

SWARTHMORE  
COLLEGE  
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COLLEGE  
BULLETIN

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968/69

SWARTHMORE, PENNSYLVANIA

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Virginia Bullitt, *Director*

ALUMNI AFFAIRS AND PUBLIC RELATIONS

Joseph B. Shane, *Vice-President*

GENERAL INFORMATION

Maralyn Orbison Gillespie, *Director of News Office*

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## The Rhodes Scholarship Trust

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

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1968/69

*American Secretary of the Rhodes Scholarships, Courtney Smith*  
*Deputy American Secretary, Gilmore Stott*  
*Secretary, Elsa Palmer Jenkins*

## TABLE OF CONTENTS

	PAGE
CALENDAR .....	5
PERSONNEL .....	7
The Corporation and The Board of Managers .....	8
Alumni Association Officers and Alumni Council .....	11
The Faculty .....	13
Standing Committees .....	22
Divisions and Departments .....	23
Administrative Officers and Assistants .....	24
INTRODUCTION TO SWARTHMORE COLLEGE .....	29
Admission .....	32
Expenses .....	36
Financial Aid and Scholarships .....	37
Educational Resources .....	48
College Life .....	53
Student Community .....	56
THE EDUCATIONAL PROGRAM .....	61
Program for Freshmen and Sophomores .....	63
Program for Juniors and Seniors .....	64
Reading for Honors .....	65
Pre-Medical Program .....	67
Faculty Regulations .....	70
Requirements for Graduation .....	72
Advanced Degrees .....	73
Awards and Prizes .....	74
Fellowships .....	76
COURSES OF INSTRUCTION .....	79
Art .....	80
Astronomy .....	84
Biology .....	86
Chemistry .....	92
Classics .....	96
Economics .....	101
Engineering .....	104
English Literature .....	117
History .....	122
International Relations .....	127
Mathematics .....	128
Modern Languages and Literatures .....	133
Music .....	146
Philosophy and Religion .....	150
Physical Education for Men .....	158
Physical Education for Women .....	160
Physics .....	162
Political Science .....	166
Psychology and Education .....	172
Sociology and Anthropology .....	179
REFERENCE SECTION .....	183
Visiting Examiners .....	184
Degrees Conferred .....	186
Awards and Distinctions .....	190
Enrollment Statistics .....	192
Index .....	193
PLAN OF COLLEGE GROUNDS .....	195

## 1968

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## 1970

## JANUARY

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## FEBRUARY

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## MARCH

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## JUNE

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## COLLEGE CALENDAR

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### Fall Semester

1968

September 18-21	Freshman placement days
September 20	Meeting of Honors students
September 21	Registration
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 20	Christmas vacation begins, 6:00 p.m.

1969

January 6	Christmas vacation ends, 8:00 a.m.
January 6-14	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 31	Mid-year examinations end

### Spring Semester

February 3	Classes begin
February 4	Executive Committee of the Board of Managers
March 4	Executive Committee of the Board of Managers
March 21	Spring vacation begins, 6:00 p.m.
March 31	Spring vacation ends, 8:00 a.m.
April 1	Meeting of the Board of Managers
May 2	Honors seminars end
May 6	Executive Committee of the Board of Managers
May 5-16	Reading period for course students (at the option of the instructor)
May 12	Written honors examinations begin
May 16	Classes end
May 19	Enrollment in classes for fall semester
May 21	Course examinations begin
May 24	Written honors examinations end
May 29-31	Oral honors examinations
May 31	Course examinations end
June 2-4	Senior comprehensive examinations
June 6	Meeting of the Board of Managers
June 7	Alumni Day
June 8	Baccalaureate Day
June 9	Commencement Day

## COLLEGE CALENDAR (*Tentative*)

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### Fall Semester

1969

September 17-20	Freshman placement days
September 19	Meeting of honors students
September 20	Registration
September 22	Classes and honors seminars begin
October 7	Meeting of the Board of Managers
November 4	Executive Committee of the Board of Managers
November 27-29	Thanksgiving recess
December 2	Annual Meeting of the Board of Managers
December 19	Christmas vacation begins, 6:00 p.m.

1970

January 5	Christmas vacation ends, 8:00 a.m.
January 5-13	Reading period for course students (at the option of the instructor)
January 13	Classes and seminars end
January 14	Meeting of honors students
January 16	Registration for spring semester
January 19	Honors seminars begin for spring semester
January 19	Mid-year examinations begin
January 30	Mid-year examinations end

### Spring Semester

February 2	Classes begin
February 3	Executive Committee of the Board of Managers
March 3	Executive Committee of the Board of Managers
March 20	Spring vacation begins, 6:00 p.m.
March 30	Spring vacation ends, 8:00 a.m.
April 7	Meeting of the Board of Managers
May 1	Honors seminars end
May 5	Executive Committee of the Board of Managers
May 4-15	Reading period for course students (at the option of the instructor)
May 11	Written honors examinations begin
May 15	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



*Philip T. Sharples Dining Hall*

PERSONNEL OF

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SWARTHMORE  
COLLEGE

## THE CORPORATION

- ROBERT M. BROWNING, *Chairman*  
Hewitt Hill Farm, R. D. 2, South Royalton, Vt. 05068
- PHILIP T. SHARPLES, *Vice-Chairman*  
The Fidelity Bank Bldg., Suite 2532, 123 South Broad Street,  
Philadelphia, Pa. 19109
- SUE THOMAS TURNER, *Secretary*  
Cook Road, Alfred Station, New York 14803
- JOSEPH B. SHANE, *Assistant Secretary*  
Swarthmore College, Swarthmore, Pa. 19081
- RICHARD B. WILLIS, *Treasurer*  
Provident National Bank, P. O. Box 7648, Philadelphia,  
Pa. 19101
- EDWARD K. CRATSLEY, *Assistant Treasurer*  
Swarthmore College, Swarthmore, Pa. 19081

## BOARD OF MANAGERS

### *Ex officio*

COURTNEY SMITH, President of Swarthmore College, Swarthmore, Pa. 19081.

### *Emeriti*

- ELISABETH HALLOWELL BARTLETT, 100 West University Parkway, Baltimore, Md.  
21210.
- ISABEL JENKINS BOOTH, Jefferson House, The Strand, New Castle, Del. 19720.
- BARCLAY WHITE, 3337 Market Street, Philadelphia, Pa. 19104.
- ALFRED H. WILLIAMS, 216 N. Providence Road, Wallingford, Pa. 19086.
- JOSEPH H. WILLITS, Box 441A, Bridgetown Pike, R. D. 1, Langhorne, Pa. 19047.

### *Life Members*

- ELEANOR STABLER CLARKE, Crumwald Farm, 401 Rogers Lane, Wallingford, Pa.  
19086.
- HADASSAH M. L. HOLCOMBE, 1025 Westview Street, Philadelphia, Pa. 19119.
- CLAUDE C. SMITH, 1617 Land Title Building, Philadelphia, Pa. 19110.
- HELEN GAWTHROP WORTH, 805 Augusta Road, Westover Hills, Wilmington, Del.  
19806.

### *Term Expires December, 1968*

- BOYD T. BARNARD, 914 Philadelphia National Bank Building, Philadelphia, Pa.  
19107.
- KERMIT GORDON, 2202 Wyoming Ave. N.W., Washington, D. C. 20008.
- H. THOMAS HALLOWELL, JR., The Benson East, Jenkintown, Pa. 19046.
- THOMAS B. MCCABE, Tincum Island Rd. and Industrial Highway, Philadelphia,  
Pa. 19113.
- \*ESTHER RIDPATH DELAPLAINE, 6402 West Halbert Rd., Bethesda, Md. 20034.
- \*WALTER O. SIMON, 15 Granite Road, Alapocas, Wilmington, Del. 19803.

\* Nominated by the Alumni Association.



*Term Expires December, 1969*

- WILLIAM F. LEE, 5 Guernsey Road, Swarthmore, Pa. 19081.  
KATHRYN SONNEBORN READ, 5407 Atlantic Avenue, Ventnor, N. J. 08406.  
PHILIP T. SHARPLES, The Fidelity Bank Bldg., Suite 2532, 123 South Broad Street, Philadelphia, Pa. 19109.  
SUE THOMAS TURNER, Cook Road, Alfred Station, New York 14803.  
RICHARD B. WILLIS, Provident National Bank, P. O. Box 7648, Philadelphia, Pa. 19101.  
\*HELEN SHILCOCK POST, 312 Whitmarsh Valley Rd., Fort Washington, Pa. 19034.  
\*ROBERT H. WILSON, 403 Cedar Lane, Swarthmore, Pa. 19081.

*Term Expires December, 1970*

- CHARLES F. BARBER, 120 Broadway, New York, N. Y. 10005.  
CARROLL G. BOWEN, 10 Ash Street Place, Cambridge, Mass. 02138.  
ROBERT M. BROWNING, Hewitt Hill Farm, R. D. 2, South Royalton, Vt. 05068.  
VIRGINIA STRATTON CORNELL, Central Valley, N. Y. 10917.  
DOROTHY SHOEMAKER MCDIARMID, 390 Maple Ave., East Vienna, Va. 22180.  
CHARLES C. PRICE, III, 118 Hilldale Road, Lansdowne, Pa. 19050.  
\*EDWIN M. BUSH, JR., 120 S. La Salle, Chicago, Illinois 60603.  
\*MARY B. NEWMAN, 5 Willard Street, Cambridge, Mass. 02138.

*Term Expires December, 1971*

- CARL K. DELLMUTH, The Fidelity Bank, Philadelphia, Pa. 19109.  
STEPHEN G. LAX, G-L Industries, Westville, N. J. 08093.  
ISABEL LOGAN LYON, 70 East 90th Street, New York, N. Y. 10028.  
WILLIAM POOLE, 350 Delaware Trust Bldg., Wilmington, Del. 19801.  
HOWARD S. TURNER, Turner Construction Co., 150 E. 42nd Street, New York, N. Y. 10017.  
\*G. LUPTON BROOMELL, JR., Leeds and Northrup Co., North Wales, Pa. 19454.  
\*ANN LAPHAM FRAZER, 510 Beatty Road, Springfield, Pa. 19064.

COMMITTEES OF THE BOARD

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

*Executive*

BOYD T. BARNARD	KATHRYN SONNEBORN READ
ELEANOR STABLER CLARKE	PHILIP T. SHARPLES
CARL K. DELLMUTH	CLAUDE C. SMITH
H. THOMAS HALLOWELL, JR.	HOWARD S. TURNER
WILLIAM F. LEE	SUE THOMAS TURNER
THOMAS B. MCCABE	RICHARD B. WILLIS
CHARLES C. PRICE, III	HELEN GAWTHROP WORTH

*Finance and Trusts Administration*

RICHARD B. WILLIS	THOMAS B. MCCABE
CARL K. DELLMUTH	CLAUDE C. SMITH
H. THOMAS HALLOWELL, JR.	HOWARD S. TURNER

*Instruction and Libraries*

CHARLES C. PRICE, III	HADASSAH M. L. HOLCOMBE
CHARLES F. BARBER	WILLIAM POOLE
CARROLL G. BOWEN	CLAUDE C. SMITH
ESTHER RIDPATH DELAPLAINE	SUE THOMAS TURNER
KERMIT GORDON	HELEN GAWTHROP WORTH

\* Nominated by the Alumni Association.

### *Investment*

THOMAS B. McCABE  
BOYD T. BARNARD  
RICHARD C. BOND  
H. THOMAS HALLOWELL, JR.

J. LAWRENCE SHANE  
PHILIP T. SHARPLES  
RICHARD B. WILLIS

### *Property*

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BOYD T. BARNARD  
VIRGINIA STRATTON CORNELL  
MARY B. NEWMAN

KATHRYN SONNEBORN READ  
WALTER O. SIMON  
HOWARD S. TURNER  
ROBERT H. WILSON

### *Student Activities*

SUE THOMAS TURNER  
CARROLL G. BOWEN  
G. LUPTON BROOMELL, JR.  
EDWIN M. BUSH, JR.  
ELEANOR STABLER CLARKE  
ESTHER RIDPATH DELAPLAINE

ANN LAPHAM FRAZER  
STEPHEN G. LAX  
ISABEL LOGAN LYON  
DOROTHY SHOEMAKER McDIARMID  
HELEN SHILCOCK POST  
CLAUDE C. SMITH

### *Nominating*

RICHARD B. WILLIS  
VIRGINIA STRATTON CORNELL  
CARL K. DELLMUTH

ISABEL LOGAN LYON  
HELEN SHILCOCK POST  
HOWARD S. TURNER

### *Development*

CARL K. DELLMUTH  
VIRGINIA STRATTON CORNELL  
H. THOMAS HALLOWELL, JR.  
STEPHEN G. LAX  
WILLIAM F. LEE

ISABEL LOGAN LYON  
WILLIAM POOLE  
PHILIP T. SHARPLES  
WALTER O. SIMON  
ROBERT H. WILSON

## ALUMNI ASSOCIATION OFFICERS

1967-1969

- President*, THOMAS B. DARLINGTON '45, Box 156, New Lisbon, N. J. 08046.  
*Vice-President for Men*, JOHN L. DUGAN, JR. '43, 5 Hillside Ave., Short Hills, N. J. 07078.  
*Vice-President for Women*, CORNELIA CLARKE SCHMIDT '46, 147 Brookstone Dr., Princeton, N. J. 08540.  
*Secretary*, NANCY ROBINSON POSEL '51, 1060 Mill Rd. Cr., Jenkintown, Pa. 19046.

## ALUMNI COUNCIL

### TERM EXPIRES

#### JUNE

#### Zone A

- 1969 PETER W. KAISER '43, 921 Winding Lane, Media, Pa. 19063.  
J. LAWRENCE SHANE '56, 21 College Avenue, Swarthmore, Pa. 19081.  
LAWRENCE A. YEARSLEY '48, R. D. 3, Coatesville, Pa. 19320.  
1970 HENRY J. BODE '55, 18 Eastwood Dr., Wilbraham, Mass. 01095.  
THOMAS D. JONES, JR. '53, 212 Herrontown Rd., Princeton, N. J. 08540.  
1971 ALAN R. HUNT '51, 603 Ogden Ave., Swarthmore, Pa. 19081.  
JOHN A. MILLER, II '41, 913 Winding Lane, Media, Pa. 19063.  
1969 ELIZABETH DOBSON BROOMELL '37, Gypsy Hill & Evans Rd., Gwynedd Valley, Pa. 19437.  
BOLLING BYRD CLARKE '49, 430 Strath Haven Ave., Swarthmore, Pa. 19081.  
YVONNE MOTLEY McCABE '50, 412 Rogers Lane, Wallingford, Pa. 19086.  
1970 ESTHER JONES BISSELL '50, 634 W. Cliveden St., Philadelphia, Pa. 19119.  
MARGERY PAXSON JONES '56, 308 Woodbridge Lane, Media, Pa. 19063.  
1971 HOLLY ROSS DRAPER '37, 1625 Montgomery Ave., Villanova, Pa. 19085.  
RUTH WILCOX MAHLER '49, 258 Moore Street, Princeton, N. J. 08540.

#### Zone B

- 1969 JAMES H. BEARDSLEY '38, Pine Hill Drive, R. F. D. 1, Katonah, N. Y. 10536.  
1970 JEROME KOHLBERG, JR. '46, 4 Quarry Rd., Larchmont, N. Y. 10538.  
CHARLES N. STABLER '50, Box 306, Rocky Hill, New Jersey 08553.  
1971 STEPHEN L. BEERS '43, 19 Kelburne Ave., N. Tarrytown, N. Y. 10591.  
SAMUEL L. HAYES III '57, 560 Riverside Dr., New York, N. Y. 10027.  
1969 MURIEL ECKES ZACHARIAS '37, 433 Ridgefield Rd., Wilton, Conn. 06897.  
1970 GLORIA EVANS DILLENBECK '47, 236 Highland Ave., Upper Montclair, N. J. 07043.  
BARBARA MULLER ORNSTEIN '49, 1099 King Street, Greenwich, Conn. 06830.  
1971 ELINOR P. GRIEST '43, 24 E. Tenth St., New York, N. Y. 10003.  
TAMZIN MACDONALD MCMINN '58, 90 May Dr., Chatham, N. J. 07928.

#### Zone C

- 1969 THOMAS A. KERSHAW, II '60, 25 Chestnut Street, Boston, Mass. 02108.  
ELINOR JONES CLAPP '46, 309 Olney Street, Providence, R. I. 02906.

#### Zone D

- 1970 CHARLES A. CALDWELL '38, 1118 Basil Road, McLean, Va. 22101.  
1971 FRANK A. SIEVERTS '55, 4216 Mathewson Dr., N.W., Washington, D. C. 20011.  
1970 SALLY MACLELLAN COUNCILL '46, 5604 Newington Rd., Washington, D. C. 20016.  
1971 ELIZABETH GAWTHROP DONNELLY '43, 11 W. Kirke St., Chevy Chase, Md. 20015.

*Zone E*

- 1969 W. DEAN TRAUTMAN '42, 12 Pepperwood Lane, Cleveland, Ohio 44124.  
MARIANNE LEAS WOLFE '50, 7066 Woodland Road, Ben Avon, Pittsburgh,  
Pa. 15202.

*Zone F*

- 1970 JOSEPH P. BAKER '59, 1701 Lee Rd., Apt. 215c, Winter Park, Fla. 32789.  
ROBIN COOLEY KRIVANEK, 2802 Gaines Street, Tampa, Fla. 33618.

*Zone G*

- 1970 GEOFFREY C. HAZARD, JR. '53, 4808 S. Kimbark Ave., Chicago, Ill. 60615.  
1971 ORVILLE R. WRIGHT, JR. '54, 11009 Territorial Dr., Burnsville, Minn. 55378.  
1970 ELIZABETH DARBISHIRE MCNEILL '43, 5327 S. University Ave., Chicago, Ill.  
60615.  
1971 LAUDIE DIMMETTE PORTER '57, 202 Elm, Northfield, Minn. 55057.

*Zone H*

- 1969 WALTER M. DICKEY '61, 1749 Valpico Drive, San Jose, Calif. 95124.  
1971 RICHARD W. COLES '61, 508 Citadel Ave., Claremont, Calif. 91711.  
1969 ALICE RICKEY JAKLE '39, 11634 Winding Way, Los Altos, Calif. 94022.  
1971 BARBARA HADDAD RYAN '59, 1 Downing Street, Denver, Colo. 80218.

## THE FACULTY

- COURTNEY SMITH, *President* ..... 324 Cedar Lane  
 B.A., M.A. and Ph.D., Harvard University; LL.D., L.H.D., and Litt.D.
- EDWARD K. CRATSLY, *Vice-President (Finance), Controller, and Professor of Economics* ..... 741 Harvard 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* ..... 550 Elm Avenue  
 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., University of Oxford; 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* ..... 512 Ogden Avenue  
 B.A., Park College; B.D., Union Theological Seminary; M.A., Harvard University; Ph.D., Columbia University.
- ROBERT A. BARR, JR., *Dean of Men* ..... 109 Columbia Avenue  
 B.A., Swarthmore College; M.A., University of Pennsylvania.
- BARBARA PEARSON LANGE, *Dean of Women* ..... 1 Crum Ledge
- FREDERICK A. HARGADON, *Dean of Admissions and Lecturer in Political Science,*  
 Cunningham House  
 B.A., Haverford College.
- JAMES F. GOVAN, *Librarian* ..... 730 Yale Avenue  
 B.A., The University of the South; M.A., Emory University; Ph.D., The Johns Hopkins University.
- MARTHA A. CONNOR, *Associate Librarian* ..... 325 Dartmouth Avenue  
 B.S., M.A., University of Pennsylvania; B.S. in L.S., Drexel Institute.

### EMERITI

- MARY ALBERTSON, *Isaac H. Clothier Professor Emeritus of History and International Relations* ..... 505 Ogden Avenue  
 B.A., M.A. and Ph.D., Bryn Mawr College.
- LYDIA BAER, *Associate Professor Emeritus of German,*  
 Manatee River Hotel, Bradenton, Fla.  
 B.A., Oberlin College; M.A. and Ph.D., University of Pennsylvania.
- EDWARD H. COX, *Edmund Allen Professor Emeritus of Chemistry,* 509 Ogden Ave.  
 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., The Johns Hopkins University.
- MILAN W. GARRETT, *Professor Emeritus of Physics,*  
 101 Orchard Circle, Oak Ridge, Tenn.  
 B.A. and M.A. Stanford University; B.A. and D.Phil., University of Oxford.
- 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*,  
211 N. Princeton Avenue  
B.A., Huron College; M.A., University of Chicago; D.Litt., Huron College.
- HOWARD MALCOLM JENKINS, *Henry C. and J. Archer Turner Professor Emeritus  
of Engineering* ..... 506 North Chester Road  
B.A. and E.E. Swarthmore College.
- FREDRIC KLEES, *Professor Emeritus of English* ..... 220 South Chester Road  
B.A., Bowdoin College.
- OLGA LANG, *Associate Professor Emeritus of Russian*,  
352 W. 110th St., New York, N. Y.  
Graduate, University of Moscow; Ph.D., Columbia University.
- HAROLD M. MARCH, *Susan W. Lippincott Professor Emeritus of French*,  
18 Day St., Northampton, Mass.  
B.A., Princeton University; Ph.D., Yale University.
- EDITH PHILIPS, *Susan W. Lippincott Professor Emeritus of French*,  
517 Elm Avenue  
B.A., Goucher College; Docteur de l'Université de Paris.
- JAMES D. SORBER, *Professor Emeritus of Spanish* ..... 404 Walnut Lane  
B.A., Lehigh University; M.A., University of Nebraska.
- ALFRED J. SWAN, *Professor Emeritus of Music*,  
773 College Avenue, Haverford, Pa.  
B.A. and M.A., University of Oxford.
- CLAIR WILCOX, *Joseph Wharton Professor Emeritus of Political Economy*,  
510 Ogden Avenue  
B.S., University of Pennsylvania; M.A., Ohio State University; Ph.D., Uni-  
versity of Pennsylvania.
- ELIZABETH COX WRIGHT, *Professor Emeritus of English*,  
Rose Valley Road, Moylan, Pa.  
B.A., Wellesley College; M.A. and Ph.D., University of Pennsylvania.

