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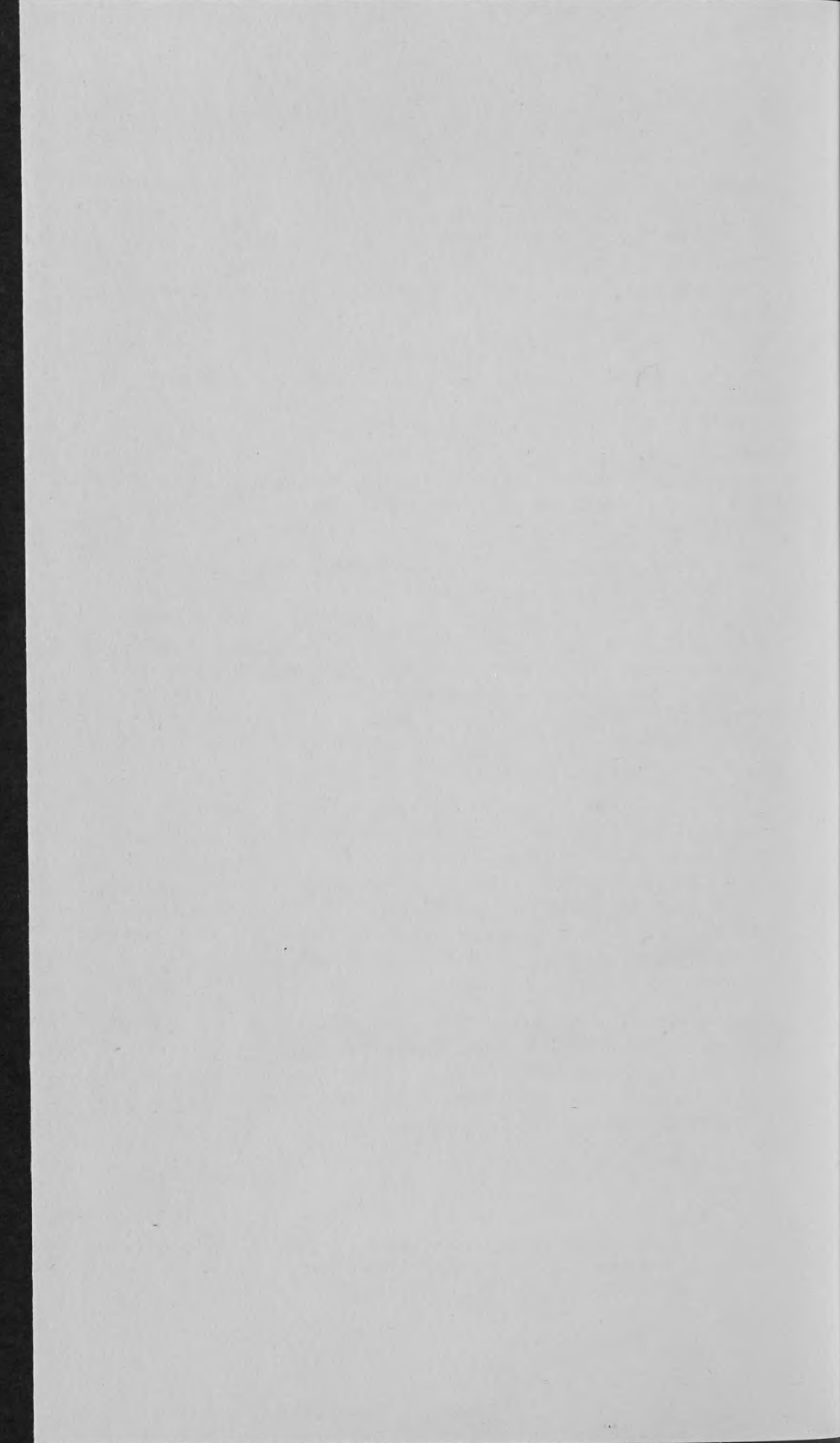


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1962

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College Calendar

1962

Fall Semester

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

1963

January 3	Christmas recess ends, 8:00 a. m.
January 3-19	Reading period for course students (at the option of the instructor)
January 15	Classes and seminars end
January 16	Meeting of honors students
January 18	Registration for spring semester
January 21	Honors seminars begin for spring semester
January 21	Mid-year examinations begin
January 30	Mid-year examinations end

Spring Semester

February 4	Classes begin
February 5	Executive Committee of the Board of Managers
March 5	Executive Committee of the Board of Managers
March 23	Spring recess begins, 12:00 noon
April 1	Spring recess ends, 8:00 a. m.
April 2	Meeting of the Board of Managers
May 4	Honors seminars end
May 6-18	Reading period for course students (at the option of the instructor)
May 7	Executive Committee of the Board of Managers
May 14	Written honors examinations begin
May 18	Classes end
May 20	Enrollment in classes for fall semester
May 22	Course examinations begin
May 25	Written honors examinations end
May 30-June 1	Oral honors examinations
June 1	Course examinations end
June 3-5	Senior comprehensive examinations
June 7	Meeting of the Board of Managers
June 8	Alumni Day
June 9	Baccalaureate Day
June 10	Commencement Day

* College Calendar (Tentative)

1963

Fall Semester

September 18-21	Freshman placement days
September 21	Registration
September 21	Meeting of honors students
September 23	Classes and honors seminars begin
October 1	Meeting of the Board of Managers
November 5	Executive Committee of the Board of Managers
November 28-30	Thanksgiving recess
December 3	Annual Meeting of the Board of Managers
December 19	Christmas recess begins, 5: 00 p. m.

1964

January 3	Christmas recess ends, 8: 00 a. m.
January 3-18	Reading period for course students (at the option of the instructor)
January 14	Classes and seminars end
January 15	Meeting of honors students
January 17	Registration for spring semester
January 20	Honors seminars begin for spring semester
January 20	Mid-year examinations begin
January 29	Mid-year examinations end

Spring Semester

February 3	Classes begin
February 4	Executive Committee of the Board of Managers
March 3	Executive Committee of the Board of Managers
March 21	Spring recess begins, 12: 00 noon
March 30	Spring recess ends, 8: 00 a. m.
April 7	Meeting of the Board of Managers
May 2	Honors seminars end
May 5	Executive Committee of the Board of Managers
May 4-16	Reading period for course students (at the option of the instructor)
May 12	Written honors examinations begin
May 16	Classes end
May 18	Enrollment in classes for fall semester
May 20	Course examinations begin
May 23	Written honors examinations end
May 28-30	Oral honors examinations
May 30	Course examinations end
June 1-3	Senior comprehensive examinations
June 5	Meeting of the Board of Managers
June 6	Alumni Day
June 7	Baccalaureate Day
June 8	Commencement Day

* The College Calendar is under study by a Faculty committee, and the above dates for 1963-64 should be regarded as completely tentative.

PERSONNEL OF SWARTHMORE COLLEGE

Board of Managers

Chairman

OF

SWARTHMORE COLLEGE

Life Members

- ELIZABETH STABLE CLARK, Chestnut Hill, Philadelphia, Pa.
- HARRISON M. J. PARKER, 1015 Westmoreland, Philadelphia, Pa.
- CLAUDE C. SMITH, 1617 Locust, Philadelphia, Pa.
- HELEN GARDNER WOOD, 595 Locust, Philadelphia, Pa.
- ROBERT C. BROWN, Woodbury, Pa.
- ASTOR F. BURN, 2 John City Place, New York, N. Y.
- YVONNE GARDNER CORNELL, Central Village, N. Y.
- CHARLES C. BUCK, III, 118 Hillside, Mt. Lebanon, Pa.
- ALICE H. WELLS, 714 Locust, Philadelphia, Pa.
- ROBERT M. FROST, 200 Locust, Philadelphia, Pa.
- THE THOMAS TRUST, 100 Locust, Philadelphia, Pa.
- CLEMENT M. BURGIE, 310 Oak Ridge Avenue, Summit, N. J.
- GEORGE B. CROWDER, 1418 Parkside Building, Philadelphia, Pa.
- HULL LANE DAWSON, 501 Locust, Swarthmore, Pa.
- WILLIAM POOL, 275 Locust, Swarthmore, Pa.
- ELIZABETH CHERRY PARKER, 59 Locust, Swarthmore, Pa.
- ELIZABETH WOOD GARDNER, 501 Locust, Swarthmore, Pa.
- CAROL DELANEY, 1118 Locust, Philadelphia, Pa.

* Continued on the adjacent page.

The Corporation

- CLAUDE C. SMITH, *Chairman*
1617 Land Title Building, Philadelphia 10, Pa.
- PHILIP T. SHARPLES, *Vice-Chairman*
23rd and Westmoreland Streets, Philadelphia 40, Pa.
- ELEANOR STABLER CLARKE, *Secretary*
Crumwald Farm, Wallingford, Pa.
- JOSEPH B. SHANE, *Assistant Secretary*
Swarthmore College, Swarthmore, Pa.
- RICHARD B. WILLIS, *Treasurer*
Provident Tradesmens Bank & Trust Co., 17th and Chestnut Streets,
Philadelphia 3, Pa.
- EDWARD K. CRATSLEY, *Assistant Treasurer*
Swarthmore College, Swarthmore, Pa.

Board of Managers

Ex officio

COURTNEY SMITH, President of Swarthmore College, Swarthmore, Pa.

Emeriti

- RUTH POTTER ASHTON, 409 Elm Avenue, Swarthmore, Pa.
- ELISABETH HALLOWELL BARTLETT, The Cambridge Arms, North Charles and 34th Sts.,
Baltimore 18, Md.
- ISABEL JENKINS BOOTH, Jefferson House, The Strand, New Castle, Del.
- ELSIE PALMER BROWN, 1622 Twenty-ninth Street, N.W., Washington 7, D. C.
- MARY LIPPINCOTT GRISCOM, 314 East Central Avenue, Moorestown, N. J.
- NICHOLAS KELLEY, 350 Park Avenue, New York 22, N. Y.
- BARCLAY WHITE, 3337 Market Street, Philadelphia 4, Pa.
- JOSEPH H. WILLITS, North Greenwich Road, Armonk, N. Y.

Life Members

- ELEANOR STABLER CLARKE, Crumwald Farm, Wallingford, 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, 1962

- RICHARD C. BOND, 1300 Market St., Philadelphia, Pa.
- ARTHUR F. BURNS, 2 Tudor City Place, New York, N. Y.
- VIRGINIA STRATTON CORNELL, Central Valley, N. Y.
- CHARLES C. PRICE, III, 118 Hilldale Rd., Lansdowne, Pa.
- ALFRED H. WILLIAMS, 716 Fidelity-Philadelphia Trust Building, Philadelphia 9, Pa.
- *ROBERT M. BROWNING, 7305 Emlen St., Philadelphia 19, Pa.
- *SUE THOMAS TURNER, East Valley Rd., Alfred Station, N. Y.

Term Expires December, 1963

- CLEMENT M. BIDDLE, 230 Oak Ridge Avenue, Summit, N. J.
- GEORGE B. CLOTHIER, 1418 Packard Building, Philadelphia 2, Pa.
- HILDA LANG DENWORTH, 301 Elm Avenue, Swarthmore, Pa.
- WILLIAM POOLE, 350 Delaware Trust Bldg., Wilmington 1, Del.
- ELIZABETH CARVER PRESTON, 60 Dogwood Lane, Swarthmore, Pa.
- *MARTHA WOOD CHRISTIAN, Powder Point Avenue, Duxbury, Mass.
- *CARL K. DELLMUTH, Fidelity-Philadelphia Trust Co., Philadelphia 9, Pa.

* Nominated by the Alumni Association.

Term Expires December, 1964

- BOYD T. BARNARD, 914 Philadelphia National Bank Building, Philadelphia 7, Pa.
H. THOMAS HALLOWELL, JR., Highland and Kenmore Avenues, Jenkintown, Pa.
THOMAS B. McCABE, Tincum Island Road and Industrial Highway, Philadelphia 13, Pa.
HOWARD S. TURNER, P. O. Box 1347, Pittsburgh 30, Pa.
NORMAN H. WINDE, Ridley Creek Road, R. D. 2, Media, Pa.
*LESTER ASPLUNDH, 505 York Road, Jenkintown, Pa.
*OLIVE DEANE BAKER, Longfield, Ridley Park, Pa.

Term Expires December, 1965

- KATHRYN SONNEBORN READ, 5407 Atlantic Avenue, Ventnor, N. J.
PHILIP T. SHARPLES, 23rd and Westmoreland Streets, Philadelphia 40, Pa.
RICHARD B. WILLIS, Provident Tradesmens Bank & Trust Co., 17th and Chestnut Streets, Philadelphia 3, Pa.
*SHIRLEY DAVIS, 128 Bayard Lane, Princeton, N. J.
*CHARLES E. RICKARDS, The Penn Mutual Life Insurance Co., Philadelphia 5, Pa.

COMMITTEES OF THE BOARD

The Chairman of the Board is ex officio a member of every Committee

Executive

- | | |
|--------------------------|-----------------------|
| BOYD T. BARNARD | CHARLES C. PRICE, III |
| CLEMENT M. BIDDLE | PHILIP T. SHARPLES |
| ELEANOR STABLER CLARKE | HOWARD S. TURNER |
| H. THOMAS HALLOWELL, JR. | RICHARD B. WILLIS |
| THOMAS B. McCABE | NORMAN H. WINDE |
| HADASSAH M. L. PARROT | HELEN GAWTHROP WORTH |
| ELIZABETH CARVER PRESTON | |

Finance

- | | |
|--------------------|--------------------------|
| RICHARD B. WILLIS | H. THOMAS HALLOWELL, JR. |
| RICHARD C. BOND | THOMAS B. McCABE |
| ROBERT M. BROWNING | CHARLES E. RICKARDS |
| GEORGE B. CLOTHIER | |

Instruction and Libraries

- | | |
|-----------------------|-----------------------|
| CLEMENT M. BIDDLE | WILLIAM POOLE |
| ROBERT M. BROWNING | CHARLES C. PRICE, III |
| ARTHUR F. BURNS | HOWARD S. TURNER |
| SHIRLEY DAVIS | SUE THOMAS TURNER |
| HILDA LANG DENWORTH | HELEN GAWTHROP WORTH |
| HADASSAH M. L. PARROT | |

Property

- | | |
|--------------------|---------------------------|
| NORMAN H. WINDE | VIRGINIA STRATTON CORNELL |
| LESTER ASPLUNDH | CARL K. DELLMUTH |
| BOYD T. BARNARD | KATHRYN SONNEBORN READ |
| ROBERT M. BROWNING | CHARLES E. RICKARDS |

Trusts

- | | |
|--------------------------|--------------------|
| THOMAS B. McCABE | PHILIP T. SHARPLES |
| BOYD T. BARNARD | ALFRED H. WILLIAMS |
| RICHARD C. BOND | RICHARD B. WILLIS |
| H. THOMAS HALLOWELL, JR. | |

* Nominated by the Alumni Association.

Student Activities

ELIZABETH CARVER PRESTON
OLIVE DEANE BAKER
CLEMENT M. BIDDLE
MARTHA WOOD CHRISTIAN
ELEANOR STABLER CLARKE
SHIRLEY DAVIS

HILDA LANG DENWORTH
CHARLES C. PRICE, III
KATHRYN SONNEBORN READ
HOWARD S. TURNER
SUE THOMAS TURNER
NORMAN H. WINDE

Nominating

BOYD T. BARNARD
CARL K. DELLMUTH
HILDA LANG DENWORTH

CHARLES C. PRICE, III
KATHRYN SONNEBORN READ
SUE THOMAS TURNER

Development

PHILIP T. SHARPLES
LESTER ASPLUNDH
BOYD T. BARNARD
ELEANOR STABLER CLARKE
GEORGE B. CLOTHIER
CARL K. DELLMUTH

H. THOMAS HALLOWELL, JR.
THOMAS B. MCCABE
WILLIAM POOLE
HOWARD S. TURNER
ALFRED H. WILLIAMS
HELEN GAWTHROP WORTH

Alumni Association Officers

1961-1963

President, WILLIAM POOLE '30, 215 Edgewood Road, Alapocas, Wilmington 3, Del.
Vice-President for Men, GILBERT B. MUSTIN, JR. '42, School House Road, Blue Bell, Pa.
Vice-President for Women, RUTH CLEAVER CARTER '30, 329 Owen Avenue, Lansdowne, Pa.
Secretary, MARGARET WALKER LIPPINCOTT '45, Rose Valley Road, Moylan, Pa.

Alumni Council

Zone A

TERM EXPIRES

- JUNE
- 1963 WILLIAM B. BROSIUS '22, Bodine Road, R. D., Berwyn, Pa.
SAMUEL L. CRESSON '39, 901 Waverly Road, Bryn Mawr, Pa.
EDWARD MAHLER '50, 3220 Comanche Road, Pittsburgh 34, Pa.
- 1964 WALTER S. BARCLAY '37, 203 Lippincott Avenue, Riverton, N. J.
THOMAS B. DARLINGTON '45, New Lisbon, New Jersey.
- 1965 JOHN B. FELTON '43, 335 Plush Mill Road, Wallingford, Pa.
ROBERT W. LAFORE '27, 10 Rose Hill Road, Moylan, Pa.
- 1963 CORNELIA CLARKE SCHMIDT '46, 334 Dickinson Avenue, Swarthmore, Pa.
SALLY SHIELDS SHANE '51, 401 Vassar Avenue, Swarthmore, Pa.
FRANCES RAMSEY WORTH '28, 1732 Cloverleaf Street, Bethlehem, Pa.
- 1964 MARY GOODWIN CHEYDLEUR '39, 1067 Wellington Road, Jenkintown, Pa.
ELIZABETH BROSIUS GARRISON '38, Tidemarsch, R. D. No. 4 Bridgeton, N. J.
- 1965 NANCY SMITH HAYDEN '46, 40 Woodbrook Road, Swarthmore, Pa.
ANNA RICKARDS SENSENIG '30, 2609 Woodleigh Road, Havertown, Pa.

Zone B

- 1963 WILLIAM C. MACPHAIL '41, 60 Sutton Place South, New York 22, N. Y.
- 1964 LEROY G. BAUM '27, 29 Bedford Road, Summit, N. J.
E. ALLAN VAN DEUSEN '50, 235 Wood Pond Road, Glastonbury, Conn.
- 1965 A. THOMAS HALLOWELL '37, 33 Rosslyn Court, Little Silver, N. J.
ALBERT G. THATCHER '41, 39 Briarcliff Road, Mt. Lakes, N. J.
- 1963 RUTH FEELY MERRILL '38, 770 Kimball Avenue, Westfield, N. J.
- 1964 JANE TOTAH DAVIS '50, 158 North Euclid Avenue, Westfield, N. J.
MARGARET CHASE JUDD '39, 85 Brookside Road, New Britain, Conn.
- 1965 MARY ANN KIDDER MARSHALL '52, 43 Knollwood Avenue, Madison, N. J.
ELIZABETH PEIRCE SWIFT '42, 399 Patton Drive, Cheshire, Conn.

Zone C

- 1963 K. PAYNE MARTIN '24, Nashawtuc Road, Concord, Mass.
- 1963 NANCY HEFFERNAN VALTIN '51, Rip Road, Hanover, N. H.

Zone D

- 1964 F. EDWARD CAVIN '41, 1628 21st Street, N.W., Washington 9, D. C.
- 1965 DAVID DOEHLERT '50, 115 Dallas Avenue, Newark, Del.
- 1964 JANE HAMILTON MACPHAIL '38, 203 Kemble Road, Baltimore 18, Md.
- 1965 RUTH E. CORNELL '27, 227 Murphy Rd., Fairfax, Wilmington 3, Del.

Zone E

- 1963 H. KIMBLE HICKS '35, c/o Dravo Corp., 1617 Pennsylvania Blvd., Philadelphia 3, Pa.
- 1963 MARGARET CUPITT STRUBLE '37, 5 Oxford Road, Pittsburgh 2, Pa.

Zone F

- 1964 GORDON ROWE '49, 4617 Southern, Dallas 9, Tex.
- 1964 JEAN ROBINSON LOEB '43, 2741 38th Street, Meridian, Miss.

Zone G

- 1964 JAMES C. HORMEL '55, 1343 Hackberry Lane, Winnetka, Ill.
- 1964 WILLIAM W. SLOCUM, JR. '43, 3250 Penobscot Bldg., Detroit 26, Mich.
- 1964 JEAN ROBERTS RELER '43, Route 2, Richmond, Ind.
- 1965 WINNIFRED POLAND PIERCE '45, 211 McCotter Drive, Ann Arbor, Mich.

Zone H

- 1963 RALPH W. TIPPING '30, 12225 San Vicente Blvd., Los Angeles 49, Calif.
- 1965 PAUL S. OUSLEY '43, 10710 S.W. Elysium Avenue, Portland, Ore.
- 1963 HILDA GRUENBERG KRECH '34, 1496 Euclid Avenue, Berkeley 8, Calif.
- 1965 ANITA KELLEY PEARSON '44, 629 Miner Road, Orinda, Calif.

The Faculty

- COURTNEY SMITH, *President* 324 Cedar Lane
 B.A., M.A., Ph.D., Harvard University; LL.D., L.H.D., and Litt.D.
- EDWARD K. CRATSLEY, *Vice-President (Finance), Controller, 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.
- GILMORE STOTT, *Administrative Assistant to the President, 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.
- SUSAN P. COBBS, *Dean and Professor of Classics* 406 Walnut Lane
 B.A., Randolph-Macon Woman's College; M.A., New York University; Ph.D., University of Chicago.
- JOHN M. MOORE, *Associate Dean, Registrar and Professor of Philosophy and Religion*,
 2 Whittier Place
 B.A., Park College; B.D., Union Theological Seminary; M.A., Harvard University; Ph.D., Columbia University.
- ROBERT A. BARR, JR., *Dean of Men* Benjamin West House
 B.A., Swarthmore College; M.A., University of Pennsylvania.
- BARBARA PEARSON LANGE, *Dean of Women* 1 Crum Ledge
- JOHN C. HOY, *Dean of Admissions* Swarthmore College
 B.A. and M.A., Wesleyan University.
- MARGARET L. MACLAREN, *Associate Dean of Admissions* 317 North Chester Road
 B.A., Swarthmore College.

EMERITI

- LYDIA BAER, *Associate Professor Emeritus of German* Anna Maria Island, Fla.
 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.
- EDWARD H. COX, *Professor Emeritus of Chemistry* 416 Park Avenue
 B.S., Earlham College; M.A., Harvard University; Docteur ès Science, L'Université de Genève, Docteur honoris causa, L'Université de Montpellier; D.Sc., Earlham College.
- HENRY JERMAIN MAUDE CREIGHTON, *Edmund Allen Professor Emeritus of Chemistry*,
 Tigh-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; D.Sc., Swarthmore College.
- ROBERT H. DUNN, *Associate Professor Emeritus of Physical Education for Men*,
 811 Westdale Avenue
 B.S., Temple University.
- DUNCAN GRAHAM FOSTER, *Professor Emeritus of Chemistry* 15 Crest Lane
 B.A. and M.A., Harvard University; Ph.D., Johns Hopkins University.
- PHILIP MARSHALL HICKS, *Alexander Griswold Cummins Professor Emeritus of English Literature* Avondale, Pa.
 B.A. and M.A., Swarthmore College; Ph.D., University of Pennsylvania.
- EVERETT L. HUNT, *Dean Emeritus and Professor Emeritus of English*.
 (on special research grant) 221 N. Princeton Avenue
 B.A., Huron College; M.A., University of Chicago; D.Litt. Huron College.
- WOLFGANG KÖHLER, *Professor Emeritus of Philosophy and Psychology*,
 Lebanon, N. H.
 Dr. Phil., University of Berlin; D.Sc., University of Pennsylvania, University of Chicago, Kenyon College, Swarthmore College.
- EDITH PHILIPS, *Susan W. Lippincott Professor Emeritus of French* 517 Elm Avenue
 B.A., Goucher College; Docteur de l'Université de Paris.

- L. R. SHERO, *Professor Emeritus of Greek* 651 North Chester Road
 B.A., Haverford College; B.A., Oxford University; M.A. and Ph.D., University
 of Wisconsin.
- ALFRED J. SWAN, *Professor Emeritus of Music* 773 College Avenue, Haverford, Pa.
 B.A. and M.A., Oxford University.

