).
6. A minimum of three full courses (or six half-courses) in the subject or field in which the student expects to teach.
7. Education 16—Practice Teaching.

Swarthmore students may receive credit toward a Pennsylvania elementary school certificate by taking:

1. Psychology 1—Introduction to Psychology.
2. Psychology 2—General Psychology.
3. Psychology 55—Child Psychology.
4. Education 11—Educational Psychology.
5. Education 14—Introduction to Teaching.
6. History 4, 5—The United States (with special work in Pennsylvania history).

Psychology

1. INTRODUCTION TO PSYCHOLOGY. Mr. Prentice, Mr. Gleitman. *Each Semester*
 An introduction to the study of psychology, including a consideration of the nature of psychological inquiry and a brief review of the available facts and theories relevant to a scientific understanding of human behavior and experience. Technical aspects are subordinated to questions concerning motivation, personality and adjustment, although the emphasis throughout is theoretical rather than practical. Three lectures and one conference section per week.
2. GENERAL PSYCHOLOGY. Mr. Wallach. *Each Semester*
 An extension of the introductory course, giving special attention to problems of cognition including facts and theories of perception, learning, memory, and thinking. In general, the orientation is historical, and students will learn about major theoretical movements in the realm of cognition.
 Prerequisite: Course 1.
3. PSYCHOLOGICAL METHODS. Mr. Gladstone, Mr. Parducci. *Spring Semester*
 The main objective of this course is to develop in the student a critical and experimental attitude towards psychological problems. The content of the course includes: a survey of the types of experimental designs, the methods of measurement, and the kinds of apparatus employed in different psychological studies, and an analysis of the historical background of selected contemporary theoretical problems.
 Prerequisite: Course 1.
52. MOTIVATION. Mr. Prentice. *Fall Semester*
 Emphasis is upon the role of dynamic factors (drives, needs, values) in the determination of behavior. Consideration is given to the measurement of motives, the relationship between biological and psychological tension-systems, conflict, frustration, success and failure, reward and punishment. Evaluation of the theories of motivation of McDougall, Tolman, Lewin, Allport, Murray and Freud. Term paper or design of an original experiment is required.
 Prerequisites: Courses 1 and 2.

53. **EXPERIMENTAL PSYCHOLOGY.** The Staff. *Fall Semester*
 A course in experimental thinking; how to conceive, design, and carry out original experiments on psychological problems. Instructor and students begin with a problem or problem-area and develop experimental attacks by group discussion. The actual experiments so designed are carried out by the students with supervision and are interpreted and evaluated by the group. Students present formal reports on each experiment. Class work, laboratories, and reports take ten to twelve hours per week.
 Prerequisites: Courses 1, 2, and 3.
54. **LEARNING AND THINKING.** Mr. Parducci. *Fall Semester*
 A detailed study of the theoretical issues and empirical observations concerning human and animal habit formation, problem solving, and thinking. Association, classical and instrumental conditioning, insight, remembering and forgetting; contemporary theories of these phenomena are studied and evaluated.
55. **CHILD PSYCHOLOGY.** Mr. Gladstone. *Fall Semester*
 The development of the child from birth through puberty, studied in terms of basic psychological principles. Important theories and practices of child-rearing are evaluated in the light of experimental and cross-cultural data. Topics include the significance of infantile and childhood experience on subsequent personality development, parent-child relationships, sibling rivalry, and the "behavior problems" which typically occur during the socialization process. One of the following is required: (1) acting as an assistant in a child-care center for approximately 20 hours, (2) an intensive study of a single child, (3) individual or group experimental or observational research, (4) a term paper.
 Prerequisites: Courses 1 and 2.
56. **SOCIAL PSYCHOLOGY.** Mr. Asch, Mr. Gladstone. *Each Semester*
 A study of some basic processes and products of interaction between persons and groups and between groups. The following topics are covered: The formation of the social field of the individual. Perception of persons as psychological entities. Perception of groups. Formation of the self; social relations of the self. Psychological forces supporting group-belonging. Functional consequences of group membership. The psychological investigation of group processes. Group requirements and group standards. Formation and change of attitudes.
 Prerequisites: Courses 1 and 2.
57. **DIAGNOSIS OF ABILITIES AND PERSONALITY.** Mr. Madison. *Fall Semester*
 Theory and techniques of assessing personality, intelligence, ability, and interest. Actual practice with such tests and procedures as the Thematic Apperception Test, Rorschach, Wechsler-Bellevue, Stanford-Binet, Non-Directive Interview, and other methods of diagnosis. Study of theory and research on the concept of measurement in psychological testing.
 Prerequisites: Courses 1, 2 and 3.
58. **PERSONALTY THEORY.** Mr. Gladstone. *Fall Semester*
 A study of the leading concepts of personality theory, including the psycho-analytic, Lewinian, socio-cultural, self-theorists and other non-systematic formulations. Application of these concepts will be made to case studies.
 Prerequisites: Courses 1 and 2.
59. **PSYCHOPATHOLOGY.** Mr. Madison. *Spring Semester*
 A study of the current theories of mental illness and of the main forms of mental disorders. Theories and techniques of therapy are considered. Extensive use of the case study method. Emphasis is on the evaluation of theories of psychopathology and of their significance for normal personality theory.
 Prerequisites: Courses 1 and 2.