#### PROFESSORS

- EDWIN ALLAIRE, *Visiting Professor of Philosophy* ..... Swarthmore College  
B.A., Drew University; M.A. and Ph.D., University of Iowa.
- MONROE C. BEARDSLEY, *Charles and Harriett Cox McDowell Professor of Phi-  
losophy* ..... 1916 Delancey Place, Philadelphia, Pa.  
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.
- WILHELM BECKER, *Visiting Professor of Astronomy* (University of Basel)  
Swarthmore College  
Dr. Phil., University of Berlin.
- ‡PAUL H. BEIK, *Centennial Professor of History* ..... 4 Whittier Place  
B.A., Union College; M.A. and Ph.D., Columbia University.
- HEINRICH BRINKMANN, *Albert L. and Edna Pownall Buffington Professor of  
Mathematics* ..... 403 Walnut Lane  
B.A., Stanford University; M.A. and Ph.D., Harvard University.
- SAMUEL T. CARPENTER, *Isaiab V. Williamson Professor of Civil and Mechanical  
Engineering* ..... 612 Ogden Avenue  
B.C.E., C.E. and M.S., Ohio State University.
- HILDE D. COHN, *Professor of German* ..... 302 North Chester Road  
Dr. Phil., University of Heidelberg.
- DAVID COWDEN, *Professor of English* ..... 312 Ogden Avenue  
B.A., Swarthmore College; M.A. and Ph.D., Harvard University.
- 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.
- E. J. FAULKNER, *Professor of Physical Education for Men* ... 235 Dickinson Avenue

‡ Absent on leave, 1968-69.

- EDWARD A. FEHNEL, *Professor of Chemistry* ..... 600 Elm Avenue  
B.S., M.S., and Ph.D., Lehigh University.
- JAMES A. FIELD, JR., *Isaac H. Clothier Professor of History* .. 612 Hillborn Avenue  
B.S., M.A. and Ph.D., Harvard University.
- LAUNCE J. FLEMISTER, *Professor of Zoology*,  
Rogers Lane and Plush Mill Road, Wallingford, Pa.  
B.A., M.A., and Ph.D., Duke University.
- ‡CHARLES E. GILBERT, *Professor of Political Science* ..... 223 Kenyon Avenue  
B.A., Haverford College; Ph.D., Northwestern University.
- WALTER B. KEIGHTON, JR., *Edmund Allen Professor of Chemistry*,  
311 Cedar Lane  
B.A., Swarthmore College; Ph.D., Princeton University.
- LAURENCE D. LAFORE, *Professor of History* ..... Swarthmore College  
B.A., Swarthmore College; M.A. and Ph.D., Fletcher School of Law and  
Diplomacy.
- †LUZERN G. LIVINGSTON, *Professor of Botany* ..... 15 Dartmouth Circle  
B.S., Lawrence College; Ph.D., University of Wisconsin.
- WILLEM J. LUYTEN, *Visiting Professor of Astronomy* (University of Minnesota)  
Swarthmore College  
Ph.D., University of Leiden.
- ‡FRANZ H. MAUTNER, *Professor of German* ..... 408 Walnut Lane  
Dr. Phil., University of Vienna.
- JOHN D. MCCRUMM, *Howard N. and Ada J. Eavenson Professor of Engineering*,  
506 North Chester Rd.  
B.A. and M.S., University of Colorado.
- NORMAN A. MEINKOTH, *Professor of Zoology*,  
431 West Woodland Avenue, Springfield, Pa.  
B. of Ed., Southern Illinois Teachers College; M.S. and Ph.D., University  
of Illinois.
- BERNARD MORRILL, *Henry C. and J. Archer Turner Professor of Engineering*,  
21 Oberlin Avenue  
B.S. in M.E., Massachusetts Institute of Technology; M.M.E., University of  
Delaware; Ph.D., University of Michigan.
- HELEN F. NORTH, *Centennial Professor of Classics* ..... 604 Ogden Avenue  
B.A., M.A., and Ph.D., Cornell University.
- MARTIN OSTWALD, *Professor of Classics* ..... 2 Whittier Place  
B.A., University of Toronto; M.A., University of Chicago; Ph.D., Columbia  
University.
- J. ROLAND PENNOCK, *Richter Professor of Political Science* .... 3 Whittier Place  
B.A., Swarthmore College; M.A. and Ph.D., Harvard University.
- FRANK C. PIERSON, *Joseph Wharton Professor of Political Economy*,  
740 Ogden Avenue  
B.A., Swarthmore College; Ph.D., Columbia University.
- HEDLEY H. RHYS, *Professor of Art History* ..... 512 Elm Avenue  
B.A., West Virginia University; M.A. and Ph.D., Harvard University.
- DAVID ROSEN, *Professor of Mathematics* ..... 336 North Princeton Avenue  
B.A., New York University; M.A. and Ph.D., University of Pennsylvania.
- DAVID L. ROSENHAN, *Professor of Psychology* ..... 5 Whittier Place  
B.A., Yeshiva College; M.A. and Ph.D., Columbia University.
- DAVID G. SMITH, *Professor of Political Science* ..... 915 Harvard Avenue  
B.A. and M.A., University of Oklahoma; Ph.D., The Johns Hopkins Uni-  
versity.
- FRANCIS P. TAFOYA, *Professor of French* ..... 635 North Chester Road  
B.A. and M.A., University of Colorado; Ph.D., Yale University.
- FREDERICK B. TOLLES, *Howard M. and Charles F. Jenkins Professor of Quaker  
History and Research and Director of the Friends Historical Library*,  
606 Elm Avenue  
B.A., M.A., and Ph.D., Harvard University; D.Litt., Haverford College.

‡ Absent on leave, 1968-69.

† Absent on leave, spring semester, 1968-69.



- PETER VAN DE KAMP, *Edward Hicks Magill Professor of Astronomy and Director of Sproul Observatory* ..... 15 Wellesley Road  
 Cand. and Docts., University of Utrecht; Ph.D., University of California;  
 D. Phil., University of Groningen.
- ROBERT M. WALKER, *Professor of Art History* ..... 212 Elm Avenue  
 B.A. and M.F.A., Princeton University; Ph.D., Harvard University.
- HANS WALLACH, *Centennial Professor of Psychology* ..... 604 Elm Avenue  
 Dr. Phil., University of Berlin.
- NEAL A. WEBER, *Professor of Zoology* ..... 1 Whittier Place  
 B.A., M.S., and D.Sc., University of North Dakota; M.A. and Ph.D., Harvard  
 University.
- HARRISON MORRIS WRIGHT, *Professor of History* ..... 319 Cedar Lane  
 B.A., M.A., and Ph.D., Harvard University.

#### ASSOCIATE PROFESSORS

- GEORGE C. AVERY, *Associate Professor of German* ..... 230 Haverford Avenue  
 B.A., M.A., and Ph.D., University of Pennsylvania.
- CARL BARUS, *Associate Professor of Electrical Engineering* .... 8 Whittier Place  
 B.A., Brown University; M.S. in E.E., Massachusetts Institute of Technology.
- DANIEL BENNETT, *Associate Professor of Philosophy* ..... 515 Elm Avenue  
 B.A., Harvard University; Ph.D., Stanford University.
- OLEXA-MYRON BILANIUK, *Associate Professor of Physics* ..... 4 Crum Ledge  
 Ingenieur, Université de Louvain; B.S.E., B.S., M.S., M.A., and Ph.D., Uni-  
 versity of Michigan.
- DAVID L. BOWLER, *Associate Professor of Electrical Engineering*,  
 505 Yale Avenue  
 B.S. in E.E., Bucknell University; M.S. in E.E., Massachusetts Institute of  
 Technology; M.A. and Ph.D., Princeton University.
- LEON BRAMSON, *Associate Professor of Sociology* ..... 333 Vassar Avenue  
 B.A. and M.A., University of Chicago; Ph.D., Harvard University.
- RAYMOND DOBY, *Associate Professor of Engineering* ..... Dartmouth House  
 B.M.E. and M.S., New York University; Ph.D., University of Pennsylvania.
- LEWIS H. ELVERSON, *Associate Professor of Physical Education for Men*,  
 6 Whittier Place  
 B.S., University of Pennsylvania.
- SHELDON FELDMAN, *Associate Professor of Psychology* ..... Swarthmore College  
 B.A., Northwestern University; Ph.D., Yale University.
- ALAN FRIEDMAN, *Associate Professor of English* ..... Swarthmore College  
 B.A., Harvard University; M.A., University of California, Berkeley; Ph.D.,  
 Columbia University.
- †KENNETH J. GERGEN, *Associate Professor of Psychology* .... 602 Elm Avenue  
 B.A., Yale University; Ph.D., Duke University.
- MARK A. HEALD, *Associate Professor of Physics* ..... 420 Rutgers Avenue  
 B.A., Oberlin College; M.S. and Ph.D., Yale University.
- STEVENS HECKSCHER, *Associate Professor of Mathematics*,  
 Pritchard Lane, Wallingford, Pa.  
 B.A., M.A., and Ph.D., Harvard University.
- ELEANOR K. HESS, *Associate Professor of Physical Education for Women*,  
 302 N. Chester Road  
 B.S. and M.S., University of Pennsylvania.
- TIMOTHY K. KITAO, *Associate Professor of Art History* .. 317 North Chester Road  
 B.A. and M.A., University of California, Berkeley; Ph.D., Harvard Uni-  
 versity.
- GEORGE KRUGOVOY, *Associate Professor of Russian* ..... 6 Crum Ledge  
 B.A., M.A., and Ph.D., Philosophical Institute, Salzburg, Austria.
- GERALD R. LEVIN, *Associate Professor of Psychology* ..... 511 Cornell Avenue  
 B.A., Antioch College; M.A. and Ph.D., Columbia University.

† Absent on leave, 1968-69.



- ‡PAUL C. MANGELSDORF, JR., *Associate Professor of Physics* . . . 110 Cornell Ave.  
B.A., Swarthmore College; Ph.D., Harvard University.
- PHILIP METZIDAKIS, *Associate Professor of Spanish* . . . . . 7 Crum Ledge  
B.A., Dartmouth College; Ph.D., Yale University.
- IRENE MOLL, *Associate Professor of Physical Education for Women*,  
The Damsite, Wallingford, Pa.  
B.S. in Ed., University of Kansas; M.A., Texas University for Women.
- VAN DOORN OOMS, *Associate Professor of Economics* . . . . . 8B Whittier Place  
B.A., Amherst College; B.A., University of Oxford; Ph.D., Yale University.
- †HAROLD PAGLIARO, *Associate Professor of English*,  
61 Sproul Road, Springfield, Pa.  
B.A., M.A., and Ph.D., Columbia University.
- DEAN PEABODY, *Associate Professor of Psychology* . . . . . 521 Elm Avenue  
B.A., Swarthmore College; Ph.D., Harvard University.
- JEAN ASHMEAD PERKINS, *Associate Professor of French*,  
446 Robin Drive, West Chester, Pa.  
B.A., Swarthmore College; M.A. and Ph.D., Columbia University.
- †FREDERIC L. PRYOR, *Associate Professor of Economics* . . . . . 3 Crum Ledge  
B.A., Oberlin College; M.A. and Ph.D., Yale University.
- KENNETH S. RAWSON, *Associate Professor of Zoology* . . . . . 228 Garrett Avenue  
B.A., Swarthmore College; M.S., Cornell University; Ph.D., Harvard University.
- ALBURT M. ROSENBERG, *Associate Professor of Natural Science*,  
609 Hillborn Avenue  
B.A., Harvard University; M.S., University of Florida; Ph.D., University of Pennsylvania.
- BERNARD SAFFRAN, *Associate Professor of Economics* . . . Benjamin West House  
B.A., The City College of New York; Ph.D., University of Minnesota.
- CLAUDIO SPIES, *Associate Professor of Music* . . . . . 645 North Chester Road  
B.A. and M.A., Harvard University.
- WILLIS J. STETSON, *Associate Professor of Physical Education for Men and Director of Athletics* . . . . . 144 North Highland Road, Springfield, Pa.  
B.A., Swarthmore College; M.A., University of Pennsylvania.
- PETER GRAM SWING, *Associate Professor of Music and Director of the Chorus*,  
614 Hillborn Avenue  
B.A. and M.A., Harvard University.
- PETER T. THOMPSON, *Associate Professor of Chemistry* . 925 Strath Haven Avenue  
B.A., The John Hopkins University; Ph.D., University of Pittsburgh.
- PERCY LINWOOD URBAN, JR., *Associate Professor of Religion*,  
20 South Princeton Avenue  
B.A., Princeton University; S.T.B., S.T.M., and Th.D., General Theological Seminary.
- †JOHN W. WILLIAMS, *Associate Professor of Art History*,  
302 Avondale Road, Wallingford, Pa.  
B.A., Yale University; M.A. and Ph.D., University of Michigan.
- M. JOSEPH WILLIS, *Associate Professor of Civil Engineering*,  
306 Chestnut Lane  
B.C.E., University of Washington; M.S., Cornell University; Ph.D., The Johns Hopkins University.

#### ASSISTANT PROFESSORS

- THOMAS ARTIN, *Assistant Professor of English* . . . . . Box 59, Moylan, Pa.  
B.A., M.A., and Ph.D., Princeton University.
- ELISA ASENSIO, *Assistant Professor of Spanish* . . 500 Oakley Road, Haverford, Pa.  
M.A., Middlebury College.
- ROBERT C. BANNISTER, *Assistant Professor of History* . . . . . 513 Elm Avenue  
B.A. and Ph.D., Yale University; B.A. and M.A., University of Oxford.

‡ Absent on leave, 1968-69.

† Absent on leave, spring semester, 1968-69.

- THOMAS H. BLACKBURN, *Assistant Professor of English* . . . . . 525 Elm Avenue  
B.A., Amherst College; B.A. and M.A., University of Oxford; Ph.D., Stanford University.
- JOHN R. BOCCIO, *Assistant Professor of Physics* . . . . . 311 Dartmouth Avenue  
B.S., Polytechnic Institute of Brooklyn; Ph.D., Cornell University.
- THOMPSON BRADLEY, *Assistant Professor of Russian*,  
240 Ridley Creek Road, Moylan, Pa.  
B.A., Yale University; M.A., Columbia University.
- CYRUS D. CANTRELL, III, *Assistant Professor of Physics* . . . . . 519 Walnut Lane  
B.A., Harvard University; M.A. and Ph.D., Princeton University.
- GOMER H. DAVIES, *Assistant Professor of Physical Education for Men*,  
225 Cornell Avenue  
B.S., East Stroudsburg State College; Ed.M., Temple University.
- ROLAND B. DI FRANCO, *Assistant Professor of Mathematics*,  
317 North Chester Road  
B.S., Fordham University; M.S., Rutgers University; Ph.D., Indiana University.
- LEWIS R. GATY, II, *Assistant Professor of Economics* . . . . . Swarthmore College  
B.A., Swarthmore College.
- ‡JAMES H. HAMMONS, *Assistant Professor of Chemistry* . . . 336 Haverford Place  
B.A., Amherst College; M.A. and Ph.D., The Johns Hopkins University.
- THOMAS W. HAWKINS, JR., *Assistant Professor of Mathematics* . . 515 Elm Avenue  
B.A., Houghton College; M.S., University of Rochester; Ph.D., University of Wisconsin.
- PATRICK HENRY, III, *Assistant Professor of Religion* . . 317 North Chester Road  
B.A., Harvard University; B.A. and M.A., University of Oxford; M.A. and Ph.D., Yale University.
- RAYMOND F. HOPKINS, *Assistant Professor of Political Science* . . 2 Crum Ledge  
B.A., Ohio Wesleyan University; M.A., Ohio State University; M.A. and Ph.D., Yale University.
- JAMES R. HUTCHISON, *Assistant Professor of Chemistry* . . Benjamin West House  
B.S., Wittenberg University; Ph.D., Princeton University.
- JOHN B. JENKINS, *Assistant Professor of Biology* . . . . . 318 North Chester Road  
B.S. and M.S., Utah State University; Ph.D., University of California, Los Angeles.
- ‡ROBERT O. KEOHANE, *Assistant Professor of Political Science*,  
317 North Chester Road  
B.A., Shimer College; M.A. and Ph.D., Harvard University.
- ‡EUGENE A. KLOTZ, *Assistant Professor of Mathematics* . . . . . 735 Yale Avenue  
B.S., Antioch College; Ph.D., Yale University.
- ASMAROM LEGESSE, *Assistant Professor of Anthropology* . 317 North Chester Road  
B.A., University College of Addis Ababa; Ed.M., Harvard University.
- ROBERT E. LEYON, *Assistant Professor of Chemistry* . . . . . 519 Walnut Lane  
B.A., Williams College; M.A. and Ph.D., Princeton University.
- RICHARD W. MANSBACH, *Assistant Professor of Political Science* . 4 Whittier Place  
B.A., Swarthmore College; D.Phil., University of Oxford.
- ‡GEORGE E. MCCULLY, *Assistant Professor of History* . . . . . 915 Harvard Avenue  
B.A., Brown University; M.A. and Ph.D., Columbia University.
- ROBERT C. MITCHELL, *Assistant Professor of Sociology*,  
16 South Princeton Avenue  
B.A., College of Wooster; B.D., Union Theological Seminary; M.A., Northwestern University.
- THOMAS N. MITCHELL, *Assistant Professor of Classics* . . 317 North Chester Road  
B.A. and M.A., National University of Ireland; Ph.D., Cornell University
- ‡HANS F. OBERDIEK, *Assistant Professor of Philosophy* . . . . . 533 Riverview Road  
B.S. and Ph.D., University of Wisconsin.
- G. STUART PATTERSON, JR., *Assistant Professor of Engineering*,  
606 North Chester Road  
B.S. and M.S., Massachusetts Institute of Technology; Ph.D., The Johns Hopkins University.

‡ Absent on leave, 1968-69.

- STEVEN I. PIKER, *Assistant Professor of Anthropology* ..... 5 Crum Ledge  
 B.A., Reed College; Ph.D., University of Washington.
- CHARLES RAFF, *Assistant Professor of Philosophy* ... 302 North Chester Road  
 B.A., University of Rochester; M.A. and Ph.D., Brown University.
- ROBERT ROZA, *Assistant Professor of French* ..... 404 Strath Haven Avenue  
 B.A., University of Toronto; M.A. and Ph.D., Princeton University.
- ROBERT E. SAVAGE, *Assistant Professor of Biology* ..... 409 College Avenue  
 B.A., Oberlin College; M.S. and Ph.D., University of Wisconsin.
- RICHARD SCHULDENFREI, *Assistant Professor of Philosophy* .. Swarthmore College  
 B.A. and M.A., University of Pennsylvania.
- VICTOR K. SCHUTZ, *Assistant Professor of Engineering*,  
 1317 Grenox Road, Wynnewood, Pa.  
 B.E.E., and M.A. in Mathematics, University of Detroit; Ph.D., University  
 of Pennsylvania.
- †J. EDWARD SKEATH, *Assistant Professor of Mathematics*,  
 11 Benjamin West Avenue  
 B.A., Swarthmore College; M.A. and Ph.D., University of Illinois.
- BERNARD S. SMITH, *Assistant Professor of History* ..... 540 Walnut Lane  
 B.A. and M.A., University of Oxford; Ph.D., Harvard University.
- SUSAN BROOKE SNYDER, *Assistant Professor of English* ..... 519 Walnut Lane  
 B.A., Hunter College; M.A. and Ph.D., Columbia University.
- RICHARD TERDIMAN, *Assistant Professor of French* ..... 409½ Elm Avenue  
 B.A., Amherst College; Ph.D., Yale University.
- NICHOLAS S. THOMPSON, *Assistant Professor of Psychology* . . 307 Vassar Avenue  
 B.A. and Ph.D., University of California, Berkeley.
- JOHN G. WILLIAMSON, *Assistant Professor of History* ... 313 Haverford Place  
 B.A., Cornell University; Ph.D., The Johns Hopkins University.
- CLAUDE WINTNER, *Assistant Professor of Chemistry* ..... 404 Elm Avenue  
 B.A., Princeton University; M.A. and Ph.D., Harvard University.
- JAMES T. WOOD, *Assistant Professor of Mathematics* ... 317 North Chester Road  
 B.A., Amherst College; M.A. and Ph.D., University of Pennsylvania.
- MARY ANN YOUNG, *Assistant Professor of Physical Education for Women*,  
 Swarthmore College  
 B.S., Slippery Rock State College.
- TSING YUAN, *Assistant Professor of History*,  
 842 Windemere Avenue, Drexel Hill, Pa.  
 B.A. and M.A., George Washington University.