PROFESSORS

- MARY ALBERTSON, *Isaac H. Clothier Professor of History and International Relations*,
 405 Walnut Lane
 B.A., M.A., and Ph.D., Bryn Mawr College.
- 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.
- †MONROE C. BEARDSLEY, *Professor of Philosophy* 133 Rutgers Avenue
 B.A. and Ph.D., Yale University.
- GEORGE J. BECKER, *Alexander Griswold Cummins Professor of English*,
 401 Walnut Lane
 B.A., M.A., and Ph.D., University of Washington.
- PAUL H. BEIK, *Professor of History* 4 Whittier Place
 B.A., Union College; M.A. and Ph.D., Columbia University.
- HAMID K. BHATTI, *Visiting Professor of Biology* (University of the Panjab, Lahore,
 Pakistan) 317 North Chester Road
 B.S. and M.S., University of the Panjab; Ph.D., Cambridge University.
- RICHARD B. BRANDT, *Charles and Harriett Cox McDowell Professor of Philosophy*,
 408 Walnut Lane
 B.A., Denison University; B.A., University of Cambridge; Ph.D., Yale University.
- HEINRICH BRINKMANN, *Edward Hicks Magill 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 En-
 gineering* 612 Ogden Avenue
 B.C.E., C.E., and M.S., Ohio State University.
- JOSEPH W. CONARD, *Professor of Economics* 217 North Swarthmore Avenue
 B.A., Grinnell College; M.A. and Ph.D., University of California.
- W. C. ELMORE, *Morris L. Clothier Professor of Physics* 525 Walnut Lane
 B.S., Lehigh University; Ph.D., Yale University.
- ROBERT K. ENDERS, *Isaac H. Clothier, Jr. Professor of Biology* 311 Elm Avenue
 B.A. and Ph.D., University of Michigan.
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EVA SHEPPARD, Robinson House; B.A., Cornell University, M.A., Radcliffe College.

CORNELIA TUCKERMAN STADLER, Worth Hall.

VIRGINIA VON FRANKENBERG, Parrish Hall; B.A., University of Nebraska.

MAYME R. WILLIAMS, Willets Hall.

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MILDRED IRWIN.

MYRTLE R. KEENEY, B.A., Dickinson College.

FRANCES WILLS SLAUGH, B.A., Swarthmore College.

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College Library

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Technical Services Librarian: MARTHA A. CONNOR, B.S., M.A., University of Pennsylvania; B.S. in L.S., Drexel Institute.

Assistant Librarians:

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MILDRED HIRSCH, B.S. in L.S., Columbia University.

ELIZABETH S. SHARPLESS, B.A., Swarthmore College; B.S. in L.S., Drexel Institute.

Order: MARY C. KERBAUGH, B.A., University of Pennsylvania; M.S. in L.S., Drexel Institute of Technology.

Assistants: GAIL C. TICKNOR, B.Mus., New England Conservatory of Music; DORIS PITMAN MOIST; CONCHITA HOGAN.

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Assistant Librarians:

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JEAN M. GILES, B.A., Swarthmore College; M.S. in L.S., New York State College for Teachers.

Periodicals: MARY G. TAIT, B.A., Wells College; B.S. in L.S., Drexel Institute

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Acting Director: DOROTHY G. HARRIS, B.A., Wellesley College; B.S. in L.S., Drexel Institute; M.A., University of Pennsylvania.

Secretarial Assistant: ELIZABETH S. MACPHERSON, B.A., Ursinus College.

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† Absent on leave, 1962-63.

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Associate College Physicians:
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HAROLD C. ROXBY, B.S., Pennsylvania State University; M.D., Temple University.
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.
NORMA S. WOHL, B.A., Bryn Mawr College; M.D., Hahnemann Medical College.
Nurses:
MARY MCCULLOUGH, R.N., E. ELIZABETH MCGEARY, R.N., HELEN R. MARTIN, R.N., ELSE SHAW, IDA MOORE THOMAS, R.N.

INTRODUCTION
TO
SWARTHMORE COLLEGE

Introduction to Swarthmore College

Swarthmore College, founded in 1864 by members of the Religious Society of Friends, is a co-educational college occupying a campus of about 300 acres of rolling wooded land in and adjacent to the borough of Swarthmore in Delaware County, Pennsylvania. Swarthmore is a small residential suburb within half an hour's commuting distance of Philadelphia. 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

In accordance with the traditions of its Quaker background, Swarthmore students are expected to prepare themselves for full, balanced lives as individuals and as responsible citizens through exacting intellectual study supplemented by a varied program of sports and other extra-curricular activities.

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. 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 by such selection can it contribute to the diversity and richness of educational opportunity which is part of the American heritage and the American strength.

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 pattern 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 the College's educational program. For many students, it provides an enriching and exciting intellectual experience. It has as its main ingredients freedom from ordinary classroom routine and close association with faculty members in small seminars, concentrated work in broad fields of study, and maximum latitude for the development of individual responsibility. The Honors program and the Course program are alternative 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.

THE RELIGIOUS TRADITION

Swarthmore College was founded by members of the Religious Society of Friends, and it seeks to illuminate the life of its students with the spiritual principles of that Society. Although it has been non-sectarian in control since the beginning of the present century, and although the children of Friends compose a minority of the student body, 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 present enrollment is about 950 students, of whom 450 are women and 500 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 arrive at reasonable solutions to their problems. They learn the meaning of responsibility as they become responsible for their activities.

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 which they never contemplated when they shaped the College in the middle of the nineteenth century. Swarthmore, if it is to remain effective, must be forever changing. 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 Office of Admissions, Swarthmore College, Swarthmore, Pennsylvania.

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 choose those who give 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. Recommendations from the school principal or headmaster and from two additional persons.
3. Rating in the Scholastic Aptitude Test and in three Achievement Tests of the College Entrance Examination Board.
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 and backgrounds.

PREPARATION

The College does not require a set plan of secondary school courses as preparation for its program. The election of specific subjects is left to the student and his school advisers. 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 two, foreign languages to the point of reading prose of average difficulty.

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; music; art.

Natural Science and Mathematics: chemistry, physics, biology, astronomy; algebra, geometry, trigonometry. Those planning to major in engineering should present work in chemistry, physics, and four years of mathematics including algebra, geometry and 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 by January 15th of the year in which the candidate wishes to be admitted. Swarthmore does not have an "early decision program." An application fee of \$10.00, 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 Scholastic Aptitude Test should be taken in December or January of the senior year.

Achievement Tests must be taken not later than January of the senior year. English Composition is required and the other two Achievement Tests are chosen by the candidate from two different fields. Applicants for Engineering must take the test in Advanced Mathematics. The Writing Sample will not be accepted as one of the three examinations.

Candidates who take Achievement Tests in May of the junior year in subjects completed by that time may submit the results to the Admission Office, but English Composition and at least one other Achievement Test must be taken in December or January of the senior year.

In 1962-63 these tests will be given in various centers throughout this country and abroad on December 1, January 12, March 2, May 18, and August 12.

Application to take these 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 be examined 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, Manitoba, Saskatchewan, 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 27896, 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. Information concerning financial aid will be found on pages 32-40.

Applicants should take the initiative in arranging to have an interview with a representative of the College. Those who can do so are urged to make an appointment to visit the College for this purpose.* If this is not possible, applicants should request a meeting with a college representative in their own area. Interviews should be completed before March 1 of the senior year. Appointments at the College can be made by calling or writing the Office of Admissions.

Notices of the action of the Admissions Committees will be mailed about April 15.

Freshmen may apply for advanced standing or placement in particular courses if they have taken college level courses in approved schools and the Advanced Placement Tests of the College Entrance Examination Board. Decisions are made by the departments concerned.

APPLICATIONS FOR TRANSFER

For favorable consideration, applicants for transfer must have had a good scholastic record in the institution attended and must present full credentials for both college and preparatory work, including a statement of honorable dismissal. They must take the Scholastic Aptitude Test given by the College Entrance Examination Board if this test has not been taken previously.

As a general practice, transfer students are not admitted to advanced standing later than the beginning of the sophomore year. Four semesters of study at Swarthmore College constitute the minimum requirement for a degree, two of which must be those of the senior year. Applicants for transfer must be filed by March 15 of the year in which entrance is desired. Decisions on these applications are announced early in June. Students admitted by transfer are not eligible for financial assistance during their first year at Swarthmore.

* To reach the college from the New Jersey Turnpike, motorists should leave by Exit 3, cross the Walt Whitman Bridge, take Pa. Route 291 past the airport to Route 420, turn right on 420 to Baltimore Pike, turn left and proceed to the intersection with Route 320. Turn left and follow the signs of the college. From the Pennsylvania Turnpike, take the Valley Forge exit and follow Routes 43, 23 and 320 to the campus.

Expenses

Charges for the academic year 1962-63 (two semesters) :

Board, room and tuition	\$2,250*
General fee	150

Total charges \$2,400

While a general charge for board, room and tuition is made, this may be divided into \$1,400 for tuition and \$850 for board and room. The general fee of \$150 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.

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 Miss G. Caroline Shero, Assistant Controller.

Students who wish to charge Book Store purchases, laboratory breakage fees, etc., may do so by maintaining a student deposit account at the Business Office against which charge checks may be drawn. Cash withdrawals may also be made. Students will be notified when overdrafts occur and no cash withdrawals may be made unless a cash balance is maintained. A minimum deposit of \$50.00 in September is suggested and all students are urged to maintain such an account for their convenience.

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.

TUITION PAYMENT PLANS

Many of the parents of students may wish to pay all tuition, fees, and residence charges on a monthly basis. It is possible to arrange this under certain alternative plans. The cost is two to six per cent greater than when payments are made in cash in advance. Details of the plans will be furnished by the College prior to issuance of the first semester's bill in September.

* 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.



The College Library



Interior, duPont Science Library

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. Accident coverage alone costs \$5.00 per year (12 months) for women, and \$10.00 for men. The combined accident and sickness policy is available at an annual cost of \$18.00 for women and \$22.00 for men. At least accident coverage is required of all students who participate in intercollegiate athletic activities and the combined accident and sickness policy is particularly recommended. Application forms are mailed to all students during the summer.

Scholarships and Student Aid

The college awards scholarships to a substantial number of students each year. These awards are normally made to entering freshman students and are renewable for four years. About sixty-five freshman scholarships are awarded each year, carrying stipends varying from \$100 to \$2,100 annually. Twenty-six per cent of the total student body are currently receiving scholarship aid, with stipends averaging about \$1,000 annually.

All awards are based upon school or college record, and upon financial need as revealed in confidential statements to the Scholarship Committee through the agency of the College Scholarship Service. In computing stipends, the committee takes into account normal family contribution, the student's savings and summer earnings, budgeting against a normal total expense of \$2,850 for the college year (\$2,400 for inclusive college fees, \$450 for travel and incidental expenses). The College reserves the right to adjust college stipends in the event the student receives scholarship assistance from other sources. First year transfer students are not eligible for scholarship aid.

Candidates wishing to apply for scholarships should make the usual application for admission. All applicants for admission are given the opportunity to apply for scholarship aid. The candidate's status with respect to need for scholarship is not considered to be a relevant factor in the matter of reaching decisions concerning admission to the college.

For the academic year 1962-63 the college has granted approximately \$250,000 in scholarships. About one-half of that sum was provided by special gifts and the endowed scholarships listed below. Applicants are not required to apply for specific scholarships but will be considered for all scholarship opportunities either from endowed scholarships or from general college scholarship funds.

SCHOLARSHIPS FOR MEN

OPEN SCHOLARSHIPS FOR MEN. Swarthmore College awards each year approximately five four-year Open 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 \$2,100 according to the financial need of the winner.

The THOMAS B. McCABE ACHIEVEMENT AWARDS, established by Thomas B. McCabe '15, are awarded to freshman men from the Delmarva Peninsula and Northern New England (Maine, New Hampshire, or Vermont) who give promise of leadership. In making selections, the Committee will place emphasis on ability, character, personality, and service to school and community. Two awards, providing a minimum annual grant of \$1,300 or up to \$2,100 depending on need, will be made to residents of Delaware or the Eastern Shore counties of Maryland or Virginia. One award, providing an annual grant of up to \$2,100 depending on need, will be made to a resident of Maine, New Hampshire, or Vermont.

The PHILIP T. SHARPLES SCHOLARSHIP, a four-year scholarship open to entering freshmen, is designed to honor and encourage young men in engineering or physical science. 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 \$2,100.

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. An award is made annually. The stipend provides a maximum of \$1,500 a year for four years.

The NEWTON E. TARBLE AWARD, established by Newton E. Tarble of the Class of 1913, is granted annually to a freshman man who gives promise of leadership, ranks high in scholarship, character and personality, and resides (but not necessarily attends school) in Coles or Clark County in the State of Illinois. If there are no suitable applicants from Coles or Clark Counties, the committee will consider other applicants from the State of Illinois residing in its capital or south of it. The stipend is set at a minimum of \$1,100 annually for four years, and may exceed this amount, depending on the individual's need.

The AARON B. IVINS SCHOLARSHIP is awarded annually to a young man of the graduating class of Friends Central School, Overbrook, Philadelphia. This scholarship is awarded by the faculty of Friends Central School, and is subject to the approval of Swarthmore College. The fund provides approximately \$1,100 annually.

The HOWARD COOPER JOHNSON SCHOLARSHIP, established by Howard Cooper Johnson '96, provides a stipend of approximately \$750 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 \$800.

The CHRISTIAN R. AND MARY F. LINDBACK FOUNDATION SCHOLARSHIP provides \$1,500 for the year 1962-63, to be awarded to deserving students from the States of Pennsylvania, New Jersey, Delaware or Maryland.

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.

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, is awarded to a young man who is looking forward to the study of medicine. The scholarship provides \$600 annually.

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.

The ANTHONY BEEKMAN POOL SCHOLARSHIP. This scholarship, carrying a stipend of \$350 annually, is awarded to an incoming freshman man of promise and intellectual curiosity. It is given in memory of Tony Pool of the Class of 1959.

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. 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 \$2,100 is based upon financial need.

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.

The ANNIE SHOEMAKER SCHOLARSHIP is granted annually to a young woman of the graduating class of Friends Central School, Overbrook, Philadelphia. This scholarship is awarded by the faculty of Friends Central School, and is subject to the approval of Swarthmore College. The fund earns \$1,200 annually.

The CLARA B. MARSHALL SCHOLARSHIP, established by the will of Dr. Clara B. Marshall, is awarded to a woman at Swarthmore College with preference given to descendants of her grandfathers, Abram Marshall or Mahlon Phillips. The amount of the scholarship is approximately \$800 per year.

The GEORGE K. AND SALLIE K. JOHNSON FUND provides \$750 a year, to be used in granting financial aid during the senior year for young women who are fitted to become desirable teachers.

The MARY COATES PRESTON SCHOLARSHIP FUND. A sum of money has been left by will of Elizabeth Coates, the annual interest of which provides about \$850. This amount is given as a scholarship to a young woman student in Swarthmore College. Preference is given to a relative of the donor.

The HARRIET W. PAISTE FUND provides a scholarship of approximately \$600 a year for a young woman who is a member of the Society of Friends (Philadelphia Yearly Meeting).

The MARY T. LONGSTRETH SCHOLARSHIP was founded by Rebecca C. Longstreth in memory of her mother and is to be awarded annually to assist a young woman student to pursue her studies in the College. The value of this scholarship is approximately \$375 annually.

The JESSIE STEVENSON KOVALENKO SCHOLARSHIP FUND, the gift of Michel Kovalenko in memory of his wife, provides an annual income of \$650. 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 \$275 annually.

The MARY WOOD FUND provides approximately \$100 a year and may be awarded to a young woman who is preparing to become a teacher.

SCHOLARSHIPS OPEN TO MEN AND WOMEN

The FRANK AND MARIE AYDELLOTTE SCHOLARSHIP is awarded biennially to a new student who shows promise of distinguished intellectual attainment based upon sound character and effective personality. The maximum annual stipend is set at \$1,750, and is renewable for the full period of undergraduate study. The award is made in honor of Frank Aydelotte, President of the College from 1921-1940, and originator of the Honors program at Swarthmore, and of Marie Osgood Aydelotte, his wife.

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 is awarded annually 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 full tuition for each of his last two years in college.

The MIDWEST SCHOLARSHIPS, carrying a maximum stipend of \$2,000, are awarded each year to one man and one woman applicant who reside in Illinois, Indiana, Michigan or Wisconsin. Winners will be selected on the basis of their potential contribution to the academic and extracurricular life of the College.

The KATHLEEN H. AND MARTIN M. DECKER FOUNDATION SCHOLARSHIP is awarded annually to young men and women preparing themselves in the field of Engineering or the Biological, Chemical, or Physical Sciences. The Scholarship Committee in making its selections will have regard for candidates who rank high in scholarship, leadership, and character. At least one scholarship will be given each year with a maximum grant of \$1,000.

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 INDUSTRIAL CREDIT COMPANY OF CHESTER SCHOLARSHIP is a one year scholarship awarded annually to an entering freshman (man or woman) who rates high in character, personality and leadership, literary and scholastic abilities, and physical vigor as shown by participation in sports or other extra-curricular activities. It has a maximum value of \$1,000.

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 undergraduate level. This scholarship provides \$800 a year and the appointment is usually made for the junior or senior year.

The E. HIBBERD LAWRENCE SCHOLARSHIP provides approximately \$700 a year for a scholarship to an incoming freshman man or woman who ranks high in scholarship, character, and personality and who has need for financial assistance.

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 \$900. 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 CLASS OF 1930 SCHOLARSHIP is awarded annually to a young man or woman who is in need of financial assistance. Preference is given to incoming freshmen but other students are eligible. The scholarship provides \$500 annually.

The CLASS OF 1931 SCHOLARSHIP FUND was established on the 25th reunion of the class. It provides a scholarship up to a maximum of \$1,000 to a man

or woman who has need for financial assistance and who ranks high in scholarship, character and personality. Preference is given to entering freshmen who are children of members of the class of 1931.

The EDWARD S. BOWER MEMORIAL SCHOLARSHIP, established by Mr. and Mrs. Ward T. Bower in memory of their son, Class of '42, is awarded annually to a man or woman student who ranks high in scholarship, character, and personality, and who has need for financial assistance. The fund provides \$1,300 per year.

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 EDWARD CLARKSON WILSON AND ELIZABETH T. WILSON SCHOLARSHIP provides \$500 annually for a deserving student in need of financial aid.

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 \$750.

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 Meetings of Friends, it is not to be confined to them when suitable persons in membership cannot be found. The fund provides approximately \$675 annually.

The PHEBE ANNA THORNE FUND provides an income of approximately \$3,800 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.

The WESTBURY QUARTERLY MEETING, N. Y., SCHOLARSHIP, is awarded annually by a committee of that Quarterly Meeting. The fund provides \$325 annually.

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 LAFORE SCHOLARSHIP is awarded in memory of John A. Lafore of the Class of 1895. The college in granting this scholarship will give preference to qualified candidates who show need of financial assistance and who are descendants of Amand and Margaret White Lafore. The value of the scholarship is approximately \$500 a year.

The JAMES E. MILLER SCHOLARSHIP. Under the will of Arabella M. Miller approximately \$200 is available annually for students from Delaware County (with preference for residents of Nether Providence Township).

The EDWARD CLARKSON WILSON SCHOLARSHIP. A scholarship 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.

The CHI OMEGA SCHOLARSHIP provides an award of approximately \$325 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.

The DELTA GAMMA SCHOLARSHIP provides an annual income of approximately \$165. 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 KAPPA KAPPA GAMMA SCHOLARSHIP provides an award of approximately \$350 annually to a member of the freshman class who is in need of financial aid. Preference is given to relatives of members of the fraternity.

The SAMUEL WILLETS FUND. This fund provides an annual income of approximately \$8,700 for scholarships. A portion of the fund is assigned for scholarships in the name of Mr. Willets' children, Frederick Willets, Edward Willets, Walter Willets, and Caroline W. Frame.

The I. V. WILLIAMSON SCHOLARSHIPS. These scholarships provide an income of about \$2,000 annually. Preference is given to graduates of Friends Central, George School, 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.

The income from each of the following funds is awarded at the discretion of the college to students needing financial 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 FRANK SOLOMON MEMORIAL SCHOLARSHIP FUND.
The MARY SPROUL SCHOLARSHIP FUND.
The HELEN SQUIER SCHOLARSHIP FUND.
The FRANCIS HOLMES STROZIER MEMORIAL SCHOLARSHIP FUND.
The JOSEPH T. SULLIVAN SCHOLARSHIP FUND.
The DEBORAH F. WHARTON SCHOLARSHIP FUND.
The THOMAS WOODNUTT SCHOLARSHIP FUND.

SPECIAL LOAN FUNDS

Several loan funds are administered by a committee to which application should be made through the financial aid officer. Students in good standing who have a demonstrated financial need and who do not receive sufficient scholarship or other assistance to provide for that need are encouraged to apply for loans which are repayable after the completion of the student's higher education. Amounts vary according to need, though the college follows the principle that students should avoid heavy indebtedness which might prove detrimental to their own plans and progress. The amount of loan to an individual student may not exceed \$1,000 annually. During the academic year 1960-61 the college made approximately 40 student loans in amounts averaging about \$450. Loans are not normally made to freshmen.

The CLASS OF 1913 LOAN FUND.
The CLASS OF 1916 LOAN FUND.
The CLASS OF 1920 LOAN FUND.
The CLASS OF 1936 LOAN FUND.
The JOHN A. MILLER LOAN FUND.
The PAUL M. PEARSON LOAN FUND.
The ELLIS D. WILLIAMS FUND.
The SWARTHMORE COLLEGE STUDENT LOAN FUND.

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 the dining room, offices, 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 cooperates in making these opportunities known to students. About one-third of the students enrolled in college obtain employment regularly through the office. Earnings are restricted by the time a student can spend, though a number of students earn as much as \$200 during the college year.

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. The Pierre S. du Pont Science Building, completed in 1960, provides superior accommodations for chemistry, mathematics, and physics. Beardsley and Hicks Halls contain the engineering laboratories. The Bartol Research Foundation of the Franklin Institute, which is also located on the campus, enjoys an international reputation for its basic research activities in physics, particularly in the fields of nuclear physics, cosmic radiation, and solid state physics.

The SWARTHMORE COLLEGE LIBRARY, in part the gift of Andrew Carnegie, contains reading rooms, offices and a collection of 215,000 volumes. Some 6,700 volumes are added annually. About 1,080 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 duPont Science Library, new in 1960, houses some 21,000 books and journals in chemistry, engineering, mathematics and physics. 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 Thomson collections, and a collection of the issuances of 546 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 fireproof 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 building houses the Friends Historical Library, which includes the Swarthmore College Peace Collection.

The FRIENDS HISTORICAL LIBRARY, founded in 1871 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 1,700 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 Whittier Collection (first editions and manuscripts of John Greenleaf Whittier, the Quaker poet), 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. About 136 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 is of special interest to research students and others seeking the records of the Peace Movement. The personal papers of Jane Addams of Hull House, Chicago, (approximately 10,000 items) formed the original nucleus of the Collection, which now contains documentation on the history of the organized peace movement from its beginnings *circa* 1815, to the present time, as well as correspondence and writings of many workers for international peace and arbitration. The Collection includes files of some 750 peace periodicals published in the United States and abroad over the past 140 years; approximately 130 such periodicals in eleven languages are currently received from twenty-five countries. This collection is the official depository for the archives of the leading peace organization in the United States. A more complete description of the Collection will be found in the *Guide to the Swarthmore College Peace Collection*, 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 eleven 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.

Redfield, Robert. *Peasant Society and Culture; An Anthropological Approach to Civilization*. Chicago, The University of Chicago Press, 1956.

Weatherford, Willis D., Jr., Editor. *The Goals of Higher Education*. A series of lectures given in the spring of 1958. Cambridge: Harvard University Press, 1960.

Rhys, Hedley H., Editor. *Art and Science in the Seventeenth Century*. Princeton: Princeton University Press, 1962.

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, irises, 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 ARTS CENTER, opened in 1961, contains the Paul M. Pearson Experimental Theater, the Florence Wilcox Lobby for art exhibitions, the Dorothy Hunt Music Room, and studios for various arts and crafts. The Class of 1910 Room provides suitable quarters for student government, and other rooms are provided for student publications and other extra-curricular activities.

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 COLLECTION OF RECORDED LITERATURE, established in 1950 with accumulated income from the William Plummer Potter Public Speaking Fund, includes a wide variety of recorded poetry, drama and prose. Among the 700 titles on disc and tape are contemporary writers reading from and discussing their works; full length versions of Shakespearean plays and other dramatic repertoire; the literature of earlier periods read both in modern English and in the pronunciation of the time; British and American ballads; lyrical verse in musical settings; and recordings of literary programs held at Swarthmore. These materials are used as adjuncts to the study of literature. They are made available at regular hours to all members of the college community by a student committee which administers the Potter Room in Bond, where most of the collection and the amplifiers are housed. The Department of English Literature is in charge of the collection and selects current additions.

The BETTY DOUGHERTY SPOCK MEMORIAL FUND, established through the generosity of friends of the late member of the Class of 1952, provides income for the purchase of dramatic recordings. These are kept in the Potter Room.

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 six dormitories for men: Wharton Hall, named in honor of its donor, Joseph Wharton, at one time President of the Board of Managers, Palmer, Pittenger and Roberts Halls on South Chester Road; and two 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, '76, and J. Sharpless Worth, ex-'73, as a memorial to their parents; Robinson House; Woolman House; and Willets Hall, largely made possible by a bequest from Phebe Seaman, '19, and named in honor of her mother and aunts.

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 and sophomores are asked to leave college immediately after their last examination 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; other churches and synagogues in the nearby towns of Morton, Media, Chester, and Springfield. The Swarthmore Meeting House is located on the campus. Students are cordially invited to attend its

meeting for worship on Sunday. Extracurricular 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 a reading. 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 Department.