- 61-62. **ADVANCED PSYCHOLOGICAL RESEARCH.** The Staff. *Each Semester*
 Individual research on a selected original problem under the direction of a member of the department. Open only to psychology majors. Credit will be given for one semester; a second semester may be taken for credit at the discretion of the department.
 Prerequisites: Courses 1, 2, 3 and 53.
- 63-64. **PSYCHOLOGICAL TUTORIAL.** The Staff. *Spring Semester*
 Weekly seminar meeting of psychology course majors held in the second term of the senior year for the purposes of reviewing, integrating, and supplementing the student's course work in psychology. Open only to senior majors.
65. **THE PSYCHOLOGY OF DRAMATIC EXPERIENCE AND PRESENTATION.** Mr. Gleitman. *Spring Semester*
 The object of this course is to explore some possible contributions of scientific psychology—in particular, the psychology of emotional expression—to an area hitherto the domain only of intuitive artists. Topics of discussion will include structural aspects of dramatic forms, the experience of the comic and the tragic, psychological problems of timing and rhythm, theories of acting and direction, and the like. The course will involve some laboratory work, testing relevant hypotheses with standard experimental techniques. Permission of instructor is necessary.
 Prerequisite, Psychology 1. Some contact with drama either through the literature or in practice is desirable.
 Three hours lecture per week and 2 hours laboratory.

Education

11. **EDUCATIONAL PSYCHOLOGY.** Mr. Prentice. *Fall Semester*
 The application of psychological principles concerned with the processes of thinking, learning and motivation to the problems of education.
 Prerequisite: Course 1.
12. **PRINCIPLES OF SECONDARY EDUCATION.** Mr. Shane. *Fall Semester*
 A study of the principles of secondary education, with emphasis upon aims and organization. Visits to nearby schools are made.
13. **METHODS OF SECONDARY EDUCATION.** Mr. Shane. *Fall Semester*
 A review and critical analysis of the methods used in secondary education.
14. **INTRODUCTION TO TEACHING.** Mrs. Brodhead. *Each Semester*
 Current educational theory and practice. Weekly seminar plus three hours a week assisting in a classroom in the local schools. Arrangements can be made for further experience in exceptional cases.
15. **HISTORY OF EDUCATION.** Mrs. Brodhead. *Each Semester*
 Educational thought in our western culture from the Greeks to the present day. Weekly seminar.
16. **PRACTICE TEACHING.** Mrs. Brodhead.
 A limited number of students may complete the Pennsylvania requirements in the Swarthmore High School summer session under the direction of their teaching staff. Application should be made to Mr. Shane or Mrs. Brodhead in the preceding spring.

HONORS SEMINARS

101. PERCEPTION. Mr. Wallach, Mr. Prentice.

Reading and discussion combined with independent experimental projects. The student is expected to know the basic facts about human perceptual mechanisms, particularly visual ones, by the time he has completed this seminar. Specific topics covered are: color vision, grouping and form, depth and distance, size, movement, influences of learning and of needs or attitudes, general theory of perception. When time permits, some attention is given to parallel problems in other senses.

102. LEARNING AND THINKING. Mr. Gleitman.

Deals with principles of adaptive behavior, the functions of memory and thinking; the nature of understanding and problem-solving; the nature of intelligence.

103. MOTIVATION. Mr. Asch, Mr. Gladstone.

A systematic and experimental approach to the dynamics of behavior, based on material drawn from the laboratory and the clinic, and covering the following topics: instinctive behavior and biological drives; the relation of motivation and learning; derived motivation; the relation of perception and motivation; frustration and its relation to aggression, regression; level of aspiration; success and failure; substitution and sublimation; ego needs and the nature of the ego; emotion and feeling; contemporary theories of motivation.

104. INDIVIDUAL IN SOCIETY. Mr. Asch, Mr. Gladstone.

The relationship between man and his society, approached from the points of view of social psychology, sociology, and cultural anthropology; the study of group-structures and the psychological consequences of group-membership; the critique of available procedures for scientific treatment of group-behavior and group-influences.

105. PERSONALITY. Mr. Madison.

A systematic approach to personality, including a survey and critique of such major theoretical positions as those of Freud, Jung, Adler, Horney, Fromm, McDougall and Murray. An examination of clinical and experimental evidence concerning personality, for example, experimental data on ego-involvement, clinical evidence of repression. A consideration of the methods employed in the assessment of personality such as life history methods, the interview, standardized personality tests, association tests, projective techniques, and situational tests.

106. DEVELOPMENT. Mr. Prentice.

An investigation of the concepts of psychological growth, including sensori-motor skill, intellectual and emotional functions, and personality. Readings in experimental and clinical literature; some direct observation and experimentation with children.

120. THESIS. All members of the department.

May be presented as a substitute for one seminar, provided the student is doing major work in psychology with four seminars, and provided some member of the department is available to undertake the direction of the thesis.

MASTER'S DEGREE

A limited number of students may be accepted for graduate study toward the Master's degree in psychology. Students receiving the Bachelor's degree from Swarthmore are not normally eligible for this work.

The program of work for the Master's degree requires the completion of four seminars, or their equivalent. One of the seminars must be a research seminar leading to a Thesis. The work of the seminars is judged by external examiners. The requirements for the Master's degree can normally be completed in one year.