INSTRUCTORS

- JOSEPH W. BERNHEIM, *Instructor in Psychology* ..... Swarthmore College  
 B.A., Swarthmore College.
- MOLLY FARIES, *Instructor in Art History* ..... Swarthmore College  
 B.A., College of Wooster; M.A., University of Michigan.
- JAMES D. FREEMAN, *Instructor in Music and Director of the Orchestra*,  
 8 Crum Ledge  
 B.A. and M.A., Harvard University.
- EWALD E. HAEUSSER, *Instructor in German*,  
 1121 S. 48th Street, Philadelphia, Pa.  
 B.A. and M.A., University of Pennsylvania.
- UWE HENKE, *Instructor in Philosophy* .... 3500 Race Street, Philadelphia, Pa.  
 M.A., University of Pennsylvania.
- PAUL LUTZKER, *Instructor in Political Science* ..... Swarthmore College  
 B.A., University of Pennsylvania; M.A., The Johns Hopkins University.
- VICTOR C. NOVICK, *Instructor in Anthropology* ..... 215 Cornell Avenue  
 B.A., Reed College.
- GILBERT ROSE, *Instructor in Classics* ..... 22 West Ridge Road, Media, Pa.  
 B.A., University of California, Berkeley.
- JOHN S. SHACKFORD, *Instructor in English* ..... Swarthmore College  
 B.A., Carleton College; M.A., Indiana University.

† Absent on leave, 1968-69.

- THOMAS L. SHERMAN, *Instructor in English* . . . . . 915 Harvard Avenue  
 B.A., Yale University; M.A., Stanford University.
- SIMONE V. SMITH, *Instructor in French*,  
 514 East Lancaster Ave., Wynnewood, Pa.  
 Licence ès Lettres, University of Grenoble.
- JON VAN TIL, *Instructor in Sociology* . . . . . Swarthmore College  
 B.A., Swarthmore College; M.A., University of North Carolina.
- DOUGLAS M. WEISS, *Instructor in Physical Education for Men*,  
 Swarthmore College

#### LECTURERS AND ASSISTANTS

- MARCUS ALEXIS, *Visiting Lecturer in Economics*, (University of Rochester)  
 Swarthmore College  
 B.A., Brooklyn College; M.A., Michigan State University; Ph.D., University of Minnesota.
- HARRIET SHORR BAGUSKAS, *Acting Director of Studio Arts*,  
 Price's Lane, Moylan, Pa.  
 B.A., Swarthmore College; B.F.A., Yale School of Art and Architecture.
- PATRICIA BOYER, *Lecturer in Physical Education for Women*,  
 817 Parkridge Drive, Media, Pa.  
 B.S., Trenton State College; M.A., New York University.
- ALICE BRODHEAD, *Lecturer in Education and Director of Student Teaching*,  
 316 Ogden Avenue  
 B.S. and M.A., University of Pennsylvania.
- WILL BROWN, *Associate in Studio Arts* . . . 429 Catherine St., Philadelphia, Pa.
- BROOKE P. COTTMAN, *Assistant in Physical Education for Men*,  
 315 Yale Avenue  
 B.A., Duke University.
- BARBARA PAGE ELMORE, *Associate in Studio Arts* . . . . . 525 Walnut Lane
- GLORIA CAREY EVANS, *Consultant for Testing and Guidance*,  
 205 Linden Lane, Wallingford, Pa.  
 B.A., Western Washington College of Education; M.S., University of Washington; Ph.D., Stanford University.
- JANICE C. FELLMAN, *Lecturer in Physical Education for Women*,  
 2401 Martingale Rd., Media, Pa.  
 B.S., Ursinus College.
- NORRIS M. GETTY, *Visiting Lecturer in Classics* (Groton School)  
 Swarthmore College  
 B.A., University of Nebraska.
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 110 Cornell Avenue  
 B.A., Eastern Mennonite College; M.A., University of Virginia.
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 Featherbed Lane, Haverford, Pa.  
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- GILBERT KALISH, *Associate in Performance* (Music) . . . . . Swarthmore College  
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Cobbs, Cohn, Cook, Govan, Richard Hegner '71, Roza, Diana Wickes '70.

### COLLECTION: Shane, *Chairman*.

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di Franco, Lippincott, Rawson, Rose, N. Thompson, Tolles.

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Bowie, Bullitt (Assistant to Chairman), Hutchison, Piker, Rosen, Stott, Weber, Williamson.

\* Undergraduate members of committees are shown with their class numerals.



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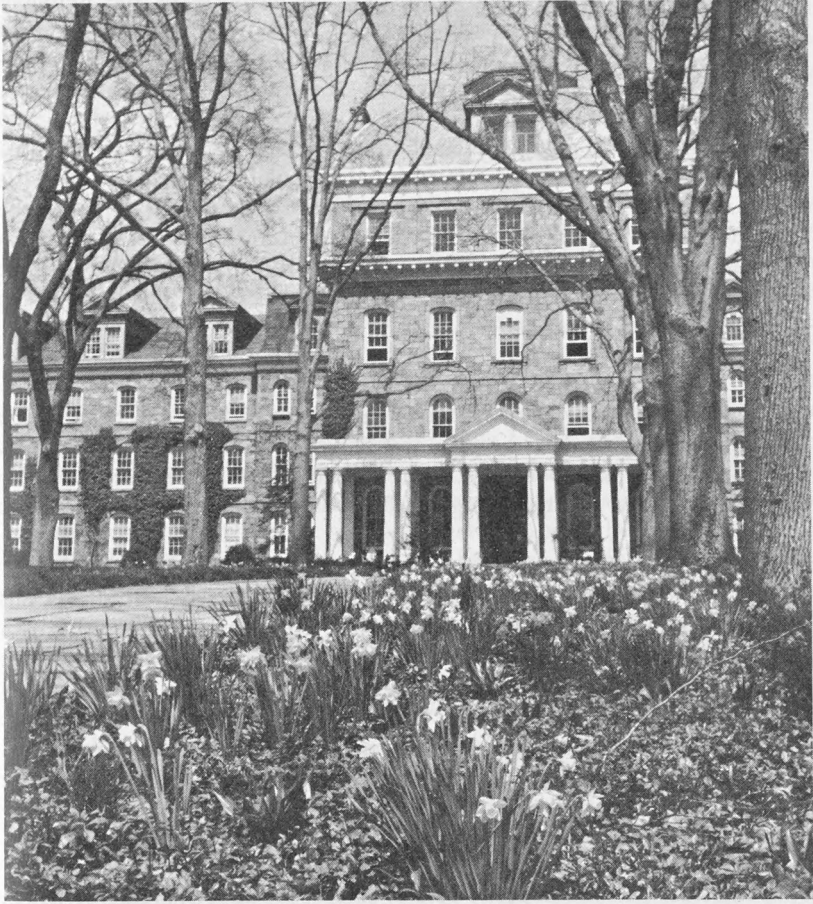
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*Parrish Hall*

## INTRODUCTION TO

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# 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. It is a small college by deliberate policy. Its present enrollment is about 1075 students, of whom 500 are women and 575 are men. The borough of Swarthmore is a 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.

### TRADITION AND CHANGE

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.

In the spring and summer of 1966 a Commission on Educational Policy and two other special committees were appointed to study various aspects of the College program and to seek ways of strengthening the educational experiences of Swarthmore students. Their reports, including many specific recommendations, were published in the volume, *Critique of a College*, which appeared in December 1967. During the rest of the college year these reports and recommendations were carefully considered by all sections of the College community. Many of the specific recommendations of the Commission on Educational Policy and the Special Committee on Library Policy have been approved and are being carried into effect. The report of the Special Committee on Student Life will be considered further and acted upon in the fall of 1968.



## ADMISSION

Inquiries concerning admission and applications should be addressed to the Dean 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.

It is 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. The college is also concerned to include in each class sons and daughters of alumni and of members of the Society of Friends.

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 secondary school program preparatory to advanced liberal study. Under exceptional circumstances, students who have virtually completed the normal four-year program in three years will be considered for admission, provided they meet the competition of other candidates in general maturity as well as readiness for a rigorous academic program.

All applicants are selected on the following evidence:

1. Record in secondary school.
2. Recommendations from the school principal, headmaster, or guidance counselor and from two teachers.
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 mathematics.
  - c. The use of one, or two, foreign languages to the point of reading prose of average difficulty. The College encourages students to study at least one language for three years or, if possible, for four years in high school.
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, Russian, 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

The closing date for applications is February 1. A preliminary application card will be sent upon request, and this card should be returned promptly, together with the (non-refundable) application fee of \$15.00. A complete set of application papers is then sent. Applicants are encouraged to send their completed applications to the College as early in the fall of their senior year as possible. Although Swarthmore does not have an "early decision" program, preliminary readings of completed applications are made at an early date to determine regional and national award winners.

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 normally be taken in November, 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 should be chosen by the candidate from two different fields. Applicants for Engineering must take one achievement test in Mathematics.

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 it is strongly recommended that the English Composition and at least one other Achievement Test be taken in December or January of the senior year.

In 1968-69 these tests will be given in various centers throughout this country on November 2, December 7, January 11, March 1, May 3, and July 12. The tests will be given abroad on each of these dates except November 2. 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, provinces, and Pacific areas—Alaska, Arizona, California, Colorado, Hawaii, Idaho, Montana, Nevada, New Mexico, Oregon, Utah, Washington, Wyoming, 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 1025, Berkeley, 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. All applicants who would like to be considered for any of our scholarships should complete their applications at the earliest possible date. Information concerning financial aid will be found on pages 37-46.

## THE INTERVIEW

An admissions interview with a representative of the College is a requirement in making application to Swarthmore. Applicants are expected to take the initiative in arranging for this interview. Those who can reach Swarthmore with no more than a half day's trip are urged to make an appointment to visit the College for this purpose.\* Other applicants should request the Office of Admissions to arrange a meeting with an

\* To reach the College from the New Jersey Turnpike, motorists should leave by Exit 4 (Camden-Philadelphia Interchange). Turn right on Route 73. In about one hundred feet turn right for Interstate Route 295 South, and follow signs for Walt Whitman Bridge. After crossing Bridge follow signs for Philadelphia International Airport, Route 291. Follow Route 291 past Airport to 420. Turn right on 420 to Baltimore Pike, turn left and proceed to intersection with Route 320. Turn left and follow signs to the College. From the Pennsylvania Turnpike, take Exit 24 (Valley Forge) and take second right (sign says Ardmore, Chester) off Route 43 on to Route 23. Turn right on Route 320 and follow it to the campus.

alumni representative in their own area. Interviews should be completed before March 1 of the senior year. Scholarship applicants should make an effort to have their interviews by January 15. Candidates are not interviewed until the latter part of the junior year. Candidates will not be able to have campus interviews from March 15 to May 1 but a tour of the campus may be arranged during this period. Appointments at the College can be made by calling or writing the Office of Admissions, KI 3-0200, Ext. 445.

#### ADMISSION DECISIONS

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

#### ADVANCED PLACEMENT

Freshmen may apply for advanced standing or placement in particular courses if they have taken college level courses and the Advanced Placement Tests of the College Entrance Examination Board. Decisions are made by the departments concerned. Every effort is made to place students in the most advanced courses for which they are qualified.

#### APPLICATIONS FOR TRANSFER

The college accepts a very limited number of transfer students. 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. Applications 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. Only under exceptional circumstances are students admitted for transfer eligible for financial assistance during their first year at Swarthmore.

## EXPENSES

Charges for the academic year 1968-69 (two semesters):

Tuition .....	\$2,050
General Fee .....	210
Board and Room .....	1,040
<hr/>	
Total Resident Charges .....	\$3,300*

While a general charge for board and room is made, this may be divided into \$590 for board and \$450 for room. The general fee of \$210 covers the cost of student health services, library and laboratory fees, athletic fees, attendance at all campus social and cultural events, and the support of most 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, Associate Controller.

Students who wish to charge Book Store purchases, laboratory break-age 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 \$100.00 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  $2\frac{3}{4}\%$  to  $6\%$  greater than when payments are made in cash in advance. Details of the plans will be

\* 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.

furnished by the College prior to issuance of the first semester's bill in September.

#### ACCIDENT AND SICKNESS INSURANCE

The college makes available both accident and accident and sickness insurance to students through Paige O'Brien Russell of Boston, Massachusetts. Accident coverage alone costs \$12.00 per year (12 months) for women, and \$18.00 for men. The combined accident and sickness policy is available at an annual cost of \$32.50 for women and \$36.00 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.

#### FINANCIAL AID

The college assigns 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 one hundred freshman scholarships are awarded carrying stipends varying from \$100 to \$3,400 annually. Approximately thirty per cent of the total student body are currently receiving scholarship aid from the College, with stipends averaging about \$1,300 annually. Another ten to fifteen per cent are being assisted from sources outside the College.

All grants 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. Entering students seeking financial assistance are required to submit a Parents Confidential Statement to the Service. This form may be obtained from a secondary school or from the College Scholarship Service, P. O. Box 176, Princeton, New Jersey 08540, Box 881, Evanston, Illinois 60204, or P. O. Box 1025, Berkeley, California 94701. The Scholarship Committee reviews the financial situation and academic progress of every scholarship holder at the end of each academic year before renewing the awards. In computing stipends the committee takes into account an expected family contribution from income and assets, the student's savings and earnings. These are budgeted against a normal total expense of \$3,750 for the college year. This allows \$450 for incidental expenses exclusive of travel and for the total college charge of \$3,300, which includes tuition, board and room, and a very comprehensive college fee. This covers not only the usual student services (health, library, laboratory) but also attendance at all campus social, cultural and athletic events, and support of most club activities. 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 1968-69 the college has granted approximately \$550,000 in scholarships. About two-thirds of that sum was provided by special gifts and the endowed scholarships listed below. Funds from the federal government are available for needy students who are eligible for Educational Opportunity Grants, National Defense Student Loans, and the Work-Study program. 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. *Financial need is a requirement for all scholarships listed below unless otherwise indicated.*

#### SWARTHMORE COLLEGE NATIONAL SCHOLARSHIPS

Swarthmore College awards each year a number of four-year National Scholarships to the men and women entering the freshman class. All candidates for admission to the College may be considered for these scholarships. Based on the general plan of the Rhodes Scholarships, the awards are made to those candidates who, in the opinion of the Committee of Award, rank highest in scholarship, character and personality. Whenever feasible, finalists for National Scholarships will be interviewed by the Committee of Award.

The amount of the annual award varies from \$100 to \$3,400 according to the financial need of the winner. In those cases where there is no financial need, National Scholarships will be awarded on an honorary basis and carry an annual stipend of \$100.

#### OTHER SCHOLARSHIPS OPEN TO MEN AND WOMEN

THE FRANK AND MARIE AYDELOTTE SCHOLARSHIP is awarded biennially to a new student who shows promise of distinguished intellectual attainment based upon sound character and effective personality. 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 CURTIS BOK SCHOLARSHIP was established in the College's Centennial Year 1964 in honor of the late Philadelphia attorney, author and jurist, who was a Quaker and honorary alumnus of Swarthmore. The scholarship is assigned annually to a junior or senior man or woman whose qualities of mind and character indicate a potential for humanitarian service such as Curtis Bok himself rendered and would have wished to develop in young people. Students in any field of study, and from any part of this country or from abroad, are eligible. The scholarship is renewable until graduation.



The EDNA POWNALL BUFFINGTON FUND was established during the College's Centennial Year of 1964. The income from this Fund is used to provide scholarships for a student or students attending Swarthmore College who are concentrating their studies in the field of the social sciences and who indicate an interest in the objects or purposes of the American Friends Service Committee and a desire following their graduation and post-graduate work to serve in those fields. Awards are made to students in any of the four classes.

The KATHARINE SCHERMAN SCHOLARSHIP, is awarded to a student with a primary interest in the arts and the humanities, having special talents in these fields. Students with other special interests, however, will not be excluded from consideration. Awarded in honor of Katharine Scherman, of the Class of 1938, it is renewable for the full period of undergraduate study.

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 \$1,500 for each of his last two years in college, regardless of financial need.

The FRANCIS W. D'OLIER SCHOLARSHIP, in memory of Francis W. D'Olier of the Class of 1907, is awarded to a freshman man or woman. In making selections, the committee will place emphasis on character, personality and ability.

The STELLA AND CHARLES GUTTMAN FOUNDATION SCHOLARSHIPS were established in 1964 by a grant from the Foundation to provide scholarships to defray all or part of the cost of tuition and fees for students who require financial assistance. Preference is given to students of recognized ability who have completed two academic years of college and who are contemplating graduate or professional study. The scholarships are renewable for a second year.

The IDA AND DANIEL LANG SCHOLARSHIP established by their son, Eugene M. Lang of the Class of 1938, provides financial assistance for a man or woman who ranks high in scholarship, character and personality.

The ADELE MILLS RILEY MEMORIAL SCHOLARSHIP, founded by her husband, John R. Riley, was awarded for the first time for the academic year 1964-65. Under the provisions of this scholarship, an annual award subject to renewal is made to a deserving student, man or woman. Selection stresses the candidate's capacity for significant development of his or her interests and talents during the college years. Qualities of intellectual promise as well as potential for service are sought in making this appointment.

The WILLIAM HILLES WARD SCHOLARSHIP in memory of William Hilles Ward of the Class of 1915, is to be awarded annually, preferably to a student who plans to major in science. The committee in making its selection, will have regard for candidates who are most deserving of financial assistance.

The HOWARD S. AND GERTRUDE P. EVANS SCHOLARSHIP FUND provides scholarships for worthy students, preference being given to students showing highest standards in scholarship from high schools of Delaware County, Pennsylvania.

The CLINTON G. SHAFER SCHOLARSHIP endowed by his family in memory of Clinton G. Shafer, of the Class of 1951, is open to students interested in engineering and physical science. The committee in making its selections will have regard for character, personality and leadership.

The ROBERT C. BROOKS SCHOLARSHIP was established as a memorial to Professor Brooks by a number of his former students. It is available to a major in Political Science in the junior or senior year.

The LOUIS N. ROBINSON SCHOLARSHIP was established during the College's Centennial year by the family and friends of Louis N. Robinson. Mr. Robinson was for many years a member of the Swarthmore College faculty and founder of the Economics Discussion Group. A member of the junior or senior class who has demonstrated interest and ability in the study of Economics is chosen for this award.

The AUDREY FRIEDMAN TROY SCHOLARSHIP, established by her husband, Melvin B. Troy '48, is awarded to a freshman man or woman with preference given to residents of the town of North Hempstead, Nassau County, New York. The scholarship is renewable for four years at the discretion of the College. In awarding the scholarship, prime consideration is given to the ability of the prospective scholar to profit from a Swarthmore education, and to be a contributor to the College and ultimately to society.

The GENERAL MOTORS SCHOLARSHIP is awarded in odd numbered years by the Scholarship Committee to an incoming freshman man or woman who is a citizen of the United States. Selection is made on the basis of the high school academic record, participation in extracurricular activities, and evidence of leadership qualities. It is renewable for the full period of undergraduate study.

The MIDWEST SCHOLARSHIPS are awarded each year to one man and one woman applicant who resides in Illinois, Indiana, Iowa, Michigan, Minnesota, Missouri or Wisconsin. Winners will be selected on the basis of their potential contribution to the academic and extracurricular life of the College.



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

The RCA SCHOLARSHIP, provided by the Radio Corporation of America, is awarded to a young man or woman who is making a creditable academic record in the field of science or engineering at the undergraduate level. The appointment is usually made for the junior or senior year.

The E. HIBBERD LAWRENCE SCHOLARSHIP provides for a scholarship to an incoming freshman man or woman who ranks high in scholarship, character, and personality.

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.

The CORNELIA CHAPMAN PITTINGER SCHOLARSHIP established by her family and friends is awarded to an incoming freshman man or woman who ranks high in scholarship, character and personality and who has need for financial assistance.

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

The EDWARD CLARKSON WILSON AND ELIZABETH T. WILSON SCHOLARSHIP provides financial aid for a deserving student.

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 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. The 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 PHEBE ANNA THORNE FUND provides an income for scholarships for students 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 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.

**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 are descendants of Amand and Margaret White Lafore.

**THE JAMES E. MILLER SCHOLARSHIP**. Under the will of Arabella M. Miller funds are available annually for students from Delaware County (with preference for residents of Nether Providence Township).

**THE EDWARD CLARKSON WILSON 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 annually to a member of the freshman class. Preference is given to daughters or sons of members of the fraternity.

**THE DELTA GAMMA SCHOLARSHIP** is to be awarded to a blind student at Swarthmore College. 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 to a member of the freshman class. Preference is given to relatives of members of the fraternity.

**THE SAMUEL WILLETS FUND**. This fund provides an annual income for scholarships. A portion of the fund is assigned for scholarships in the name of Mrs. Willets' children, Frederick Willets, Edward Willets, Walter Willets, and Caroline W. Frame.

**THE I. V. WILLIAMSON SCHOLARSHIP**. 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 ROBERT PYLE SCHOLARSHIP** was established by his sisters, Margery Pyle and Ellen Pyle Groff, in memory of Robert Pyle of the Class of 1897 and for many years a member of the Board of Managers. Applicants who show promise of intellectual attainment based upon sound character and effective personality and who reside in Chester County are given preference.

The N. HARVEY COLLISON SCHOLARSHIP established by his family and the Olin Mathieson Charitable Trust in memory of N. Harvey Collison of the Class of 1922 is awarded to a freshman man or woman. In making selections the committee will place emphasis on character, personality and ability.

The income from each of the following funds is awarded at the discretion of the college.