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. Registered nurses are on duty in 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 \$3.00 per day is made. Students suffering from a communicable disease or from illness which makes 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. 33.)

The college psychiatric consultants hold office hours by appointment each week. The purpose of this service is to be of help in 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 opportunities are made known to students.

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 practices and many of the scheduled contests.

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 hall. There are also student proctors in each of the men's dormitory sections. A group of students cooperate with proctors and counselors in helping the Deans with the orientation program conducted during the freshman week.

THE STUDENT COMMUNITY

Student Conduct

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. Students who choose Swarthmore as their college should recognize that they are selecting a set of social and academic standards that are intrinsic to the history and point of view of this institution. In general, the life of students is to be governed by good taste and accepted practice rather than by elaborate rules. Certain rules, however, are of sufficient importance to deserve attention here:

1. The men's and women's dormitories are not to be visited by members of the opposite sex except under the following conditions: Visiting is permitted in the public parlors between certain specified hours; open houses on certain Saturday or Sunday afternoons may be scheduled according to the rules established by the Student Affairs Committee.

2. The possession and use of alcoholic beverages on the campus is forbidden, as is drunken conduct.

3. The use or possession of firearms or other dangerous weapons is not permitted. Firecrackers or other explosives are prohibited. Tampering with fire alarm or prevention equipment is a serious offense.

4. 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.

5. At evening concerts or dramatic performances or public lectures men will wear coats and ties and women dresses or skirts. At the evening meal and Sunday noon dinner in the dining room the same standards will apply except that it is recommended that the men wear coats and ties but not required so long as the dress is in other respects consistent with the spirit of these regulations.

6. It is a 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 student community are discussed and formulated for the approval of the Administration by the Student Affairs Committee, which is composed of Deans and Faculty members appointed by the President and students appointed by the Student Council. 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 coordination of student activities and the expression of student opinion.

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, Men's Athletics, Student Affairs, and Admissions Policy.

Judicial Bodies

Where infractions of college rules have occurred, decisions about responsibility and about penalties are made by elected committees. Four such committees have different jurisdictions. The *Women's Judiciary Committee* is a branch of WSGA and is elected by the women of the student body. It sits in all cases of violations of WSGA rules or of violations by women of general campus regulations except as they fall in the sphere of the Student Judiciary Committee (see below). The *Men's Judiciary Committee* is elected by the male students and sits in all cases of violations of college rules by male students except in the kinds of cases indicated below as coming under the jurisdiction of the *Student Judiciary Committee*. The *Student Judiciary Committee*, its members selected from the other two committees, serves on cases involving the car rule, on those involving both men and women, and on others that may require joint action. The *College Judiciary Committee* is composed of student and faculty members and the two Deans. It deals with cases referred or appealed from the other Committees or with any cases that involve penalties of suspension or expulsion.

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: Judiciary, which maintains social regulations; Somerville, which arranges the program for Somerville Day, on which alumnae are invited to return to the College, and fosters student-alumnae relations.

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 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.

Extra-curricular musical activities at Swarthmore are numerous and well-supported. The college chorus is led by Professor Swing, and the college orchestra by Professor Spies. 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, and the editing of college publications conduct their own affairs with occasional advice from the faculty.

Athletics

Swarthmore's athletic policy is based on the premise that any intercollegiate program must be justified by the contribution which it can make to the educational development of the individual student who chooses to participate. In keeping with this fundamental policy, Swarthmore's athletic program is varied and extensive, offering every student a chance to take part in a wide range of sports. The College feels that it is a good thing to have as many students as possible competing on its intercollegiate teams.

Fraternities

There are four national fraternity chapters at Swarthmore: Delta Upsilon, Kappa Sigma, Phi Kappa Psi, Phi Sigma Kappa, and one local fraternity, Tau Alpha Omicron. Fraternities are adjuncts to the college social program and maintain separate lodges on the campus. The lodges do not contain dormitory accommodations or eating facilities. New members are pledged during the late fall of their first year at the college and normally about one-half of the freshman men decide to affiliate with one of the five chapters.

Student Activities Bulletin

A booklet describing more fully all these activities and many others 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 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 versatile 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 in view.

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 normally studies by the seminar method. At the end of his senior year he must take a battery of eight examinations on the work of his seminars, set by outside examiners. (The system will be explained more fully below.)

* For groupings of departments, see page 20.

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 85. 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. 126-128) 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. 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.

Each student shall meet the following general requirements, ordinarily during the first two years:

1. A year-course to be chosen from Astronomy 1-2, Biology 1-2, Chemistry 1-2 or 7-8, Physics 1-2 or 7-8, Mathematics 1-2, 3-4, or 5-6.

2. Two year-courses to be chosen from Economics 1-2, History 1-2, and Political Science 1-2. For students in the Divisions of Engineering and the Natural Sciences the requirement shall consist of one year-course.

3. For students in the Humanities and Social Science division, four half-courses to be chosen as follows:

One half-course in Literature (English or foreign).

One half-course in Fine Arts, Music, Religion, or Classical Civilization.

Two half-courses (from different departments), in History, Philosophy, Psychology, or Classics 31 or 32.

For students in the Engineering and Natural Science divisions, four half-courses in at least two departments:

Two half-courses to be chosen from literature (English or foreign), Fine Arts, Music, Religion, or Classical Civilization (Classics 33, 34, or 36).

Two half-courses to be chosen from History, Philosophy, Psychology, or Classics 31 or 32.

History can be used as an option here by students in any division who have not chosen History 1-2 to satisfy requirement 2 above.

Pre-medical students with a major in the Humanities or the Social Sciences may substitute a second half-course in literature for the second requirement above in order to satisfy medical school requirements.

4. 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.

Students entering college with special preparation in any one of these subjects may apply for exemption. No student may take more than four half courses in any one department during the first two years except in special circumstances. Applications for exceptions must be made to the Committee on Academic Requirements.

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 a full program.

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 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 or a placement test given 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, or equivalent, with a minimum average of C, normally constitutes the course requirement for a degree. Under certain circumstances this may be reduced to seventeen. 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.

The faculty may award the bachelor's degree with Distinction to students who have done distinguished work in the course program.

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 Division of the Natural Sciences 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 divisions. 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

All students who are considering the possibility of attending medical (or dental) school after graduation from Swarthmore should register their names with the Chairman of the Committee on Pre-Medical Education at the first opportunity. Information and advice on general requirements and on the special requirements of specific medical schools may be obtained by either the student or his adviser from this committee. In addition, it is a function of the committee to prepare a statement of evaluation and its recommendation to each medical school to which the student may apply, basing this statement on all information available to it, including the student's record and faculty evaluations.

In conference with the student, the course adviser maps out a program based on requirements listed below, the college's general requirements, and the particular needs and interests of the student. Beyond these considerations the need for understanding basic social problems, the cultivation of sensitiveness to cultural values, and the value of intensive work in at least one field is kept in mind in mapping an individual program.

The following courses are among the minimum requirements of most medical schools: Biology 1-2, Chemistry 1-2, Chemistry 28-29, Mathematics 1-2 or 3-4, Physics 1-2, English (two semester courses). The foreign language requirements of medical schools are automatically met when the student has satisfied the college language requirement, which includes language course 4 or its equivalent. In addition, some medical schools require quantitative analysis (Chemistry 26) or comparative anatomy (Zoology 11). Advanced work in biology, chemistry and mathematics is recommended where the student's program and interests permit. The student is urged to familiarize himself with the specific requirements of those medical schools in which he is interested in planning his program.

The work of the junior and senior year may be done either in the honors program or in course. Intensive work of the major may be carried out in any department of the student's choice, or major requirements may be met by completing three full courses in each of two related departments in the Division of the Natural Sciences. In the latter case the comprehensive examination will be jointly arranged 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, and in practice admit very few with less.

FOREIGN STUDY

Students who wish to study abroad should consult with the dean and the chairman of their major department and plan a specific program which must be approved by the departments concerned. A copy of this program should be filed in the Registrar's office. Examinations must ordinarily be taken upon return to Swarthmore if credit is desired, but these examinations may be waived if satisfactory evidence is presented that examinations were successfully passed abroad.

WRITING AND SPEAKING

Students deficient in the mechanics of composition will be required to take tutorial work before entering the junior year. Expert assistance is also available to increase efficiency in reading.

A special course in English for foreign students is provided when necessary.

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 four 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* satisfactory work, *D* passing but below the average required for graduation, 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. *R* is used to designate an auditor or in cases when the work of a foreign student cannot be evaluated because of deficiencies in English.

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 complete 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 fol-

lowing 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.

REGISTRATION

All students are required to register at the time specified in official announcements and to file programs of courses or seminars approved by their course advisers. Fines are imposed for late or incomplete registration.

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 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 de-

partment 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 \$1,000 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 PHI BETA KAPPA PRIZE is awarded by the Swarthmore Chapter to the member of the junior class who had the best academic record for the first two years. The value of the prize is \$40.

The BRAND BLANSHARD PRIZE, honoring Brand Blanshard, professor of philosophy at Swarthmore from 1925 to 1945, has been established by David H. Scull, of the Class of 1936. The award of \$50 is presented annually to the student who, in the opinion of the department, submits the best essay on any philosophical topic.

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 fresh-



Wharton Hall, a Dormitory for Men



Willets Halls, a Dormitory for Women



Pierre S. duPont Science Building

man woman who, in the opinion of the department, shows greatest proficiency in English.

PUBLIC SPEAKING CONTESTS. Prizes for contests in public speaking are provided as follows: The **ELLA FRANCES BUNTING EXTEMPORARY SPEAKING FUND** awards prizes for the best extemporaneous short speeches. The **OWEN MOON FUND** provides the Delta Upsilon Speaking Contest awards for the best prepared speeches on topics of current interest. The **WILLIAM PLUMMER POTTER PUBLIC SPEAKING FUND**, established in 1927, sponsors the Potter Public Speaking Contest. This fund also provides awards for a Poetry Reading Contest, held normally in the fall semester, and the One-Act Play Contest, held in the spring semester.

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.

The **MAY E. PARRY MEMORIAL AWARD**, given by the Class of 1925 of which she was a member, is presented each year to the senior woman who by her loyalty, sportsmanship, and skill in athletics has made a valuable contribution to Swarthmore College. The recipient is chosen by the faculty of the Department of Physical Education for Women.

Fellowships

Three fellowships are awarded annually by the faculty, on recommendation of the Committee on Fellowships, to seniors or graduates of the college for the pursuit of advanced work. The proposed program of study must have the approval of the faculty. 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 \$250, 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 has been elected to Phi Beta Kappa and 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*

RESEARCH ASSOCIATE AND LECTURER: SARAH L. LIPPINCOTT

RESEARCH ASSOCIATE: ARTHUR R. UPGREN, JR.

RESEARCH ASSISTANTS: DAVID F. GRAY
SUSAN WYCKOFF

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 development of theories. The advanced courses consider some of these problems in detail. The seminars deal primarily with the techniques, methods and problems of the Sproul Observatory research program.

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. 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.

The Sproul Observatory is open to visitors on the second Tuesday night of each month during the college year—October through May. With clear weather, visitors have the opportunity of seeing many celestial objects of various types in the course of a year. The visiting hours are from 7:00 to 8:30 p.m. in the fall and winter, but are set later during the spring.

REQUIREMENTS FOR MAJORS

Prerequisites for an Astronomy major, in course, are Astronomy 1-2, advanced courses and seminars (taken as double courses) in Astronomy, combined with work in mathematics and physics.

Prerequisites for admission to the honors program in Astronomy, either as a major or a minor, are Mathematics 11-12, Astronomy 1-2, Physics 1-2, and a reading knowledge of French, German or Russian.

COURSES

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.

13. INTRODUCTION TO MATHEMATICAL ASTRONOMY. Mr. van de Kamp.

Spherical astronomy; celestial navigation; the two body problem; energy concepts.

14. PROBLEMS OF GALACTIC STRUCTURE. Miss Lippincott.

Stellar motions, magnitudes and spectra. Unstable stars. Stellar populations. Star clusters and associations.

HONORS SEMINARS

101. DOUBLE STARS. Mr. van de Kamp and Miss Lippincott.

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.

102. PHOTOGRAPHIC ASTROMETRY. Mr. van de Kamp and Miss Lippincott.

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.

103. COSMIC MATTER, RADIATION, AND FIELDS.

Phenomena in the upper atmosphere. Solar terrestrial relationships. Cosmic rays. Radiation belts. Radio astronomy. Meteors and meteorites. Studies with rockets, artificial satellites and space probes.

110. RESEARCH PROJECT. Staff.

Participation in a research project of Sproul Observatory, related to seminars 101 or 102.

GRADUATE WORK

In conformity with the general regulations for work leading to the Master's degree (see page 64), 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

PROFESSORS: ROBERT K. ENDERS, *Chairman*

NEAL A. WEBER

VISITING PROFESSOR: HAMID K. BHATTI

ASSOCIATE PROFESSORS: LAUNCE J. FLEMISTER

LUZERN G. LIVINGSTON

NORMAN A. MEINKOTH

ASSISTANT PROFESSORS: WILLIAM C. DENISON

KENNETH S. RAWSON

ALBURT M. ROSENBERG

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 or Russian preferred) through course 4. These courses are required for majors in botany or zoology, and should be completed by the end of the junior year. 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.

Three lectures and one three-hour laboratory per week.

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

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, fall 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. MORPHOLOGY OF LOWER PLANTS. Mr. Denison. *Alternate years, fall semester*

A comparative study of the structure, reproduction, life habits and relationships of the algae, fungi, mosses, and lower vascular plants, emphasizing their use as tools in investigating fundamental biological phenomena. The laboratory will stress the culture of living plants. Opportunity will be provided to learn techniques of field collection, preservation, and identification.

Two lectures and one laboratory or field trip 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.

Three lectures and two laboratory periods per week.

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

69. TAXONOMY OF SEED PLANTS. Mr. Denison. *Spring semester*

A study of the principal families of seed plants emphasizing those forms occurring naturally or under cultivation, in the temperate and subtropical portions of eastern North America. The fundamentals of systematics are discussed but not stressed.

Three lectures, one field trip, and one laboratory period per week.

Prerequisite: Biology 1-2.

70. PLANT ECOLOGY. Mr. Denison. *Alternate years, fall semester*

A study of the plant communities of North America, their relationships with the environments on which they depend and their influence upon animals, including man. The major floristic regions of the world are described briefly.

Three lectures, one field trip, and one laboratory per week plus one or more week-end field trips.

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. Mr. Livingston.

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 PLANT GROWTH AND DEVELOPMENT. Mr. Livingston.

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. Staff.

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. Mr. Denison.

An extension of the area covered in course 69. Emphasis is placed on the methods used in recognizing and evaluating taxa. Ordinarily Biology 20 or 113 should precede this seminar. Seminar discussions and field work, supplemented by laboratory work.

115. MICROBIOLOGY. Mr. Livingston.

An extension of the area covered in Course 68. Particular emphasis is placed on physiological and biochemical aspects of the subject. Some work on fungi and viruses is included.

116. MYCOLOGY. Mr. Denison.

A study of the morphology of the principal groups of the fungi with emphasis on their relationships with other living organisms and their use as tools in the study of fundamental biological processes. The seminar discussion is supplemented by a full day of laboratory work each week.

Zoology

11. COMPARATIVE VERTEBRATE ANATOMY. Mr. Rawson.

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 and cat are studied as representative forms in the laboratory. The course has three lecture and two laboratory meetings per week.

12. VERTEBRATE PHYSIOLOGY. Mr. Flemister.

Spring semester

A general consideration of the functional process 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. Mr. Rosenberg.

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. Mr. Enders or Mr. Weber. *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. Weber. *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. Rawson or Mr. Weber. *Spring 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 one laboratory period per week. Occasional field trips.
 Prerequisite: 11 Comparative Vertebrate Anatomy.
57. COMPARATIVE PHYSIOLOGY. Mr. Flemister or Mr. Rawson. *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 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 appraised.
 Two lectures and two laboratory periods per week.
 Prerequisite: 57 Comparative Physiology.
59. CYTOLOGY. Mr. Rosenberg. *Alternate years, fall semester*
 A study of the structure and function of cells as units of biological organization, and relationships within tissues and organs. In the laboratory the student learns some of the techniques by which information about cells is arrived at, and observes the characteristics of cells as units, and as parts of organized tissues.
 Three lectures and two laboratory periods per week.
 Prerequisites: Biology 1-2, Biology 11 or 20, Chemistry 1-2.
61. BIOLOGY FOR SENIORS. Mr. Enders. *Spring semester*
 A course, patterned on the seminar plan, designed to broaden and integrate the student's knowledge of biology. Each student must present three topics and lead the discussion. A weekly summary of reading is required.
- 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.

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, Mathematics 3-4, and Physics 1-2. In addition, to qualify for minor seminars in the departments indicated, Chemistry requires Chemistry 28-29, Mathematics and Physics require Mathematics 11-12, and Psychology requires Psychology 1, and another half course.

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. Mr. Rosenberg.

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. Weber.

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 or Mr. Rawson.

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 most 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. Weber.

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. Mr. Meinkoth.

A study of the morphology, taxonomy, natural history, distribution and adaptation of invertebrate phyla with a special emphasis on evolutionary trends, ecological relations, and problems peculiar to each group.

108. SENSORY PHYSIOLOGY. Mr. Rawson.

The functional specializations of sense organs for the transfer of information in biological systems are considered in relation to the adaptations of vertebrate and invertebrate animals to their environments. Electrophysiological and behavioral approaches are used in laboratory studies.

110. SPECIAL TOPICS. 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

PROFESSOR: WALTER B. KEIGHTON, JR., *Chairman*

ASSOCIATE PROFESSORS: EDWARD A. FEHNEL
GILBERT P. HAIGHT, JR.

ASSISTANT PROFESSORS: PETER T. THOMPSON
WILLIAM JAMES SHEPPARD

INSTRUCTOR: ROBERT E. LEYON

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

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 should take Chemistry 1, 2 and Mathematics 3-4 in their freshman year; Chemistry 28 and 29, Mathematics 11, 12 and Physics 1, 2 in their sophomore year; Chemistry 26, 27 and Chemistry 61, 62 in their junior 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. These courses—together with two semesters from Chemistry 63, 65, 66 and 69 and the general college requirements outlined on pages 54 to 57—satisfy the minimum requirements of the American Chemical Society for professional training in chemistry. Mathematics 51, 52 and Physics 11, 12 are strongly recommended. Major students are expected to have a reading knowledge of German before graduation.*

1, 2. INTRODUCTION TO CHEMISTRY. Mr. Haight and Staff.

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 elements and their compounds is related to the periodic classification of the elements and to the structure of elements and molecules. In the laboratory in the first semester a number of quantitative experiments are worked, in the second semester the principles of chemical equilibria are applied to qualitative analysis. No previous training in chemistry is required.

Students who enter college with advanced training in chemistry are encouraged to take a placement examination during freshman orientation week. If sufficiently well prepared they may omit all or part of the introductory course. Other students with demonstrated ability who also show a capacity for independent work may do, in Chemistry 1, 2, work of a more advanced nature in both lectures and laboratory.

Prerequisite for all other courses in Chemistry.

Two lectures, a recitation, and one laboratory period weekly.

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

- 7-8. CONCEPTS AND THEORIES IN PHYSICAL SCIENCE. Mr. Rosenberg. *Full course*
 The first semester consists in an analysis of motion leading to the Newtonian synthesis, the conservation laws of physics, the development of an atomic theory of matter, the Periodic Table of Elements, and the kinetic theory of gases.
 The second semester considers the evolution of modern physics: physical properties of light, aspects of relativity, the wave versus the quantum theory of light, certain electrical phenomena, the atomicity of charge, Bohr's model of the atom, radioactivity, fundamental particles, the nuclear atom and nuclear energy, stellar energy.
 Three lectures and one three-hour laboratory per week.
26. QUANTITATIVE ANALYSIS I. Mr. Leyon. *Fall semester*
 The theory and practice of volumetric and gravimetric analysis, acid-base titrations, and oxidation-reduction.
 One semester. Prerequisite: Chemistry 2.
 Two lectures and two laboratory periods weekly.
27. QUANTITATIVE ANALYSIS II. Mr. Leyon. *Spring semester*
 Spectrophotometry, complexometric titrations, electrochemical analyses, separations.
 One semester. Prerequisite: Chemistry 26.
 Two lectures and two laboratory periods weekly.
- 28-29. ORGANIC CHEMISTRY. Mr. Fehnel and Mr. Sheppard. *Full course*
 This course 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.
- 61, 62. THEORETICAL CHEMISTRY. Mr. Keighton and Mr. Thompson.
 The principles of physical 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: Calculus, and general physics.
 Three lectures and one laboratory period weekly.
63. QUANTUM CHEMISTRY. Mr. Thompson. *Spring semester*
 An extension of course 61, 62 in breadth and depth. Quantum mechanics is introduced and applied to a variety of problems in valence theory and molecular structure determination. Such topics as atomic structure, chemical bonding theory, molecular spectroscopy, dielectric and magnetic phenomena, molecular symmetry, and statistical mechanics are considered.
 One semester. Prerequisite: Chemistry 62.
 Three hours of discussion 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, solvent systems, inorganic reaction mechanisms, and other phases of inorganic chemistry.

One semester. Prerequisite: Chemistry 61.

Three lectures or conferences and one laboratory period weekly.

66. QUALITATIVE ORGANIC ANALYSIS. Mr. Fehnel. *Fall semester*

Classroom and laboratory study of the characterization and systematic identification of organic compounds. Emphasis is placed on the correlation of structure and properties of organic molecules and on the theoretical principles underlying various chemical and physical methods of isolation and identification. A reading knowledge of German is desirable.

One semester. Prerequisite: Chemistry 28-29.

Two lectures and two laboratory periods weekly.

69. SPECIAL TOPICS. Staff. *Fall and spring semester*

An elective half-course, which provides an opportunity for qualified advanced students to undertake original investigations or to make detailed literature studies of selected topics in the fields of inorganic, organic, analytical, and physical chemistry. The course is designed to give the student practical experience in the solution of a research problem, to develop facility in the use of the chemical literature and in the interpretation and communication of experimental results, 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 must secure the approval of the instructor under whose supervision the work is to be done.

One conference and approximately ten hours of laboratory and/or library work weekly.

HONORS WORK

Before admission to honors work the chemistry major will have completed Chemistry 1, 2, 28, 29, Mathematics 3, 4, 11, 12, and Physics 1, 2. The honors program includes Chemistry 101, 105 in the junior year and Chemistry 106 and 108 in the senior year, with four other seminars usually in biology, mathematics, or physics.

101. THEORETICAL CHEMISTRY. Mr. Keighton and Mr. Thompson. *Fall semester*

The gaseous, liquid, and solid states, solutions, colloids, elementary thermodynamics, chemical equilibria, electrochemistry, the kinetics of chemical reactions.

Prerequisites: Calculus and general physics.

One four-hour seminar and one seven-hour laboratory period weekly for one semester.

105. QUANTITATIVE ANALYSIS. Mr. Leyon. *Spring semester*

Essentially the content of courses 26 and 27, designed to prepare honors candidates for an honors examination.

Prerequisite: Chemistry 2 and 101.

One seminar and twelve hours of laboratory work weekly.

106. ADVANCED ORGANIC CHEMISTRY. Mr. Fehnel. *Fall semester*

Selected topics in organic chemistry, including resonance and molecular orbital theory, reaction mechanisms, molecular rearrangements, stereochemistry, 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 isolation, characterization, and identification of organic compounds. A familiarity with physical chemistry and a reading knowledge of German are desirable.

Prerequisites: Chemistry 28-29 and senior standing.

One seminar and seven hours of laboratory weekly.

108. VALENCE AND MOLECULAR STRUCTURE. Mr. Thompson and Mr. Haight.

Spring semester

Topics such as the periodic table and atomic structure, types and properties of bonds, the chemistry of transition metals, coordination compounds, acid-base and oxidation-reduction mechanisms, etc., are studied. Quantum theory is developed and applied throughout to these topics and the use of dielectric and magnetic phenomena, spectroscopy, and molecular symmetry in determining structure is discussed. Laboratory: study of reaction kinetics and equilibria in inorganic systems.

Prerequisite: Physical Chemistry 62 or 101.

One seminar and six hours of laboratory weekly.

Classics

PROFESSORS: SUSAN P. COBBS
HELEN F. NORTH, *Chairman*
ASSOCIATE PROFESSOR: MARTIN OSTWALD
LECTURERS: VIRGINIA B. JAMESON
DOROTHY KOONCE

The Department of Classics offers courses in the Greek and Latin languages and literatures, numbered from 1 to 20. Another group of courses, numbered from 31 onwards, deals with the history of the Greeks and Romans and with various aspects of their culture. These courses presuppose no knowledge of the Greek or Latin languages and are open without prerequisite 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.

Students reading for Honors in Greek may offer Latin as one of their minors, and vice versa. Students majoring in Greek may substitute a Latin seminar for one of their seminars in Greek, and vice versa. In addition, majors in both Honors and course are strongly advised to take for at least one semester a course in prose composition (Greek 9, 10 or Latin 9, 10).