Russian Studies

The Russian Studies program, inaugurated in the fall of 1949 at Bryn Mawr, Haverford and Swarthmore Colleges, has been made possible by a grant of \$105,000 from the Carnegie Corporation of New York. As a part of this program, Swarthmore is offering courses in Russian language, history, and economic and political institutions.

Courses in this group cannot themselves comprise a major subject. Courses in the Russian language may be used to fulfill the college foreign language requirement. Courses in Russian history and in Russian political and economic institutions may be counted toward a major or minor in the departments offering them. (These courses are listed under their appropriate departments.)

RUSSIAN LANGUAGE

- 1-2. ELEMENTARY RUSSIAN. Miss Lamkert. *Full Course*
Vocabulary and grammar. Oral and written translations from English into Russian and vice versa. Vocabulary building. Reading of short stories. Books: *Essentials of Russian* (Prentice-Hall), *Stories by Lermontoff and Pushkin* (Heath series). Five hours a week.
- 3, 4. INTERMEDIATE RUSSIAN. Miss Lamkert.
Review of grammar with special emphasis on use of prepositions, verb forms, numerals. Short area study, geography and history of Russia to the revolution of 1917. Advanced reading and composition. Books: *Essentials of Russian* (Prentice-Hall), *Russian Area Reader* (Ronald Press), *Pushkin's Captain's Daughter*.
- 11, 12. INTRODUCTION TO RUSSIAN LITERATURE: PROSE. Miss Lamkert.
A short survey of the Russian literature of the 18th and 19th centuries. Books: *Russian Area Reader* (Ronald Press) and other books to be selected by the class.
- 13, 14. POETRY AND CONTEMPORARY AUTHORS. Miss Lamkert.
Books: *Eugene Onegin by Pushkin*. Readings from Chekov and Gorky.
- 51, 52. SENIOR CONFERENCE. Miss Lamkert.
Writings of Gogol and Turgenev.

HISTORY

14. RUSSIA. Mr. Beik. *Fall Semester*
The history of modern Russia. For sophomores, juniors and seniors. The course begins with the reign of Peter and gives half its time to the period since the Revolution. It may be taken only after History 1-2.

ECONOMIC AND POLITICAL INSTITUTIONS

19. THE SOVIET SYSTEM. Mr. McLane. *Spring Semester*
The structure and operation of the economic and political institutions of the Soviet Union, described and analyzed in the light of their theoretical and historical background. Soviet foreign policy is also treated.

REFERENCE SECTION

Visiting Examiners—May 1955

BIOLOGY: DR. BENTLEY GLASS, Johns Hopkins University; PROFESSOR WESLEY G. HUTCHINSON, *University of Pennsylvania*; PROFESSOR WILLIAM H. TELFER, *University of Pennsylvania*.

CHEMISTRY: PROFESSOR WILLIAM A. MOSHER, *University of Delaware*; DR. WILMER JENKINS, *E. I. du Pont de Nemours & Co., Wilmington, Del.*

CLASSICS: PROFESSOR WILLIAM C. McDERMOTT, *University of Pennsylvania*.

ECONOMICS: PROFESSOR ROBERT L. BISHOP, *Massachusetts Institute of Technology*; PROFESSOR FLOYD A. BOND, *Pomona College, Claremont, California*; PROFESSOR KERMIT GORDON, *Williams College*; PROFESSOR ROBERT R. FRANCE, *Princeton University*.

ENGLISH LITERATURE: PROFESSOR WARNER BERTHOFF, *Bryn Mawr College*; PROFESSOR JOEL DORIS, *Yale University*; PROFESSOR ISABEL GAMBLE, *Bryn Mawr College*; PROFESSOR WILLIAM R. KEAST, *Cornell University*; PROFESSOR VICTOR LANGE, *Cornell University*.

FINE ARTS: PROFESSOR ELEANOR BARTON, *Sweetbriar College*.

HISTORY: PROFESSOR GEORGE B. COOPER, *Trinity College*; DR. PHILIP A. CROWL, *Department of the Army, Washington, D. C.*; PROFESSOR EUGENE O. GOLOB, *Wesleyan University*; PROFESSOR HENRY L. ROBERTS, *Director, Program on East Central Europe, Columbia University*.

MATHEMATICS: PROFESSOR LARS V. AHLFORS, *Harvard University*; PROFESSOR ROBERT A. ROSENBAUM, *Wesleyan University*.

MODERN LANGUAGES: *French*—PROFESSOR RENE NOEL GIRARD, *Bryn Mawr College*; *German*—PROFESSOR ADOLF D. KLARMANN, *University of Pennsylvania*.

PHILOSOPHY AND RELIGION: PROFESSOR ABRAHAM KAPLAN, *University of California at Los Angeles*; PROFESSOR GEDDES MACGREGOR, *Bryn Mawr College*; PROFESSOR ARTHUR PAP, *Lehigh University*; PROFESSOR WALTER T. STACE, *Princeton University*.