- The BARCLAY G. ATKINSON SCHOLARSHIP FUND.
- The REBECCA M. ATKINSON SCHOLARSHIP FUND.
- The CLASS OF 1913 SCHOLARSHIP FUND.
- The CLASS OF 1914 SCHOLARSHIP FUND.
- The CLASS OF 1915 SCHOLARSHIP FUND.
- The CLASS OF 1917 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 READER'S DIGEST FOUNDATION ENDOWED 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.

#### SCHOLARSHIPS FOR MEN

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 \$2,050 (tuition) or up to \$3,400 depending on need, will be made to residents of Delaware or the Eastern Shore counties of Maryland or Virginia. Non-residents attending school in this area are also eligible. One award, providing an annual grant of up to \$3,400 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 selec-

tions, 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.

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 NEWTON E. TARBLE AWARD, established by Newton E. Tarble of the Class of 1913, is granted to a freshman man who gives promise of leadership, ranks high in scholarship, character and personality, and resides west of the Mississippi River or south of Springfield in the State of Illinois.

The BOOK AND KEY SCHOLARSHIP, established by the Book and Key men's senior honorary society in 1965 when the Society dissolved itself, is awarded each year to a senior man who has shown quality of leadership and has demonstrated through past performance his eagerness to give service to college and community. He should rank high in scholarship, character and personality.

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 HOWARD COOPER JOHNSON SCHOLARSHIP, established by Howard Cooper Johnson '96, 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.

The CHRISTIAN R. AND MARY F. LINDBACK FOUNDATION SCHOLARSHIP is 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. 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 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 PETER MERTZ SCHOLARSHIP 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. It is renewable for all four undergraduate years.

The ANTHONY BEEKMAN POOL SCHOLARSHIP. This scholarship 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.

The WALTER W. KRIDER SCHOLARSHIP was established by his wife and daughter for a young man who ranks high in scholarship, character and personality.

The HOWARD S. EVANS 1903 SCHOLARSHIP provides scholarships for worthy male students. The awards are made to those who stand high in scholarship, character, and personality. Preference is given first to applicants preparing for the ministry of the Episcopal Church, second, to that of other protestant denominations; and third, to those interested in Engineering or Economics.

#### SCHOLARSHIPS FOR WOMEN

The ALUMNAE SCHOLARSHIP, established by the Philadelphia and New York Alumnae Clubs, is awarded to a young woman who ranks high in scholarship, character and personality. 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 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 GEORGE K. AND SALLIE K. JOHNSON FUND provides 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 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 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 LILY TILY RICHARDS SCHOLARSHIP, established by Peirce L. Richards, Jr., in memory of his wife, Lily Tily Richards '29, is awarded to a woman distinguished for high scholarship, character, personality and physical vigor.

The SARAH W. SHREINER SCHOLARSHIP given in loving memory by her daughter, Leah S. Leeds of the Class of 1927, is awarded annually to a woman who ranks high in scholarship, character and personality.

The TITUS SCHOLARSHIPS established by the will of Georgiana Titus of the Class of 1898 are awarded to young women in order that they may pursue their studies in the College.

The JESSIE STEVENSON KOVALENKO SCHOLARSHIP FUND is the gift of Michel Kovalenko in memory of his wife. This scholarship 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 MARY WOOD FUND provides a scholarship which may be awarded to a young woman who is preparing to become a teacher.

#### LOAN FUNDS

Swarthmore participates in the federal loan program established under the National Defense Education Act. The College also maintains special loan funds which are listed below. Repayment of college loans begins nine months after the student completes his higher education and are repayable within the next eleven years. The loans bear annual interest of 3% on the unpaid balance beginning with the date on which repayment is to begin. Amounts vary according to need, although the College believes that students should avoid heavy indebtedness which might prove detrimental to their own plans. The amount of a loan may not exceed \$1,000 annually. For the year 1968-69 the College has made approximately 150 loans in amounts averaging about \$300.

The JOSEPH W. CONARD MEMORIAL FUND, established by friends of the late Professor Conard, is available for loans to worthy students in financial difficulty.



## OTHER SPECIAL LOAN FUNDS

The ALPHONSE N. BERTRAND 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.

STUDENT 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 many students earn as much as \$200-\$300 during the college year, and some earn up to \$500.



## 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 facilities for work in psychology, zoology, botany, and premedical studies. The Pierre S. du Pont Science Building, completed in 1960, provides 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 THOMAS B. AND JEANNETTE E. L. McCABE LIBRARY contains reading rooms, offices and a collection of 315,000 volumes. Some 12,000 volumes are added annually. About 1,500 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. The Du Pont 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 561 private presses.

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

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 and other Yearly Meetings. More than 2,600 record books have been deposited; many of them have been reproduced on microfilm, for which four reading machines are 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 30,000 volumes. About 73 Quaker periodicals are currently received. There is also an extensive collection of photographs of meetinghouses and pictures of representative Friends, as well as a number of oil paintings, including two versions of "The Peaceable Kingdom" by Edward Hicks. 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 1,200 peace periodicals published in the United States and abroad over the past 150 years; approximately 154 such periodicals in eleven languages are currently received from twenty-one countries. This collection is the official depository for the archives of leading peace organizations in the United States. A more nearly complete description of the Collection will be found in the *Guide to the Swarthmore College Peace Collection*, published by the College and available 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 sixteen 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.

Salter, Arthur S. baron. *World Trade and Its Future*. Philadelphia, University of Pennsylvania Press, 1936.

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.

Griffith, Ernest Stacey. *The Modern Government in Action*. New York, Columbia University Press, 1942.

Linton, Ralph. *The Cultural Background of Personality*. New York, London, D. Appleton-Century Co., 1945.

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.

Lovejoy, Arthur Oncken. *Reflections on Human Nature*. Baltimore: Johns Hopkins University Press, 1961.

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

Brandt, Richard B., Editor. *Social Justice*. Englewood Cliffs: Prentice-Hall, 1962.

Pennock, James Roland, Editor. *Self-government in Modernizing Nations*. Englewood Cliffs: Prentice-Hall, 1965.

**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, magnolias and tree peonies, and a great variety of lilacs, rhododendrons, azaleas, daffodils, irises, herbaceous peonies, and hemerocallis. 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 COMPUTER CENTER, located in Beardsley Hall, is equipped with an I.B.M. Computer. It is available to the faculty members and students for research and instruction.

A new LANGUAGE LABORATORY, made possible by a contribution from the James Foundation of New York, was installed in 1964. It provides stations for 35 students and has the equipment for effective use in language teaching.

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 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 Plumer 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. The collection is housed in Beardsley Hall and students are admitted on application to the Secretary of the Language Laboratory. 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 with the Potter Collection.

THE BOYD AND RUTH BARNARD FUND FOR THE ADVANCEMENT OF MUSIC AT SWARTHMORE was established in 1964 by two graduates of the College, Mr. and Mrs. Boyd T. Barnard of Rosemont, Pennsylvania. The income from the fund may be used for any activity that contributes to the advancement of music at the college. It has been used, for example, for concerts on the campus, for the purchase of vocal and orchestral scores and other musical literature, and to provide scholarships for students in the Department of Music who show unusual promise as instrumentalists or vocalists. Since 1966 part of the fund has been used to bring to the campus two Associates in Performance who direct the chamber music coaching program in the Department of Music and give weekly concerts of chamber music.

The GENE D. OVERSTREET MEMORIAL FUND, given by friends in memory of Gene D. Overstreet (1924-1965), a member of the Political Science Department, 1957-1964, provides income to bring a visiting expert to the campus to discuss problems of developing or modernizing nations and cultures.

## 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 eight 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, two buildings on the former Mary Lyon School property, and two new dormitories, Hollowell and Dana, which were opened in September of 1967.

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. Sharples Worth, ex-'73, as a memorial to their parents; Robinson House; Woolman House; Ashton 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, sophomores and juniors are asked to leave college immediately after their last examination in the spring so that their rooms may be used by Commencement visitors.

The insurance program for the College is designed to provide protection for College property and does not include the property of students or others. It is therefore suggested that students and their parents should review their insurance program in order to be sure that coverage is extended to include personal effects while at college.

#### *Dining Hall*

All students, both men and women, have their meals in the Philip T. Sharples Dining Hall. The dining hall is ordinarily closed during 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.

## COLLECTION

An assembly of the college, called Collection, is held at 10:00 a.m. on alternate Thursdays in Clothier Memorial; attendance of students is required. There is regularly a period of silence according to the Friendly tradition and a reading. Lasting about 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 physicians hold daily office hours at the college, where students may consult them without charge. A student must report any illness to the college physicians, 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.

The Worth Health Center, a gift of the Worth family in memory of William Penn Worth '76 and Caroline Hallowell Worth '79, was opened in September of 1965. It houses offices for the college physicians and nurses, out-patient treatment facilities and rooms for men and women who must remain as in-patients. Registered nurses are on duty under the direction of the college physicians.

Each student is allowed ten days care in the Health Center per term without charge unless the services of a special nurse are required. After ten days, a charge of \$5.00 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 Health Center for the period of their illness. Ordinary medicines are furnished without cost, but a charge is made for special medicines, certain immunization procedures, and transportation.

The medical 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 page 37.)

The college psychiatric consultants hold office hours by appointment each week in the Worth Health Center. The purpose of this service is to be of help in all types of emotional problems. The psychiatrists will provide as complete an evaluation of any student as possible. Brief psychotherapy within the limits of available time will be given to students without charge. In instances where longer treatment is needed, the student will be referred to an outside psychiatrist.

### *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, 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.

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.

Mrs. Gloria Evans is an experienced counselor who is glad to assist students with problems of academic adjustment, study skills and reading proficiency. She also can give aptitude and interest tests on request. Appointments may be made at her office in Parrish Hall.

Each women's dormitory has a head resident. In Parrish and Willets, the head resident is assisted by student residents who are members of the junior or senior class.

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 assist 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 afternoons and evenings 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 disorderly 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 the permission of the Dean of Men. This permission is not extended to freshmen. The administration of this rule is in the hands of a Student-Faculty committee. 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, dramatic performances, and public lectures men will wear coats and ties and women dresses or skirts. At evening meals 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. Undergraduates who wish to marry and remain at Swarthmore must request permission to do so from the Deans. If two students are married without this permission, one of them must withdraw from the College.

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 elected by the student body. This Committee delegates to student government agencies as much authority in the administration of rules as they responsibly accept.

### *Student Council*

The semi-annually elected Student Council represents the entire undergraduate community and is the chief body of student government. Its efforts are directed toward 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 Elections Committee, which supervises procedure in campus elections; and the Social Committee, see below. In addition to these, there are several joint Faculty-Student Committees, whose student membership is appointed by the President of the College and the President of Student Council: Collection, Cooper Foundation, Bookstore, Curriculum, Educational Policy, Men's Athletics, Schedule of Classes, Computer, and Library.

### *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*, elected by the entire student body, acts on cases involving the car rule, dress rule, on cases 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 Deans.

It deals with cases referred or appealed from the other Committees or with any violations 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 chairman of the Women's Judiciary Committee, which maintains social regulations.

### *Tarble Social Center*

Through the generosity of Newton E. Tarble of the Class of 1913, the building which formerly housed the College Library has been completely renovated and serves as the College's Social Center. It includes recreational facilities, lounges, meeting rooms, and a snack bar.

### *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. There is usually no 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. There are more than thirty-five organized activities, not including departmental clubs or political organizations. They vary as greatly as the interests of the students vary, from the Flying Club to the Chess Club, from the Creative Writing Group to the Co-ed Dance Group. The College, however, 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.

### *The Studio Arts Program*

The Acting Director of Studio Arts, Harriet Shorr Baguska, arranges for classes in studio arts and for exhibits in the Arts Center and acts as an adviser to other organizations. See under Studio Arts, page 83, for a list of credit and non-credit courses.

The Wilcox Gallery provides ten to twelve exhibitions a year, which are a direct complement to the program. The works of nationally known painters as well as those of younger artists are exhibited in group and one man shows.

### *The Marjorie Heilman Visiting Artist Program*

Each year a committee of students and faculty members selects an artist to be invited to spend a week at the College. The work of the invited artist is exhibited in the Wilcox Gallery, and he meets and talks with students on an informal basis. In the past, film maker Rudy Burckhardt, painter Neil Welliver, potter Toshiko Takaezu, and painter Red Grooms have been the invited artists.

### *Music*

The Department of Music administers and staffs several performing organizations. The College Chorus, directed by Professor Swing, rehearses twice per week for a total of three hours. (The College Singers, a select small chorus drawn from the membership of the Chorus, rehearses an additional hour per week.) The College Orchestra, directed by Mr. Freeman, rehearses twice per week: a two-hour rehearsal for full orchestra and a one-hour rehearsal for strings. Members of the orchestra, other instrumentalists and solo singers can participate in the chamber music coaching program directed by Mr. Kalish and Mr. Zukofsky.

The Chorus and Orchestra give several public concerts per year at the College and at other schools. Selected members of the chamber music coaching program give a public concert in the spring.

All three organizations require auditions for membership.

The Bond Concert Committee, a student organization working with the Department of Music, plans a series of informal Sunday afternoon concerts to accommodate students interested in preparing solo and chamber music performances. These concerts also provide an opportunity for student composers to get public performances.

The College Band meets once a week to prepare for concerts, and for playing at fall athletic events.

There are facilities for private practice, and an excellent college record collection. The Cooper Foundation presents a distinguished group of concerts each year on the campus.

### *Drama*

Mr. Robert Simons is Director of Dramatics. He directs two major productions and supervises the drama program, which consists of student-produced workshop productions, and a bill of student-written one-act plays. The Theater Workshop course is described on page 120.

### *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

desirable to have as many students as possible competing on its inter-collegiate teams.

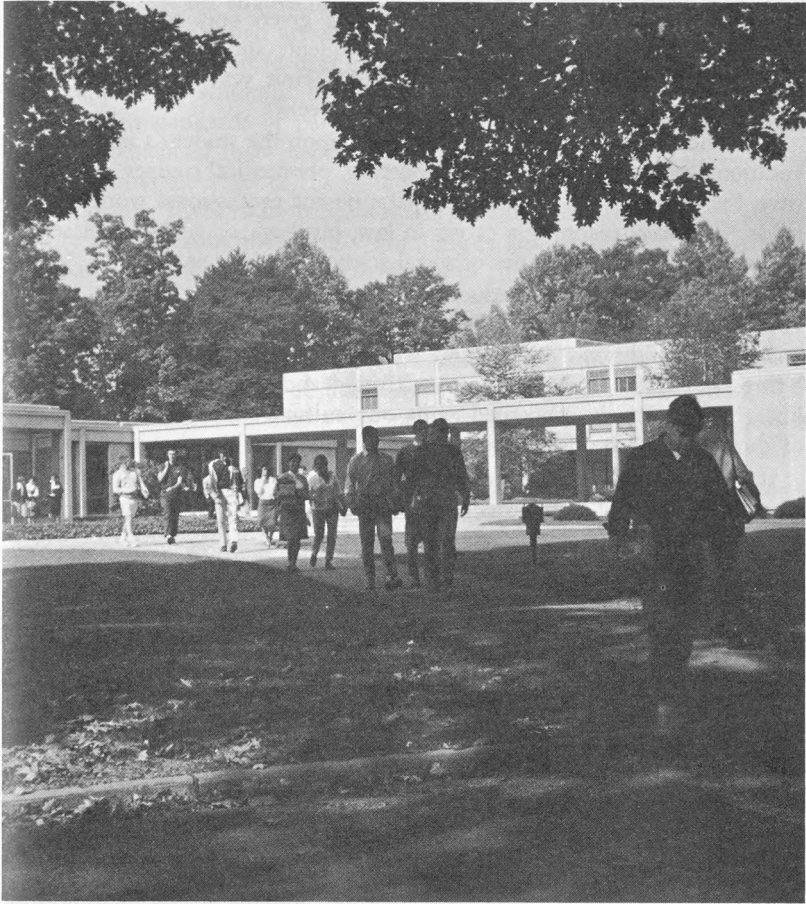
### *Fraternities*

There are five fraternities at Swarthmore; Delta Upsilon and Phi Sigma Kappa are affiliated with national organizations while Kappa Sigma Pi, Tau Alpha Omicron and Phi Omicron Psi are local associations. 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. In recent years about 40% of the freshman men have decided to affiliate with one of the five fraternities.

### *Student Activities Bulletin*

A booklet describing more fully all these activities and many others can be had upon request from the Office of Admissions.





*Pierre S. du Pont Science Building*

**THE EDUCATIONAL PROGRAM OF**

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**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 to students who major in Engineering; the former, to students in the Humanities, the Social Sciences, and the Natural Sciences.\* Four years of resident study are normally required for 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.

All students during the first half of their college program are expected to satisfy some if not all of the distribution requirements, to choose their major and minor subjects, and to prepare for advanced work in these subjects by taking certain prerequisites. The normal program consists of four courses each semester chosen by the student in consultation with his course adviser.

The program for upper class students affords a choice between two methods of study: Honors work and the Course program. An Honors student concentrates on two or three fields, his major and one or more minors, which he studies intensively and which occupy three-fourths of his working time during the last two years. At the close of his senior year he takes a series of six examinations given by visiting examiners over this work. In addition he takes four courses, or the equivalent, which provide opportunities for further exploration outside of his Honors program.

A student in the Course program has a somewhat wider freedom of election and takes four courses or their equivalent in each of the last

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\* For groupings of departments, see page 23.

four semesters. 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 104. 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. 158-161) and must attend the Collection exercises of the college (see p. 54).

The course advisers of freshmen and sophomores are members of the faculty appointed by the Dean. For juniors and seniors the advisers are the chairmen of their major departments or their representatives.

### Program for Freshmen and Sophomores

The curriculum of the first two years introduces a student to the methods and content of a variety of fields important to a liberal education. To this end the student chooses a part of his program in each of four groups of courses and in addition meets a specified standard in a foreign language.

I. To meet the distribution requirements of the College, a student must take at least two courses from each of the four groups listed below and must elect work in at least six departments. Mathematics, though not one of the subjects included in the four groups, may be counted as one of the six departments.

1. Astronomy 1-2; Biology 1,2; Chemistry 1,2; Engineering 7,8; Physics 1,2; Physics 7,8 (Concepts and Theories of Physical Science). See note below.
2. English Literature 1, which may be followed by another course in English Literature; all literature courses numbered 11, 12 or above in classical or modern foreign languages; Art History 1, which may be followed by another course in Art History; Music 1, 15, or 16.
3. History 1-2 or 5,6; Philosophy 1, which may be followed by another course in Philosophy or Religion; Psychology 3, which may be followed by another course in Psychology.
4. Economics 1-2A followed by another half-course in Economics; Political Science 1 followed by Political Science 2, 3, or 4; Sociology-Anthropology 1, which may be followed by another course numbered in the 20's in Sociology-Anthropology.

II. Languages. All students except those majoring in Engineering must include in their programs sufficient work in a modern or classical language to complete course 4 or its equivalent. The language requirement may be met in whole or in part by secondary school preparation as measured by the appropriate achievement test of the College Entrance

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Note: Year 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. Those whose numbers are separated by a comma (e.g., 1, 2) may be divided. (Credit is given separately for each half of the course.)

Examination Board, or by a placement examination given at the college by the appropriate department. 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 semesters in college.

At the discretion of the department concerned, a student may be permitted to substitute an advanced course for the introductory course in meeting one of the distribution requirements. Students entering college with special preparation in any of the subjects included in the distribution requirements may apply to the Committee on Academic Requirements for exemption from that requirement.

A student who majors in the Natural Sciences, Mathematics, or Engineering will take an appropriate mathematics course in the freshman year.

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 satisfying the requirements 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.

Physical education is required of all students (except veterans) in the first two years. The requirements are stated in full on page 72 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 eight courses. Work taken during the first two years may be counted toward fulfillment of the major requirements but not more than twelve 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 desig-

nated 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 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 and modified most recently in 1968, 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 field of studies. He normally 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 prepare himself to take examinations in six subjects at the close of his senior year. 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 or small classes or in independent projects which may lead to an Honors paper or 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 seminar or

course taken in preparation for an Honors paper or examination. No student is permitted under ordinary circumstances to take more than six seminars. He may take fewer than six, since he may prepare in other ways for his Honors examinations.

In practice three avenues toward an Honors degree are open:

(1) The normal program of Honors work consists of six subjects studied during the last two years in preparation for papers or examinations given by the visiting examiners at the close of the senior year. The usual pattern is four papers in the major department and two in a minor department, but other combinations of major and minor fields are possible. No student is allowed more than four papers in his major; in those cases where he offers three subjects in each of two fields, one of them must be designated as his major. While there is a general belief that two papers in a minor field are desirable because of the mutual reinforcement they provide, there are by custom certain subjects 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.

(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. 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 enter the Honors program as late as the middle of the senior year. 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 petition the division for permission to take the Honors examinations and must submit an acceptable list of examinations which they are prepared to take.

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 field 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

Students who are considering the possibility of attending medical (or dental) school after graduation from Swarthmore should plan their academic programs carefully to meet the pre-medical requirements, listed below, as well as the general College requirements. Specific requirements of the various medical schools, as well as basic information on other aspects of pre-medical and medical training, can be found in "Admission Requirements of American Medical Colleges" published by the Association of American Medical Colleges. Recent editions of this book are available in the various libraries on the campus. All students planning a medical career should be familiar with this book.