Greek

- 1-2. ELEMENTARY GREEK. Mr. Ostwald. *Full course*
The essentials of Greek grammar are covered and selections from masterpieces of Greek literature are read.
- 9, 10. GREEK PROSE COMPOSITION. Staff. *Each semester*
A non-credit course, meeting one hour a week. This course is recommended in conjunction with courses at the intermediate level or above, to provide the student with grammatical and stylistic exercise.
- 11, 12. INTERMEDIATE GREEK. Miss North.
Plato's *Apology*, a play of Euripides, and selections from Homer are read.
- 13, 14. GREEK PROSE AUTHORS. Mrs. Koonce.
The works read are determined by the interests and needs of the members of the class. These readings are supplemented by a survey of the history of Greek Literature. Credit is given for each semester.
- 15, 16. GREEK POETS. Miss North, Mr. Ostwald.
The works read are determined by the interests and needs of the members of the class. Credit is given for each semester. The course is offered only when required.
20. SPECIAL TOPICS. Staff.
Readings selected to fit the needs of individual seniors in preparation for their comprehensive examinations. No course credit is given.

Latin

- 1-2. ELEMENTARY LATIN. Miss Cobbs. *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 is offered only when required.
- 3, 4. INTERMEDIATE LATIN. Mrs. Jameson.
The first semester includes a thorough review of the principles of Latin grammar through an intensive study of Cicero's *De Senectute* and practice in Latin prose composition. Virgil's *Aeneid* is studied in the second semester. Credit is given for each semester.
- 9, 10. LATIN PROSE COMPOSITION. Staff. *Each semester*
A non-credit course, meeting one hour a week. This course is recommended in conjunction with courses at the intermediate level or above, to provide the student with grammatical and stylistic exercise.
- 11, 12. INTRODUCTION TO LATIN LITERATURE. Miss Cobbs.
The course aims to give some conception of the scope and characteristic qualities of Latin literature. The reading includes a comedy and the *Cena Trimalchionis* from Petronius' *Satyricon* 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. Mrs. Jameson. *Fall semester*
A study of the poems of Catullus and the elegiac poets.
14. MEDIAEVAL LATIN. Mrs. Jameson. *Spring semester*
The works studied in this course are chosen from the principal types of mediaeval Latin literature (including religious and secular poetry, history and chronicles, saints' lives, satire, philosophy, and romance). Some attention is paid to their origins in late antiquity and their influence on the early Renaissance.
20. SPECIAL TOPICS. Staff.
Readings selected to fit the needs of individual seniors in preparation for their comprehensive examinations. No course credit is given.

Ancient History and Civilization

31. HISTORY OF GREECE. Mr. Ostwald. *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.
32. HISTORY OF ROME. Mr. Ostwald. *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.
33. GREEK LITERATURE IN TRANSLATION. Miss North. *Fall semester*
The works read in this course include the *Iliad*, Hesiod's *Theogony* and *Works and Days*, much of Greek tragedy and comedy, selections from the historians, the lyric and elegiac poets, and the pre-Socratic philosophers, and several dialogues of Plato.

34. LATIN LITERATURE IN TRANSLATION—CLASSICAL AND MEDIAEVAL. Miss North.
Spring semester

The works studied in this course range in time from the age of the Roman Republic to the twelfth century after Christ. They include, from the classical period, such major authors as Cicero, Lucretius, Virgil, Livy, Ovid, 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 in alternate years.

36. CLASSICAL MYTHOLOGY IN LITERATURE AND ART. Miss North. *Spring 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 normally given in alternate years.

HONORS SEMINARS

102. ROMAN HISTORIANS. Mr. Ostwald.

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 later epic, typified by Lucan's *Pharsalia*. The seminar is given in the fall semester.

104. LATIN COMEDY AND SATIRE. Mr. Ostwald.

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.

107. ROMAN RHETORIC AND ORATORY. Miss North.

This seminar combines the study of Greek and Roman rhetorical theory and literary criticism with the reading of representative speeches of Cicero. It also considers the influence of rhetorical education on Latin literature, particularly that of the Empire. The seminar is given in the fall semester.

111. GREEK PHILOSOPHERS. Mr. Ostwald.

This seminar is primarily devoted to the study of Plato, which is supplemented by study of the pre-Socratic philosophers and of Aristotle and the Hellenistic schools. The seminar is given in the fall semester.

112. GREEK EPIC. Miss North.

The study of Homer's *Odyssey* constitutes the chief work of this seminar. Some attention is also paid to Hesiod's *Theogony* and to the *Argonautica* of Apollonius of Rhodes. The seminar is given in the spring semester.

113. GREEK HISTORIANS. Mr. Ostwald.

The greater part of the work of this seminary is devoted to Herodotus and Thucydides, but portions of Xenophon's *Hellenica* and of Polybius are also studied. The seminar is given in the fall semester.

114. GREEK DRAMA. Miss North.

The whole body of extant Greek tragedies and comedies is studied, with a careful reading in the original language of one play by each of the major dramatists. The seminar is given in the spring semester.

Economics

PROFESSORS: JOSEPH W. CONARD
EDWARD K. CRATSLY
FRANK C. PIERSON
CLAIR WILCOX, *Chairman*

VISITING PROFESSOR: NORMAN SUN

ASSOCIATE PROFESSORS: WILLIAM H. BROWN, JR. ‡
WILLIS D. WEATHERFORD

INSTRUCTOR: CHARLES J. SIEGMAN

The courses in economics are designed: first, to acquaint the student with the institutions and 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 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 courses 3 and 4. Students intending to major in economics are advised to take Political Science 1-2 and courses in accounting, statistics or mathematics. Majors in course are required to take courses 50 and 51 in the junior year. Majors in honors are advised to take seminars 103 and either 101 or 102.

1-2. INTRODUCTION TO ECONOMICS. Messrs. Conard, Pierson, Siegman, Sun, Weatherford, and Wilcox. *Full course*

This course is designed both to afford the general student a comprehensive survey and to provide students doing further work with a foundation on which to build. It describes the organization of the economic system and analyzes the allocation of resources, the distribution of income, the maintenance of economic stability, and international economic relations.

3. ACCOUNTING. Mr. Cratsley. *Fall semester*

The purpose of this course is to equip the student with the rudiments of accounting that he will need to employ in his advanced work in business finance, banking, taxation, and public regulation.

4. STATISTICS. *Spring semester*

The purpose of this course is to make the student a critical user of statistics. Topics covered include frequency distributions, sampling, index numbers, and economic time series.

11. ECONOMIC DEVELOPMENT. Mr. Wilcox. *Spring semester*

Requisites for the economic development of underdeveloped countries. Obstacles to development. Strategy and tactics of development. Aid for development.

50. ECONOMIC THEORY. Mr. Siegman. *Spring semester*

Determination of prices in theory and in practice. Distribution of income. Determination of the level of income and employment.

‡ Absent on leave, 1962-63.

51. MONEY AND BANKING. Mr. Siegman. *Fall semester*
 Organization and operation of commercial banking in the United States. Central banking; the Federal Reserve system. Monetary policy.
52. PUBLIC FINANCE. Mr. Wilcox. *Fall semester*
 Revenues and expenditures of Federal, state, and local governments. Principles of taxation. Borrowing and debt management. Fiscal policy.
53. BUSINESS ADMINISTRATION. Mr. Cratsley. *Spring semester*
 Problems confronting the business executive: organization, management, marketing, merchandising, risk and insurance. Case studies of business policy.
54. BUSINESS FINANCE. Mr. Brown. *Fall semester*
 Corporate finance, investment banking, and the securities markets.
 Not offered in 1962-63.
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*
 The extent, consequences, and causes of poverty, inequality, and insecurity. An appraisal of reforms: social insurance, medical care, public housing, rural development.
 Not offered in 1962-63.
- 57-58. PUBLIC CONTROL OF BUSINESS. Mr. Wilcox. *Fall semester*
 Maintenance of competition in American industry; moderation of competition in agriculture, extractive industries, and distributive trades. Regulation of public utilities, transport, and communications. Public ownership and operation of industry.
 Not offered in 1962-63.
59. BUSINESS CYCLES. Mr. Pierson. *Spring semester*
 Analysis of business fluctuations and long-term economic change. Public policies for stabilization and growth.
60. INTERNATIONAL ECONOMICS. Mr. Sun. *Fall semester*
 Theory and practice of international trade. Balance of payments, foreign exchange, national commercial policies, international investment, and foreign aid.
61. COMPARATIVE ECONOMIC SYSTEMS. Mr. Weatherford. *Fall semester*
 A comparative study of the economic systems of the Soviet Union, China, India, the United Kingdom, and the United States.
 Not offered in 1962-63.

HONORS WORK

101. FINANCE. Mr. Brown. *Spring semester*
 Revenues and expenditures of Federal, state and local governments. The principles of taxation. Problems of the Federal debt. Corporation finance, investment banking, and the securities markets. Public regulation of financial practices.
 Not offered in 1962-63.
102. ECONOMIC STABILITY AND GROWTH. Mr. Pierson. *Spring semester*
 The theory of cyclical fluctuations and secular growth. Money and banking. Monetary and fiscal policy. Collective bargaining, wage-price pressures and the control of inflation.

103. ECONOMIC THEORY. Mr. Conard. *Both semesters*
 Contemporary theory: price determination, the functional distribution of income, the level of employment. Evaluation of theory in the light of simplifying assumptions and empirical evidence. The relevance of theory to socio-economic problems.
104. PUBLIC CONTROL OF BUSINESS. Mr. Wilcox. *Fall semester*
 The maintenance of competition in American industry. The moderation of competition in agriculture, the extractive industries, and the distributive trades. The regulation of public utilities, transport, and communications. Public ownership and operation of industry.
105. INTERNATIONAL ECONOMICS. Messrs. Siegman and Wilcox. *Both semesters*
 Theory and practice in international economic relations. The pure theory of international trade. The balance of payments and the mechanism of international exchange. Restrictionism and discrimination. Regionalism. Relations with controlled economies. International investment and foreign aid.
106. COMPARATIVE ECONOMIC SYSTEMS. Mr. Weatherford. *Fall semester*
 Economic organization, resource allocation, and growth in an advanced planned economy: the USSR. Economic development in a backward planned economy: China. Economic development in a backward mixed economy: India. An advanced socialist-welfare economy: the United Kingdom. The changing economy of the United States.
107. LABOR AND SOCIAL ECONOMICS. Messrs. Pierson and Weatherford. *Spring semester*
 The organization of labor. Analysis of wage policies. Government control of labor relations. Poverty, inequality, and insecurity. Social insurance, medical care, public housing, and rural development.
108. MATHEMATICAL ECONOMICS. Mr. Brown. *Spring semester*
 Econometrics, linear programming, input-output analysis, and other applications of mathematics.
 Prerequisites: Mathematics 12 and Economics 103.
 To be offered in 1963-64.

Division of Engineering

SAMUEL T. CARPENTER, *Chairman*

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

The professional practice of engineering requires skill and resourcefulness in applying scientific knowledge and methods to the solution of problems of ever growing technical complexity. The successful engineer will, in addition, possess an understanding of the socio-economic forces which bear upon his work, an appreciation of the cultural and humanistic aspects of the society in which he lives, and a sound working knowledge of human relations. Our program meets these objectives by providing the student with technical knowledge in a setting of scientific rigor, together with the foundation of a liberal education. The student is educated in the professional disciplines of the engineer such as critical analysis, and in humanistic studies and the communication of ideas, as well as training in the natural and engineering sciences.

Three educational plans are open to engineering students at Swarthmore.

- (1) The Course program with a major in Civil, Electrical, or Mechanical Engineering.
- (2) The Honors program in Engineering Sciences.
- (3) A special sequence to meet unusual needs or interests of certain students:
 - (a) a five-year program leading to both a B.S. and a B.A. degree, or
 - (b) a four-year program integrating engineering with other areas of study.

A candidate for a degree in Engineering must meet the general requirements of the College as specified for the Division of Engineering (pp. 53-55) and the requirements of the particular department or program in which he is a major. Thus curricular plans for the first two years must take two objectives into consideration: (1) the basic engineering science courses must provide a foundation and meet the prerequisite requirements for advanced work at the upper-class level, and (2) the general College requirements should be essentially fulfilled prior to junior standing. Experience has shown that the suggested "Basic Engineering Curriculum of the First Two Years" (page 86) will meet the needs of the usual engineering student in any one of the three plans and will clear the way for the advanced work of the junior and senior years. Modifications of the basic program, as well as those of the major departments, are possible in individual cases but such changes must be justified and approved by the student's course adviser. At the end of the sophomore year, the student will enter the Course program in a major field of Civil, Electrical, or Mechanical Engineering, or he may apply for Honors.

(1) The Course Program

This program leads to the degree of Bachelor of Science in Civil, Electrical, or Mechanical Engineering; these curricula are accredited by the Engineers' Council for Professional Development. Over the four years, the student will take about one-quarter of his work in the Divisions of the Humanities and Social Sciences, one-quarter in the Departments of Chemistry, Mathematics, and Physics, and the remainder 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. After completing the basic program of the first two years, the student follows the curriculum outlined on the following pages under the particular department in which he is a major.

(2) The Honors Program in Engineering Sciences

The Division of Engineering offers an Honors program in Engineering Sciences in addition to the above programs in Civil, Electrical, and Mechanical Engineering. A general statement describing Honors work at Swarthmore may be found on page 55. The program is open, by application, to qualified students upon completion of the sophomore year. Successful participants will receive the degree of Bachelor of Science with Honors, High Honors, or Highest Honors in Engineering Sciences. Details of the program are given on page 87 following.

(3) Special Programs

There is growing recognition of the value of an engineering training fortified by a strong background of work in the humanities and social sciences or in the natural sciences. It is possible, with early planning of a five-year program, for a student to obtain both an engineering degree and a Bachelor of Arts degree in another field of interest. It is also possible to effect a four-year engineering plan with a minor in another field.

These special curricula are tailored to individual cases; in any event, planning early in the freshman year is essential. Requests for additional information should be directed to the Chairman of the Engineering Division.

BASIC ENGINEERING CURRICULUM OF THE FIRST TWO YEARS

<i>First Semester</i>	<i>Second Semester</i>
<i>Freshman Year</i>	
Mathematics 3 (or 5)	Mathematics 4 (or 6)
Physics	Physics
Chemistry**	Chemistry
Engineering Graphics	Engineering Measurements
Elective	Elective
<i>Sophomore Year</i>	
Mathematics 11 (or 15)	Mathematics 12 (or 16)
Mechanics I	Mechanics II
Engineering Properties of Matter	Electrical Engineering Science
Elective	Elective
Elective	Elective

GENERAL COURSES *

- GE1. ENGINEERING GRAPHICS. Staff. *Fall semester*
Descriptive geometry with emphasis on spatial visualization and the solution of engineering problems by graphical methods. Engineering drawing with emphasis on methods for describing the shape of an object by the use of projections and of freehand sketches.
Two class periods and two three-hour drawing room periods per week.
- GE11. ENGINEERING PROPERTIES OF MATTER. Mr. Mangelsdorf. *Fall semester*
Study of the structure of matter on an atomic and microscopic level and the relation of structure to engineering properties and bulk characteristics. Metals, ceramics and organic materials are examined with emphasis upon those properties common to each group rather than upon particular materials. The laboratory period includes standard testing techniques, operation and function of shop processes and machine tools in materials processing, and individual research. Laboratory period each week.

* Except as noted, the following courses are open to all students in the College.

** Chemistry may be deferred until the sophomore year.

GE12. ENGINEERING MEASUREMENTS. Staff.

Spring semester

A study of the basic procedures and mathematical principles required in making, interpreting and using measurements for engineering purposes, including linear and angular measurements, leveling, traversing, and triangulation, as well as the measurement of thermodynamic, fluid and electrical quantities.

Three recitations and one three-hour laboratory each week.

GE57. ENGINEERING ECONOMY AND OPERATIONS RESEARCH. Mr. Carpenter.

Spring semester

The principles of engineering economy and operations research as applied to defining optimal economic solutions of industrial problems. Annual cost methods, present worth, discounted costs, inventory control, probability principles with random number solutions, queuing theory, linear programming, scheduling, transportation and allocation theory.

Open to all juniors and seniors.

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

HONORS PROGRAM IN ENGINEERING SCIENCES

The program has been established to meet the new and challenging demands placed upon the engineering profession by the rapid advances in science. The eight seminars in which the student participates cover a wide range of fundamental knowledge in the fields of mathematics, modern physics, and engineering sciences. The program is characterized by its orientation to basic scientific and mathematical principles in lieu of specialized subject matter. The program is unique and suited for those planning a future career in professional engineering, research and development, or college teaching.

Two seminars are normally taken each semester of the junior and senior year, for a total of eight. The final evaluation of the students in the program occurs at the end of the senior year by means of eight examinations, one for each seminar, given by outside examiners.

Students applying for the Honors program are required to submit their proposed seminar programs to the Division of Engineering, accompanied by a letter setting forth their defense of the program. The proposed program must include seminars in Mathematics, Physics, and the Engineering Sciences. The Mathematics and Physics seminars are described in the departmental listings and the Engineering Science seminars are described in the following section. It is advisable for students interested in this program to consult with the Chairman of the Division of Engineering.

All Engineering Science seminars include from one-half to a full day of laboratory each week.

ENGINEERING SCIENCE SEMINARS

ES101. MECHANICS OF SOLIDS.

Mechanics and analysis of deformable bodies treating elastic and plastic stresses and strains due to general and specific force systems. General equations of equilibrium and compatibility. Failure theories, stability. Experimental analysis based on strains, photoelasticity, and membrane analogy. Elementary vibrations. Lagrange and Hamilton equations.

Prerequisite: Mechanics I and II; Mathematics 11, 12, or equivalent.

ES102. ELECTRODYNAMICS.

Electromagnetic field theory and linear circuit theory. Static and dynamic field theory through Maxwell's Equations, using the applicable vector analysis. Electromagnetic fields in magnetic and dielectric materials; electromagnetic energy and forces. The circuit theory includes transient and steady state analysis of linear networks. The relation of circuit behavior to pole and zero locations in the s -plane is emphasized.

ES103. THERMODYNAMICS.

Fundamental concepts, properties of substances, equations of state, first and second laws of thermodynamics and their applications, entropy, gas and vapor cycles, Maxwell equations, heat transfer.

ES104. FLUID MECHANICS.

Fluid statics and dynamics, continuity, dimensional analysis, incompressible flow, generalized equations of motion, Navier-Stokes equation, boundary layer theory, convective heat transfer, mass transfer, compressibility phenomena.

ES105. LINEAR SYSTEMS.

Analysis and synthesis of electrical and electromechanical linear systems such as electric networks and servomechanisms. The following analytical methods are emphasized: differential equations, the Laplace transformation, Fourier methods, poles and zeroes, superposition integral, complex loci, analog simulation, transforms. Prerequisite ES102—Electrodynamics.

ES106. STRUCTURAL MECHANICS.

Theory, analysis, and design of structural systems. Basic theory of determinate and indeterminate structures, fundamentals of theoretical applied mechanics, including beams on elastic foundation, stability, plates and shells, with applicable vector and tensor approaches, and series solution. Ground motion and structural dynamics. Model analysis. Matrix methods.

Prerequisite: ES101—Mechanics of Solids.

ES107. MECHANICAL DESIGN.

Analysis and synthesis of the elements of a machine. Vibrational study of both lumped and distributed mass systems. Dynamic systems are studied from a Newtonian and Lagrangian point of view.

ES108. EARTH SCIENCE.

Principles of soil mechanics, hydrology, hydraulics, sedimentation, ground water flow and clay mineralogy, using the basic concepts of physical geology as a unifying framework. Theory of consolidation of soils, stresses in earth masses, Laplace equation of seepage, precipitation runoff relationships, are introduced for the analysis of engineering problems.

ES109. THESIS. Elective, upon approval of the Engineering Division of an acceptable field of original investigation.

ES111. CIRCUIT THEORY.

Theory of linear time invariant electric circuits with brief extensions to nonlinear networks and methods of synthesis. Network topology and equilibrium equations. Pole-zero concepts, transient and steady state response, impedance, resonance and the complex s -plane. Superposition techniques, signal flow graphs, one- and two-port networks, filter theory and power networks. Analytic properties of network functions. Treatment of electromechanical energy transfer of devices having linear network equivalents.

Offered in combination with ES112 Electromagnetic Theory, when demand so warrants, as an expanded version of ES102 Electrodynamics.

ES112. ELECTROMAGNETIC THEORY.

Development and application of Maxwell's equations. Fields in bounded space and in dielectric, magnetic and conducting materials. Wave propagation and reflection. Radiation. Electromagnetic energy storage and electromechanical energy conversion.

Offered in combination with ES111 Circuit Theory, when demand so warrants, as an expanded version of ES102 Electrodynamics.

EE102. ELECTRONICS. (See Department of Electrical Engineering.)

Civil Engineering

PROFESSOR: SAMUEL T. CARPENTER, *Chairman*

ASSOCIATE PROFESSOR: M. JOSEPH WILLIS ‡

ASSISTANT PROFESSORS: CLARK P. MANGELSDORF
ARCHIE M. RICHARDSON, JR.

LECTURER: RANALD V. GILES

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, naval architecture, engineering mechanics, industrial management and sales.

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 electing the Honors Program in Engineering Sciences may prepare for graduate work in Civil Engineering by electing ES106 Structural Mechanics and ES108 Earth Science.

STANDARD PROGRAM FOR COURSE STUDENTS

Fall Semester

Spring Semester

Junior Year

CE51 Mechanics III
EE63 Electronic Circuits
ME51 General Thermodynamics
EE55 Engineering Analysis

CE52 Structural Theory
CE54 Soil Mechanics and Foundations
ME54 Fluid Mechanics
EL10 Writing and Speaking

Senior Year

CE53 Structural Mechanics
CE55 Civil Engineering Design I
CE57 Hydraulic & Sanitary Engineering
Physics 51 Atomic and Nuclear Physics
(or Elective)

CE58 Special Topics
CE56 Civil Engineering Design II
GE57 Engineering Economy and Operations Research
Elective

CE11 MECHANICS I. Mr. Carpenter

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 3-4, or equivalent. (3 recitations and 1 3-hour laboratory per week.)

CE12 MECHANICS II. Mr. Mangelsdorf.

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; relative motion, angular momentum; combined translation and rotation.

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

‡ Absent on leave, 1962-63.

- CE51 MECHANICS III. Mr. Richardson. *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 Mechanics I, and Mathematics 12, or equivalent. (3 recitations and 1 3-hour laboratory per week.)
- CE52 STRUCTURAL THEORY. Mr. Mangelsdorf. *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 STRUCTURAL MECHANICS. Mr. Carpenter, Mr. Mangelsdorf. *Fall semester*
 A study of indeterminate structural systems and advanced structural theory. Structural models.
 Prerequisite: CE52 Structural Theory. (3 recitations and 1 3-hour laboratory per week.)
- CE54 SOIL MECHANICS AND FOUNDATIONS. Mr. Richardson. *Spring semester*
 The properties of soils, including the fundamentals of the structure of clays, flow through porous media, consolidation, compaction and shear strength. These fundamentals, combined with engineering geology and the principles of mechanics are applied to slope stability, settlement analysis, foundation design and analysis of loads on retaining walls and bulkheads.
 Prerequisite: CE51 or equivalent. (3 recitations and 1 3-hour laboratory per week.)
- CE55 CIVIL ENGINEERING DESIGN—I. Mr. Carpenter, Mr. Richardson. *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.)
- CE56 CIVIL ENGINEERING DESIGN—II. Mr. Carpenter, Mr. Richardson. *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. Ultimate design theory.
 Prerequisite: CE55 Civil Engineering Design—I. (3 recitations and 1 3-hour laboratory each week.)
- CE57 HYDRAULIC AND SANITARY ENGINEERING. Staff. *Fall semester*
 An introduction to the fundamentals of hydrology, including precipitation—run-off relationships, ground water flow, the routing and hydraulics of surface flow through channels and reservoirs. Fundamentals are related to Civil Engineering activities, especially river basin development, water supply, and drainage. An introduction to the principles of water and sewage treatment is included.
 Prerequisite: ME54, Fluid Mechanics. (3 recitations and 1 3-hour laboratory per week.)
- CE58 SPECIAL TOPICS. Staff.
 Required course with subject matter dependent on a group need or interest. The laboratory period is devoted to the principles and practice of civil engineering measurements through a study of photogrammetry, map projections, curves and earth work, celestial observations, field layout, and related topics of importance to the professional civil engineer.
- CE69 CIVIL ENGINEERING THESIS. Staff.

Electrical Engineering

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

ASSOCIATE PROFESSOR: CARL BARUS

ASSISTANT PROFESSOR: DAVID L. BOWLER *

Electrical Engineering deals with the development and application of precise notions of electricity and allied physical sciences in the broad fields of conversion, transmission, control, and utilization of electrical energy for the purposes of transmitting power and communicating intelligence.

The courses in Electrical Engineering are each a series of inquiries dealing with the fundamental concepts of electrical phenomena and are designed to inculcate in the student confidence in analytical methods and competence to apply basic principles to new engineering situations. The students are encouraged to examine problems critically and to make such simplifying assumptions as are appropriate without destroying the significance of the results. The importance of the presentation of work is also stressed, a student being required to gain some proficiency in communicating the results of his work clearly, completely and in a well-organized form.