PHYSICS: DR. JOHN F. MARSHALL, *Bartol Research Foundation, Swarthmore, Pa.*

POLITICAL SCIENCE: DR. STEPHEN K. BAILEY, *Director, Woodrow Wilson School, Princeton University*; PROFESSOR WILLIAM M. BEANEY, *Princeton University*; PROFESSOR ROBERT F. BYRNES, *Director, Mid-European Studies Center, New York City, N. Y.*; PROFESSOR WILLIAM EBENSTEIN, *Princeton University*; PROFESSOR NORMAN D. PALMER, *University of Pennsylvania*.

PSYCHOLOGY: PROFESSOR DONALD BROWN, *Bryn Mawr College*; PROFESSOR RACHEL DUNAWAY COX, *Bryn Mawr College*; PROFESSOR JOSEPH GREENBAUM, *Wesleyan University*; DR. LEO HURVICH, *Eastman Kodak Company, Rochester, N. Y.*; PROFESSOR FRANCIS W. IRWIN, *University of Pennsylvania*; PROFESSOR SILVAN TOMKINS, *Princeton University*.

Degrees Conferred

June 6, 1955

BACHELOR OF ARTS

In the Division of the Humanities

- ANNE KENNEDY ABERNETHY (English Literature)
‡ROGER DAVID ABRAHAMS (English Literature)
‡JOYCE BOK AMBRUSTER (Psychology)
‡GEORGE W. BAHLKE, (English Literature)
EDWIN H. BLAKELOCK (Psychology)
BEVERLEY ANNE BOND (English Literature)
WILLIAM ALLEN BOSBYSHELL (English Literature)
MARTHA BUCKNELL (Psychology)
JANET BUSHMAN (Fine Arts)
JOANNA DALRYMPLE (English Literature)
‡DOROTHY DAY (Psychology)
KAREN ANN DETTMERS (English Literature)
ANETTA DE VRIENDT (Spanish)
WILLIAM FRANCIS DOMINICK, II (Religion)
‡HELEN ELIZABETH DRAKE (History)
MARY FRANCES DUNLEVY (Fine Arts)
JEAN MARGARET ELLIOTT (English Literature)
SARA WALKER FILEMYR (Latin)
CLINTON FREDERICK FINK (Psychology)
‡CARL KERMEEN FRISTROM (English Literature)
ALICE FRANCES GENDELL (English Literature)
MARY JEAN GRAY (English Literature)
SHIRLEY CARTER GRIMES (Psychology)
CLEMENT ALEXANDER F. HASTIE (History)
‡SANDRA JOAN HEILVELL (Philosophy)
KATHERINE ELIZABETH HENDERSON (English Literature)
JANE ANN HICKS (French)
MEREDITH HOWELL (English Literature)
MARGARET ANNE HUDGINS (Psychology)
‡JOHN MITCHELL HUGHLETT, JR. (English Literature)
GRENELLE HUNTER (English Literature)
PETER AUSTIN JENSH (Religion and Psychology)
SHARON DAVIS KAPLAN (History)
JANE M. W. KENNEDY (Fine Arts)
ANNE DAVIES KESTEN (English Literature)
JULIA ALICE LANGE (English Literature)
JUDITH BEN-HAREL LIEBERMAN (Psychology)
WINIFRED YUK WEN LIU (Psychology)
§ISABEL ALICE MACDONALD (English Literature)
PETER MICHAEL MARIN (English Literature)
CAROL MAY MCCOY (Philosophy)
§RHEA MENDOZA (Psychology)
ELINOR CECILY MEYER (Psychology)
JOHN WILSON MILLS (French)
§JERROLD NORTHROP MOORE (English Literature)
ELIZABETH BUNN MURPHEY, JR. (Psychology)
§HUGH HOWARD NISSENSON (English Literature)
ANNE ORDWAY SCHICK PLACE (English Literature)
¶MARGOT LYNN RAVAGE (English Literature)
SUSAN JEANNE ROSE (English Literature)
LAURA SARA SALAS (French)
§JEROME PAUL SCHILLER (Philosophy)
SALLY SCHNECKENBURGER (English Literature)
SONJA SCHULZ (German)
NANCY CAROLINE SCOTT (French)

For interpretation of all symbols see page 150.

§JOHN YOUNKER SIMON (History)
 KATHRYN KALMON SLAGER (Fine Arts)
 SARITA BARRINGTON SMITH (English Literature)
 FRANCES JANE STEVENSON (English Literature)
 TAMIYO SUEMATSU (English Literature)
 CHARLES THOMAS SULLIVAN (English Literature)

CAROLINE THOMAS (English Literature)
 GAIL DELVINE TODD (Psychology)
 §CHARLES CUTLER TORREY (English Literature)
 BRUCE BANCROFT VENRICK (Russian)
 ‡ERICA WEIS WATTS (French)
 CAROLYN LOIS WITTMAN (Psychology)
 §JANE BALDWIN WOODBRIDGE (History)
 §VALERIE WORTH (English Literature)