Sophomores, juniors, and seniors will be in contact with the Faculty Committee on the Pre-Medical Program for special advising. It is the function of this 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 values 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 3,4 or 5,6, 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 vertebrate morphology (Zoology 14). Advanced work in biology, chemistry and mathematics is recommended where the student's program and interests permit. Medical school requirements are changing rapidly and 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 six 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.

#### COOPERATION WITH NEIGHBORING INSTITUTIONS

With the approval of their course adviser and the Dean, students may take courses offered by Bryn Mawr or Haverford Colleges or the University of Pennsylvania without the payment of extra tuition. This arrangement does not apply to the summer session of the University of Pennsylvania.

#### EDUCATION ABROAD

The College recognizes the general educational value of travel and study abroad and cooperates as far as possible in enabling interested students to take advantage of such opportunities. It distinguishes, however, between those foreign study plans which may be taken for credit as part of a Swarthmore educational program, and those which must be regarded as supplementary. To be acceptable for credit, foreign study must meet Swarthmore academic standards, and must form a coherent part of the student's four-year plan of study. The Honors Program in particular demands a concentration of study which is not easily adapted to the very different educational systems of foreign universities. Therefore, while some of the approved programs listed below may normally be taken as substitutes for a semester or a year of work at Swarthmore, each case is judged individually, and the college may withhold its approval of a particular program, or may insist that the program be carried out as an extra college year.



Plans for study abroad must be approved in advance by the Dean and by the Chairmen of departments concerned, if credit is to be given for courses taken, and students may be asked to take examinations upon their return to the College.

1. *Established Programs.* Students who wish to study abroad under formal academic conditions may apply to one of the programs administered by other American colleges and universities; for example, those of Hamilton College, Smith College, or Sweet Briar College. These are full-year programs of study at foreign universities, under the supervision of American college personnel. Interested students should consult the Dean for details.

2. *Direct Enrollment.* Application may also be made directly to foreign institutions for admission as a special student. This should be done only after consultation with the Dean and the appropriate department head, and care must be taken to assure in advance that courses taken abroad will be acceptable for Swarthmore credit. Most foreign universities severely limit the number of students they accept for short periods, however, and anyone who applies for admission directly must be prepared to be refused.

3. *University of Keele.* For a number of years Swarthmore College and the University of Keele, Staffordshire, England, have had a student exchange each year. A student from Swarthmore is selected for study at Keele by a committee which interviews the applicants. The year at Keele may take the place of the junior year at Swarthmore, though it is often taken as an extra year.

4. *Peaslee Scholarships.* These scholarships, the gifts of Amos Peaslee (Class of '07) were instituted in 1953 and are normally awarded each year, preferably to sophomores and juniors, for language study abroad. The scholarships are for a minimum of one semester plus a summer; course credit is given for the work done upon approval of the department concerned.

5. *International Association for the Exchange of Students for Technical Experience.* This program, administered by the Engineers' Joint Council, provides opportunities for engineering and science students to work for engineering firms and laboratories in Europe during summer vacations. Students are paid living expenses by the employing firm in the currency of the country in which they work; they pay their own travel costs. Applications must be made by January 1 for work the following summer, and students are notified of the Association's decision by March 31. For further information, students should consult the chairman of the Department of Engineering.

6. *University of Warwick, England.* A fall semester exchange program for members of the Swarthmore junior class majoring in History and second year students in the School of History at Warwick was inaugurated in 1966.

## FACULTY REGULATIONS

### ATTENDANCE AT CLASSES AND COLLECTION

Registration to take a course for credit implies regular attendance at classes, unless a student specifically elects to obtain credit in a course without attending classes. The conditions for exercising this option are set forth below. With this exception, students are responsible for regular attendance. Faculty members 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* classes.

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

A student may obtain credit for a course without attending class meetings by reading the material prescribed by a syllabus and taking a final examination, under the following conditions:

- 1) The student must signify his intent to do so at the time of registration, having obtained the instructor's approval in advance.
- 2) If after such registration the student wishes to change his status and attend classes normally, he must again obtain the instructor's approval.
- 3) The student may be required to perform such work, in addition to the final examination, as the instructor deems necessary for adequate evaluation of his performance.
- 4) The final grade will be recorded by the Registrar exactly as if the student had attended classes normally.

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

### GRADES

Instructors report to the Deans' office at intervals during the year upon the work of students in courses. Informal reports during the semester take the form of comments on unsatisfactory work. At the end of each semester formal grades are given in each course under the letter system, by which *A* means excellent work, *B* good work, *C* satisfactory work, *D* passing but below the average required for graduation, and *E* failure. Beginning in September, 1968, the only reports recorded on students' records for courses taken during their freshman year will be *P* (pass) or *E* (fail). *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 following that in which it was incurred. A date is set at the end of the first six weeks of each term when make-up examinations must be taken and late papers submitted. Under special circumstances involving the use of laboratories or attendance at courses not immediately available, a student may 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 than five or fewer than four courses seem desirable, he should consult his course adviser and file a petition with the Committee on Academic Requirements.

Applications involving the 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 thirty-two courses or their equivalent.
2. He must have an average grade of *C* on the courses counted for graduation.
3. He must have complied with the distribution requirements.
4. He must have met the requirements in the major and supporting fields during the last two years.
5. 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.
6. He must have completed four terms of study at Swarthmore College, two of which have been those of the senior year.
7. He must have completed the physical education requirement set forth on page 72 and in statements of the Physical Education Departments.

8. He must have paid all outstanding bills and returned all equipment and library books.

## Advanced Degrees

### MASTER OF ARTS AND MASTER OF SCIENCE

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

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

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

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

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

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

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

The tuition fee for graduate students who are candidates for the Master's degree is \$1,600 per year, and the general fee for these students is \$25 per semester.

### ADVANCED ENGINEERING DEGREES

The advanced degrees of Mechanical Engineer (M.E.), Electrical Engineer (E.E.), and Civil Engineer (C.E.), may be obtained by graduates

who have received their Bachelor's degree in Engineering upon fulfilling the requirements given below:

1. The candidate must have been engaged in engineering work for five years since receiving his first degree.
2. He must have had charge of engineering work and must be in a position of responsibility and trust at the time of application.
3. He must make application and submit an outline of the thesis he expects to present, one full year before the advanced degree is to be conferred.
4. The thesis must be submitted for approval one calendar month before the time of granting the degree.
5. Every candidate shall pay a registration fee of \$5 and an additional fee of \$20 when the degree is conferred.

## AWARDS AND PRIZES

The 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 department 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 Blandshard, 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 freshman 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 Contests awards for the best prepared speeches on topics of current interest. The WILLIAM PLUMER POTTER PUBLIC SPEAKING FUND, established in 1927, sponsors a contest in the reading of poetry as well as providing funds for other contests described below and for the collection of recorded literature described on page 50.

Three prizes for the best student-written one-act plays are provided by the WILLIAM PLUMER POTTER FUND. The winning plays are usually produced during the fall semester by the Little Theater Club.

Prizes for the best student short stories are also awarded from the WILLIAM PLUMER POTTER FUND.

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 ACADEMY OF AMERICAN POETS has established at Swarthmore College one of its five-year award programs. The Academy gives \$100 each year for the prize poem (or group of poems) submitted in a competition under the direction of the Department of English Literature. The program was initiated in 1967.

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 \$1,100 founded by the bequest of Hannah A. Leedom.

The JOSHUA LIPPINCOTT FELLOWSHIP of \$1,400, founded by Howard W. Lippincott, of the Class of 1875, in memory of his father.

The JOHN LOCKWOOD MEMORIAL FELLOWSHIP of \$1,400, 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 or more. It is awarded each year by a committee of the faculty to a 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 committee of the faculty to a woman graduate of that year who plans to enter elementary or secondary school work. The recipient of the award is to pursue a course of study 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.

*Charles H. and Ruthanna L. McCabe Library*

## COURSES OF INSTRUCTION

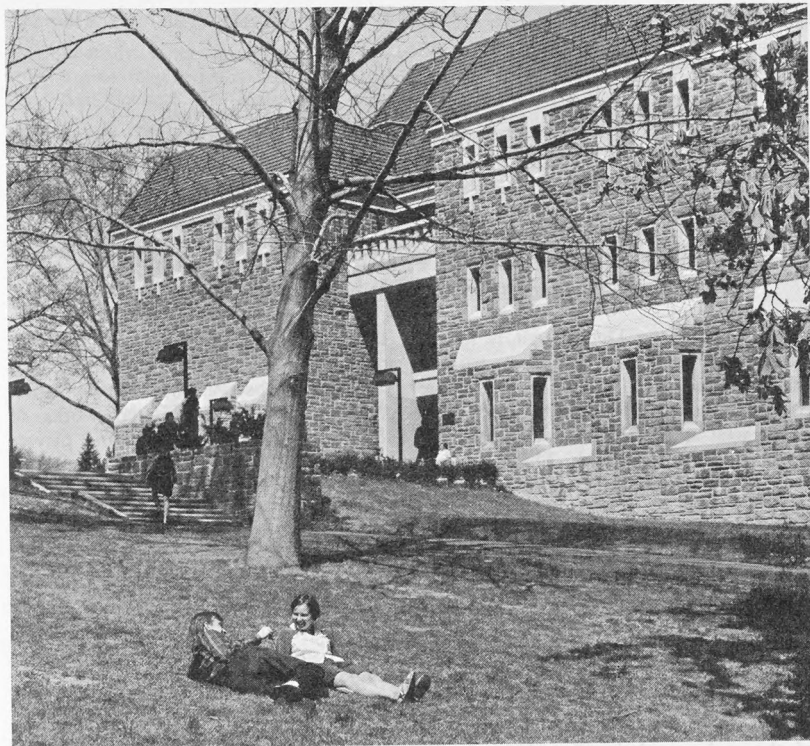
The course (number course) is the unit of credit. Seminars and independent research are usually given for double credit, i. e., equivalent to two courses.

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

- 1-10 0—introductory studies
- 11-20 10—other studies open to students of all classes
- 21-30 20—advanced courses limited to Juniors and Seniors
- 31-40 30—courses for Honors students and graduate students

This states the number of which are joined by a hyphen (10-12) and is continued for the whole year; credit is not given for one-semester work only.





*Thomas B. and Jeannette L. McCabe Library*

## COURSES OF INSTRUCTION

The course (semester course) is the unit of credit. Seminars and colloquia are usually given for double credit, i.e., equivalent to two courses.

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

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Year courses the number 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.

# ART

## Department of Art History

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

ASSOCIATE PROFESSORS: JOHN W. WILLIAMS †  
TIMOTHY K. KITAO

INSTRUCTOR: MOLLY FARIES \*\*

VISITING LECTURER: DAVID SYLVESTER \*\*\*

The aim of the Department is to study the historical significance and aesthetic values 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 these areas.

### REQUIREMENTS AND RECOMMENDATIONS

*Prerequisites:* Majors in Course and majors and minors in Honors must take two courses, one of which must be Art History 1. This requirement must be fulfilled before the junior year. For other students the prerequisite for all other courses is Art History 1, with the exception of Art History 30, Modern Architecture, which is open to Engineers without any prerequisite.

*Majors in Course:* The program consists of at least eight courses (including Art History 1) in the Department. The student must have at least one course in each of the major periods of art history.

*Majors and Minors in Honors:* Majors in Honors may take four seminars in the Department. 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 art history requires a knowledge of French and German.

### COURSES

1. INTRODUCTION TO ART HISTORY, Mr. Kitao, Mr. Walker. *Each semester*  
A critical study of the nature and development of architecture, sculpture and painting in the historical context of the major cultural periods of western civilization from the Fifth Century B.C.  
Two hours of lectures and a conference meeting each week.
11. DESIGN IN DRAWING AND PAINTING. Mr. Rhys. *Spring semester*  
The basic elements of design and their function in drawing and painting. Types of harmony, sequence and balance such as linear, tonal and spatial. 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.

† Absent on leave, 1968-69.

\*\* Spring semester, 1968-69.

\*\*\* Spring semester, 1969-70.



13. ANCIENT ART. Mr. Walker. *Fall semester*  
 A study of the development of the forms of architecture, sculpture and painting as they express the cultural patterns of Ancient Greece from the Bronze Age through the Hellenistic Age.
16. EARLY MEDIEVAL ART. Mr. Williams. *Fall semester*  
 The formation and development of art and architecture in Europe and the Mediterranean from about 300 to 1000 A.D.  
 Not offered in 1968-69.
17. ROMANESQUE AND GOTHIC ART. Mr. Williams. *Spring semester*  
 The art of Western Europe from about 1000 to about 1350 A.D.  
 Not offered in 1968-69.
18. ITALIAN RENAISSANCE ART. Mr. Kitao. *Fall semester*  
 A study of selected problems in Italian art and architecture from 1400 to 1600 as represented by such masters as Masaccio, Donatello, Leonardo, Raphael, Michelangelo, Titian and Palladio.  
 Not offered in 1968-69.
20. NORTHERN RENAISSANCE ART. Miss Faries. *Spring semester*  
 Developments in painting and the graphic arts during the fifteenth and sixteenth centuries in France, the Netherlands and Germany through the study of individual artists such as Jan van Eyck, Roger van der Weyden, Jean Fouquet, Albrecht Dürer, Grünewald, Holbein, Jerome Bosch and Pieter Bruegel.
21. BAROQUE ART. Mr. Kitao. *Spring semester*  
 A study of selected problems in European art and architecture of the seventeenth century as represented by such masters as Caravaggio, the Carracci, Rubens, Bernini, Borromini, Rembrandt and Velazquez. Special attention will be given to the genesis of the Baroque style in Rome.
30. MODERN ARCHITECTURE. Mr. Walker. *Spring semester*  
 An introduction to the nature of architecture and the functions of the architect through a study of the 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 New York and Philadelphia areas and on the work of such men as Sullivan, Wright, Gropius, Mies van der Rohe, Saarinen and Le Corbusier.  
 The prerequisite of Art History 1 is waived for students in Engineering.
31. 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.
32. AMERICAN ART. Mr. Rhys. *Spring 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 1968-69.
51. FAR EASTERN ART. Mr. Rhys. *Spring semester*  
 An introduction to the history of pictorial art in Asia, especially China and Japan, from the earliest phases and origins of pictorial art in China to new movements in the eighteenth and nineteenth centuries. Iconography, stylistic definition and the treatment of form, color and space as they differ from such concerns in Western art will receive special attention.

56. THE CITY. Mr. Kitao. *Fall semester*  
 A study of the visual and physical aspects of our man-made environment; the way it affects our lives through our immediate perception and daily use of it; perception, analysis and interpretation of the form, structure, imagery and dynamics of selected historical and contemporary urban spaces.
60. SENIOR READING. Staff. *Spring semester*
- 61-62. SENIOR THESIS. Staff. *Fall and spring semesters*  
 With the approval of the department a thesis may be written during the senior year.
- 63-64. COLLOQUIUM: PROBLEMS IN TWENTIETH CENTURY ART. Mr. Sylvester. *Spring semester*  
 Offered in 1969-70.
- 65-66. COLLOQUIUM: MICHELANGELO. Mr. Williams. *Spring semester*  
 Offered in 1969-70.

#### HONORS SEMINARS

101. ANCIENT ART. Mr. Walker. *Fall semester*  
 A study of the development of the forms of art and architecture as they express the cultural patterns of Ancient Greece from the Bronze Age through the Hellenistic Age.
103. MEDIEVAL ART. Mr. Williams. *Fall semester*  
 The development of the forms of Christian art during the Middle Ages from the fourth to the thirteenth century.  
 Not offered in 1968-69.
104. ITALIAN RENAISSANCE ART. Mr. Kitao. *Spring semester*  
 A study of selected problems in Italian art and architecture from 1400 to 1600 with special emphasis on the development of the High Renaissance by Raphael, Michelangelo and Bramante in the Rome of Julius II.
105. NORTHERN RENAISSANCE PAINTING. Miss Faries. *Spring semester*  
 Developments in painting and the graphic arts during the fifteenth and sixteenth centuries in France, the Netherlands and Germany with intensive study of individual masters: Jan van Eyck, Roger van der Weyden, Jean Fouquet, Albrecht Dürer, Jerome Bosch and Pieter Bruegel.
106. BAROQUE ART. Mr. Kitao. *Spring semester*  
 A study of selected problems in European art and architecture of the seventeenth and eighteenth centuries with special emphasis on the genesis and development of the Baroque style in Rome.  
 Not offered in 1968-69.
107. 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.
108. PROBLEMS IN TWENTIETH CENTURY ART. Mr. Sylvester. *Spring semester*  
 Offered in 1969-70.
109. MASTER PRINT MAKERS. Mr. Walker. *Spring semester*  
 A consideration of certain problems in the history of the graphic arts. A study of the work of such men as Schongauer, Dürer, Rembrandt, Goya, Daumier, Toulouse-Lautrec, and Picasso for the development of expression in the media of woodcut, engraving, etching, aquatint and lithography. Students work almost exclusively with originals in the Print Room of the Philadelphia Museum and the Lessing J. Rosenwald Collection in Jenkintown.

## Program In Studio Arts

INSTRUCTING STAFF: HARRIET SHORR BAGUSKAS, *Acting Director*

WILL BROWN

BARBARA ELMORE

KIT YIN TIENG SNYDER \*\*

JOHN VORLICEK

Work in drawing, painting and printmaking may be taken for course credit with the approval of the instructor and normally after a semester's work without credit. The courses are designed for half-course credit.

1. DRAWING. Mrs. Baguskas. *Each semester*

Three hour studio course. The student will be expected to fulfill twelve drawing assignments in addition to work in the class. Introduction to the problems of drawing and to the various drawing media. Emphasis on drawing from the nude figure. Drawing trips, four during the semester, will enable the student to explore the problems of landscape drawing.

5. INTRODUCTION TO OIL PAINTING. Mrs. Baguskas. *Fall semester*

Problems in oil painting with the emphasis on the making of space and form through color. Exploration of color through collage complements work in painting. Work will be largely from still life set ups, each student designing his own. Four visiting painters from New York will give critiques to the class during the course of the semester. Gallery trips to New York and Philadelphia will be an integral and required part of the course.

6. INTRODUCTION TO OIL PAINTING. Mrs. Baguskas. *Spring semester*

Problems in oil painting with the emphasis on the figure, in interior and landscape space. Four visiting critics. Students will study through slides and library sources the development of figure painting.

9. PRINTMAKING. Mr. Vorlicek. *Each semester*

Exploration in the processes of Intaglio and Screen printing. The techniques and tools of etching, aquatint, drypoint, engraving and silk screen are discussed and demonstrated. The student will explore one of these processes thoroughly. Discussion and criticism of formal organization is an integral part of the course. Students will visit, with the instructor, important collections of prints so they can study first hand various technical and aesthetic aspects of printmaking.

Studio work, not given for course credit, is offered in jewelry making, photography and film, and pottery. There will be twelve classes of two hours each during the semester.

JEWELRY. Mrs. Elmore. *Each semester*

Instruction in the making of jewelry and small sculpture, using copper, silver and enamel. Techniques of sawing, shaping, soldering and polishing for the beginner, etching, dressing, stone setting and work in gold for the more advanced.

PHOTOGRAPHY AND FILM. Mr. Brown. *Spring semester*

Instruction in the techniques of film making. Individual projects in film as well as a class film. Instruction in photography and dark room techniques.

POTTERY. Mrs. Snyder. *Each semester*

Beginning course. An introduction to the techniques of forming stoneware pottery. Instruction in handbuilding, throwing on the potter's wheel and glazing.

Advanced course. (Six two-hour classes) Concentration on individual projects, with the emphasis on form and glazing. Instruction in kiln operation.

\*\* Fall semester.

# ASTRONOMY

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

VISITING PROFESSORS: WILHELM BECKER \*\*  
WILLEM J. LUYTEN \*\*

RESEARCH ASSOCIATES AND LECTURERS: JOHN L. HERSHEY  
SARAH LEE LIPPINCOTT

RESEARCH ASSISTANT: BARRY H. FEIERMAN

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, recently renovated, has been in 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, or 1-15, 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, or 1-15, Physics 1-2, and a reading knowledge of French, German or Russian.

## COURSES

1-2. DESCRIPTIVE ASTRONOMY. Mr. van de Kamp, Mr. Becker, and Mr. Luyten.  
*Year 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. 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.

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\*\* Spring semester, 1968-69.

14. PROBLEMS OF GALACTIC STRUCTURE. Miss Lippincott.  
Stellar motions, magnitudes and spectra. Unstable stars. Stellar populations. Star clusters and associations.
15. INTERMEDIATE ASTRONOMY. Mr. Becker and Mr. Luyten.  
Survey of observational data. Variable and double stars. Stellar spectra and stellar structure. Spectrum-luminosity diagram. Evolution of stars and clusters; galactic structure.  
Prerequisites: Mathematics 3-4 or equivalent; Physics 1-2, or equivalent, may be taken concurrently with consent of instructors.

### HONORS SEMINARS

101. ASTROMETRY. Mr. van de Kamp.  
Spherical trigonometry, celestial sphere. Stellar positions and their changes. Precession, proper motion, parallax and aberration. Solar motion, galactic rotation. Relation between sphere and plane. Long-focus photographic astrometry, technique and methods. Analysis of stellar paths for proper motion and parallax; secular acceleration. Visual binaries; analysis for mass-ratio; perturbations. Star fields; clusters and multiple stars. Theory of errors, method of least squares.
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.  
Not offered in 1968-69.
104. ASTROPHYSICS. Mr. Hershey.  
Review of observational material. Atomic spectra. The gaseous state. Radiation. Continuous spectra of stars. Formation of absorption lines. Stellar interiors.
110. RESEARCH PROJECT. Staff.