Students applying for a major in Electrical Engineering will normally have followed the basic engineering program outlined on page 86 during their first two years. Satisfactory completion of this program will fulfill the curricular prerequisites of the Department. In special cases, the Department will consider applications from students who have pursued a different program but who will have completed at least the following courses or their equivalents: Math 3, 4 and 11, 12; Physics 1, 2; Chemistry 1, 2; CE11, 12 or Physics 11, 12; and EE12. Majors must maintain a "C" average or better in the required electrical courses.

STANDARD PROGRAM FOR COURSE STUDENTS

Fall Semester

Spring Semester

Junior Year

EE53 Circuit Theory I
EE55 Engineering Analysis
EE59 Electronics
ME51 General Thermodynamics

EE54 Circuit Theory II
EE56 Field Theory
EE60 Electronics
EL10 Writing and Speaking

Senior Year

EE57 Electrical Machinery I
EE61 Waves and Transmission Lines
Ph51 Atomic and Nuclear Physics
Elective

EE58 Electrical Machinery II
Electrical Engineering Elective
Technical Elective
Non-technical Elective

EE12 ELECTRICAL ENGINEERING SCIENCE.

Spring semester

The experimental and theoretical basis of electricity and magnetism; elementary electrostatics and magnetostatics; foundations of circuit theory, principles of energy conversion, and transient analysis of linear networks.

Three class periods per week; one laboratory each week.

Prerequisites: Physics 1 and 2, and to be preceded or accompanied by Integral Calculus.

* Absent on leave, fall semester, 1962-63.

EE53 CIRCUIT THEORY I.*Fall semester*

Transient and steady-state analysis of electric circuits. Treatment is based on the differential equations of the circuit and the circuit impedance as a function of the complex frequency variable.

Three class periods per week; one laboratory each week.

Prerequisites: Physics 1 and 2 and preferably EE12 Electrical Engineering Science.

EE54 CIRCUIT THEORY II.*Spring semester*

Further study of electric networks, using the Laplace transformation and other mathematical methods. Synthesis of impedances containing two element-types is included. Conventional filter theory.

Three class periods per week; one laboratory each week.

Prerequisites: EE53 Circuit Theory I, and EE55 Engineering Analysis, or equivalents.

EE55 ENGINEERING ANALYSIS.*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 bona fide engineering problems. A study is made of the common physical and mathematical aspects shared by different systems such as mechanical, thermal, and electrical. The theory and application of ordinary differential equations is systematically covered. The Laplace transformation is developed and applied. Partial differential equations and Fourier methods are introduced.

Three class periods per week; one computation period each week.

Prerequisites: EE12 Electrical Engineering Science, and Integral Calculus.

EE56 FIELD THEORY.*Spring semester*

An analytical study of electromagnetism. Maxwell's equations are developed and applied, with greatest attention given to the static and quasi-static cases. Considerable emphasis is given to the following topics: solutions of Laplace's equation, fields in dielectric and magnetic materials, energy and forces, and the relationship of field theory to circuit theory.

Three class periods per week; one laboratory each week.

Prerequisites: EE53 Circuit Theory I, and EE55 Engineering Analysis, or equivalent.

EE57 ELECTRICAL MACHINERY I.*Fall 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 Circuit Theory I.

EE58 ELECTRICAL MACHINERY II.*Spring semester*

Synchronous machines, performance, effects of saturation and saliency; polyphase 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: EE57 Electrical Machinery I.

EE59-60 ELECTRONICS.*Full course*

Electronic circuit analysis and signal theory. Transistors, vacuum tubes, and other devices are treated by the use of linear and piecewise-linear models and by graphical analysis. Transient and steady-state circuit theory, normally studied con

currently, is extensively applied. Topics in signal theory include Fourier transform analysis, noise, modulation, sampling, and information theory.

Credit for the first semester alone will be given by special arrangement.

Three class periods per week; one laboratory each week.

Prerequisite: EE53 Circuit Theory I, preceding or concurrent.

EE61 WAVES AND TRANSMISSION LINES.

Fall semester

Application of Maxwell's equations to electromagnetic wave problems. Transmission lines are treated from both field and circuit viewpoints. Other topics include wave propagation and reflection, waves in lossy media, wave guides, cavity resonators, antennas and radiation.

Three class periods per week; one laboratory each week.

Prerequisite: EE56 Field Theory.

EE62 PHYSICAL ELECTRONICS.

Spring semester

A study of the physical principles underlying the operation of electronic devices. The basic material covered includes: motion of charged particles in electric and magnetic fields, emission, space-charge-limited vacuum tube conduction, semiconductor junctions and transistors, gaseous conduction. If time and interest permit, additional topics such as dielectric and magnetic materials and photoelectric phenomena will be included.

Three class periods per week; one laboratory each week.

Prerequisite: Physics 51 Atomic and Nuclear Physics.

EE63 ELECTRONIC CIRCUITS.

Fall semester

Further study of electrical engineering subjects, primarily for non-electrical engineering students. Conventional analysis of single phase a-c circuits and a study of the fundamentals of electronic circuits will lead to consideration of the problems of processing signals from transducers such as strain gages, magnetic pickups, etc. The use of the analog computer will be covered in the laboratory work.

This course meets the requirements for entrance into EE64 Automatic Control.

Three class periods and one laboratory per week.

Prerequisite: EE12 Electrical Engineering Science.

EE64 AUTOMATIC CONTROL.

Spring semester

An introduction to automatic control systems using Laplace transform techniques. System design is studied by means of the Nyquist diagram, frequency response methods, and the root locus method. Other topics include compensation networks, multiple input systems, systems optimization, etc. Applications are made to space vehicle guidance, process control and, in general, to systems requiring control of position, torque, temperature, etc.

Three class periods per week; one laboratory each week.

Open to senior Electrical or Mechanical Engineering majors, or others with equivalent background.

EE71 ELECTRICAL ENGINEERING THESIS.

An engineering thesis may be substituted for a course by special arrangement with the staff.

HONORS SEMINAR

EE102. 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. The seminar is accompanied by a full-day laboratory.

Prerequisite: ES 102 or Physics 102.

Mechanical Engineering

PROFESSOR: BERNARD MORRILL, *Chairman*

ASSOCIATE PROFESSOR: PHILIP C. PRAGER

INSTRUCTOR: JOHN K. HAWLEY

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

CE51 Mechanics III
ME51 General Thermodynamics
EE55 Engineering Analysis
Non-technical Elective

Spring Semester

ME52 Advanced Thermodynamics
ME54 Fluid Mechanics
ME62 Advanced Strength of Materials
Non-technical Elective

Junior Year

Senior Year

ME53 Heat Transfer
ME55 Advanced Fluid Mechanics
ME63 Engineering Design I
EE63 Electronic Circuits

ME64 Engineering Design II
ME66 Mechanical Engineering Problems
EE64 Automatic Control
Non-technical Elective

ME51 GENERAL THERMODYNAMICS.

An introduction to thermodynamics using the information theory approach to statistical mechanics. The thermodynamic systems discussed are sufficiently broad to include the solid, liquid, vapor, or gaseous state of the matter contained therein.

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

Prerequisite: Mathematics 11, or equivalent.

ME52 ADVANCED THERMODYNAMICS.

An extension of the laws of thermodynamics to cyclic processes encountered by mechanical engineers.

Four class periods per week.

Prerequisite: ME51. General Thermodynamics.

ME53 HEAT TRANSFER.

A course presenting a basic introduction to the field of engineering heat transfer. The problems analyzed are in the area of conduction, radiation, and convection in both steady and transient state conditions.

Four class periods per week.

Prerequisite: ME51 General Thermodynamics, and EE55 Engineering Analysis.

ME54 FLUID MECHANICS.

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 General Thermodynamics.

ME55 ADVANCED FLUID MECHANICS.

Extension of ME54. Theory of fluid mechanics in turbomachinery, jets, lubrication; fluid dynamics leading to Navier-Stokes equation, Euler's equation, potential flow theory; boundary layer theory and drag on immersed bodies; one dimensional compressible flow.

Four class periods per week.

Prerequisites: ME54 Fluid Mechanics, EE55 Engineering Analysis.

ME62 ADVANCED STRENGTH OF MATERIALS.

Review of stress and strain leading to equilibrium equations and generalized Hooke's Law; disks and cylinders; torsion; beams on elastic foundations; energy methods; theories of failure under stress; influence of stress concentration and working stresses; theory of stability.

Four class periods per week.

Prerequisites: CE51 Mechanics III, EE55 Engineering Analysis.

ME63 ENGINEERING DESIGN I.

A study of the analysis and synthesis of the elements of a machine. Machine vibrations from a lumped parameter point of view are studied.

Four class periods per week.

Prerequisite: ME62 Advanced Strength of Materials.

ME64 ENGINEERING DESIGN II.

Rigid body dynamics leading to a discussion of the gyroscope are developed in vector form. Formulation of dynamic problems is developed by means of Lagrange Equations and Hamilton's Principle. A study of the vibration of distributed systems for both free and forced systems completes the course.

Four class periods per week.

Prerequisite: ME63 Engineering Design I.

ME66 MECHANICAL ENGINEERING PROBLEMS.

The study of a group of selected problems in Mechanical Engineering by analytical and experimental means. An attempt is made to integrate the analytical and experimental approach by work in the laboratory.

Two three-hour meetings per week.

Prerequisite: ME63 Engineering Design I.

ME71 MECHANICAL ENGINEERING THESIS.

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

English Literature

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

ASSOCIATE PROFESSORS: DAVID COWDEN
DANIEL G. HOFFMAN
SAMUEL L. HYNES
FREDRIC KLEES

ASSISTANT PROFESSOR: STEPHEN J. BROWN

INSTRUCTOR: THOMAS H. BLACKBURN

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

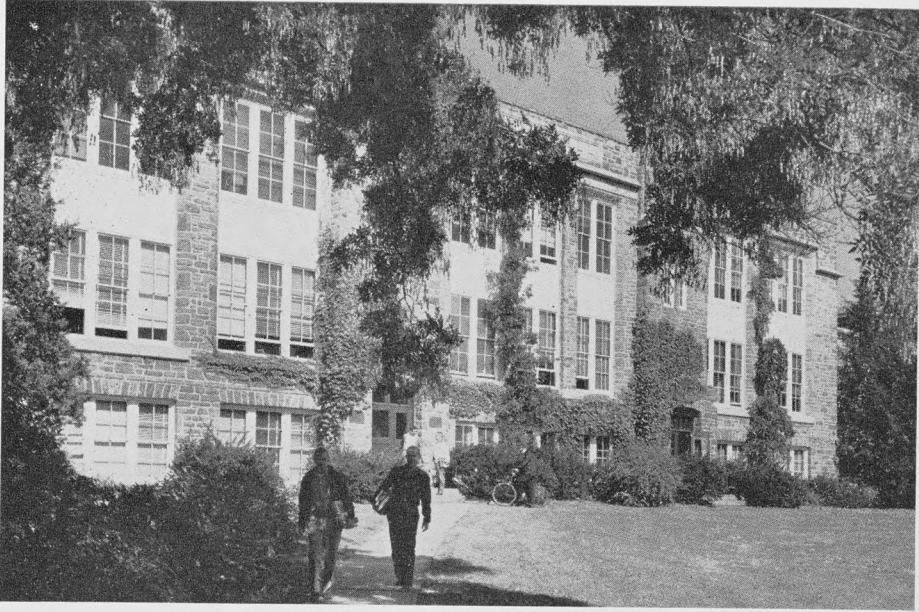
The work of the major in course consists of at least eight semester courses in the department. It is recommended that majors take The Development of English Literature (3-4) in the freshman year, one of the type courses (21-26) during the sophomore year, Chaucer or Milton in the junior year, and Shakespeare and Problems of Literary Study in the final year. The comprehensive examination at the end of the senior year is based on this body of work, but also includes questions on other courses offered by the department for those prepared in those fields.

COURSES

1. INTRODUCTION TO LITERARY STUDY. Staff. *Each semester*
An examination of the principal types of literature.
This course is not open to students who elect 3-4. Either 1 or 3-4 is prerequisite to all other literature courses offered by the department.
- 3-4. THE DEVELOPMENT OF ENGLISH LITERATURE. Staff. *Full course*
An introduction to literary study by means of the traditional materials of English literature from the Renaissance to the twentieth century.
Recommended for English majors; not open to students taking course 1.



Friends Meeting House



Hicks Hall, an Engineering Building



Commencement in the Arthur Hoyt Scott Auditorium

5, 6. ENGLISH FOR FOREIGN STUDENTS.

Individual and group work on an advanced level for students from non-English backgrounds.

10. WRITING AND SPEAKING. Staff. *Each semester*

Analysis, organization, and effective presentation of complex subject matter in both speech and writing. Open only to students for whom the course is a requirement or for whom it is recommended by their advisers.

12. THE SEVENTEENTH CENTURY. Mr. Blackburn. *Spring semester*

Study of the major literary currents and figures of the period.

14. THE EIGHTEENTH CENTURY. *Spring semester*

The developing sensibility and literary forms of the period.

16. THE ROMANTIC PERIOD. Mrs. Wright. *Spring semester*

Studies in poetry, the novel, and the essay from about 1790 to 1820, with attention to the new materials and forms of romanticism.

18. VICTORIAN LITERATURE. Mr. Cowden. *Spring semester*

The important ideas and literary currents of the period.

NOTE: These four period courses are open in the spring of the freshman year to students who have taken course 1. The combination of one of these courses and course 1 will be considered as equivalent to 3-4 for students who wish to proceed to a major in the department.

21, 22. ENGLISH POETRY. Mrs. Wright.

A study of the development of English poetry from its beginnings, with consideration of the principles of poetic criticism and a detailed examination of the work of two or three poets. Primarily for sophomores.

23, 24. THE ENGLISH NOVEL. Mr. Cowden.

The first semester emphasizes the chronicle form of novel prevalent from Fielding to Trollope; the second semester emphasizes developments in technique and content since Meredith. Credit is given for either semester, but students desiring both should take them in regular sequence. Primarily for sophomores.

25. COMEDY. Mr. Klees. *Fall semester*

Dramatic comedy in its various forms, with particular attention to the Elizabethan, Restoration, and modern periods. Primarily for sophomores.

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. Primarily for sophomores.

42. SHAKESPEARE. Staff. *Each semester*

A study of the major plays. Not open to freshmen or to majors in course.

51, 52. LITERATURE IN AMERICA. Mr. Hoffman.

A study of the major American writers from Puritan times to the early 20th century. Open to juniors and seniors.

53. RENAISSANCE COMPARATIVE LITERATURE. *Fall semester*

Emphasis on the assimilation of the classical tradition by English and other European literatures during the Renaissance. Open to juniors and seniors.

54. MODERN COMPARATIVE LITERATURE. Mr. Becker. *Spring semester*

The rise and decline of the realistic movement as seen through the study of European and American works since Flaubert. Open to juniors and seniors.

55. CHAUCER. Mr. Klees.

Fall 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. Open to juniors and seniors.

56. MILTON. Mr. Blackburn.

Spring semester

Study of the main body of Milton's works with particular emphasis on *Paradise Lost*. Open to juniors and seniors.

58. SPECIAL TOPICS. Staff.

From time to time intensive courses will be offered in fields not covered by the regular program. Open only to juniors and seniors.

61-62. SHAKESPEARE. Staff.

Fall semester

A study of the complete works of Shakespeare, tracing the development of his craftsmanship and ideas. Required of majors in the department, who meet weekly in small groups during the first semester of the senior year. Students should read through the plays before taking the course.

64. PROBLEMS OF LITERARY STUDY. Staff.

Spring semester

Group meetings of departmental majors in the second semester of the senior year to review, integrate, and supplement their major programs. Under exceptional circumstances a student who has made application by November 15 of his senior year may be allowed to substitute a thesis, which will receive double credit.

HONORS WORK

Prerequisites: The course requirements for a major in Honors are the same as for a major in course, either *The Development of English Literature* (3-4) or *Introduction to Literary Study* (1) and one of the period courses (12, 14, 16, 18).

The election of one or two additional courses in the sophomore year is highly recommended.

For acceptance as a minor in the department, two semester courses are required.

Program: Majors in Honors must take four seminars in the department, one of which must be Chaucer, Shakespeare, or Milton. Minors in Honors may enroll in any two or three seminars which seem best suited to the purposes of their whole program. No student may take more than two seminars in Group II.

Seminars: The following seminars prepare for examination for a degree with Honors:

Group I

101. SHAKESPEARE. Staff.

Each semester

A study of Shakespeare as dramatist and poet. The emphasis is on the major plays, with a more rapid reading of the remainder of the canon. Students are advised to read through all the plays before entering the seminar.

103. CHAUCER. Mr. Klees.

Fall semester

A reading of Chaucer's poems in the original Middle English, with particular attention to *Troilus and Criseyde* and *The Canterbury Tales*.

104. MILTON.

Spring semester

An examination of the poetic achievement of John Milton.

106. DRAMA. Mr. Brown and Mr. Klees.

Spring semester

A study of comedy and tragedy in the Greek, Elizabethan, and modern periods with a consideration of the various forms these types take from one age to another.

108. RENAISSANCE POETRY. Mrs. Wright. *Spring semester*
The basic elements of poetic expression, thought, imagery, and sound, are studied in poems from the Spenserian and Metaphysical strains.

109. THE ENGLISH AUGUSTANS. *Fall semester*
The interests, sensibility, and literary practice of such figures as Dryden, Swift, Pope, Fielding, Johnson.

Group II

111. ROMANTICISM. *Fall semester*
A study of the romantic movement in England. The concentration will be on the five major poets, but some attention will also be given to critical theory and the varieties of prose expression.

113. THE NOVEL. Mrs. Wright and Mr. Cowden.
a. Changing Forms in the Modern English Novel: A study of basic forms, with reading of novels outside the Victorian tradition, 1850-1950. Mrs. Wright. *Fall semester.*
b. Studies in Four Novelists: James, Conrad, Joyce, and Woolf. Mr. Cowden. *Spring semester.*

115. 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.

116. PROBLEMS IN AMERICAN LITERATURE. Mr. Hoffman. *Fall semester*
A study of the themes, forms and aesthetic premises of selected writings, and their relations to the cultural situations in which they were created.

118. MODERN POETRY. Mr. Hynes and Mr. Hoffman. *Spring semester*
A study of the modern tradition in English and American poetry from Yeats to the present. The seminar will concentrate on the work of a few major poets.

119. SPECIAL TOPICS IN LITERATURE. Staff.
Occasional seminars will be given in special fields not part of the regular program.

120. THESIS.
A major in Honors may elect to write a thesis as a substitute for one seminar. He must select his topic and submit his plan of work for departmental approval by the end of the junior year. Then during one semester of the senior year he writes his thesis under the direction of a member of the department, with whom he has periodic consultations.

Fine Arts

PROFESSORS: ROBERT M. WALKER, *Chairman*
HEDLEY H. RHYS

INSTRUCTOR: JOHN W. WILLIAMS

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 develop technical skills, 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. This requirement must be fulfilled before the Junior year. For other students the prerequisite for all other 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 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. Walker and Mr. Williams. *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.

2. INTRODUCTION TO ART HISTORY. Mr. Rhys and Mr. Williams. *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 special. 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 the ancient civilizations of Greece and Rome.
52. MEDIEVAL ART. Mr. Williams. *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. Williams. *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.
54. NORTHERN RENAISSANCE ART. Mr. Walker. *Fall semester*
 Developments in painting and the graphic arts of drawing and print making during the fifteenth and sixteenth centuries in England, France, the Netherlands, Germany, and Spain through the study of individual artists such as Jan van Eyck, Roger van der Weyden, Jean Fouquet, Albrecht Dürer, Grünewald, Holbein, Peter Bruegel, Jerome Bosch and El Greco.
55. BAROQUE ART. Mr. Rhys. *Spring semester*
 The characteristics of art in the seventeenth century in Italy, France, Flanders, Holland, and Spain. Special emphasis is given to the paintings of such masters as Caravaggio, Poussin, Rubens, Rembrandt, El Greco, and Velasquez.
 Not offered in 1962-63.
56. 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.
57. 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.
 Not offered in 1962-63.
58. MODERN ARCHITECTURE. 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 or 2 is waived for students in Engineering.

60-61. SENIOR CONFERENCE. Mr. Walker.

Spring semester

HONORS SEMINARS

100. ANCIENT ART. Mr. Walker.

Fall semester

Classical Greek art and architecture within the art historical context of ancient civilizations of the Near East.

101. MEDIEVAL ART. Mr. Williams.

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.

102. ITALIAN RENAISSANCE PAINTING. Mr. Williams.

Spring 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.

103. NORTHERN RENAISSANCE PAINTING. Mr. Walker.

Spring semester

Developments in painting and the graphic arts of drawing and print making during the fifteenth and sixteenth centuries 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.

104. THE BAROQUE. Mr. Rhys.

Fall semester

The formation of the Baroque in Italy and its development as an international style in Western Europe. Some consideration is given to architecture and sculpture in Italy, but the primary orientation is toward painting, especially the work of such masters as Caravaggio, Poussin, Rubens, Rembrandt, and Velasquez.

105. 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.

106. 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*

PAUL H. BEIK

JAMES A. FIELD, JR. ‡

LAURENCE D. LAFORE *

FREDERICK B. TOLLES

ASSISTANT PROFESSORS: ROBERT C. BANNISTER

R. ARNOLD RICKS

HARRISON M. WRIGHT

INSTRUCTOR: JEAN H. KOPYTOFF

LECTURERS: F. HILARY CONROY

DAVID HERLIHY

PHILIP R. MARSHALL

The first course introduces the student to the past, not only of the western tradition but of various parts of the world which have come to share the same heritage since the beginning of the expansion of Europe, and also introduces the student to the methods of the historian and the uses of a knowledge of history. The other courses in the department, particularly at the sophomore level, treat more fully our heritage from England and offer a choice among various aspects of the history of America, and among approaches to an understanding of other parts of the world. The courses open chiefly to juniors and seniors expand certain of the topics introduced in History 1-2. The Honors program is planned for different objectives as well as different methods from the Course program.

REQUIREMENTS AND RECOMMENDATIONS

FOR MAJORS AND MINORS

History 1-2 should be taken in the freshman year, if possible, followed in the sophomore year, if there is room in the individual's program, by a choice of two of the following: (1) one semester of American history, (2) England, and (3) either Russia, the Expansion of Europe, or The Other American Republics. For the major, carefully 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. The minimum requirement for acceptance as a major in history at the beginning of the junior year is successful completion of History 1-2. 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.

The work of the major in Course consists of at least eight half courses in the department, including History 1-2, a half course in American history, a half course in English history, and Special Topics. The comprehensive examination is based on the fields covered in these courses and also includes questions on the other courses offered by the department. 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. 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, 1962-63.

* Absent on leave, fall semester, 1962-63.

Students intending to do graduate work in history should bear in mind that the languages usually required by graduate schools are French and German.

COURSES

- 1-2. INTRODUCTION TO HISTORY. All members of the department. *Full course*
One of the basic courses in the curriculum. It is an introduction to the study, understanding, and use of history for those who do not plan to take any more courses in history as well as for those who do. It is a prerequisite to all other work in history except courses 4, 5, 12, 13, and 61. The historical problems selected for discussion follow in general in chronological order, from classical antiquity to the mid-twentieth century, centered on the history of Europe. Sections are small enough for discussion.
3. ENGLAND. Miss Albertson.
A survey of the history of the English people.
4. THE UNITED STATES TO 1877. Mr. Bannister or Mr. Field.
The colonial experience; independence, a new society, and a new government; transcontinental expansion and the struggle between North and South. Not open to freshmen.
5. THE UNITED STATES SINCE 1877. Mr. Bannister or Mr. Field.
Industrialism and its consequences; the United States as a great power; the problems of a shrinking world. Not open to freshmen.
6. AMERICAN INTELLECTUAL HISTORY BEFORE 1865. Mr. Tolles.
The history of ideas in the United States from the colonial period through the middle of the nineteenth century. A general knowledge of the political and social history of the period is assumed.
7. AMERICAN INTELLECTUAL HISTORY AFTER 1865. Mr. Bannister.
The history of ideas in the United States from the middle of the nineteenth century to the present time. A general knowledge of the political and social history of the period is assumed.
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.
Not offered in 1962-63.
12. THE FAR EAST. Mr. Conroy.
From the mid-nineteenth century to the present.
13. THE FAR EAST.
The traditional civilization of East Asia, particularly China.
Not offered in 1962-63.
14. RUSSIA. Mr. Beik.
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. Wright.
A survey of the origins and character of European overseas expansion and the impact on non-European societies, with a comparative study of selected areas and times.

The following courses are open to sophomores on written approval by the chairman of the department.

52. MODERN BRITAIN. Mr. Lafore.

The development of a modern industrial society and welfare state.

Not offered in 1962-63.

53. THE FRENCH REVOLUTION AND NAPOLEON. Mr. Beik.

The significance of the period of 1789 to 1815 in the development of modern European social theories and political institutions.