In the Division of the Social Sciences

‡PAUL ANTHONY BAUMGARTEN (Political Science)
 JOHN EDWARD BECKER (Political Science)
 JEROME BEKER (Psychology)
 §PAUL C. BERRY (Psychology)
 MARTHA JOSEPHINE BLACK (Psychology)
 §JANE WINSTON BOETCHER (History)
 §ELIZABETH CLEVELAND BOMAR (History)
 WILLIAM HENRY BRUCE (Political Science)
 CAROLYN MARY BUCK (Political Science)
 ‡MICHAEL CALINGAERT (History)
 §LEE DRANGA CAMPBELL (Psychology)
 FELIX SAUL CARRADY (Economics)
 §CHARLES A. COOPER (Economics)
 JULIEN MARTIN CORNELL (Political Science—International Relations)
 TIMOTHY CLAY COSS (History)
 ‡BARBARA ANNE CULIN (Political Science)
 ‡ARTHUR EDWARD CURTIS (History)
 RONALD OVERTON DECKER (History)
 JEAN TAFT DOUGLAS (Political Science)
 ¶MICHAEL STANLEY DUKAKIS (Political Science)
 MIRIAM JANE BERKES (Political Science)
 CAROL ELKINS (History)
 ¶JUDITH FAGAN (Political Science)
 ‡DAVID FITELSON (History)
 STEPHEN RICHARD FOX (Political Science)
 CLOTILDA GILBERT (History)
 SURELL LANDIS GOLDBERG (Political Science)
 *FRED WILLIAM GRUPP, JR. (Political Science)
 JAMES PARKER HALL, III (Economics)

JACQUELINE ARAMONDE HAMMITT (Psychology)
 RUSSELL ROBERT HARRIS, JR. (Economics)
 DAVID S. HASKELL (History)
 ¶DAVID BEN-AMI HATTIS (Economics)
 WILLIAM RICHARD HAWKINS (Economics)
 EUGENE EDWARD HEATON, JR. (Economics)
 ‡RICHARD G. HODGSON (History)
 §NEIL ANTON HOLTZMAN (History)
 JAMES CATHERWOOD HORMEL (History)
 JOHN GOODALL HUTTON, JR. (Political Science)
 PATRICIA WOOD IMBRIE (History)
 KARL JOHN INGEBRITSEN (History)
 WILLIAM MELVILLE JONES, III (Economics)
 JOANNA VIEDT KASLER (Economics)
 SALLY ANN KENNEDY (Philosophy)
 HAN KYO KIM (Political Science—International Relations)
 §RICHARD CLEMENT KOHLS (Economics)
 ELAINE LEE (Political Science—International Relations)
 ‡GERARD LENTHALL (Economics)
 §SUSAN JEWETT LEPPER (Economics)
 LOIS ANN LESLEY (Psychology)
 ‡JAY H. LEVINE (Political Science)
 §DANIEL MEIER LEWIN (Political Science)
 §JOHN GLENN LIPSETT (Economics)
 ALFRED MEYER LIVERIGHT, II (Political Science)
 PAUL N. MARCUS (Economics)
 DONOGH ZINN MCCUTCHEON (Economics)
 §BRUCE JONES MILLER, JR. (Political Science)

- HENRY ALLEN COCHRAN MYERS (Political Science)
 ¶PAUL HORNING NOYES (History)
 IRIS HISAKO OKAZAKI (Political Science)
 §PHILIP HUTCHINSON OSBORNE (Economics)
 ‡COSTAS DEMOSTHENES PHILIPIDES (Political Science)
 PHOEBE W. ROSENBERRY (Economics)
 ‡HUGH LAURENCE ROSS (Psychology)
 KARLA SCHRIFTGIESSER (Political Science)
 BETTY MAX SHAPIRO (Psychology)
 §WILLIAM E. SHEPARD (History)
 ‡BARBARA SICHERMAN (History)
- §FRANK ARNE SIEVERTS (Political Science)
 MARY ANN SMITH (Economics)
 §DIRK DRUKKER SNEL (Political Science)
 §NANCY LEE STURTEVANT (History)
 LAUREN LINDSAY SUTER (Political Science)
 NANCY ANN TRIGGS (Economics)
 §SEYMOUR DAY VESTERMARK, JR. (Political Science)
 ‡ERNST-WILHELM VONRINTELEN (Political Science)
 DAVID MACLANE WILKISON (Political Science)
 §JUDITH WUBNIG (Philosophy)
 BRENDA LOIS ZATZ (History)

In the Division of Mathematics and the Natural Sciences

- **JUDITH C. ALBRECHT (Zoology)
 ALAN IRA BURBANK (Chemistry)
 RICHARD THOMAS BURTIS (Zoology)
 ‡SARAH CURTIS (Psychology)
 ‡MARTIN HEIDENHAIN DAVID (Mathematics)
 IRWIN ROBERT FENICHEL (Mathematics)
 WILMER KRUSEN GALLAGER, JR. (Zoology)
 EDWARD S. GELARDIN (Zoology)
 ‡JULIEN GENDELL (Chemistry)
 ELLEN G. GINSBURG (Zoology)
 JEROME DAVID GOODMAN (Zoology)
 DIETER WALTER GUMP (Zoology)
 §LOUIS NEFF HAND (Mathematics)
 GEORGE WELLINGTON HARTZELL, JR. (Chemistry)
 HENRY HAVEN (Biology)
 ANN G. IMLAH (Mathematics)
 PAUL MARSHALL JAMES, JR. (Zoology)
 GEORGE ALEXANDER LAMB (Zoology)
 §JUDITH HELEN LIVANT (Psychology)
 SANDRA RAE LOEWY (Biology)
- MICHAEL MAYER (Mathematics)
 MICHAEL MENAKER (Zoology)
 ALAN SCHOFIELD PARKES (Psychology)
 JOHN HIESTER PARKES (Psychology)
 VIRGINIA PERKINS (Zoology)
 STEVEN JONES PHILLIPS (Zoology)
 THEODORE J. PHILLIPS (Zoology)
 LINCOLN TRUSLOW POTTER (Zoology)
 ANN L. PRICE (Zoology)
 PAUL RAPHAEL RESNICK (Chemistry)
 GERD MATTHEW ROSENBLATT (Chemistry)
 DANIEL LOUIS ROSS (Chemistry)
 KATHARINE SNYDER SASSE (Psychology)
 CARL HUGH SMITH (Chemistry)
 CARL BLAKE SPERRY (Mathematics)
 §MICHAEL SWIFT (Mathematics)
 §HOWARD MARTIN TEMIN (Zoology)
 ANNE VOHL (Zoology)
 STELLA YA-YEN WANG (Chemistry)
 WOLFGANG OSCAR WEIGERT (Zoology)
 JAY J. WEIMER (Zoology)
 LOIS JANET WITHROW (Zoology)