### GRADUATE WORK

In conformity with the general regulations for work leading to the Master's degree (see page 73), 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  
LAUNCE J. FLEMISTER  
LUZERNE G. LIVINGSTON †  
NORMAN A. MEINKOTH, *Chairman*  
NEAL A. WEBER

ASSOCIATE PROFESSOR: KENNETH S. RAWSON

ASSISTANT PROFESSORS: JOHN B. JENKINS, JR.  
ROBERT E. SAVAGE

ASSISTANTS: BARBARA Y. STEWART  
JEAN D. TOMEZSKO

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 plants and animals interpreted on a comparative basis. Advanced courses are listed under three categories: those dealing specifically with plant biology (Botany), or animal biology (Zoology), and those whose subject matter deals with phenomena common to all living organisms (Biology).

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 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 elect to major in biology, botany or zoology. Students in Course should include the following supporting subjects in addition to the eight courses in their major subject: chemistry, including at least one semester in organic chemistry, two courses in physics and two in mathematics. 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 in respect to outside requirements when the department considers cause for such modification to be sufficient.

### HONORS WORK

Requirements for admission to Honors with major work in the department include: Biology 1,2, another course in the department, chemistry through organic chemistry, physics, and first year mathematics. It should be noted that certain subjects likely to be chosen as minors in other departments require a second year of mathematics.

Honors students in this department may designate a major in biology, botany or zoology according to their preferences. Offerings listed under Biology may be included in a major in botany or zoology, but a botany major may not include papers listed as Zoology nor the zoology major include those listed under Botany. A major in biology will by definition include papers selected from among the

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† Absent on leave, spring semester, 1968-69.



total departmental Honors offerings. Any Honors program in the biological sciences must include at least two papers outside the department.

Students planning a minor in biology, botany or zoology should note the prerequisites listed for each seminar, and consult with the department chairman.

## Biology

### 1,2. GENERAL BIOLOGY. Staff.

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 organisms 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.

### 20. GENETICS. Mr. Jenkins.

*Fall semester*

The course centers around three basic areas: the nature of the genetic material, its transmission, and its mode of action; the role of genetics in development and evolution will also be considered. Some time will be devoted to historical development of the basic concepts of genetics, and to the social implications of modern genetics.

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

Prerequisite: Biology 1,2.

### 21. CELL BIOLOGY. Mr. Savage.

*Spring semester*

A study of the ultrastructure and function of cytoplasmic components of the cell, including membranes and membrane surrounded organelles (endoplasmic reticulum, Golgi, lysosomes, microbodies, mitochondria, chloroplasts and other plastids), ribosomes, centrioles, and related structures. Laboratory experiments illustrate techniques commonly used in cell biology.

Three hours of lecture or discussion and one period of laboratory per week.

Prerequisites: Biology 1,2 and concurrent registration in organic chemistry.

### 59. CYTOLOGY. Mr. Savage.

*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 one laboratory period per week.

Prerequisites: Biology 1,2 and organic chemistry.

### 68. BIOLOGY OF BACTERIA. Mr. Livingston.

*Spring 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, ecology, genetics, and classification of bacteria.

Three lectures and one laboratory period per week.

Prerequisites: Biology 1,2 and organic chemistry.

## HONORS WORK

### 102. CYTOLOGY. Mr. Savage.

*Fall semester*

A study of the structure and function of the cell. Living material will be examined and modern microscopical techniques employed in the laboratory.

113. GENETICS. Mr. Jenkins. *Spring semester*  
 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.
115. MICROBIOLOGY. Mr. Livingston. *Spring semester*  
 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.  
 Not offered in 1968-69.

## Botany

15. TAXONOMY OF SEED PLANTS. *Spring semester*  
 An introduction to the classification of the major groups of flowering plants and gymnosperms, stressing those of biological, cultural, or economic interest. The emphasis is upon a world wide flora and upon cultivated as well as wild plants. Modern concepts of phylogeny, biosystematics, and biogeography are included. Suggested as an early course for biology majors and as a cultural course for non-majors.  
 Three lectures and one field trip and/or laboratory period per week.  
 Prerequisite: Biology 1,2.
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 one three-hour laboratory period per week.  
 Prerequisite: Biology 1,2.
18. BIOLOGY OF LOWER PLANTS. Mr. Livingston. *Alternate years, fall semester*  
 An introduction to the algae, fungi, mosses, and ferns, including aspects of their classification, phylogeny, structure, physiology, and ecology. The laboratories are in part exploratory and experimental. Their content depends in part upon the current interests of staff and students.  
 Three lectures and one field trip and/or laboratory period per week.  
 Prerequisite: Biology 1,2.  
 Not offered in 1968-69.
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 and organic chemistry.  
 Not offered in 1968-69.
70. PLANT ECOLOGY. *Alternate years, fall semester*  
 A study of the structure, distribution, and dynamics of plant communities. Background material in physical geography is included. The impact of plant communities upon man through agriculture and land use practices is mentioned but not stressed. Laboratory work emphasizes the accumulation and analysis of field data.

Three lectures and one field trip or laboratory period per week.  
Prerequisites: Biology 1,2 and permission of the instructor.  
Not offered in 1968-69.

71-72. SPECIAL TOPICS. Staff.

With the permission of the department, qualified students may elect to pursue a research or reading program not included in the regular course program.

### HONORS WORK

111. PLANT PHYSIOLOGY. Mr. Livingston. *Alternate years, spring semester*

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.

Prerequisites: Biology 1,2 and organic chemistry.

Not offered in 1968-69.

112. PROBLEMS OF PLANT GROWTH AND DEVELOPMENT. Mr. Livingston. *Alternate years, fall semester*

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.

Prerequisites: Biology 1,2 and permission of the instructor.

118. PLANT ECOLOGY. Mr. Livingston. *Alternate years, fall semester*

A study of the interrelationships between plants and their environment. Discussion periods are devoted to the development of basic principles. Field and laboratory work applies these concepts to specific organisms and habitats. Laboratory work is used to isolate problems encountered in the field. Both higher plants and microorganisms are used as experimental materials. Comparisons are made between aquatic and terrestrial habitats.

Prerequisites: Biology 1,2 and permission of the instructor.

Not offered in 1968-69.

120. SPECIAL TOPICS. Staff.

With the permission of the department, qualified students may elect to pursue a research problem or reading program not included in the regular offerings in honors.

### Zoology

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.

Not offered in 1968-69.

14. VERTEBRATE MORPHOLOGY. Mr. Weber. *Fall semester*

A consideration of the vertebrate body plan at the microscopic, developmental and adult gross morphological levels. Areas stressed in some detail will include the structure and microscopic appearance of vertebrate tissues and organs, embryonic development of an amphibian through organogenesis and adult mammalian gross morphology.

Three hours of lecture or discussion and one laboratory period per week.

Prerequisite: Biology 1,2.

25. FIELD ZOOLOGY. Mr. Weber. *Spring semester*  
 Emphasis is on the living animals as they occur in nature, their systematics, relationships to the environment, habits and distribution. Regional and world faunas will be discussed. Much of the work will be done in the field.  
 Prerequisite: Biology 1,2, Zoology 14 desirable.
52. EMBRYOLOGY. Mr. Enders. *Fall 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 one laboratory period per week.  
 Prerequisites: Biology 1,2, Zoology 14.
53. BIOLOGY OF ARTHROPODS. Mr. Weber. *Fall semester*  
 The study of insects and their relatives, their morphological and physiological adaptations and their effect on man. Laboratory work will include the study of living material and current research will be considered. Each student will prepare a study collection from field trips.  
 Not offered in 1968-69.
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.
56. INVERTEBRATE ZOOLOGY. Mr. Meinkoth. *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.
57. COMPARATIVE PHYSIOLOGY. Mr. Flemister. *Fall semester*  
 A course of lectures and laboratory experiments treating functional processes from the standpoint of adaptation of the animal to its environment. These processes in representative animals are compared in order to follow their elaboration from the more general to the more specialized.  
 Two lectures and one laboratory period per week.  
 Prerequisites: Zoology 14, organic chemistry and physics.
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: Zoology 57.
60. BIOLOGY OF ANIMAL COMMUNITIES. Mr. Rawson. *Fall semester*  
 The study of animals at the emergent level of populations. Problems of animal behavior as related to the growth and maintenance of populations will be considered with particular reference to communication and social interaction within animal groups. Both field and laboratory study techniques will be used.  
 Two lectures per week and the equivalent of one laboratory meeting per week.  
 Prerequisite: Biology 20 or Zoology 14.

- 60a. SELECTED TOPICS IN COMPARATIVE SOCIAL ORGANIZATION. Mr. Novick, Mr. Rawson, Mr. Thompson. *Half course, spring semester*

Evening film and lecture series on the social organization of various animal species, including man. Films, speakers, readings, and discussions concerning the environmental and structural forces which shape social groups. Designed for students who have had, or are taking concurrently, Sociology-Anthropology 23, Psychology 36, or Zoology 60.

- 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

103. EMBRYOLOGY. Mr. Enders. *Spring semester*

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.

Prerequisite: Zoology 14.

104. COMPARATIVE PHYSIOLOGY. Mr. Flemister. *Fall semester*

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: Zoology 14, organic chemistry and physics.

106. BIOLOGY OF ARTHROPODS. *Alternate years, fall semester*

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, independent work on one topic, and discussions of current research.

Not offered in 1968-69.

107. INVERTEBRATE ZOOLOGY. Mr. Meinkoth. *Alternate years, fall semester*

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. *Alternate years, spring semester*

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.

Not offered in 1968-69.

109. BIOLOGY OF ANIMAL COMMUNITIES. Mr. Rawson. *Fall semester*

The subject of Course 60 in seminar format. The analysis of the interrelations of species considered in an ecological context including a study of animal behavior relating to the growth and maintenance of animal populations.

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

PROFESSORS: EDWARD A. FEHNEL

WALTER B. KEIGHTON, JR., *Chairman*

ASSOCIATE PROFESSOR: PETER T. THOMPSON

ASSISTANT PROFESSORS: JAMES H. HAMMONS †

JAMES R. HUTCHISON

ROBERT E. LEYON

CLAUDE E. WINTNER

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, or 3, 4 and Mathematics in their freshman year; Chemistry 28, 29, Mathematics and Physics 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.

Students who wish to meet the minimum standards of the American Chemical Society for professional training in chemistry should also take Chemistry 56, an additional semester of advanced chemistry, and have a reading knowledge of scientific German.\* Additional mathematics and physics are strongly recommended.

### 1, 2. INTRODUCTION TO CHEMISTRY. Mr. Keighton and Staff.

A study of the central concepts and basic principles of chemistry; the interpretation of chemical properties and reactions through equilibrium constants, oxidation potentials, free energies, thermochemistry; the relation of chemical properties to atomic and molecular structure and to the Periodic Table; rates and mechanisms of chemical reactions.

Students who enter college with advanced training in chemistry are encouraged to take a placement examination during freshman orientation week to determine which college chemistry course they should start with.

Chemistry 1, 2 or 3, 4 is a prerequisite for all other courses in chemistry. One laboratory period weekly.

### 3, 4. GENERAL CHEMISTRY. Mr. Hutchison.

The subject matter of this course parallels that of Chemistry 1, 2 but at a more advanced and mathematically oriented level. The course is intended

\* This may be demonstrated by completing German 4 or 8 or by an examination given by the Department of Chemistry, preferably before the beginning of the senior year.

† Absent on leave, 1968-69.



for students with a strong interest in chemistry, whose high school preparation has been extensive, and who are prepared to work independently.

Admission to this course is based on consultation with the staff and a placement examination.

Chemistry 1, 2 or 3, 4 is a prerequisite for all other courses in chemistry. One laboratory period weekly.

26, 27. QUANTITATIVE CHEMISTRY. Mr. Leyon.

Reactions and equilibria in acid-base, complexation, oxidation-reduction, and two-phase systems are studied, with emphasis on their applications in chemical analysis. The principles and methods of laboratory measurements, volumetric and gravimetric analysis, spectrophotometry, electroanalytical techniques, separations and chromatography, and organic analysis are introduced and developed. Laboratory work is designed to illustrate the lecture material, to give the student practical experience with theories, techniques, and instruments of modern analytical chemistry, and to encourage an independent approach to experimental work. Course 26 satisfies most medical school requirements.

Chemistry 61, 62 taken concurrently is highly desirable.

One laboratory period weekly.

28, 29. ORGANIC CHEMISTRY. Mr. Fehnel and Mr. Wintner.

An introduction to the chemistry of the more important classes of organic compounds, with emphasis on nomenclature, structure, reactions, and methods of synthesis. Current theoretical concepts of structure and mechanism are applied throughout the course to the interpretation of the properties and reactions of a wide variety of organic compounds. The laboratory work illustrates some of the principles and reactions discussed in the classroom and provides practical experience in the techniques involved in synthesizing, isolating, purifying, and characterizing organic compounds.

One laboratory period weekly.

56. ORGANIC STRUCTURE DETERMINATION. Mr. Fehnel. *Fall semester*

Classroom and laboratory study of the principles and techniques involved in the elucidation of the structures 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 spectroscopic methods of identification and structure determination.

Prerequisite: Chemistry 29.

One laboratory period weekly.

58. BIOLOGICAL CHEMISTRY. Mr. Fehnel. *Spring semester*

An introduction to the chemistry of living systems, with emphasis on the relationship of molecular structure and chemical reactivity to biological function. Consideration will be given to such topics as the organic chemistry of cellular constituents, certain aspects of intermediary metabolism and biosynthesis, mechanisms of enzyme action, and the chemical basis of genetics.

Prerequisites: Chemistry 29 and consent of the instructor. Prior or concurrent enrollment in Biology 21 is strongly recommended.

60. PHYSICAL CHEMISTRY. Mr. Thompson. *Spring semester*

The principles of physical chemistry are studied with emphasis on application to material systems including the gaseous, liquid, solid and solution states. Topics included are chemical thermodynamics, rate processes and the application of quantum mechanical principles in such areas as spectroscopy, structure determination, and molecular bonding.

One laboratory period weekly.

This course is intended primarily for students majoring in engineering.

Prerequisites: Mathematics 12 or 16, Physics 2, and Engineering 53.



61, 62. THEORETICAL CHEMISTRY. Mr. Hutchison.

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.

Prerequisites: Second year mathematics and general physics.  
One laboratory period weekly.

63. QUANTUM CHEMISTRY. Mr. Thompson.

*Fall 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.

Prerequisite: Chemistry 62.

65. ADVANCED INORGANIC CHEMISTRY. Mr. Hutchison.

*Spring semester*

Important principles for the understanding of the chemical behavior of inorganic compounds are discussed. Topics include: electronic structure of atoms, ionic and covalent bonding, molecular orbital theory applied to inorganic compounds, and inorganic reaction mechanisms. Considerable emphasis is placed on the chemistry of transition metal coordination compounds through the application of ligand field theory.

Prerequisite: Chemistry 62. Prior or concurrent enrollment in Chemistry 62 is highly desirable.

One laboratory period weekly.

67. ADVANCED ORGANIC CHEMISTRY. Mr. Fehnel.

*Spring semester*

Selected topics in organic chemistry, including resonance and molecular orbital concepts, reaction mechanisms, molecular rearrangements, stereochemistry, free radicals, and other topics of current interest. A familiarity with physical chemistry is desirable.

Prerequisite: Chemistry 29.

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. Students who propose to take this course should consult with the appropriate instructor during the early part of the semester preceding that in which the work is to be done.

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 or 3, 4, 28, 29, Mathematics 3, 4, 11, 12, and Physics 1, 2. It is recommended that students in the Honors program take Chemistry 101 and 102 in the junior year and Chemistry 106 and 108 in the senior year, together with seminars in biology, mathematics, or physics.

101. THEORETICAL CHEMISTRY. Mr. Thompson. *Fall semester*  
 The gaseous, liquid, and solid states, solutions, colloids, elementary thermodynamics, chemical equilibria, electrochemistry, the kinetics of chemical reactions.  
 Prerequisites: Second year mathematics and general physics.  
 One seminar and laboratory weekly.
105. CHEMICAL ANALYSIS. Mr. Leyon. *Spring semester*  
 The material covered is essentially the same as in courses 26 and 27: the principles and practice of volumetric and gravimetric analysis, optical and electrical methods of analysis, separation techniques, and the analysis of organic compounds. The analytical chemistry of the common elements is studied to illustrate the application of analytical methods.  
 Prerequisite: Chemistry 2 or 4, and 101.  
 One seminar and laboratory weekly.
106. ADVANCED ORGANIC CHEMISTRY. Mr. Fehnel. *Fall semester*  
 An intensive study of essentially the same subject matter as is covered in courses 56 and 67. A familiarity with physical chemistry is desirable.  
 Prerequisites: Chemistry 28, 29 and senior standing.  
 One seminar and laboratory weekly.
108. VALENCE AND MOLECULAR STRUCTURE. Mr. Hutchison and Mr. Thompson. *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: Chemistry 62 or 101.  
 One seminar and laboratory weekly.

## CLASSICS

PROFESSORS: SUSAN P. COBBS  
HELEN F. NORTH, *Chairman*  
MARTIN OSTWALD

ASSISTANT PROFESSOR: THOMAS N. MITCHELL

INSTRUCTOR: GILBERT P. ROSE

VISITING LECTURER: NORRIS M. GETTY \*\*

The Department of Classics offers instruction in the various fields which constitute the study of Greek and Roman culture. Courses numbered from 1 to 20 are devoted to the Greek and Latin languages and literatures. Courses numbered from 31 onwards presuppose no knowledge of the Greek or Latin languages and are open without prerequisite to all students; they deal with the history, mythology, religion, archaeology, and other aspects of the ancient world and include the study of classical literature in translation.

Swarthmore College contributes to the American Academy in Rome and the American School of Classical Studies in Athens, and its students have the privileges accorded to undergraduates from contributing institutions (use of the library at both schools and consultation with the staff). Swarthmore is also one of the institutions sponsoring the Intercollegiate Center for Classical Studies in Rome, which provides facilities for the study of Classics, Archaeology, and Ancient History. Classics majors, recommended by the Department, are eligible to study at the Center, usually during their junior year, either for one semester or for two.

### 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 Greek 11,12 or Latin 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.

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).

In the Honors program, three or four papers constitute a major in Greek or in Latin. Normally all but one of these will be prepared for by seminars. Either Directed Reading in a field in which a seminar is not given (courses 17,18), a thesis, or a course supplemented by additional independent work may be used to prepare for the remaining paper. A minimum of two papers constitutes a minor in Greek or in Latin, at least one of which must be prepared for by a seminar.

### Greek

1-2. ELEMENTARY GREEK. Mr. Rose. *Year course*

The essentials of Greek grammar are covered and selections from masterpieces of Greek literature are read.

9, 10. GREEK PROSE COMPOSITION. Staff. *Half course, each semester*

Course meets 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.

\*\* Spring Semester, 1968-69.

11, 12. INTERMEDIATE GREEK. Miss North, Mr. Ostwald.

Plato's *Apology*, a play of Euripides, and selections from Homer are read.

13, 14. GREEK PROSE AUTHORS. Mr. Rose.

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. Staff.

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.

17, 18. DIRECTED READING. Staff.

A program of independent work under the supervision of the instructor. It is open only to advanced students and may be taken only with the consent of the departmental chairman.

20. SPECIAL TOPICS. Staff.

Readings selected to fit the needs of individual seniors in preparation for their comprehensive examinations.

## Latin

1-2. ELEMENTARY LATIN. Mr. Rose, Mr. Getty.

*Year 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.

3. THE PHILOSOPHICAL WORKS OF CICERO. Staff.

*Fall semester*

This course has been especially designed for students entering Swarthmore with two or three years of Latin in secondary school. Its governing assumption is that those who wish seriously to study Latin literature and language require at this point an intensive review and refinement of their grammatical knowledge by a combination of close reading and prose composition.

4. OVID. Mr. Getty.

*Spring semester*

An intensive study of Ovid's *Metamorphoses* and a review of the principles of Latin grammar.

9, 10. LATIN PROSE COMPOSITION. Staff.

*Half course, each semester*

Course meets 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. LIVY. Mr. Mitchell.

*Fall semester*

A study of the foremost prose author of the Augustan Age. This course is normally open to students who have had four or more years of secondary-school Latin. Students admitted with less than four years of secondary-school Latin are required to take Latin 9 in conjunction with this course.

12. HORACE. Miss Cobbs.

*Spring semester*

A study of the *Odes* of Horace. This course is normally open to students who have had four or more years of secondary-school Latin. Students admitted with less than four years of secondary-school Latin are required to take Latin 10 in conjunction with this course.

13. CATULLUS AND ELEGY. Staff. *Fall semester*  
A study of the poems of Catullus and of the elegiac poets.
14. MEDIAEVAL LATIN. Miss North. *Spring semester*  
Works chosen from the principal types of mediaeval Latin literature (including religious and secular poetry, history and chronicles, saints' lives, satire, philosophy, and romances) are studied in this course.
15. ROMAN COMEDY. Staff. *Fall semester*  
A study of selected plays of Plautus and Terence.
16. VIRGIL. Mr. Mitchell. *Spring semester*  
An intensive study of Virgil's *Aeneid*. Majors and minors (in Course as well as in Honors) who do not elect to take the seminar in the Latin Epic are required to take this course.
- 17, 18. DIRECTED READING. Staff.  
A program of independent work under the supervision of the instructor. It is open only to advanced students and may be taken only with the consent of the departmental chairman.
20. SPECIAL TOPICS. Staff.  
Readings selected to fit the needs of individual seniors in preparation for their comprehensive examinations.