Not offered in 1962-63.

54. MEDIEVAL EUROPE.

European and Mediterranean history from the disintegration of the Roman Empire to about 1300, with special emphasis on western Europe.

Not offered in 1962-63.

55. THE RENAISSANCE AND REFORMATION. Miss Albertson.

Topics in the history of western Europe from the fourteenth through the seventeenth century.

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.

Not offered in 1962-63.

57. MODERN EUROPE. Members of the department.

Recent European problems and institutions examined primarily through the experiences of one nation in the nineteenth and twentieth centuries. In 1962-63 the nations studied will be Germany and France. Mr. Ricks and Mr. Beik.

58. HISTORY OF IDEAS. Members of the department.

Aspects of intellectual history. (For American intellectual history see courses 6 and 7.)

Not offered in 1962-63.

60. AFRICA. Mr. Wright.

Aspects of the history and civilization of Africa. The emphasis is on tropical Africa in modern times.

61. 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.

Not offered in 1962-63.

65, 66. SPECIAL TOPICS.

For seniors. Individual programs are planned to prepare majors in history for the comprehensive examination. The discussion of review problems, of papers, and of reading is conducted in group meetings supplemented by individual conferences with members of the department. This may be elected as a single one-semester course or as a double one-semester course. Time is allowed for optional reading and research. The second credit (66) is usually given for a Course thesis.

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 without regard to chronological order. History 1-2 is a prerequisite to all seminars. In addition, for seminars 101, 102, and 103 some preliminary reading is required if neither course 4 nor course 5 has been elected.

Those who wish to specialize in international relations with a major in history (see p. 107, last paragraph) should include in their programs at least three of the following seminars: numbers 103, 110, 116, 117.

101. EARLY AMERICAN HISTORY. Mr. Tolles.
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. Bannister or Mr. Field.
Selected topics in the history of the United States.
103. PROBLEMS IN AMERICAN HISTORY: FOREIGN. Mr. Field.
The United States in the world community; a study of the evolution since 1776 of the American policies toward Europe, Latin America, and the Orient, with emphasis on ideological, economic, and strategic developments.
106. MEDIEVAL ENGLAND. Miss Albertson.
Aspects of English life and institutions from the Norman conquest through the Wars of the Roses.
107. TUDOR AND STUART ENGLAND. Miss Albertson.
The English Renaissance and Reformation, constitutional theory, the Civil War, and the Restoration. The emphasis will be on the history of the seventeenth century with its European background.
109. ENGLAND SINCE 1785. Mr. Lafore.
The rise of the first modern industrial state. Its social, political, and economic problems.
110. THE BRITISH EMPIRE. Mrs. Kopytoff or Mr. Wright.
Selected areas of the empire and commonwealth from 1750 to the present, with special reference to the history and problems of Canada, Australia, India, South Africa, and tropical Africa.
111. MEDIEVAL EUROPE. Mr. Herlihy.
The making and expansion of Western Europe from Charlemagne to the twelfth century.
112. THE RENAISSANCE AND REFORMATION. Miss Albertson.
The period of the Renaissance and the Reformation in continental Europe.
114. EUROPE 1760 TO 1870. Mr. Beik.
The disintegration of the old regime and the rise of liberalism.
115. EUROPE 1870 TO 1939. Mr. Lafore, Mr. Marshall, or Mr. Ricks.
Political and social changes which preceded the second world war in western continental Europe.
116. DIPLOMATIC HISTORY OF EUROPE. Mr. Lafore.
The management of international affairs and problems since 1870.
117. EASTERN EUROPE. Mr. Beik.
The origins and consequences of the Russian Revolution and the development of the Soviet zone in East Central Europe.
120. THESIS.
A thesis may be substituted for one of the Honors examinations by permission of the department. The topic should be selected and approved by the end of the junior year. The thesis must be completed during the first semester 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 pp. 62-63.

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 12. THE FAR EAST
- History 14. RUSSIA
- History 15. THE EXPANSION OF EUROPE
- History 60. AFRICA

Group III

- Political Science 15. COMPARATIVE GOVERNMENT
- Political Science 19. THE SOVIET SYSTEM
- Political Science 20. ASIAN POLITICAL SYSTEMS
- Political Science 55. 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 PROFESSORS: PHILIP W. CARRUTH

DAVID ROSEN

RALPH L. SHIVELY

INSTRUCTORS: STEVENS HECKSCHER

DOROTHY W. WOLFE

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 the social sciences.

For students who intend to major in mathematics in course, the normal sequence of courses is the following: Freshman year, courses 3-4 or 5-6; Sophomore year, courses 11, 12 or 15, 16; Junior and Senior years, courses 13, 14, 51, 52, 55, these are required of all majors in course. 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 11, 12 or 15, 16. 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 I and II or the seminar in Advanced Analysis; these seminars are offered each year. The remaining seminars are usually taken by senior students and are offered as they are required.

1-2. INTRODUCTION TO MATHEMATICS.

Full course

The purpose of this course is to acquaint the student with some of the principles and fundamental concepts of mathematics. The main topics for study will be an introduction to logic and sets, linear algebra, the basic ideas of the calculus, with probability theory and statistics as an application. Pertinent topics from algebra and trigonometry will be studied as needed. The course is designed as a terminal course in mathematics and cannot be used as a prerequisite for any course offered by the Department of Mathematics.

3-4. FIRST YEAR MATHEMATICS.

Full course

The subject matter of this course consist of calculus combined with appropriate material from analytic geometry. This course, or course 5-6, should be taken by students intending to do their major work in mathematics, the physical sciences, or engineering.

5-6. FIRST YEAR MATHEMATICS. (Advanced Course).

Full course

This course is intended for students with superior preparation in mathematics. Permission to enroll in it must be obtained from the chairman of the department. The subject matter studied is calculus combined with certain topics from analytic geometry.

11, 12. CALCULUS.

Full course

In this course the student continues the study of the calculus begun in Mathematics 3-4; certain topics from algebra and analytic geometry are also included. The course or course 15, 16 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.

Prerequisite: Courses 3-4; these courses must be passed with a grade of C or better.

13. HIGHER GEOMETRY.

Spring 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. This course is not open to freshmen except by special permission.

14. HIGHER ALGEBRA.

Fall semester

The subject matter of this course consists of various topics of modern algebra, such as groups, vector spaces, and the algebra of linear transformations and matrices. This course is not open to freshmen except by special permission.

15, 16. CALCULUS (Advanced Course).

This course follows Mathematics 5-6 and continues the work in calculus as begun there.

Prerequisite: Courses 5-6; these courses must be passed with a grade of C or better.

51. ADVANCED ANALYSIS I.

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 11, 12 or 15, 16; these courses must be passed with a grade of C or better.

52. ADVANCED ANALYSIS II.

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 11, 12, or 15, 16, 51.

54. PROBABILITY AND STATISTICS.

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 11, 12, or 15, 16, 51 (Course 51 may be taken concurrently).

55. SENIOR CONFERENCE.

Spring semester

A weekly meeting held for the purpose of integrating and supplementing the course program of majors in this department. It is required of all majors in the course program.

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.

HONORS SEMINARS

101. ADVANCED CALCULUS I.

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. ADVANCED CALCULUS II.

Spring semester

This seminar continues the study of the topics listed under the seminar in Advanced Calculus I. It also includes 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, and related topics.

103. ADVANCED ANALYSIS.

Fall semester

This seminar is planned for students who have mathematics as a minor and who wish to have just one seminar in analysis. It is part of the Honors Program in Engineering Sciences (see p. 87). Among the subjects studied are functions of several variables, infinite series, uniform convergence of infinite processes, Fourier series, differential equations of the first order, linear differential equations, Bessel functions.

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.

Prerequisites: Seminars 101 and 102.

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. THEORY OF FUNCTIONS OF A REAL VARIABLE.

This seminar is intended for students of some mathematical maturity, and will be an introduction to some material that is important in present-day mathematics. Topics covered will include axiomatic set theory, topological and metric spaces, measure theory, topological groups, and elements of the theory of Banach and Hilbert spaces.

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.

109. PROBABILITY AND STATISTICS.

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.

Modern Languages and Literatures

PROFESSORS: HAROLD MARCH, *Chairman* (French)

FRANZ H. MAUTNER (German)

JAMES D. SORBER (Spanish)

ASSOCIATE PROFESSORS: HILDE D. COHN (German)

FRÉDÉRIC J. GROVER (French)

ASSISTANT PROFESSORS: ELISA ASENSIO (Spanish)

GEORGE C. AVERY (German)

OLGA LANG (Russian)

JEAN ASHMEAD PERKINS (French)

ROBERT A. PICKEN (French)

INSTRUCTORS: THOMPSON BRADLEY (Russian)

ANNIE-CLAUDE DURRBACH DOBBS (French)

LECTURERS: ALBERT R. SCHMITT (German)

FRANKLIN C. SOUTHWORTH (Linguistics)

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. Literature courses listed in the separate sections are conducted in the language concerned, 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 possible with some extra reading, to major or to enter honors seminars in a language started in college, but elementary and intermediate courses (numbered 1 to 4) do not count toward the minimum of eight half courses required of a major.

Prerequisites and recommended subjects for majors are noted under the listing of each language section.

MODERN LANGUAGE COURSE (conducted in English)

13. MEDIEVAL COMPARATIVE LITERATURE.

The tension between ideals and their realization as reflected in the literature of the Middle Ages.

MODERN LANGUAGE SEMINAR (conducted in English)

130. LINGUISTICS.

I. The basic techniques of descriptive linguistics (phonology, morphology, syntax) with emphasis on their application to languages known to the participants; II. The methods and results of historical-comparative language study; other topics (such as language typology, translation problems, semantics, language and culture, histories of linguistics) may be covered, depending on time and students' interests.

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 or 12 Introduction to Literature, or evidence of equivalent work.
- French 6 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: Not all advanced courses are 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 and for those who have had only one year in high school. 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.

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 in the fall semester.)

5. ADVANCED COMPOSITION.

Problems of syntax, stylistics, and translation.

6. ADVANCED COMPOSITION AND DICTION.

For those who intend to major in French or who wish an advanced linguistic course. An effort is made to correct faulty pronunciation and to improve self-expression in the language, both oral and written.

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. (Offered each semester.)

In Course 12 the treatment is more historical with selected readings from Rabelais to Rousseau. (Offered spring semester.)

15, 16. LE DÉVELOPPEMENT DE L'IDÉE CLASSIQUE, 1549—1715.

Course 15, French Literature from the Renaissance through the Baroque period (the Pléiade, Montaigne, Malherbe, Corneille, Descartes, Pascal).

Course 16, a study of Classicism and its ultimate decline (La Fontaine, Boileau, Molière, Racine, La Bruyère, Saint-Simon and others).

17. 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.

18. LE ROMAN AU 17^e ET 18^e SIÈCLES.

Selected novels before Balzac.

19. ROMAN MODERNE.

Important novels from Balzac to the early twentieth century, including such authors as Balzac, Stendhal, Flaubert, Zola, Gide, Proust.

20. ROMAN CONTEMPORAIN.

Representative novels from 1920 to the present.

21. THÉÂTRE MODERNE.

The theater since the classic period.

22. POÉSIE LYRIQUE.

Lyric poetry from Villon, with emphasis on the modern period.

52. 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 ÂGE.

Old French readings in lyric poetry, theater and fiction.

101. PASCAL ET MONTAIGNE.

102. LE THÉÂTRE CLASSIQUE.

Corneille, Racine, Molière.

103. L'ÂGE DES LUMIÈRES.

The "Philosophes," the theater and the novel of the eighteenth century.

104. BALZAC, STENDHAL, FLAUBERT.

105. PROUST.

106. POÉSIE MODERNE.

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

108. LE ROMAN DU 20^e SIÈCLE.

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

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. As far as possible, German is the language of the classroom, with the exception of German 7-8.

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 or 12. Introduction to German Literature or equivalent work.

Recommended supporting subjects:

Courses in other literatures, History of Philosophy and of Germany, Fine Arts.

NOTE: Majors are expected to speak German with sufficient fluency to take part in discussion in courses and seminars in the language and to pass oral examinations in German. 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.

COURSES

1-2. ELEMENTARY GERMAN.

For students who begin German in college. Equivalent to two years' German in secondary school. Fundamentals of grammar; easy literary prose.

NOTE: German 2 is usually also offered in the fall semester for students not ready for German 3.

3. INTERMEDIATE GERMAN.

Prerequisite: German 1-2 or its equivalent. Narrative and expository prose of moderate difficulty such as Hesse: *Knulp*; Schweitzer: *Leben und Denken*. Review grammar.

4. INTERMEDIATE GERMAN.

Fulfills the college requirement. Literary narrative, drama, poetry, expository prose of greater difficulty, conversation.

Prerequisite: German 3 or equivalent.

6. WRITING AND SPEAKING GERMAN.

Composition and conversation in connection with contemporary literature.

Prerequisite: Course 3-4 or equivalent.

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

A special course designed for those who wish to acquire only a reading knowledge of German. German 7-8 may be used to fulfill the requirements of certain departments or of graduate schools, but not the college foreign language requirement.

11, 12. INTRODUCTION TO GERMAN LITERATURE.

A study of representative German dramas, *Novellen*, and lyric poems. Discussion, papers. Not a survey course.

Prerequisite: German 4 or equivalent.

Course 11 deals mainly with 19th and 20th century authors, course 12 with the classical period.

13. DIE GOETHE-ZEIT.

The most significant works of Goethe, Schiller, and their contemporaries.

14. GOETHE'S FAUST, ERSTER UND ZWEITER TEIL.
An intensive study of *Faust, I and II*. Also for students who only know *Faust, Part One*.
15. DIE DEUTSCHE ROMANTIK.
An introductory study of the Romantic movement in Germany, with readings from representative authors such as Novalis, Tieck, Arnim, Brentano, Eichendorff.
16. DIE DEUTSCHE NOVELLE SEIT GOETHE.
A study of significant examples of this typically German genre. Authors: Goethe, Eichendorff, Kleist, Stifter, Keller, Meyer, Storm, Thomas Mann, and contemporary writers.
17. MODERNE DEUTSCHE LITERATUR.
A study of leading German writers of the twentieth century, including Hauptmann, Thomas Mann, Rilke, Hofmannsthal, Kafka.
18. DIE DEUTSCHE LYRIK.
A study of German poetry through the ages. The interrelation of form and "contents." Reading will include, among others, Goethe, Schiller, Hölderlin, Eichendorff, Heine, Mörike, Meyer, George, Rilke, and contemporary poets.
20. DIE DEUTSCHE KOMÖDIE.
Outstanding comedies from Goethe to the present time will be studied in their own right, as examples of the *genre*, and as illustrations of German intellectual history.
51. SPECIAL TOPICS.
Readings selected to fit the specific needs of students with an advanced knowledge of the German language. Not designed to prepare for any specific type of comprehensive examination.

HONORS SEMINARS

101. LITERATUR DES MITTELALTERS.
Elements of Middle High German grammar as introduction. A study of mediaeval epics and other poetry, especially *Nibelungenlied*, *Parzival*, *Tristan*, *Minnesang*, and Walther von der Vogelweide.
103. DEUTSCHES BAROCK UND AUFKLAERUNG.
A study of German literature in the seventeenth and early eighteenth centuries. The lyric poetry of the period, the mysticism of Angelus Silesius and Jakob Böhme, the plays of Gryphius, and the prose of Grimmelshausen; a study of Lessing.
104. GOETHE.
Goethe's most significant works and his rôle in German intellectual history will be studied.
105. DIE DEUTSCHE ROMANTIK.
Romanticism as the dominant movement in German literature and thinking of the first third of the nineteenth century.
106. "BIEDERMEIER" UND "REALISMUS."
Studies in the works of Grillparzer, Stifter, Heibel, Keller, Meyer, and Storm.
107. DEUTSCHE LITERATUR SEIT 1900.
The chief writers from naturalism to expressionism: Hauptmann's dramas; Thomas Mann's prose; Rilke's poetry; Hofmannsthal's prose and poetry; Kafka; Brecht.

108. DAS DEUTSCHE DRAMA.

Representative examples of the dramatic genre in German literature from the end of the 18th century to the present.

109. DIE DEUTSCHE LYRIK.

Studies in German poetry. Methods and problems of interpretation.

Russian

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. 142).

1-2. ELEMENTARY RUSSIAN.

Full course

Designed to familiarize the beginner with the essentials of the spoken and written language. Fundamentals of grammar and reading of easy literary prose.

3, 4. INTERMEDIATE RUSSIAN.

Readings in Russian classical literature: Pushkin, Lermontov, Gogol, Tolstoy, Tur-Short Russian area study: geography, history, constitution. Translations from Russian fiction and periodicals. Review of grammar. Conversation. Reports. Composition. Conducted in Russian.

Prerequisite: Russian 1-2 or its equivalent.

11, 12. INTRODUCTION TO LITERATURE.

Readings in Russian classical literature: Pushkin, Lermontov, Gogol, Tolstoy, Turgenyev, Dostoyevsky, Chekhov. Study of these writers' biographies and their political and social backgrounds. Intensive work in translation and composition. Advanced conversation. Conducted in Russian.

Prerequisite: Russian 3, 4 or its equivalent.

HONORS SEMINARS

101. TOLSTOY.

102. CHEKHOV AND GORKY.

Spanish

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 Marmol 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.)

17. LA POESIA EN EL SIGLO XX.

A study of the major poets of Spain and Latin America since *modernismo*.

18. LA NOVELA EN EL SIGLO XX.

A study of the major novelists since the Spanish Civil War.

19. POESIA, TEATRO Y NOVELA DEL SIGLO DE ORO.

Representative authors of the Siglo de Oro, excluding Cervantes.

52. 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 EN EL SIGLO XX.

103. LAS OBRAS DE CERVANTES.

104. EL TEATRO MODERNO.

105. POESIA, TEATRO Y NOVELA DEL SIGLO DE ORO.

106. LA POESIA EN EL SIGLO XX.

107. LA LITERATURA DE LA EDAD MEDIA.

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

ASSOCIATE PROFESSOR: PETER GRAM SWING, *Chairman*

ASSISTANT PROFESSOR: CLAUDIO SPIES ‡

INSTRUCTOR: JOSÉ SEREBRIER

LECTURER: ALVIN H. JOHNSON

ASSISTANT: CARL R. BERKY

The study of music as a liberal art requires an integrated approach to theory, history and performance, experience in all three fields being essential to the understanding of music as an artistic and intellectual achievement. Theory courses and seminars train the student to handle musical materials, to hear and comprehend modes of organization in actual compositions and to evolve methods in musical analysis. History courses and seminars trace the development of these modes of organization in historical time, exploring relationships with modes of organization found in other arts and realms of thought. Performance is assumed as part of the training in hearing and comprehending music, thus as an element in the academic program. While the Department does not give course credit for instruction in performing on instruments and/or singing, it encourages its students to develop performing skills through private study and through participation in the chorus and orchestra, both of which are conducted by members of the Department.

Students wishing to combine instrumental or vocal studies outside the College with their academic curriculum at Swarthmore can, with special permission from the Department and the Dean, elect a five-year plan, thus reducing the normal number of courses to be taken per semester.

REQUIREMENTS FOR MAJORS AND MINORS

Music 11-12 is prerequisite for acceptance as a major. All majors will take three full courses in Theory and four half courses (or the equivalent in seminars) in History. Music 1, 2 can be counted towards meeting the History requirement. A major who does not take Music 1, 2 will include both Music 151 and Music 152 in his program.

Majors in Honors: A major in honors will normally take four examinations in music. He will take Music 61-62 in course, preferably in the junior year, in preparation for an honors examination on the material covered.

Minors in Honors: A minor in honors will normally take two examinations in music. Music 11-12 (or the equivalent) is prerequisite for all History seminars; Music 1 or 2 is strongly recommended.

Language Requirements for Graduate Schools: Students are advised that graduate work in music requires a reading knowledge of French and German. A reading knowledge of Latin is also desirable for students planning to do graduate work in musicology.

Instrumental proficiency: All majors in music will be expected to play the piano well enough to perform at sight a two-part invention of J. S. Bach and a first movement of an easy late 18th or early 19th century sonata. By the end of the junior year they should be able to read chamber music scores as well as vocal music in four clefs. Stu-

‡ Absent on leave, 1962-63.

dents with exceptional proficiency in an instrument other than the piano or in singing will not be expected to meet the performing standards of pianists.

THEORY AND COMPOSITION

11-12. FIRST YEAR THEORY. Mr. Serebrier.

Full course

A course in elementary Harmony. Emphasis will be placed on written exercises along with ear-training, dictation and keyboard harmony. Frequent reference will be made to a variety of keyboard and chamber compositions which will be carefully analysed.

13-14. SECOND YEAR THEORY. Mr. Serebrier.

Full course

A course in Counterpoint, offering training in Modal Counterpoint with reference to sixteenth-century practice, and in Tonal Counterpoint with specific reference to the style of J. S. Bach. Students will be required to submit exercises at regular intervals. Toward the end of the course they will compose several two-part Inventions. In addition to exercises there will be analyses of a variety of compositions for vocal and instrumental media.

61-62. THIRD YEAR THEORY. Staff.

Full course

Advanced work in theory covering specialized areas of Harmony, Counterpoint and analysis.

Prerequisite: Music 11-12, Music 13-14.

HONORS SEMINARS

163. ADVANCED THEORY.

181. COMPOSITION.

Offered as a tutorial to qualified students. Prerequisite: Music 62.

HISTORY OF MUSIC

1, 2. INTRODUCTION TO THE HISTORY OF MUSIC. Mr. Swing.

The study of a basic repertory of compositions within the historical context of the eras in which they were written, with emphasis on training in listening and analysis. The first semester deals with music to 1750, the second semester with music from 1750 to the present. Open to all students.

20. VOCAL MUSIC. Mr. Johnson.

Fall semester

A study of selected compositions from the Middle Ages to the present, considering style and form as related to problems of text-setting and contemporary esthetic doctrine.

Prerequisite: One of the following: Music 1, Music 2, Music 12.

27. J. S. BACH. Mr. Swing.

Spring semester

A study of representative works, including the Mass in B Minor and the St. Matthew Passion.

Prerequisite: Music 1, or the equivalent.

HONORS SEMINARS

128. W. A. MOZART. Mr. Swing.

Fall semester

A study of representative works in the light of modern style criticism. A reading knowledge of French or German is desirable.

132. HISTORY OF THE STRING QUARTET. Mr. Swing. *Spring semester*
 This seminar traces the development of the string quartet from the middle of the 18th century to the present through study of selected quartets by Haydn, Mozart, Beethoven, Schubert, Brahms, Bartók, and Webern.
 Not offered in 1962-63.
151. MEDIEVAL AND RENAISSANCE MUSIC. Mr. Swing. *Fall semester*
 An introduction to the study of music from the 9th century to the middle of the 16th century. Emphasis will be placed on analysis of selected compositions, related problems in performance practice, the function of music in the Catholic liturgy and the relationship of music to the thought and art of the times.
 Not offered in 1962-63; offered in 1963-64.
152. MUSIC IN THE BAROQUE ERA. Mr. Johnson. *Spring semester*
 A continuation of Music 151. The emergence of opera, oratorio and cantata in Italy and their dissemination over the Continent; the development of idiomatic instrumental music.
191. TUTORIAL. Staff.

Philosophy and Religion

PROFESSORS: RICHARD B. BRANDT, *Chairman*
MONROE C. BEARDSLEY †
JOHN M. MOORE

ASSISTANT PROFESSORS: JEROME A. SHAFFER
P. LINWOOD URBAN

INSTRUCTORS: JAEGWON KIM
LAWRENCE SKLAR

LECTURERS: MALCOLM L. DIAMOND
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. (Courses 25, 26 and 27 may be counted either as philosophy or as religion.) Philosophy majors in course must elect course 52 in their senior year.

1. INTRODUCTION TO PHILOSOPHY. The staff. *Each semester*

Several of the most important problems of philosophy, and alternative answers to them, are discussed. Typical examples are: the problem of free will, the arguments for the existence of God, the nature of logic and mathematics, the sources and kinds of knowledge, the justification of ethical judgments.

NOTE: Course 1 is a prerequisite for courses 11 through 27. 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.

† Absent on leave, spring semester, 1962-63.