BACHELOR OF SCIENCE

In the Division of Engineering

- BENJAMIN HOWARD BEATTIE (Mechanical Engineering)
 HENRY JOSEPH BODE (Mechanical Engineering)
 SCOTT ANDREW COOPER (Mechanical Engineering)
- JAMES EWING DAVIS (Civil Engineering)
 T. GERRET DEWEES (Mechanical Engineering)
 *JOHAN ANTON FRIEDERICX (Civil Engineering)

LIONEL R. FRIEDMAN (Electrical Engineering)
 LEE FRANKLIN HALLBERG (Mechanical Engineering)
 LAWRENCE MERKEL HANDLEY (Mechanical Engineering)
 CONSTANTINE J. INGLESSIS (Civil Engineering)
 DONALD SELLERS MCKINLEY (Mechanical Engineering)
 ALBERT W. PRESTON, JR. (Electrical Engineering)
 THOMAS A. PRESTON (Electrical Engineering)

HORACE A. REEVES, JR. (Civil Engineering)
 †RICHARD WALLACE SCHWERTNER (Civil Engineering)
 LAYIWOLA OGUNSIJI SHOYINKA (Civil Engineering)
 GORDON PARRAN SMITH (Civil Engineering)
 HUGH HARTICH STRACHAN (Civil Engineering)
 THOMAS A. THROOP (Electrical Engineering)
 BERNARD NASH WEBB (Civil Engineering)

* As of the Class of 1954.

† As of the Class of 1948.

** As of the Class of 1953.

‡ Honors.

§ High Honors.

¶ Highest Honors.

Awards and Distinctions

ELECTIONS TO HONORARY SOCIETIES

PHI BETA KAPPA:

Paul C. Berry, Jane Winston Boetcher, Elizabeth Cleveland Bomar, Richard Thomas Burtis, Charles A. Cooper, Michael Stanley Dukakis, Judith Fagan, Irwin Robert Fenichel, Louis Neff Hand, David Ben-Ami Hattis, Susan Jewett Lepper, Daniel Meier Lewin, John Glenn Lipsett, Judith Helen Livant, Rhea Mendoza, Hugh Howard Nissenson, Paul Horning Noyes, Margot Lynn Ravage, Jerome Paul Schiller, Nancy Caroline Scott, John Younker Simon, Carl Hugh Smith, Mary Ann Smith, Nancy Lee Sturtevant, Michael Swift, Howard Martin Temin, Bruce Bancroft Venrick, Seymour Day Vestermark, Jr., Anne Vohl.

SIGMA XI:

Irwin Robert Fenichel, Johan Anton Friedericy, Lionel R. Friedman, Michael Swift, Howard Martin Temin.

SIGMA TAU:

Benjamin Howard Beattie, Henry Joseph Bode, Lionel R. Friedman, Lawrence Merkel Handley, Thomas A. Preston, Thomas A. Throop.

SWARTHMORE COLLEGE FELLOWSHIP AWARDS

The Hannab A. Leedom Fellowship to MARGOT LYNN RAVAGE.

The Joshua Lippincott Memorial Fellowship to BRUCE BANCROFT VENRICK and JUDITH WUBNIG.

The John Lockwood Fellowship to DIETER WALTER GUMP.

The Lucretia Mott Fellowship to RHEA MENDOZA.

SPECIAL AWARDS *

The Ivy Medal to RICHARD THOMAS BURTIS.

The Oak Leaf Medal to ANNE KENNEDY ABERNETHY.

The McCabe Engineering Award to HENRY JOSEPH BODE.

The John W. Nason Award to RUFFIN HERNDON, Head Trainer of the Swarthmore College Athletic Department.

The Crane Prize to NORMAN RUSH.

The A. Edward Newton Library Prize to JERROLD MOORE.

The Katherine B. Sicard Prize to LINDA PARKOFF.

The William Plummer Potter Public Speaking Fund Awards:

The Potter Public Speaking Contest; first prize, HUGH H. NISSENSON; second prize, HENRY A. MYERS.

The Potter Poetry Contest; first prize, C. SYLVESTER WHITAKER; second prize, JOHN M. HUGHLETT, JR.