### 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. Mitchell *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 normally 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. The principal works studied are Homer's *Odyssey*, Hesiod's *Theogony*, selected Greek tragedies, Virgil's *Aeneid*, the *Metamorphoses* of Ovid, and Dante's *Commedia*. A study is made of the way in which mythological themes have been handled in painting and sculpture at various periods, and topics for papers provide an opportunity for the study of the treatment of mythology by writers from the Renaissance to modern times. The course is normally given in alternate years.

42. GREECE IN THE FIFTH CENTURY B.C. Mr. Ostwald.

Spring semester

An intensive study, chiefly on the basis of primary sources, of Athens and the Greek world from the reforms of Cleisthenes to the end of the Peloponnesian War. Special emphasis is placed on the political, social, and economic institutions of the Athenian democracy and on the problems of the Delian League, both internal and in its relation to the Greek and non-Greek world. The course is normally given in alternate years.

Prerequisite: Classics 31 or its equivalent.

44. ROME IN THE AGE OF AUGUSTUS. Mr. Mitchell.

Spring semester

This course treats in detail the political, economic, social, and cultural development of Rome and the Roman world from the death of Julius Caesar to the accession of Tiberius. Special emphasis is placed on Octavian's rise to power, the nature of the principate, the relationship of the ruling city to her provinces, Rome's changing social structure, and the problems of political stability and the transference of power. Some attention is paid to literary, artistic, and religious movements. Readings are chiefly in primary sources in translation. The course is normally given in alternate years.

Prerequisite: Classics 32 or its equivalent.

### HONORS SEMINARS

102. ROMAN HISTORIANS. Mr. Mitchell.

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, both as examples of Roman historiography and as sources for Roman history. The seminar is given in the spring semester.

103. LATIN EPIC. Mr. Mitchell.

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. ROMAN SATIRE. Mr. Mitchell.

A study of the *Satires* and *Epistles* of Horace and of the *Satires* of Juvenal is supplemented by a general survey of the development of Roman satire. The seminar is given in the fall semester.

105. CICERO. Mr. Mitchell.

A study of the political and forensic speeches of Cicero and of his personal correspondence as sources for the political and constitutional history of the final years of the Roman Republic. Attention is also paid to Ciceronian prose style as exemplified in his letters and orations. The seminar is given in the spring semester.



111. GREEK PHILOSOPHERS. Mr. Ostwald.

This seminar is devoted mainly to the study of Plato, which is supplemented by study of the pre-Socratic philosophers and of Aristotle and the Hellenistic schools. The orientation of the seminar is primarily philosophical, although the literary merits of the Greek philosophers receive consideration. The seminar is given in the fall semester.

112. GREEK EPIC. Mr. Rose.

The study of Homer's *Iliad* or *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.

This seminar is devoted to a study of Herodotus and Thucydides, both as examples of Greek historiography and as sources of Greek history. 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: EDWARD K. CRATSLEY  
FRANK C. PIERSON, *Chairman*

ASSOCIATE PROFESSORS: VAN D. OOMS  
FREDERIC L. PRYOR †  
BERNARD SAFFRAN

ASSISTANT PROFESSOR: LEWIS R. GATY

VISITING LECTURER: MARCUS ALEXIS

LECTURERS: HELEN M. HUNTER  
ANITA A. SUMMERS

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 1-2A 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, statistics, and/or accounting. While not essential, college-level mathematics would also be helpful. Students intending to do graduate work in economics should take Mathematics 3,4 and 11,12 or (if they are especially interested or gifted in mathematics) 5,6 and 15,16. 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.

1-2A. INTRODUCTION TO ECONOMICS. Messrs. Gaty, Ooms, Pierson, Pryor, Saffran, and Mrs. Summers.

This course, which is 1½ semesters in length, 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. On completing the course, students will have the option of joining seminars for one half course credit held during the last seven weeks of the semester.

3. ACCOUNTING. Mr. Cratsley. *Spring 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. Mrs. Hunter. *Fall semester*

The course is designed to make the student a critical user of statistics. Topics covered include frequency distributions, sampling, correlation, economic time series, and an introduction to econometric analysis. Students acquire some familiarity with the IBM computer.

11. ECONOMIC DEVELOPMENT. Mr. Ooms. *Fall semester*

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

† Absent on leave, spring semester, 1968-69, and fall semester, 1969-70.

50. ECONOMIC THEORY. Mr. Gaty. *Fall semester*  
 Determination of prices in theory and in practice. Distribution of income. Economic welfare aspects of various market structures.
51. MONEY AND BANKING. Mrs. Hunter. *Spring semester*  
 Organization and operation of commercial banking in the United States. Central banking; the Federal Reserve system. Monetary policy.
52. PUBLIC FINANCE. Mr. Gaty. *Fall semester*  
 Social goals and fiscal institutions, Federal, state, and local, including analysis of public expenditures, taxation, the national debt, fiscal federalism, and current fiscal policy.
54. BUSINESS FINANCE. Mr. Gaty. *Fall semester*  
 Analysis of private financial instruments, markets, and institutions, and public regulation of financial practices.  
 Not offered in 1968-69.
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. Alexis. *Spring semester*  
 The extent, consequences, and causes of poverty and economic insecurity; an appraisal of reforms in social insurance, medical care, public housing, and rural development; the economics of discrimination and urban ghettos.
57. MANAGERIAL ECONOMICS. Mr. Gaty. *Spring semester*  
 Analysis of business decision-making; economic theory and management control; market structure, pricing, and output; the budgetary process and business planning; business behavior and social welfare.
58. PUBLIC CONTROL OF BUSINESS. Mr. Gaty. *Spring 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 1968-69.
59. BUSINESS CYCLES. Mr. Pierson. *Spring semester*  
 National income theory. Analysis of business fluctuations and long-term economic change. Public policies for stabilization and growth.
60. INTERNATIONAL ECONOMICS. Mr. Ooms. *Spring 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. Pryor. *Fall semester*  
 Analysis of methods by which economic systems can be compared; case studies of the Soviet Union, Yugoslavia, and several West European nations.

#### HONORS WORK

101. FINANCE. Mr. Gaty. *Fall semester*  
 Social goals and fiscal institutions, Federal, State, and local, including analysis of public expenditures, taxation, the national debt, fiscal federalism, and current fiscal policy. Analysis of private financial instruments, markets, and institutions, and public regulation of financial practices.

102. **ECONOMIC STABILITY AND GROWTH.** Mr. Pierson. *Spring semester*  
 The theory of cyclical fluctuations and secular growth. Money and banking. Monetary and fiscal policy. Wage-price pressures and the control of inflation.
103. **ECONOMIC THEORY.** Mr. Saffran. *Each semester*  
 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. Gaty. *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.  
 Not offered in 1968-69.
105. **INTERNATIONAL ECONOMICS.** Mr. Ooms. *Each semester*  
 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. Pryor. *Spring semester*  
 Analysis of methods by which economic systems can be compared; study of resource allocation and growth in socialist, capitalist, and mixed economies; case studies of the U.S.S.R., Yugoslavia, China, France, and other nations; examination of special problems in economic planning.  
 Not offered in 1968-69.
107. **LABOR AND SOCIAL ECONOMICS.** Messrs. Pierson and Pryor. *Fall semester*  
 The organization of labor. Analysis of wage policies. Government control of labor relations. Problems stemming from income inequality and insecurity. Methods of income maintenance. Economic aspects of education, medical care, public housing. Special topics in urban economics.
108. **MATHEMATICAL ECONOMICS.** Mr. Saffran. *Spring semester*  
 Topics in mathematical economics. Econometric theory and empirical studies. An empirical research paper is required.  
 Prerequisites: Mathematics 12 and Economics 103.

## ENGINEERING

PROFESSORS: SAMUEL T. CARPENTER, *Chairman*  
JOHN D. MCCRUMM  
BERNARD MORRILL

ASSOCIATE PROFESSORS: CARL BARUS  
DAVID L. BOWLER  
RAYMOND DOBY  
M. JOSEPH WILLIS

ASSISTANT PROFESSORS: G. STUART PATTERSON, JR.  
VICTOR K. SCHUTZ

LECTURER: CHARLES R. LANSBERRY

The Department of Engineering offers engineering programs\* directed toward four principal educational aims: to introduce the student to a body of knowledge fundamental to all of modern engineering; to provide him with a comprehensive base of mathematics, chemistry and physics; to allow him maximum flexibility in electing plans of study to suit individual objectives; to provide him the opportunity to study in the humanities and social sciences.

The professional practice of engineering requires skill and resourcefulness in applying scientific knowledge and methods to the solution of engineering problems of ever growing technical complexity. In addition, the role of engineering in our society demands that the engineer recognize and take into account the economic and social factors that bear on his technical problems. The successful engineer will therefore possess an understanding of socio-economic forces, an appreciation of the cultural and humanistic aspects of the society in which he lives, and a sound working knowledge of human relations. Our total program furthers these objectives by providing the student with a broad technical knowledge, together with the foundation of a liberal education.

Courses in the Department of Engineering are open to all students who have the interest and the prerequisite background. Special inquiries may be made through the Chairman of the Department.

Educational plans available to engineering students at Swarthmore are as follows:

- (1) Four year course programs with the major in Engineering, with elected concentrations of study in the professional branches of engineering such as Civil, Electrical, and Mechanical Engineering, and in related engineering areas. (See suggested Elective Plans.)
- (2) Four year course programs with the major in Engineering, with elected combinations of study in Biology, Chemistry, Economics, Mathematics, Political Science, etc.
- (3) Reading for Honors in Engineering.
- (4) Special combinations to meet unusual needs or interests:
  - (a) A four year program relating Engineering with other College areas of study, or
  - (b) A five year program leading to both a B.S. degree with a major in Engineering, and a B.A. degree.

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\* The new programs and courses presented in this catalogue are effective with the freshman class entering college in September 1966. Previously enrolled students follow programs and courses as outlined on page 106 and in the 1964-65 College Catalogue, a copy of which is available upon request.

A candidate for a degree in Engineering must meet the general requirements of the College as well as the requirements of the Department of Engineering. Curricular plans for the first two years must take two objectives into consideration: (1) courses should provide an adequate background for work in Engineering at the upperclass level, and (2) the satisfying of the general College requirements. During the second semester of the sophomore year the student, following College procedure, will apply for a major in Engineering. All four-year programs lead to the degree of Bachelor of Science with the major in Engineering.

### *Course Program*

Students interested in applying for a major in Engineering may follow several paths in preparation. The prerequisites leading to an Engineering major normally are Engineering 5 and 6, and these courses are recommended for inclusion in sophomore programs. The prerequisites to Engineering 5 and 6 may be met by satisfactorily completing Engineering 2 and 3 and/or Physics 1 and 2. First year students who plan to study engineering are encouraged to enroll in Engineering 1 and Engineering 2. Engineering majors are normally expected to take appropriate courses in chemistry and those planning a program in bio-engineering will find biology important. Students normally follow a mathematics sequence during the first two years.

The departmental requirements for the degree of Bachelor of Science with a major in Engineering fall into two categories: (1) satisfactory completion of those courses common to all Engineering students; namely, Fields and Continua, Thermodynamics, Materials Science, and Physical Chemistry; (2) satisfactory completion of a minimum of four advanced Engineering courses beyond those listed in category (1) during the junior and senior years with no more than seven such courses normally permitted in any program. All programs leading to a Bachelor of Science degree with the major in Engineering must be submitted for approval to the Department of Engineering.

### *Course Advising*

Students are advised to make their educational goals known to their advisers at the earliest possible time. In this way the student can best benefit from the flexibility provided for course election and provide for a curricular program specifically oriented to his future educational goals. The plan for upperclass study in Engineering should be formulated during the second semester of the sophomore year when the student applies for a major in Engineering.

### *Reading for Honors in Engineering*

Students who wish to become candidates for a Bachelor of Science degree in Engineering with Honors should follow the application procedure given on pages 65-67.

A student's program should include seminars and/or other work in Engineering and, normally, science and mathematics. A student who wishes to concentrate in civil, electrical, or mechanical engineering may prepare for up to four examination papers in his chosen area. The other two papers will usually be chosen from mathematics, science, or (since the Engineering Department comprises the merged civil, electrical and mechanical departments) a branch of engineering other than the field of concentration.

### *Elective Plans in the Course Program*

The following suggested plans of study for the last two years are listed to indicate the flexibility of choice open to the student. Other plans may also be arranged



beyond those suggested. At least four elected and approved advanced courses in Engineering must be included in the program of the junior and senior years. Electives in the humanities, social sciences and life sciences can also contribute, in many cases, to the central educational aims. A course in Special Topics or a Thesis are available for meeting special interests or needs.

## Suggested Elective Plans

### BIO-ENGINEERING

A minimum of four Engineering courses with additional elections in Engineering, Biology, and Chemistry.

The application of engineering principles to biological and medical problems. Students with this interest will normally elect two semesters of biology and two semesters of organic chemistry, and an appropriate sequence of engineering courses. Suggested sequences of study in this interdisciplinary field are available upon request or can be developed with the assistance of your Engineering adviser.

### CIVIL ENGINEERING AND RELATED AREAS

General Civil Engineering  
Structures  
Urban and Regional Planning  
Water Resources

The suggested course program is Mechanics of Solids, Structural Mechanics I, Earth Science, Civil Engineering Design, with a fifth course chosen from Fluid Mechanics, Structural Mechanics II, or Soil Engineering. The sequence provides the prerequisites for an additional elective sequence in Structures, Water Resources and Planning, Pre-Architecture, or General Civil Engineering. Plans may be made for work in Bio-Engineering with an emphasis on Environmental Control and Water Resources.

The early planning of electives in Biology, Economics, Political Science, Sociology, or Fine Arts, is essential for programs related to Urban and Regional Planning or Water Resources.

### ELECTRICAL ENGINEERING AND RELATED AREAS

General Electrical Engineering  
Electric Power and Energy Conversion  
Electronics and Information Processing  
Systems and Control  
Engineering Physics

Students who plan to do work in electrical engineering will normally include the following courses in their programs as a minimum background in the field beyond the required engineering core: Circuit Theory, Electromagnetic Theory, Electronics I, Electromechanical Energy Conversion I.

In addition, a student may pursue his electrical interests, with emphasis in one of the areas shown at the left, by the appropriate choice of further electives.

### ENERGY CONVERSION

Direct Energy Conversion  
Electromechanical Energy Conversion  
Thermodynamics and Heat Transfer

Energy conversion is one of the outstanding problems of the present and future. Conventional sources and means of conversion will continue to be important. New and as yet undeveloped systems will become increasingly significant. A concentration of electrical and mechanical courses built on fundamental courses in thermodynamics can be developed for students with a special interest in energy conversion.

## ENGINEERING SCIENCES

A number of feasible programs may be elected from Engineering, Mathematics, Chemistry, Physics, with the engineering courses dealing primarily with the theoretical bodies of knowledge.

A program in Engineering Sciences provides for diversity and depth in engineering, combined with mathematics, chemistry, or physics. It is suitable for those planning to enter college teaching or engineering research after graduate study.

## ENGINEERING COMBINED WITH STUDY IN OTHER COLLEGE AREAS

Biology  
Chemistry  
Economics  
Mathematics  
Political Science  
Psychology  
Physics

An engineering student is required to include at least four approved engineering courses beyond the required engineering core. Fourteen electives, including the six to satisfy the College distribution requirements, are available for planning a sequence of study leading to concentrations or diversity in other College areas. The areas listed on the left are not exclusive but they do represent areas in which engineering students may find a strong interest and a relationship to future engineering work.

## MECHANICAL ENGINEERING AND RELATED AREAS

General Mechanical Engineering  
Applied Mechanics  
Thermodynamics and Energy Conversion  
Fluid Mechanics and Heat Transfer  
Engineering Design

Sequences in general mechanical engineering will normally include, in addition to the required engineering core, courses in advanced dynamics, solid mechanics, fluid mechanics and heat transfer, and automatic controls. Courses in thermodynamics, applied mechanics, fluids, heat transfer, and engineering design can be used to develop such specialized sequences as those shown at the left. Plans may be made for work in bio-engineering with an emphasis on the structure and function of biological systems.

## COURSES

### 1. INTRODUCTION TO ENGINEERING

*Fall semester*

An introduction to engineering analysis evolving solution to engineering problems through the use of simple mathematical models. The body of mathematics necessary for structuring these models is fully developed within the course. Only a background of high school mathematics is necessary. Programming concepts for the digital computer are introduced so that the computer can be used for solution of some of the problems represented by the models. The laboratory work consists of some graphical concepts, shop practice, and design projects.

Three class periods and a laboratory each week.

### 2. MECHANICS I.

*Spring semester*

Concept and definition of forces, vector methods of analysis. Equilibrium principles. Analysis of forces in machines and structures. Virtual work. Shear and bending in beams, elementary concepts of deformable bodies. Centroids and inertia of plane areas.

Three class periods and a laboratory each week.

### 3. MECHANICS II.

*Fall semester*

Vector treatment of dynamics; kinematics of particles in fixed and moving reference systems; Newton's laws applied to particle motion; central force motion; rigid body kinematics, relative motion, and kinetics; energy methods;

impulse and momentum methods; kinematics and kinetics of rigid bodies in three dimensions.

Three class periods and a laboratory every other week.

Prerequisite: Mechanics I, or equivalent.

5. ELECTRICAL SCIENCE.

*Fall semester*

The experimental and theoretical basis of electricity and magnetism; elementary electrostatics and magnetostatics; principles of energy conversion, foundations of circuit theory; basic electrical measurements.

Three class periods and a laboratory every other week.

Prerequisite: To be preceded or accompanied by Integral Calculus.

6. PHYSICAL SYSTEMS ANALYSIS.

*Spring semester*

The study of physical phenomena and systems which may be represented to a good degree of approximation by a linear model or a lumped-parameter pictorial model. The formulation of the mathematical model from basic physical laws and the treatment of the ordinary differential equations resulting therefrom. Emphasis will be placed upon the unity resulting from the mathematical representation for many types of physical systems: mechanical, electrical, electromechanical, thermal, etc. Techniques of analysis will include classical solution of differential equations including power series solutions, and also solution by Laplace transform methods. Transient and steady state response, frequency response, pole-zero concepts, notions of stability, and energy considerations. The analog computer will be introduced.

Three class periods and a laboratory every other week.

Prerequisite: Engr. 5, or equivalent.

7, 8. PRINCIPLES AND PROBLEMS OF MODERN TECHNOLOGY.

This course is designed to meet the needs of non-science majors and fulfills the group I distribution requirement. (See p. 63.) In the first semester, the logic and programming of the digital computer will be introduced, elementary decision theory will be developed, and the engineering concepts of optimization, feedback, and information discussed. Newton's laws of motion and the laws of thermodynamics will be introduced to illustrate the use of science in technology. In the second semester, a series of three to five special topics illustrative of modern technological problems and activity will be developed. Topics will be chosen for their timeliness, interest and importance to both society and technology.

Three class periods and a laboratory every other week.

51. INTRODUCTION TO FIELDS AND CONTINUA.

*Fall semester*

Analysis of field phenomena in a variety of continuous media. Fluid-flow, elastic, thermal, electromagnetic, and other fields are treated with emphasis on their common properties. The partial differential equations governing time-invariant fields, diffusion, wave motion, etc., are developed from basic principles. Application is made to realistic engineering situations.

Three class periods and a laboratory each week.

Prerequisite: Engr. 6, or equivalent.

53. THERMODYNAMICS.

*Fall semester*

Macroscopic concepts of thermodynamics: temperature, the First Law, thermodynamic properties, reversibility. Statistical inference of thermodynamics: probability, entropy and equilibrium, the partition function. Ideal gases. The Second Law of Thermodynamics. Cycles. Maxwell's Relations.

Three class periods and a laboratory each week.

55. SYSTEMS THEORY.

Mathematical analysis of an assemblage of interacting elements comprising a generalized system. Fourier methods and the Laplace transform. Linear

graphing and operators. Root locus theory. State variables, the system state transition matrix and canonical forms. Sampled systems and the Z transform. Response to random inputs. Correlation functions and spectral distribution. Applications to filter theory. Some aspects of socio-economic and urban systems. The role of the digital computer; further work on the analog computer.

Three class periods each week; conference or laboratory every other week.

Prerequisite: Engr. 6, or equivalent.

56. OPERATIONS RESEARCH. *Spring semester*

The principles of operations research as applicable to defining optimum solutions of engineering and financial problems as an aid to managerial decision making. Probability and probability distributions, reliability, random number stimulation, queuing theory, linear programming, dynamic programming, allocation and transportation theory. The working principles of engineering economy are introduced and combined with operations research topics.

Three class periods each week.

Normally for junior and senior students.

59. MECHANICS OF SOLIDS. *Fall semester*

This course deals with the internal stresses and changes of form when forces act on solid bodies. State of stress and strain, strength theories, stability, deflections, and photoelasticity. Elastic and Plastic theories.

Three class periods and a laboratory each week.

Prerequisites: Mechanics I and II, or equivalent.

61. MATERIALS SCIENCE. *Fall semester*

This course brings together much of the background material acquired in other courses and focuses on the problem of understanding at a technological as well as theoretical level the engineering properties of materials in terms of atomic and sub-atomic phenomena. Among the topics considered will be crystal structure, electrical, thermal and magnetic properties of solids, imperfections and their effect on mechanical and electrical properties, corrosion and environmental effects.