11. **ETHICS.** Mr. Stott. *Each semester*
 A study of the principal theories about value and moral obligation, and of their justification. The emphasis is systematic, but works of leading ethical philosophers, both classical and contemporary, will be read as illustrations of the major theories.
12. **LOGIC.** Mr. Kim. *Fall semester*
 An introduction to deductive logic with some attention to the problems of inductive logic. The emphasis is on principles of logical inference in the propositional calculus and general quantification theory. Due attention will be given to practical applications of these principles. Other topics include: theory of definition, algebra of classes, the nature of axiomatic systems, and probability.
13. **SELECTED MODERN PHILOSOPHERS.** Mr. Shaffer. *Spring semester*
 The history of modern philosophy, with primary attention given to the problem of the foundations, scope and limits of human knowledge, as examined by Descartes, Locke, Berkeley, Hume and Kant.
14. **ANCIENT PHILOSOPHY.** *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.
15. **PHILOSOPHY OF SCIENCE.** Mr. Kim. *Spring semester*
 A study of the nature, scope, and limitations of scientific method and scientific explanations. This involves, on the one hand, a treatment of a number of particular logical problems such as the nature of laws, explanations, probability, and theories; and, on the other hand, some treatment of a number of particular scientific topics such as the definition of life, action at a distance, cosmology, the uncertainty principle, and evolution.
16. **CONTEMPORARY PROBLEMS.** Mr. Brandt and Mr. Shaffer. *Fall semester*
 A study of contemporary discussions of fundamental problems, such as the theory of meaning, the foundations of knowledge, the perception of physical objects, the nature of the self. Readings in the articles and books of major living philosophers, including Russell, Lewis, Ayer, and Ryle.
17. **AESTHETICS.** Mr. Beardsley. *Spring semester*
 A study of some problems that arise in describing, interpreting, and evaluating aesthetic objects, including literature, music and fine arts. Among these problems are the clarification of such terms as "form," "style," and "meaning," an examination of current attempts to subsume aesthetic objects under the general theory of signs, and the analysis of the reasoning by which value judgments about aesthetic objects are supported and defended.
18. **SOCIAL PHILOSOPHY.** Mr. Sklar. *Fall semester*
 A survey of the philosophical problems arising from the study of the history and behavior of human societies. Some examples are: the possible limitations on prediction and explanation, the methodological role of value-judgments, the idea of the society as more than its members, historical relativism, the concept of progress, objectivity, the sociology of knowledge, the justification of democracy.
19. **PHILOSOPHY OF RELIGION.** Mr. Diamond. *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.
20. **MEDIEVAL PHILOSOPHY.** Mr. Urban. *Spring semester*
 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, and Ockham. Although the primary emphasis will be historical, attention will be given to the contemporary relevance of medieval thought.

Not offered in 1962-63.

27. THEOLOGY AND ANALYTICAL PHILOSOPHY. Mr. Moore and Mr. Urban.

Spring semester

A study in the meaning and verification of religious statements, the concept of analogy, the nature of theological explanation, and the analytical critique of the arguments for the existence of God. Readings in the articles and books of contemporary thinkers, including Ayer, Flew, Hepburn, MacIntyre, Toulmin and Zuurdeeg. The course will consider both the question of the validity of the analytical critique of traditional theology and the possibility of a philosophy of religion within analytical philosophy.

Not offered in 1962-63.

31. PROBLEMS OF CHRISTIANITY TODAY. Mr. Urban.

Each semester

The purpose of this course is to study various answers to the chief religious problems of the twentieth century. Problems include: faith and reason, the existence of God, religion and morality, science and religion, the Bible, and the problem of evil. Answers include reference to various schools of thought: fundamentalism, liberalism, humanism, and neo-orthodoxy; and to the works of individual thinkers: Reinhold Niebuhr, Paul Tillich, Martin Buber, and others. The student will be urged to find his own answers and to work out his own religious beliefs.

NOTE: Students planning to take more than one course in Religion should normally commence with Course 31, although this course is not a prerequisite for the others.

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. Urban.

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. Urban.

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.

51. SPECIAL TOPICS. Staff.

An intensive course may be offered from time to time in a field not covered by the regular program. Open only to juniors and seniors.

52. SENIOR CONFERENCE. Staff.

Spring semester

For senior majors in philosophy. Individual programs are planned to prepare for the comprehensive examination.

HISTORY 61. 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 27. 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.

A study of the principal theories about value and moral obligation, and of their justification, in the light of psychological and anthropological material; of the concepts of justice and human rights; of the implications for ethics of different theories about the freedom of the will. The emphasis is systematic, but works of representative theorists, both classical and contemporary, will be read.

102. ANCIENT PHILOSOPHY. Mr. Shaffer.

The development of Greek thought in ethics, metaphysics, logic and science, with special attention to Plato and Aristotle. Emphasis is given to tracing the emergence of distinctively philosophical and scientific methods, and the relation of these methods to contemporary techniques.

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

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

104. CONTEMPORARY PROBLEMS. Mr. Brandt and Mr. Shaffer.

A study of contemporary theories on some basic problems such as the theory of meaning, universals, the foundations of knowledge, theories of perception, the nature of the self and mental states, and the relation of mind and body. The reading is in the recent work of such philosophers as Broad, Ayer, Russell, Lewis, Ryle, and Wittgenstein.

105. PHILOSOPHY OF SCIENCE. Mr. Kim.

Spring semester

An advanced treatment of some fundamental problems in the field. Some of the topics are: the nature of scientific explanations, laws, and theories; the concepts of probability and meaningfulness; the thesis of determinism; definition and inference; the role of mathematics and models in science; simplicity; the problems of definition and verification in such fields as cosmology, evolution, and psychoanalysis.

106. AESTHETICS. Mr. Beardsley.

A systematic examination of the philosophy of art and the methodological foundations of criticism. (See course 17.) Recommended for students of literature, music and the fine arts.

107. SOCIAL PHILOSOPHY. Mr. Sklar.

An advanced treatment of some problems arising from the study of societies and individuals. Examples of topics: the nature of scientific method; the possibility and significance of distinctions between these studies and the physical sciences; sophisticated experimental design; analytical philosophy of history; the logical character of explanations of behavior; the difference between causes of beliefs and reasons for beliefs; the descriptive-evaluative distinction; ideal types and ideal societies.

108. SYMBOLIC LOGIC. Mr. Kim.

Fall semester

The three aims of this seminar are (1) thorough coverage of the techniques of elementary and intermediate symbolic logic, and some attention to advanced topics; (2) development of the various views about the foundations of mathematics in the light of (1); (3) study of the logical implications and difficulties with (1) and (2) with reference to, e.g., the paradoxes, orders of infinity, extensions of the number concept, the Gödel and Skolem theorems.

109. THE THEORY OF VALUES.

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.

Not offered in 1962-63.

110. MEDIEVAL PHILOSOPHY. Mr. Urban.

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. Urban.

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, John Baillie and others.

112. CONTEMPORARY RELIGIOUS PHILOSOPHERS. Mr. Urban.

This seminar will concentrate on representative thinkers and schools of thought in the present century. These will include Karl Barth, Martin Buber, Jacques Maritain, Reinhold Niebuhr, William Temple, Paul Tillich, and Henry N. Wieman.

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 ASSOCIATE PROFESSOR: WILLIS J. STETSON

ASSOCIATE PROFESSORS: LEWIS H. ELVERSON
EDWIN J. FAULKNER

ASSISTANT PROFESSOR: GOMER DAVIES

ASSISTANTS: BROOKE P. COTTMAN
ROBERT B. FORWOOD
JAMES W. LUKENS, JR.

JAMES J. McADOO
JAMES H. MILLER

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 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 is permitted to enter his Senior year.

FALL ACTIVITIES

Badminton
*Cross Country
*Football

Golf
*Soccer
Swimming

Tennis
Touch Football

WINTER ACTIVITIES

Badminton
*Basketball
Boxing

Lacrosse
*Swimming
Tennis

Track
Volley Ball
*Wrestling

SPRING ACTIVITIES

*Baseball
*Golf
*Lacrosse

Softball
*Tennis

*Track
Volley Ball

* Indicates intercollegiate competition.

Physical Education for Women

ASSOCIATE PROFESSORS: VIRGINIA RATH, *Chairman*
IRENE MOLL

ASSISTANT PROFESSOR: ELEANOR K. HESS

INSTRUCTOR: AILYN TERADA

COLLEGE PHYSICIAN: DR. MORRIS A. BOWIE

The aim of the 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. The program provides: instruction and experience in sports and dancing; swimming instruction on all levels; corrective and developmental exercises. It is our hope that the student will also acquire: appreciation of the dance as an art form; good sportsmanship; added endurance; good posture; leadership training; joy in outdoor exercise; and a program of interests and skills that will carry over for her after college, so she may become a useful part of her community.

Classes are kept small to insure individual attention, and students are grouped where possible according to ability. Ample opportunities are given for intramural and inter-collegiate 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 dance activity; take a team sport; take developmental gymnastics if the posture grade or motor skill test indicate 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

ARCHERY. Miss Rath. Class and Varsity.	<i>Fall and Spring</i>
BADMINTON. Miss Hess, Miss Rath, Mr. Faulkner, Miss Terada. Class and Varsity.	<i>Winter</i>
BASKETBALL. Miss Moll, Miss Hess. Class and Varsity.	<i>Winter</i>
BOWLING. Staff.	<i>Winter</i>
GOLF. Miss Moll. Class and Varsity.	<i>Fall and Spring</i>
HOCKEY. Miss Hess. Class and Varsity.	<i>Fall Term</i>
LACROSSE. Miss Hess. Class and Varsity.	<i>Spring</i>
SOCCER. Miss Hess. Class.	<i>Winter</i>

- SOFTBALL.** Miss Moll. *Spring*
 Class and Varsity.
- SWIMMING.** Miss Rath, Miss Hess, Miss Terada. *Fall, Winter and Spring*
 Beginner, intermediate and advanced classes in strokes, diving, and water ballet.
 Class and Varsity.
- TENNIS.** Miss Terada, Miss Hess, Mr. Faulkner, Miss Rath and Miss Moll. *Fall, Winter and Spring*
- VOLLEYBALL.** Miss Moll, Miss Hess, Miss Terada. *Winter*
 Class and Varsity.
- WATER BALLET.** Miss Terada. *Fall and Spring*

OTHER ACTIVITIES

- DEVELOPMENTAL GYMNASTICS.** Miss Rath, Miss Terada. *Winter*
 Required of all first-year students whose posture grade or motor ability test indicate a need for it.
- FOLK AND SQUARE DANCING.** Miss Moll. *Fall and Winter*
 Open to men students also.
- MODERN DANCE.** Miss Terada. *Fall, Winter and Spring*
 Class and Club.
- RECREATIONAL MATERIALS AND RESOURCES.** Staff. *Winter and Spring*
- RED CROSS LIFE SAVING AND WATER SAFETY.** Miss Rath. *Winter and Spring*
 Senior and Instructors' courses.

Physics

PROFESSORS: WILLIAM C. ELMORE, *Chairman*
MILAN W. GARRETT

ASSOCIATE PROFESSOR: PAUL C. MANGELSDORF, JR.

ASSISTANT PROFESSORS: ROBERT N. EUWEMA
MARK A. HEALD

INSTRUCTOR: JARL A. ELMGREN

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, since physics is primarily an experimental science. Honors candidates taking physics seminars accompanied by laboratory work must submit their laboratory notebooks to the visiting examiners for their inspection.

REQUIREMENTS AND RECOMMENDATIONS FOR MAJORS AND MINORS

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

Honors students majoring in physics normally take Physics 102, 112, 113, in that order, and Mathematics 101, 102. A third mathematics seminar, usually Mathematics 104, is encouraged but not required. An honors student who has been unable to schedule Physics 11, 12 should plan to take Physics 111. Other seminars in the program may be chosen from astronomy, biology, chemistry, electrical engineering, engineering sciences, experimental psychology, or philosophy. Such a program is a particularly satisfactory way of preparing for graduate or other professional work in physics or 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 students majoring in physics normally complete the following courses in their junior and senior years: Mathematics 51, 52; Electrical Engineering 53, 56; Chemistry 61, 62; and Physics 51, 52. This program provides a well-rounded study of physics, and by requiring less intensive concentration than an honors program offers the student the opportunity to extend his work outside the Division of the Natural Sciences. It should also meet the needs of those who wish to teach science in secondary school.

Secondary school students who are considering majoring in physics at Swarthmore are strongly encouraged to complete four years of mathematics and a minimum of two years of either German or Russian, or French if neither of these is available.

COURSE STATEMENT

1, 2. GENERAL PHYSICS. Mr. Garrett, Mr. Elmgren, and Staff.

An introductory course in basic physics. During the first semester special emphasis is placed on particle mechanics, conservation principles, harmonic motion, kinetic theory and heat. During the second semester the topics include basic concepts in electricity and magnetism, direct current circuits, and optics, with a brief introduction to quantum physics. 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.

Prerequisite: Mathematics 3, 4 taken concurrently, or equivalent preparation in mathematics.

7-8. CONCEPTS AND THEORIES IN PHYSICAL SCIENCE. Mr. Rosenberg. *Full course*

The first semester consists in an analysis of motion leading to the Newtonian synthesis, the conservation laws of physics, the development of an atomic theory of matter, the Periodic Table of Elements, and the kinetic theory of gases.

The second semester considers the evolution of modern physics: physical properties of light, aspects of relativity, the wave versus the quantum theory of light, certain electrical phenomena, the atomicity of charge, Bohr's model of the atom, radioactivity, fundamental particles, the nuclear atom and nuclear energy, stellar energy.

Three lectures and one three-hour laboratory per week.

11, 12. MECHANICS AND WAVE MOTION. Mr. Elmgren and Mr. Elmore.

Particle and rigid body mechanics with an introduction to advanced dynamics. Elastic waves and wave motion. Interference and diffraction phenomena. Considerable emphasis is placed on laboratory work, both to illuminate and extend the subject matter, and to foster the students' ability to work independently. This course is required of physics majors. In addition, this course or its equivalent, Physics 111, is recommended for others who desire further work in physics.

Prerequisite: Mathematics 11, 12 taken concurrently.

51, 52. MODERN PHYSICS. Mr. Mangelsdorf and Mr. Euwema.

A selection of topics including special relativity; quantum theory with applications to atomic structure and solid-state physics; nuclear and high-energy physics. Three lectures and one laboratory period weekly. Open to seniors only.

Prerequisite: Mathematics 12 and consent of the instructor.

53. CIRCUIT THEORY I.

Fall semester

(Identical with Electrical Engineering 53)

56. FIELD THEORY.

Spring semester

(Identical with Electrical Engineering 56)

HONORS SEMINARS

102. ELECTRICITY AND MAGNETISM. Mr. Garrett, Mr. Heald, and Mr. Euwema.

Spring semester

Classical electrodynamics, covering static and dynamic electricity, magnetism and electromagnetism, with some electronics. Laboratory measurements in direct and alternating currents and in magnetism, together with fundamental experiments in electronics.

Prerequisites: Mathematics 101, or 103, and Physics 11, 12 (or 111).

104. MATHEMATICAL PHYSICS. Mr. Euwema.

Fall semester

A study of the partial differential equations of physics, and their solution for particular cases. Expansions in orthogonal functions, linear vector spaces and matrices. Fourier and Laplace transforms. Problems arising in all areas of physics will be treated. This seminar is recommended for physics majors who have a particular interest in theoretical physics. Not accompanied by laboratory.

Prerequisites: Mathematics 102, and Physics 11, 12 (or 111) and 102.

111. CLASSICAL MECHANICS AND WAVES. Mr. Heald.

Fall semester

This seminar covers substantially the same material as Physics 11, 12. It is offered for students unable to schedule the course, and who desire further work in physics as part of an honors program. One full-day laboratory each week.

Prerequisite: Mathematics 12.

112. RADIATION AND STATISTICAL PHYSICS. Mr. Elmore.

Fall semester

Free and guided electromagnetic waves, with particular emphasis on waves in the microwave, optical and X-ray regions. The velocity of electromagnetic waves and the theory of special relativity. Thermal radiation and early quantum theory through the Bohr atom. Quantum statistics with applications. Accompanied by a full-day laboratory each week.

Prerequisite: Physics 102.

113. QUANTUM AND NUCLEAR PHYSICS. Mr. Mangelsdorf.

Spring semester

The particle-wave duality in quantum theory. Schroedinger's equation and its solution. Atomic structure and spectra including X-rays. The band theory of solids. Nuclear and high-energy physics. The laboratory includes basic experiments in atomic and nuclear physics.

Prerequisites: Physics 11, 12 (or 111) and Physics 102, or their equivalents in the Honors Program in Engineering Sciences.

Political Science

PROFESSOR: J. ROLAND PENNOCK,* *Chairman*

ASSOCIATE PROFESSORS: CHARLES E. GILBERT
DAVID G. SMITH

KENNETH N. WALTZ,
Acting Chairman fall semester

VISITING ASSOCIATE PROFESSOR: JOHN W. CHAPMAN †

ASSISTANT PROFESSOR: GENE D. OVERSTREET

INSTRUCTOR: CYRIL B. ROSEMAN

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 relations.

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; however, Course 11 may be taken by sophomores concurrently with Course 2. 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) or Asian Political Systems (Political Science 20) for Course 11. Majors are also advised to take Economics 1-2. Courses in Statistics (Economics 4) 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.

* Absent on leave, fall semester, 1962-63.

† Fall semester, 1962-63.

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 12—Modern China and Japan
- History 13—East Asia
- History 14—Russia
- History 15—The Expansion of Europe
- History 62—The Near and Middle East

GROUP III

- Political Science 15—Comparative Government
- Political Science 19—The Soviet System
- Political Science 20—Asian Political Systems
- Political Science 55—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—historical, economic, psychological, sociological, and ideological; nature and development of political institutions. Application of the foundations as instanced by major types of government, including a more detailed study of selected aspects of American national government. 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. Roseman. *Spring semester*

The sociological, economic, and legal setting of local government. Politics and administration at the state and local levels. Federalism, intergovernmental relations, and the metropolitan area. City planning. The course emphasizes field work and research in nearby communities.

12. INTERNATIONAL POLITICS. Mr. Waltz. *Alternate years, fall semester*

Approaches to the theory and practice of international politics such as those developed by liberals, pacifists, behavioralists, and socialists will be examined in some detail before considering the abiding and changing patterns of relations among states and the various factors that affect them.

13. INTERNATIONAL LAW AND ORGANIZATION. Mr. Waltz. *Alternate years, spring semester*

The development of international law and organization, including a study of the major problems of international law and world government and of the structure, accomplishments and limitations of general and regional organizations.

15. COMPARATIVE GOVERNMENT. Mr. Smith. *Alternate years, fall semester*

A critical study of selected political systems of Western and Eastern Europe. The major countries studied include France, Germany, Italy, and the states of Central and Eastern Europe. Major emphasis will be placed on comparative politics and comparative public policy, as well as the relation of domestic politics to problems of foreign policy and international cooperation.

Not offered in 1962-63.

19. THE SOVIET SYSTEM. Mr. Overstreet. *Spring semester*
 An analysis of the Soviet political system in relation to its theoretical and historical bases and its socio-economic setting. Topics included are the role of the Party, the nature of governmental institutions and mass organizations, economic structure and policy, selected problems of domestic and foreign policy, and a comparative examination of other Communist political systems, notably that of China.
20. ASIAN POLITICAL SYSTEMS. Mr. Overstreet. *Fall semester*
 A comparative study of the contemporary political systems of China, Japan, and India. Introductory consideration is given to nationalism in Asia, with its traditionalist, Marxist, and liberal democratic elements, while, in the concluding section, attention is given to special features of political development in backward areas.
51. PUBLIC ADMINISTRATION. Mr. Gilbert. *Alternate years, fall semester*
 An analysis of policy-making and 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.
 Not offered in 1962-63.
52. AMERICAN CONSTITUTIONAL LAW. Mr. Gilbert or Mr. Pennock. *Fall semester*
 The role of the Supreme Court in the American political system, viewed both historically and through analysis of leading cases. Areas of Constitutional development emphasized are: the nature and exercise of judicial review; federalism and the scope of national power; civil liberties.
 Open to sophomores and upperclassmen. Sophomores carrying five courses will be relieved of the term paper requirement.
53. AMERICAN PARTY POLITICS. Mr. Roseman. *Alternate years, fall semester*
 An historical and functional analysis of American political parties. The study of interest groups, public opinion and voting behavior, electoral systems and representation, the legislative process.
54. POLITICAL THEORY: PLATO TO ROUSSEAU. Mr. Smith. *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 sophomores planning to take the "Modern and Analytical" version of the Political Theory honors seminar; otherwise to juniors and seniors only, except by special arrangement.
55. MODERN POLITICAL THEORY. Mr. Smith. *Spring semester*
 Political theory from the Enlightenment to the present. Idealism and romantic and conservative nationalism; anarchism, Marxism, and later socialist doctrines; Utilitarianism and "revisionist" Liberalism; pragmatic and sociological theories of politics; conservative critics of democracy and the political theories of authoritarianism and of fascism. Considerable time will be devoted to the analysis of liberal, democratic, and totalitarian theories and to influential theories of an ideological quality such as nationalism, Marxism, and fascism.
56. JURISPRUDENCE. Mr. Pennock. *Alternate years, 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.
 Open to sophomores by arrangement with the instructor.

57-58. AMERICAN FOREIGN POLICY. Mr. Waltz.

Alternate years, full course

The problem of defining the objectives of American foreign policy and of selecting the means for achieving them; past, present and suggested American strategies in world politics; the influence of internal and external conditions on the making of foreign policy; the effects of our policies in crucial parts of the world.

Not offered in 1962-63.

59. MARXISM. Mr. Smith.

A study of Marxist political theory and philosophy. Primary emphasis is placed on the works of Marx, Engels, Lenin, and Stalin. In addition, some attention is devoted to the background of Marxist thought as well as to influential derivatives of Marxism other than Communism. Selected examples of contemporary Marxist theory are also considered.

60. SPECIAL TOPICS IN POLITICAL SCIENCE. Mr. Smith.

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. (a) and (b). POLITICAL THEORY. Mr. Chapman or Mr. Pennock. *Each semester*

The nature of the state, the bases of political obligation, sovereignty and the nature of law, liberty, equality, rights, democracy, totalitarianism—all in the light of the theories set forth by writers on these subjects from Plato to the present. This seminar is given in two versions, one (101a) beginning with Plato and proceeding chronologically, and the other (101b, designated "Modern and Analytical") starting with Machiavelli and organized in more topical fashion. It is desirable for students planning to take 101b to take Political Science 54 during their sophomore year.

102. POLITICS AND LEGISLATION. Mr. Gilbert.

Spring semester

The study of political parties, interest groups, public opinion and voting behavior, electoral systems and representation, the legislative process. Emphasis is on American politics, with some comparative material; and, ultimately, on politics from the standpoint of theories of political democracy.

103. PROBLEMS IN GOVERNMENT AND ADMINISTRATION. Mr. Gilbert.

Fall 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. Waltz.

Fall semester

A comprehensive inquiry into the principles and problems of international politics, international law, and international organization.

105. AMERICAN FOREIGN POLICY. Mr. Waltz.

Spring semester

A study of key problems faced by the United States in the modern world together with a detailed, critical investigation of the making and implementing of American foreign policy. The changing assumptions of our policy and the political, economic, and social influences upon it will be carefully considered.

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. Overstreet. *Spring semester*
 A study of political, social, and economic institutions in the Soviet Union in relation to their theoretical and historical background; selected problems of domestic and foreign policy; a comparative examination of other Communist political systems, notably that of China.
108. **COMPARATIVE GOVERNMENT.** Mr. Smith. *Fall semester*
 Advanced study of comparative government; governmental structures and political processes largely as exemplified by selected governments of Western and Eastern Europe; inquiries into common problems, such as planning, defense, nationalization, and trans-national political movements.
120. **THESIS.** All members of the department.
 Approval must be secured early in the student's junior year.

Psychology and Education

PROFESSORS: HANS WALLACH, ‡ *Chairman*
SOLOMON E. ASCH
JOSEPH B. SHANE

ASSOCIATE PROFESSOR: HENRY GLEITMAN, *Acting Chairman*

ASSISTANT PROFESSOR: DEAN PEABODY

LECTURERS: ELISE S. BARTHOLOMEW
ALICE K. BRODHEAD
DONALD R. BROWN

RESEARCH ASSOCIATE: EILEEN B. KARSH

ASSISTANT: FREDDA STEINMAN

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

Both semesters of the course Introduction to Psychology are required of all students who wish to take other courses or seminars in the department. The two semesters of this course may be taken in either sequence. Credit is given for either semester, and either semester may be used to fulfill the general curriculum requirement. Majors in course are required to take at least one course with a laboratory and majors in Honors one of the seminars in experimental psychology: 101, 102, or 108.

Courses in education—11, 12, 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:

Psychology 1—Introduction to Psychology.

Education 11—Educational Psychology.

Education 14—Introduction to Teaching.

Education 12—Principles and Methods of Secondary Education.

Education 15—History of Education.

History 4, 5, 6 or 7—The United States (arrangements must be made for special work in the History of Pennsylvania). Only one term is required.

A minimum of three full courses (or six half-courses) in the subject or field in which the student expects to teach.

Education 16—Practice Teaching.

‡ Absent on leave, 1962-63.

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

Psychology 1—Introduction to Psychology.

Psychology 55—Child Psychology.

Education 11—Educational Psychology.

Education 14—Introduction to Teaching.

History 4, 5, 6 or 7—The United States (with special work in Pennsylvania history)

Only one term is required.