The Potter One-Act Play Contest; first prize, JOHN M. HUGHLETT, JR. and JEFFREY R. DAVIDSON; second prize, EDWARD H. BRIGHT.

The Lois Morrell Poetry Award to CHARLES THOMAS SULLIVAN.

The John Russell Hayes Poetry Prizes: first prize, VALERIE WORTH; second prize, PETER M. MARIN.

The Scott Award to THOMAS K. GLENNAN, JR.

The Sarah Kaighn Cooper Scholarship to ROGER LEVIEN.

The American Viscose Scholarship to CHARLES ODENWELLER.

The American Cyanamid Company Scholarship to CARL VON FRANKENBERG.

The Radio Corporation of America Scholarship to ROBERT E. POTTHOFF.

The Westinghouse Achievement Award to ROGER LEVIEN.

* A description of each of these awards may be found in another section of the catalogue.

Enrollment of Students by Classes, 1954-55

	Men	Women	Total
Seniors '55	115	89	204
Juniors '56	99	100	199
Sophomores '57	132	125	257
Freshmen '58	132	117	249
	<hr style="width: 50%; margin: 0 auto;"/>	<hr style="width: 50%; margin: 0 auto;"/>	<hr style="width: 50%; margin: 0 auto;"/>
Special	7	4	11
Graduate	2	3	5
	<hr style="width: 50%; margin: 0 auto;"/>	<hr style="width: 50%; margin: 0 auto;"/>	<hr style="width: 50%; margin: 0 auto;"/>
	487	438	925

Geographical Distribution

New York	223	Idaho	1
Pennsylvania	201	Kentucky	1
New Jersey	99	New Mexico	1
Illinois	51	South Carolina	1
Maryland	44	West Virginia	1
Massachusetts	34	Canal Zone	1
Ohio	29	Hawaii	2
Connecticut	28		<hr style="width: 50%; margin: 0 auto;"/>
District of Columbia	22	Total number of students	
Delaware	17	from U. S. and territories	884
Virginia	15		
Indiana	13	Canada	5
Michigan	13	Japan	4
Florida	11	Jordan	3
California	8	Nigeria	3
Texas	7	Saudi Arabia	3
Minnesota	6	Germany	3
North Carolina	6	Brazil	2
Vermont	6	British West Indies	2
Rhode Island	5	China	2
Washington	5	England	2
Alabama	4	Greece	2
Maine	4	Philippines	2
Wisconsin	4	France	1
Colorado	3	Ireland	1
Missouri	3	Italy	1
Arizona	2	Korea	1
Georgia	2	Lebanon	1
Iowa	2	Syria	1
Nebraska	2	Thailand	1
New Hampshire	2	Venezuela	1
Oklahoma	2		<hr style="width: 50%; margin: 0 auto;"/>
Tennessee	2	Total from Abroad	41
Arkansas	1	Grand Total	925

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 Library Building
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 Meeting House
 Palmer Hall
 Pittenger Hall
 Parrish Hall
 Roberts Hall
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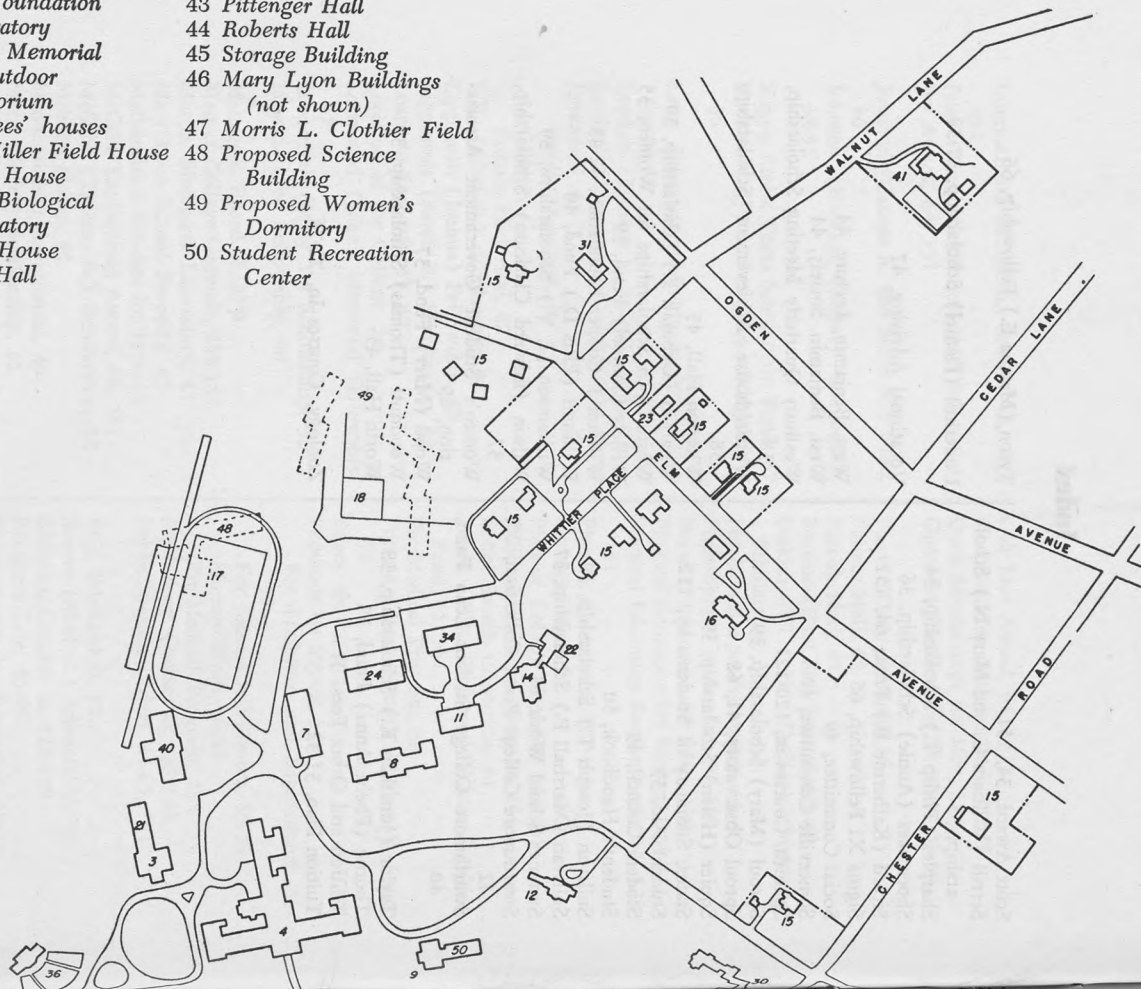
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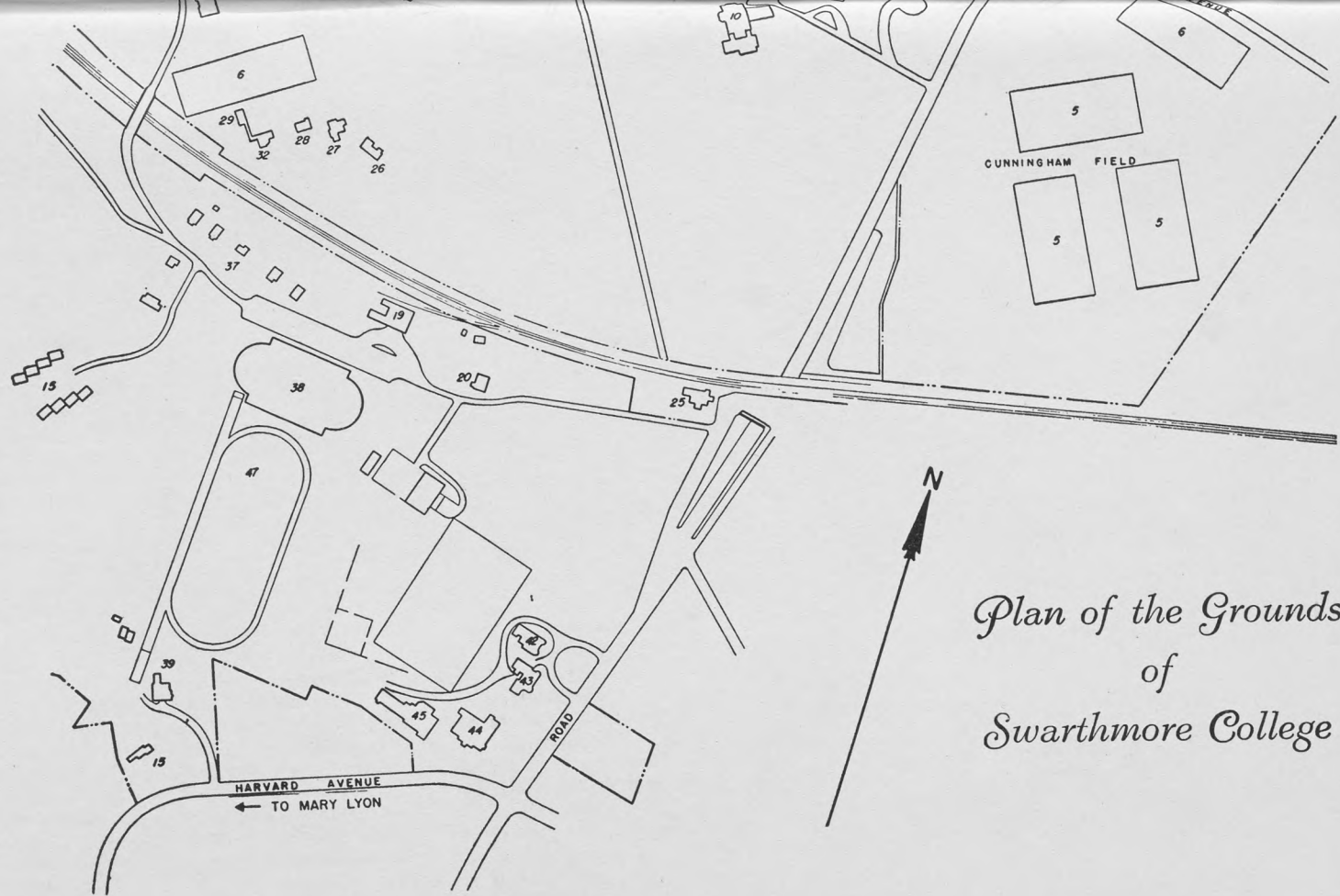
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*Plan of the Grounds
of
Swarthmore College*

W. H. ...

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