Psychology

1. INTRODUCTION TO PSYCHOLOGY. Mr. Gleitman. *Spring semester*
On introduction to the basic processes underlying human and animal behavior: sensation and perception, learning and thinking, emotion and motivation.
Three lectures plus weekly conference hour to be arranged.
2. INTRODUCTION TO PSYCHOLOGY. Staff. *Fall semester*
An introduction to the study of human behavior in its social context. Topics to be stressed: conflict, personality development and psychopathology; the psychology of language and of the arts; individual differences and testing; attitudes and social action.
Three lectures plus weekly conference hour to be arranged.
12. MOTIVATION. *Spring 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.
14. LEARNING AND BEHAVIOR THEORY.
This course will cover the major attempts to systematize the phenomena of simple learning and behavioral processes, taken primarily from the animal level, including conditioning, reinforcement, generalization and extinction. It will also consider the attempts to derive more complex phenomena from these simpler ones.
15. ANIMAL EXPERIMENTATION. Mr. Gleitman. *Offered irregularly on request*
Students desiring to exercise this option should consult with the Staff at least one semester in advance.
17. HUMAN LEARNING AND THINKING.
An examination of the phenomena of association, memory, problem solving, thinking and language.
50. PERCEPTION. Mr. Wallach.
Laboratory section one afternoon per week to be arranged. The major facts and some problems of visual perception are outlined and used to acquaint the student with experimental research.
55. CHILD PSYCHOLOGY. *Alternate years*
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.

56. SOCIAL PSYCHOLOGY. Mr. Asch. *Fall 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.

57. PSYCHOLOGICAL TESTS AND MEASUREMENTS. *Alternate years*

The concept of psychological measurements as applied to tests of intelligence, personality, interests, and abilities. The course surveys a wide variety of contemporary tests and studies intensively the characteristics and underlying assumptions of one representative test of each major type. (Open to sophomores.)

58. PERSONALITY. Mr. Peabody. *Fall semester*

Intensive study of some of the main theories of personality examined in the light of recent research. Extensive use of case material will be made.

60. PHYSIOLOGICAL PSYCHOLOGY. *Fall semester*

The physiological foundations of human and animal behavior, including sensory function, metabolic and endocrine functions, the nervous systems, and response mechanisms; the application of such facts to motives and appetites, to emotion, to perceiving and to learning and thinking.

63-64. SYSTEMATIC SEMINAR. The Staff. *Full course, spring semester*

A double credit course requiring half the student's time for a semester. This seminar covers the major integrative theories or approaches to psychology, including structuralism, functionalism, behaviorism, Gestalttheorie, and psychoanalysis. Majors students who so elect will take Course 63-64 in their senior year. The course is open only to senior psychology majors except by special arrangement.

65. HISTORY OF PSYCHOLOGY. Mr. Gleitman.

This course is given as an alternative to 63-64. It is a lecture course open to juniors and seniors. It covers the major integrative theories or approaches to psychology, including structuralism, functionalism, behaviorism, Gestalttheorie, and psychoanalysis.

The following courses are not to be counted toward a major in psychology and are not included in the comprehensive examination; they are designed primarily for students whose major work is in other departments.

41. THE PSYCHOLOGY OF DRAMATIC EXPERIENCE AND PRESENTATION. Mr. Gleitman.

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.

Not offered in 1962-63.

42. APPLIED SOCIAL PSYCHOLOGY.

This course deals with communications within groups, leadership, attitudes and propaganda, wage payment plans, consumer motivation and behavior, and the structure of organizations. Attention will be given to the application of concepts

that have been drawn from the laboratory study of motivation, perception, and learning.

Not offered in 1962-63.

43. EMOTIONAL AND MOTIVATIONAL PROCESSES. Mr. Hunt, Dr. Saul, Mr. Wallach.
Spring semester

The role of emotions and motives in the process of reaching maturity. In addition to readings in the general literature, a number of case histories will be studied. To increase the student's insight into the difficulties and possibilities of emotional growth.

Education

11. EDUCATIONAL PSYCHOLOGY. Mr. Shane. *Fall semester, alternate years*

The application of psychological principles concerned with the processes of thinking, learning and motivation to the problems of education.

Prerequisite: Course 1.

12. PRINCIPLES AND METHODS OF SECONDARY EDUCATION. Mr. Shane.
Fall semester, alternate years

A study of the principles of secondary education, with emphasis upon aims and organization. Visits to nearby schools are made.

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.

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 requirement of 180 hours in the Swarthmore High School summer session under the direction of their teaching staff. Students should enroll for this course at the January registration. They must be recommended by the college department whose subject they plan to teach.

HONORS SEMINARS

101. PERCEPTION. Mr. Wallach.
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 and attitudes, general theory of perception. When time permits, some attention is given to parallel problems in other senses.

102. LEARNING AND BEHAVIOR THEORY. Mr. Gleitman.
This seminar will undertake a systematic analysis of the major phenomena and theories of learning, based primarily upon material drawn from the animal level. Among the topics discussed will be the following: classical and instrumental conditioning, the nature of the response, generalization and discrimination, primary and secondary reinforcement and drive, extinction and interference processes, complex learning and problem-solving. Theories discussed will be those of Hull, Guthrie, Skinner, and Tolman, as well as some current mathematical approaches to learning and decision-making.

103. MOTIVATION.
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; frus-

tration 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. Peabody.

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. Peabody.

The personality concept, considered broadly as the individual's characteristic representation of and reaction to events of emotional significance in living. Principal attention to the origin of contemporary thought on personality in Freud's writings and the relation of his concepts to general theory in psychology. Topics such as the adjustive, motivational and cognitive aspects of personality, the nature of our phenomenal experience of self and of personality, the concepts of unrecognized and unconscious processes, personality types, the characteristics of good and poor adjustment, and methods of personality study. Problems of the origin, persistence and change of personality habits as these are understood in personality theory on the one hand and in the psychology of learning and perception on the other. Laboratory work in the study of problems in personality when conditions permit.

106. **DEVELOPMENT.** Mr. Gleitman.

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.

107. **PHYSIOLOGICAL PSYCHOLOGY.**

The seminar will consider physiological mechanisms underlying selected psychological phenomena. Particular attention will be given to sensation and perception (especially visual), learning (the role of maturation, nature of memory traces), and motivation (the biological drives, attention). The evidence to be examined comes mostly from the study of the central nervous system of mammals.

Prerequisites: A good background in the natural sciences is desirable. Psychology 1 and 2 and Biology 1 and 2 are required.

108. **MEMORY, THINKING, LANGUAGE.** Mr. Asch.

An inquiry into human cognitive processes, including human learning, memory functions, thinking, and language phenomena. Topics to be considered will be: principles of association; association and perceptual organization; recognition and recall; interference phenomena; trace theory; attention and mental set; concept formation; problem-solving and insight; symbolic operations; semantic and syntactic processes.

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

A grant from the Carnegie Corporation made possible the inauguration of a Russian Studies program, in the fall of 1949, at Bryn Mawr, Haverford, and Swarthmore Colleges. While the grant has now expired, Swarthmore College continues to offer courses in Russian language, history, and political and social 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 and seminars 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.

Full course

Designed to familiarize the beginner with the essentials of the spoken and written language. Fundamentals of grammar and reading of easy literary prose.

3, 4. INTERMEDIATE RUSSIAN.

Reading of selections from Russian 19th century and contemporary prose and poetry.

Short Russian area study: geography, history, constitution.

Translations from Russian fiction and periodicals. Review of grammar.

Conversation. Reports. Composition. Conducted in Russian.

Prerequisite: Russian 1-2 or its equivalent.

11, 12. INTRODUCTION TO LITERATURE.

Readings in Russian classical literature: Pushkin, Lermontov, Gogol, Tolstoy, Turgenyev, Dostoyevsky, Chekhov. Study of these writers' biographies and their political and social backgrounds. Intensive work in translation and composition.

Advanced conversation. Conducted in Russian.

Prerequisite: Russian 3, 4 or its equivalent.

101. TOLSTOY.

102. CHEKHOV AND GORKY.

HISTORY

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.

117. EASTERN EUROPE. Mr. Beik.

Honors seminar

The origins and consequences of the Russian Revolution and the development of the Soviet zone in East Central Europe.

POLITICAL AND ECONOMIC INSTITUTIONS

19. THE SOVIET SYSTEM. Mr. Osborn.

Spring semester

An analysis of the Soviet political system in relation to its theoretical and historical bases and its socio-economic setting. Topics included are the role of the Party, the nature of governmental institutions and mass organizations, economic structure and policy, selected problems of domestic and foreign policy, and a comparative examination of other Communist political systems, notably that of China.

107. THE SOVIET SYSTEM. Mr. Overstreet.

Honors seminar

A study of political, social, and economic institutions in the Soviet Union in relation to their theoretical and historical background; Soviet foreign relations and the international Communist movement.

Visiting Examiners—May-June, 1962

- ASTRONOMY:** PROFESSOR ARTHUR BEER, *Cambridge University*; PROFESSOR LEENDERT BINNENDIJK, *University of Pennsylvania*; PROFESSOR LOUIS GREEN, *Haverford College*.
- BIOLOGY:** PROFESSOR L. JOE BERRY, *Bryn Mawr College*; PROFESSOR RALPH O. ERICKSON, *University of Pennsylvania*; PROFESSOR CHARLES E. JENNER, *University of North Carolina*; DR. STUART MUDD, *Veterans Administration Hospital, Philadelphia*; PROFESSOR ALVIN NOVICK, *Yale University*; DR. RUTH PATRICK, *Academy of Natural Sciences*; PROFESSOR MALCOLM S. STEINBERG, *The Johns Hopkins University*; DR. R. C. VON BORSTEL, *Oak Ridge National Laboratory*; DR. ANNA R. WHITING, *University of Pennsylvania*.
- CHEMISTRY:** PROFESSOR CLARK E. BRICKER, *The College of Wooster*; PROFESSOR WALTER KAUZMANN, *Princeton University*; PROFESSOR ROBERT I. WALTER, *Haverford College*.
- ECONOMICS:** PROFESSOR KENNETH J. ARROW, *Council of Economic Advisers, Washington, D. C.*; PROFESSOR MORTON J. BARATZ, *Bryn Mawr College*; PROFESSOR RONALD W. JONES, *University of Rochester*.
- ENGINEERING:** PROFESSOR L. PAUL BOLGIANO, JR., *University of Delaware*; PROFESSOR MUNIR R. EL-SADEN, *North Carolina State College*; PROFESSOR BRUCE C. LUTZ, *University of Delaware*; PROFESSOR SIDNEY SHORE, *University of Pennsylvania*.
- ENGLISH LITERATURE:** PROFESSOR ROBERT M. ADAMS, *Cornell University*; PROFESSOR HARRY BERGER, *Yale University*; PROFESSOR THEODORE HORNBERGER, *University of Pennsylvania*; PROFESSOR S. FRED JOHNSON, *Columbia University*; PROFESSOR J. HILLIS MILLER, *The Johns Hopkins University*.
- FINE ARTS:** PROFESSOR JAMES FOWLE, *Bryn Mawr College*; PROFESSOR ROBERT A. KOCH, *Princeton University*; PROFESSOR BENTON SPRUANCE, *Beaver College*; PROFESSOR A. RICHARD TURNER, *Princeton University*.
- HISTORY:** PROFESSOR PHILIP C. F. BANKWITZ, *Trinity College*; PROFESSOR NORTON DOWNS, *Trinity College*; PROFESSOR SAMUEL P. HAYS, *University of Pittsburgh*; PROFESSOR BEATRICE HYSLOP, *Hunter College*; PROFESSOR RICHARD LYMAN, *Stanford University*.
- MATHEMATICS:** PROFESSOR L. H. LOOMIS, *Harvard University*; PROFESSOR C. O. OAKLEY, *Haverford College*; PROFESSOR J. BARKLEY ROSSER, *Cornell University*.
- MODERN LANGUAGES—FRENCH:** PROFESSOR NATHAN EDELMAN, *The Johns Hopkins University*; PROFESSOR ARMAND HOOG, *Princeton University*.
- MODERN LANGUAGES—GERMAN:** PROFESSOR DETLEV SCHUMANN, *University of Pennsylvania*.
- MODERN LANGUAGES—LINGUISTIC SCIENCE:** PROFESSOR FRANK C. SOUTHWORTH, *University of Pennsylvania*.
- MUSIC:** PROFESSOR A. TILLMAN MERRITT, *Harvard University*.
- PHILOSOPHY AND RELIGION:** PROFESSOR WILLIAM A. CHRISTIAN, *Yale University*; PROFESSOR GLENN MORROW, *University of Pennsylvania*; PROFESSOR MARY MOTHERSILL, *The City College*; PROFESSOR JOHN RAWLS, *Harvard University*; PROFESSOR WESLEY C. SALMON, *Brown University*.
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POLITICAL SCIENCE: PROFESSOR WILLIAM M. BEANEY, *Princeton University*; PROFESSOR JOHN W. CHAPMAN, *University of Pittsburgh*; PROFESSOR DANIEL S. CHEEVER, *University of Pittsburgh*; PROFESSOR HOLLAND HUNTER, *Haverford College*; PROFESSOR FRANCIS E. ROURKE, *The Johns Hopkins University*.

PSYCHOLOGY: PROFESSOR M. E. BITTERMAN, *Bryn Mawr College*; PROFESSOR DONALD R. BROWN, *Bryn Mawr College*; PROFESSOR ROGER W. BROWN, *Massachusetts Institute of Technology*; PROFESSOR JOSEPH J. GREENBAUM, *The New School*; PROFESSOR IRVIN ROCK, *Yeshiva University*.

in the Division of the Humanities

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KEITH DARSON GEORGE (English Literature)	DAVID SEYMOUR HARRISON (History)
LEIDA JOHNSON (History)	KORNELIA HARTMAN (English Literature)
GEORGE PATRICK BIRCHMONT-JONES (History)	HELEN MARY BURNHAM (English Literature)
JAY SCOTT KATZMAN (English Literature)	PETER HANCOCK (English Literature)
EMMA KATZMAN (English Literature)	PAUL ANTHONY BURNHAM (English Literature)
SALLY KATZMAN (English Literature)	T. ALAN BROOKHUIS (English Literature)
MARCOY RITA KATZMAN (English Literature)	RENEE BROWN (Fine Arts)
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JACQUELINE ANITA LARSON (History)	DAVID ARONSON BURNHAM (English Literature)
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JUDITH BERNICE MANNING (English Literature)	EARL P. EVANS (English Literature)
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GERTRUDE MITCHELL (English Literature)	PHYLLIS A. MITCHELL (Fine Arts)
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PATRICIA MARY MITCHELL (English Literature)	HELEN ELIZABETH MITCHELL (English Literature)
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JANE MITCHELL (English Literature)	SUZANNE GOUGHAN (English Literature)
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LARSON MITCHELL (English Literature)	ROBERT JAY GUNN (English Literature)
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	CHARLES MITCHELL HARRIS (English Literature)
	ELIZABETH MITCHELL (English Literature)
	CAROLINE MITCHELL (English Literature)

Degrees Conferred

June 11, 1962

BACHELOR OF ARTS

In the Division of the Humanities

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SUE ASHTON FINES (French)	GUNNAR NIEMI (Philosophy)
MARGARET FLACCUS (English Literature)	CHRISTIAN FRIEDRICH OTTO (German)
PHYLLIS A. FOSTER (Fine Arts)	BARBARA JOSEPHINE PALMER (Latin)
JAMES ANTHONY FREYER (Latin)	PATIENCE NENE PARRISH (Fine Arts)
MERRIE GARDNER (English Literature)	KATHARINE HARTWELL PECKHAM (Fine Arts)
MARY MARJORIE GILRUTH (Fine Arts)	JEANNE BARRON PENNIMAN (Fine Arts)
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* As of the Class of 1961.

** As of the Class of 1951.

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PARKER JONATHAN STAPLES (Zoology)
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JOHN KIRKER STEPHENS (Mathematics)
PHILLIP JAY STONE (Chemistry)
HERBERT HOPPER TAYLOR (Philosophy)
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PETER KENNETH UNGER (Philosophy)
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(Zoology)
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ELIZABETH SMYTH WOOD (Mathematics)
SUZANNE ESTELLE WRIGHT (Zoology)
BARBARA YODER (Chemistry)

* As of the Class of 1961.

BACHELOR OF SCIENCE

In the Division of Engineering

LAWRENCE JOHN CAROFF (Engineering Sciences)	WARREN CREAMER KENDIG (Electrical Engineering)
JAMES ROBERT CHESTNUT (Engineering Sciences)	LOUIS LEE MOORE, III (Electrical Engineering)
ROBERT CROFT ELLIS (Electrical Engineering)	JOHN L. NELSON (Mechanical Engineering)
ALLEN CLARK GIESE (Engineering Sciences)	STUART JAY SAFFT (Mechanical Engineering)
ALLEN HARVEY GREENLEAF (Mechanical Engineering)	DOUGLAS CARL THOMPSON (Electrical Engineering)
NIKKI ELIZABETH HILDUM (Engineering Sciences)	DAVID ARTHUR WALTER (Civil Engineering)
	PETER SVEN WESTINE (Civil Engineering)

MASTER OF ARTS

EUGENE ABRAVANEL	Psychology
PHILIP A. IANNA	Astronomy
JON KENNETH WOOLEY	Astronomy

DOCTOR OF LAWS

CONSTANTINOS A. DOXIADIS
RICHARD H. MCFEELY
HILTON S. READ

DOCTOR OF SCIENCE

CHARLOTTE MOORE SITTERLY

Awards and Distinctions

June 11, 1962

HONORS AWARDED BY THE VISITING EXAMINERS

HONORS:

Paul Stanley Armington, John David Berryman, Peter Ebin Biskind, Ruth Ellen Brosi, T. Alan Broughton, W. Butler Burton, James Robert Chesnut, Lois Elinor Clarenbach, DeLanson Ross Crist, Suzanne P. Duvall, David VanDeusen Edwards, A. Harris Fairbanks, Sue Ashton Fines, Phyllis A. Foster, Cynthia Ann Ganung, Allen Clark Giese, Mary Marjorie Gilruth, Robert L. Goble, Lora Katherine Graham, Robert Jay Gross, Judith Gutman, John H. Hand, Nikki Elizabeth Hildum, James Robert Himes, Christopher Robin Hopps, Peter Samuel Latham, Marged Lindner, Andrea Neiman, Carolyn Penta, Louis Burton Potter, James Johlin Robinson, Stephen Carl Schoenbaum, Jane Shelby, Robert Nichols Stearns, Marsha Swiss, John Bell Thompson, Lise Jo Waldman, Nina deAngeli Walls, Douglas Grey Worth.

HIGH HONORS:

Ellen L. Asher, Stephen L. Bloom, Lawrence John Caroff, George Clayton Carroll, Oliver Thomas Fein, Ronald Stephen Goor, Nicolas Fischer Hahn, James A. Henretta, Margaret Reno Hurchalla, Naomi Eleanor Kies, Stephen Douglas Koch, Nancy Ruth Kramer, Lloyd Barton Kreuzer, Jacqueline Anita Lapidus, David Kellogg Lewis, Judith Benita Markham, Nicholas Passell, Frederick Hooker Russell, Arthur Jay Siegel, John Kirker Stephens, Ronald Grikor Suny, John Ernest Tannehill, Walter Fuller Taylor, Peter Kenneth Unger, Lenore Veit, Peter Sanborn Walch, Lewis David Wurgaft.

HIGHEST HONORS:

George F. Bertsch, Stephen Walter Mark, Robert A. Rescorla, Lee Ruth Rosenblum, Jonathan Lincoln Rosner, Bert Irwin Shapiro.

DISTINCTION IN COURSE AWARDED BY THE FACULTY

David Sidney Bamberger, Rose-Marie Bentele, Diana Mack Drake, Stephen Thompson Emlen, Allen Harvey Greenleaf, Reida Johnson, David Elwyn Kidder, Charles Brown Kimmel, Eric Norman Kronfeld, Mary Caroline McCutchan, Stephanie Jo Ross, Norma Jean Thompson, Rosemary Werner.

ELECTIONS TO HONORARY SOCIETIES

PHI BETA KAPPA:

David Sidney Bamberger, George F. Bertsch, Stephen L. Bloom, T. Alan Broughton, George Clayton Carroll, David VanDeusen Edwards, Ronald Stephen Goor, Nicolas Fischer Hahn, John H. Hand, James A. Henretta, Margaret Reno Hurchalla, Reida Johnson, David Elwyn Kidder, Nancy Ruth Kramer, Lloyd Barton Kreuzer, Jacqueline Anita Lapidus, David Kellogg Lewis, Stephen Walter Mark, Judith Benita Markham, Nicholas Passell, Robert A. Rescorla, Lee Ruth Rosenblum, Jonathan Lincoln Rosner, Stephanie Jo Ross, Frederick Hooker Russell, Bert Irwin Shapiro, Jane Shelby, Arthur Jay Siegel, John Kirker Stephens, Ronald Grikor Suny, Walter Fuller Taylor, John Bell Thompson, Norma Jean Thompson, Peter Kenneth Unger, Lenore Veit.

SIGMA XI:

George F. Bertsch, Stephen L. Bloom, W. Butler Burton, Lawrence John Caroff, George Clayton Carroll, DeLanson Ross Crist, Robert L. Goble, Allen Harvey Greenleaf, Nikki Elizabeth Hildum, Philip Anthony Ianna, Lloyd Barton Kreuzer, Nicholas Passell, David Claude Richardson, Jonathan Lincoln Rosner, Stephen Carl Schoen-

baum, Bert Irwin Shapiro, John Kirker Stephens, Walter Fuller Taylor, Albert J. Williams, 3rd, Jon Kenneth Wooley, Barbara Yoder.

SIGMA TAU:

James Robert Chestnut, Allen Harvey Greenleaf, Nikki Elizabeth Hildum, Warren Creamer Kendig, Stuart Jay Safft.

SWARTHMORE COLLEGE FELLOWSHIP AWARDS

- The Hannab A. Leedom Fellowship* to LENORE MACGAFFEY ABRAHAMS.
The Joshua Lippincott Fellowship to RONALD GRIKOR SUNY.
The John Lockwood Memorial Fellowship to CAROLYN RHOADES.
The Lucretia Mott Fellowship to CYNTHIA ANN HEYNEN.
The Martha E. Tyson Fellowship to LORA KATHERINE GRAHAM.
The Phi Beta Kappa Fellowship to NORMA JEAN THOMPSON.

SPECIAL AWARDS *

- The Ivy Medal* to DAVID VANDEUSEN EDWARDS.
The Oak Leaf Medal to CAROLINE SUE HODGES.
The McCabe Engineering Award to LAWRENCE JOHN CAROFF.
The John W. Nason Award to HOWARD M. JENKINS.
The Katherine B. Sicard Prize to ANNE T. FEW.
The William Plummer Potter Public Speaking Fund Awards:
The Potter Poetry Reading Contest: first prize, CHRISTINA POOLE; second prize, MARY WILLIAMS; third prize, ROSAMUND STONE.
The Potter One-Act Play Contest: prize awarded to DUNCAN K. FOLEY.
The John Russell Hayes Poetry Prizes: first prize, JOHN O. SIMON; second prize, EDWARD H. ALLEN.
The Lois Morrell Poetry Award to CHRISTIAN F. OTTO.
The A. Edward Newton Library Prize to JUDITH B. MARKHAM.
The Brand Blanshard Prize to DAVID K. LEWIS.
The Phi Beta Kappa Prize to ALLAN GIBBARD and ROBERT PUTNAM.
The Scott Award to DAVID A. HEIDER.
The Sarah Kaighn Cooper Scholarship to ROBERT PUTNAM.
The Radio Corporation of America Scholarship to J. EVAN DEARDORFF.
The May E. Parry Memorial Award to MARGARET FLACCUS.

* A description of each of these awards can be found in another section of the catalogue.

Enrollment of Students by Classes—1961-62

	<i>Men</i>	<i>Women</i>	<i>Total</i>
Seniors	137	106	243
Juniors	106	107	213
Sophomores	139	113	252
Freshmen	133	125	258
	<hr style="width: 50%; margin: 0 auto;"/>	<hr style="width: 50%; margin: 0 auto;"/>	
Special Students	4	3	7
Graduate Students	2	0	2
	<hr style="width: 50%; margin: 0 auto;"/>	<hr style="width: 50%; margin: 0 auto;"/>	
Totals	521	454	975

Geographical Distribution—1961-62

New York	208	New Mexico	3
Pennsylvania	194	Oklahoma	3
New Jersey	82	Alabama	2
Massachusetts	56	Iowa	2
Maryland	41	New Hampshire	2
Illinois	37	Vermont	2
Connecticut	34	Arizona	1
Virginia	30	Arkansas	1
California	29	North Dakota	1
Delaware	28	South Dakota	1
Ohio	27		
District of Columbia	26	Total United States	950
Michigan	18	Canada	3
Wisconsin	11	England	3
Indiana	10	Japan	3
Kentucky	10	Germany	2
Missouri	10	Italy	2
North Carolina	10	Nigeria	2
Tennessee	10	B. W. I.	1
Texas	8	Egypt	1
Washington	7	Ghana	1
Maine	6	Greece	1
Minnesota	6	Iran	1
Oregon	5	Kenya	1
Rhode Island	5	Pakistan	1
Florida	4	Poland	1
Louisiana	4	Puerto Rico	1
West Virginia	4	Venezuela	1
Colorado	3		
Georgia	3	Total from abroad	25
Hawaii	3	Grand Total	975
Kansas	3		

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