Three class periods and a laboratory each week.

Prerequisite: Physical Chemistry.

62. STRUCTURAL MECHANICS I. *Spring semester*

Principles of structural systems and advanced mechanics of deformable bodies pertaining to deflection and stability. Structural Mechanics of space and plane framed structures including stress analysis, influence lines, and matrix solutions.

Three class periods and a laboratory each week.

Prerequisite: Engr. 59.

63. STRUCTURAL MECHANICS II. *Fall semester*

A study of statically indeterminate structural systems and advanced structural theory. Response of structures to complex dynamic inputs such as earthquakes and moving loads. Digital computer applications.

Three class periods and a laboratory each week.

Prerequisite: Structural Mechanics I.

64. EARTH SCIENCE. *Spring semester*

Using the basic concepts of physical geology as a unifying framework, the principles of soil mechanics and hydrology are studied. Subjects introduced include clay mineralogy, theory of consolidation of soils, stresses in earth masses, flow through porous media, precipitation-runoff relationships, open channel flow, ground water hydraulics, and sedimentation.

Three class periods and a laboratory each week.

65. CIVIL ENGINEERING DESIGN.

*Fall semester*

An introduction to the design of engineering structures with emphasis on structural components and structural materials; design projects involving planning, field surveys, analysis and synthesis, structural models, and optimization criteria.

Three class periods and a laboratory each week.

66. STRUCTURAL DESIGN.

*Spring semester*

An advanced course in the design of structures dealing with stability, flat plates, shells, pre-stressed concrete, high strength steels, ultimate design, dynamic force systems, comprehensive design problems, advanced structural model studies.

Three class periods and a laboratory each week.

Prerequisites: Engr. 59, 62, 63, 65.

67. WATER RESOURCES.

An introduction to the fundamentals of water-resources engineering, including pertinent areas of hydrology and hydraulics, precipitation-runoff relationships, groundwater flow, sedimentation, and hydraulics of steady and gradually varied flow through channels and reservoirs are studied. Fundamentals are related to engineering aspects of planning for water-resources projects, followed by some case studies of existing projects which draw on the background of the student in engineering science, design, the humanities, and the social sciences.

Three class periods and a laboratory each week.

69. SOIL ENGINEERING.

Advanced principles of soil mechanics with application to problems in design. Theoretical aspects of seepage, settlement and foundation stability analysis. The design of retaining walls, foundations, and earth structures are among the specific topics.

Three class periods and a laboratory each week.

Prerequisite: Engr. 64.

71. CIRCUIT THEORY.

*Fall semester*

Transient and steady-state analysis of electric circuits and networks with emphasis on Laplace and Fourier methods and s-plane interpretation. Network topology, equilibrium equations, theorems, network functions and their properties. Energy in electric networks. Introduction to synthesis.

Three class periods and a laboratory each week.

Prerequisites: Engr. 6, or Physics 12.

72. ELECTROMAGNETIC THEORY.

*Spring semester*

Application of Maxwell's equations. Macroscopic field treatment of magnetic, dielectric and conducting bodies. Forces, motion and energy storage. Field basis of circuit theory. Electromagnetic waves; wave-guides, transmission lines, and antennas.

Three class periods and a laboratory each week.

Prerequisite: Engr. 51, or equivalent.

73, 74. ELECTRONIC CIRCUIT THEORY.

Following an introduction to vacuum tubes, the principal emphasis of the course is on the use of transistors as active circuit elements. The physical basis of transistor operation is briefly discussed and the Ebers-Moll, charge control and hybrid- $\pi$  models developed. The remainder of the course is devoted to a study of the use of these models and appropriate analytical techniques in such applications as biasing circuits, low-pass amplifiers, tuned

amplifiers, power amplifiers, feedback circuits and switching circuits. The bulk of the laboratory work is oriented toward circuit design. Students are encouraged to become familiar with and use the IBM Electronic Circuit Analysis Program which is available in the Computer Center.

The first semester provides a working knowledge of some basic aspects of the subject for those who are unable to pursue it further.

Three class periods and a laboratory each week.

Prerequisite: Engr. 6, or equivalent.

75. ELECTROMECHANICAL ENERGY CONVERSION.

The conversion of energy by means of electromagnetic fields. Electromechanics of lumped parameter systems, force-field relationships, energy storage and transfer in electrodynamic systems. Transducers and rotating machines in engineering practice. Practical engineering aspects of general purpose machines and special electromechanical devices.

Three class periods and a laboratory each week.

Prerequisites: Engr. 5 and Engr. 6, or equivalent.

76. DIRECT POWER CONVERSION.

Topics are chosen from photoelectric, thermionic, and thermoelectric conversion; fuel cells; magnetohydrodynamics and nuclear reactor theory.

Three class periods and a laboratory each week.

Prerequisite: Engr. 6 and Engr. 53, or equivalent.

77. TOPICS IN INFORMATION TRANSMISSION.

Selected topics relating to the transmission and processing of information and information-bearing signals. Application to communication and information-processing systems.

Three class periods and a laboratory each week.

Prerequisite: Engr. 51, or equivalent.

78. CONTROL THEORY.

An introduction to classical and modern control theory. Concepts of state, controllability and observability. Analysis and design of linear automatic control systems by means of Nyquist diagram, frequency response and root locus method. Design by matrix methods and state variables. Stability criteria. Computers and logic systems in control. Analog to digital conversion. Introduction to optimum control. Special topics; sampled data systems, nonlinear processes, etc., according to class interest.

Three class periods and a laboratory each week.

Prerequisite: Engr. 6 (and preferably Engr. 54).

80. PHYSICAL ELECTRONICS.

A study of the physical principles underlying the operation of electronic devices. Attention is focused on the relationship between material properties and the characterization of devices as circuit elements. Semiconductor devices are extensively treated.

Three class periods and a laboratory each week.

Prerequisite: Physics 51.

82. FLUID MECHANICS.

Fluid mechanics is treated as a special case of continuum mechanics for which the relevant equations expressing the conservation of mass, momentum, and energy are derived. Examples and applications are given for the perfect fluid and the linearly viscous fluid. Current research and problem areas in fluid mechanics and heat transport are discussed.

Four class periods each week.

Prerequisite: Ordinary differential equations and multivariate calculus.



84. ADVANCED FLUID MECHANICS.

A study of the more specialized areas of fluid mechanics: boundary layer theory, compressible flow, wave motions, material-spatial coordinate transformations, and convective heat transfer. Independent work in either an experimental or analytical area is an important part of each student's work.

Four class periods each week.

Prerequisite: Engr. 81.

86. ADVANCED THERMODYNAMICS.

An extension of the basic core thermodynamics, Engr. 53. The fundamental laws of thermodynamics are applied to conventional systems of energy conversion. Principles of irreversible thermodynamics are developed and applied to systems of direct energy conversion.

Four class periods each week.

Prerequisite: Engr. 53.

87. CONDUCTION AND RADIATION HEAT TRANSFER.

A course dealing with the basic introduction to physical phenomena involved in the conduction and radiation heat transfer processes. Work is done in both steady state and transient conditions. Analytical, empirical and numerical approaches are covered.

Four class periods each week.

Prerequisite: Ordinary differential equations.

88. ADVANCED DYNAMICS.

Review of kinematics and particle dynamics using vectors. Vibrations and stability of lumped parameter system. Rigid body dynamics, including gyroscopes, in vector form. Lagrange's equations and Hamilton's Principle. Vibration of distributed systems.

Four class periods each week.

Prerequisite: Engr. 51.

89. MACHINE DESIGN.

The study of the analysis and synthesis of the elements of machines.

Three class periods and a laboratory each week.

Prerequisites: Engr. 85, 59.

90. ENGINEERING DESIGN.

A generalized approach to the design of engineering systems and components is developed stressing inventiveness, engineering analysis and decision making. The design process is studied through case histories and student projects which utilize a number of areas of engineering science. Optimization theory, the use of probability and statistics in design, decision theory, and reliability theory are discussed.

Three class periods and a laboratory each week.

Prerequisite: Senior Engineering standing.

91. SPECIAL TOPICS.

Subject matter dependent on a group need or individual interest. Normally restricted to senior students and offered only when staff interests and availability make it practicable to do so. Past offerings have been: digital computers, numerical methods, physical problems.

92. THESIS.

With approval, a student may undertake a thesis project as a part of his program in the senior year. The student is expected to submit a prospectus of his thesis problem before the start of the semester in which the thesis project is carried out.

## HONORS SEMINARS

Seminars beyond those listed may be arranged on sufficient demand. Suggested seminar areas are: Thermodynamics, Fluid Mechanics, Linear Systems and Electro-magnetic Theory.

### 102. ENGINEERING SYSTEMS.

This seminar concerns itself with the representation of engineering systems as mathematical models. These models fall into the two fundamental classes of lumped parameters and distributed systems. Emphasis will be placed on the physical meaning of the applied mathematics.

### 109. THESIS. Elective, upon approval of an acceptable field of original investigation.

### 111. CIRCUIT THEORY.

Theory of linear time invariant electric circuits with brief extensions to non-linear 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.

### 113. ELECTRONICS.

A study of electronic devices and circuits. Subject matter includes physical theory of electronic devices; 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.

## Engineering Curricula

### FOR STUDENTS WHO HAVE ENTERED IN SEPTEMBER 1965 OR BEFORE

Three educational plans are offered:

- (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. 63-65), and the requirements of the particular discipline 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 112) 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 disciplines, 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 Department 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 disciplines 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 area in which he is a major.

For descriptions of courses in Engineering, see the 1964-65 College Catalogue (pp. 91-100).

### (2) The Honors program in Engineering Sciences

The Division on Engineering offers an Honors program accredited 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 65. 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.

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 Engineering Sciences. The Mathematics and Physics seminars are described in the departmental listings and the Engineering Science seminars are described in the 1964-65 College Catalogue (p. 92). It is advisable for students interested in this program to consult with the Chairman of the Department of Engineering.

### (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 Department.

## BASIC ENGINEERING CURRICULUM OF THE FIRST TWO YEARS

### *Fall Semester*

Mathematics 3 (or 5)  
Physics  
Chemistry \*  
Introduction to Engineering  
Elective

### *Fall Semester*

Mathematics 11 (or 15)  
Mechanics II  
Materials Science  
Elective  
Elective

### *Spring Semester*

Mathematics 4 (or 6)  
Physics  
Chemistry  
Mechanics I  
Elective

### *Spring Semester*

Mathematics 12 (or 16)  
Engineering Measurements  
Electrical Engineering Science  
Elective  
Elective

### *Freshman Year*

### *Sophomore Year*

## Civil Engineering

### STANDARD PROGRAM FOR COURSE STUDENTS

#### *Fall Semester*

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

#### *Spring Semester*

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

### *Junior Year*

### *Senior Year*

CE53 Structural Mechanics  
CE55 Civil Engineering Design I  
CE57 Water Resources  
Elective

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

## Electrical Engineering

### STANDARD PROGRAM FOR COURSE STUDENTS

#### *Fall Semester*

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

#### *Spring Semester*

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

### *Junior Year*

### *Senior Year*

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

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

\* Chemistry may be deferred until the sophomore year.

# Mechanical Engineering

## STANDARD PROGRAM FOR COURSE STUDENTS

### *Fall Semester*

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

### *Fall Semester*

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

### *Spring Semester*

### *Junior Year*

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

### *Senior Year*

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

## ENGLISH LITERATURE

PROFESSORS: GEORGE J. BECKER, *Chairman*  
DAVID COWDEN

ASSOCIATE PROFESSORS: ALAN FRIEDMAN  
HAROLD E. PAGLIARO †

ASSISTANT PROFESSORS: THOMAS ARTIN  
THOMAS H. BLACKBURN  
SUSAN B. SNYDER

INSTRUCTORS: JOHN S. SHACKFORD  
THOMAS L. SHERMAN

DIRECTOR OF DRAMATICS: R. D. SIMONS

DIRECTOR OF POETRY WORKSHOP: JEAN VALENTINE

This department offers courses and seminars in English literature, American literature, and some foreign literatures in translation. The departmental curriculum is planned to provide experience of several critical approaches: the intensive study of the works of major writers, study of the literature of limited periods, and thorough study of the development of literary types. The department also provides instruction in the techniques of writing.

### REQUIREMENTS AND RECOMMENDATIONS FOR MAJORS AND MINORS

*Prerequisites.* English 1 or its equivalent by Advanced Placement is the prerequisite for all other courses in literature. (This prerequisite does not apply to seniors.) The minimum requirement for admission as a major in English is English 1 plus one other semester-course in the department. However, students considering a major in English are strongly urged to take one or two additional courses during the sophomore year. The study of history, particularly of the history of England, is also recommended. Advanced study in a classical or modern foreign language is also desirable, and is virtually a requirement for admission to graduate school.

*Major in Course:* The work of a major in Course consists of from 8 to 12 semester-courses in the department, including Shakespeare, Chaucer or Milton, and Problems of Literary Study.

*Major in Honors:* Majors in Honors must take four seminars in the department, one of which must be Chaucer, Shakespeare, or Milton. Majors are advised to take two seminars in Group I.

*Minor in Honors:* Minors in Honors are ordinarily required to take two seminars in the department.

### COURSES

1. THE ENGLISH POETIC TRADITION. Staff. *Each semester*  
Close study of selected works of Chaucer, Shakespeare, Donne, Pope, and Blake.
- 5, 6. ENGLISH FOR FOREIGN STUDENTS. *Each semester*  
Individual and group work on an advanced level for students with non-English backgrounds.

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† Absent on leave, spring semester, 1968-69, and fall semester, 1969-70.



10. **ADVANCED COMPOSITION.** Staff. *Spring semester*  
 Analysis, organization, and effective presentation of complex subject matter. The course will be conducted for the most part on a tutorial basis.
21. **POETICS.** Mr. Artin. *Fall semester*  
 Consideration of the essential aspects of poetry. Readings will include poetry in English from all periods, as well as some of the major documents of poetics.
22. **SATIRE.** Mr. Pagliaro and Mr. Blackburn. *Spring semester*  
 Examination of satire as a literary genre.
23. **MAIN CURRENTS OF NINETEENTH-CENTURY LITERATURE.** Mr. Becker. *Fall semester*  
 The major movements of romanticism, realism-naturalism, and symbolism in European literature.
24. **MAIN CURRENTS OF TWENTIETH-CENTURY LITERATURE.** Mr. Friedman. *Spring semester*  
 Emphasis on the European novel. The creation of new forms of literary experience by such figures as Proust, Gide, Camus, Kafka, Mann, Joyce, and Lawrence.
25. **SHAKESPEARE (for non-majors).** Staff. *Each semester*  
 Study of representative plays. Not open to majors in the department.
28. **MODERN BRITISH LITERATURE.** Staff. *Spring semester*  
 Forms and ideas in British writing in the twentieth century.  
 Not offered in 1968-69.
31. **CHAUCER.** Mr. Artin. *Fall semester*  
 Reading in Middle English of most of Chaucer's poems, with special emphasis on *The Canterbury Tales*. The course attempts to place the poetry in the context of medieval culture.
32. **MEDIEVAL LITERATURE.** Mr. Artin. *Spring semester*  
 Study of the literature of England from *Beowulf* to Malory. From time to time the course will focus on more specialized topics, such as the Germanic epic or the emergence of romance from Celtic narrative and mythology.
33. **RENAISSANCE POETRY.** Miss Snyder. *Spring semester*  
 The development of forms and ideas in English non-dramatic poetry from the beginning of the sixteenth century to the death of Milton.
34. **RENAISSANCE COMPARATIVE LITERATURE.** Miss Snyder. *Fall semester*  
 Selected major writers of the Continental Renaissance will be studied in translation.
35. **TUDOR-STUART DRAMA.** Mr. Friedman. *Fall semester*  
 Development of the English drama in the sixteenth and seventeenth centuries.  
 Not offered in 1968-69.
36. **MILTON.** Mr. Blackburn. *Spring semester*  
 Study of the main body of Milton's poetry with particular emphasis on *Paradise Lost*.
37. **EIGHTEENTH-CENTURY LITERATURE.** Mr. Pagliaro. *Fall semester*  
 Study of representative works with emphasis on the genres and on the critical values of the age.  
 Not offered in 1968-69.

38. ROMANTIC POETRY. Mr. Pagliaro. *Spring semester*  
The major English romantic poets, with attention given to the ideas as well as to form and structure.  
Not offered in 1968-69.
39. THE ENGLISH NOVEL. Mr. Cowden. *Fall semester*  
Study of the beginnings of the novel concentrating on eighteenth-century, romantic, and Victorian novels.
41. AMERICAN LITERATURE TO 1865. Mr. Shackford. *Fall semester*  
Study of the original ideals and forms of American literature as seen in the major writers from the Revolution to the Civil War.
43. VICTORIAN LITERATURE. Mr. Cowden. *Spring semester*  
Study of representative figures of the period.
44. AMERICAN LITERATURE SINCE 1865. Mr. Shackford. *Spring semester*  
Developments in the forms and character of American literature as seen in representative novels and poets from Mark Twain to Faulkner.
45. MODERN POETRY (BRITISH). Mr. Sherman. *Fall semester*  
Major British poets of the last hundred years. Readings include critical and autobiographical writings as well as poetry.
46. MODERN POETRY (AMERICAN). Mr. Shackford. *Spring semester*  
Examination of the work of selected American poets.
48. MODERN DRAMA. Staff. *Spring semester*  
Examination of the range of dramatic literature since Ibsen.
50. THE MODERN NOVEL. Mr. Cowden. *Spring semester*  
Study of the development of the modern novel beginning with James and continuing to the present.
- 51-52. COLLOQUIUM. Staff.
53. SPECIAL TOPICS. Staff.  
From time to time intensive courses will be offered in fields not covered by the regular program.
- 61-62. SHAKESPEARE. Staff. *Fall semester*  
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 beginning the course.
- 63-64. PROBLEMS OF LITERARY STUDY. Staff. *Spring semester*  
Group meetings of departmental majors in the second semester of the senior year. About half the semester is devoted to writing a research paper of magnitude.
- 65-66. THESIS. *Spring semester*  
Majors may elect to substitute a thesis for Problems of Literary Study. Application must be made by May 15 of the junior year.
70. FICTION WRITERS' WORKSHOP. Mr. Friedman. *Fall semester*  
Projects in imaginative writing. Meetings will be devoted primarily to the analysis of stories submitted by students; secondarily to the discussion of readings in the theory of fiction, the craft of fiction, and the work of contemporary authors.

71. POETRY WORKSHOP. Miss Valentine. *Each semester*  
 A seminar in which students will write, read, and talk about poetry. Limited to twelve. Students should submit three poems or the equivalent for admission to the course. The class will meet once a week together, and in individual conferences.
72. THEATER WORKSHOP. Mr. Simons. *Each semester*  
 A course open to all students interested in acting, directing, and play production. Lectures, demonstrations and laboratory. Each semester a different element is stressed. Fall will stress production and spring acting and directing.

## HONORS SEMINARS

### Group I

101. SHAKESPEARE. Staff. *Each semester*  
 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. Artin. *Fall semester*  
 Reading of Chaucer's poems in the original Middle English, with particular attention to *Troilus and Criseyde* and *The Canterbury Tales*.
104. MILTON. Mr. Blackburn. *Spring semester*  
 Study of Milton's works with special emphasis on *Paradise Lost*.
105. TUDOR-STUART DRAMA. Mr. Friedman. *Fall semester*  
 The development of English drama from the medieval morality plays to Restoration tragedy and comedy.  
 Not offered in 1968-69.
108. RENAISSANCE POETRY. Miss Snyder. *Spring semester*  
 Modes and preoccupations of English poetry from Wyatt and Surrey through Marvell.
109. EIGHTEENTH-CENTURY LITERATURE. Mr. Pagliaro. *Fall semester*  
 An examination of the literary forms and critical values of the age, with special attention given to the works of Dryden, Swift, Pope, and Johnson, and to a few representative playwrights.
110. THE ROMANTIC POETS. Mr. Pagliaro. *Fall semester*  
 An examination of the poetry of Blake, Wordsworth, Coleridge, Byron, Shelley, and Keats.

### Group II

113. THE NOVEL. Mr. Cowden. *Each semester*  
 Studies in four novelists: James, Conrad, Joyce, and Woolf.
114. MODERN DRAMA. *Spring semester*  
 Study of realism, expressionism, and the absurd in the works of Ibsen, Strindberg, Shaw, O'Neill, and Beckett.  
 Not offered in 1968-69.
115. MODERN COMPARATIVE LITERATURE. Mr. Becker and Mr. Friedman. *Each 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. AMERICAN LITERATURE. Mr. Shackford. *Fall semester*  
 Study of the themes, forms, and character of American literature as seen in four or five representative writers from the nineteenth and twentieth centuries.
118. MODERN POETRY. Staff. *Spring semester*  
 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.

## HISTORY

PROFESSORS: PAUL H. BEIK †  
JAMES A. FIELD, JR.  
LAURENCE D. LAFORE  
FREDERICK B. TOLLES  
HARRISON M. WRIGHT, *Chairman*

ASSISTANT PROFESSORS: ROBERT C. BANNISTER  
GEORGE E. MCCULLY †  
BERNARD S. SMITH  
JOHN G. WILLIAMSON  
TSING YUAN

LECTURER: PEGGY K. KORN

The offerings of the History Department are designed to give the student a sense of the past and an acquaintance with the course of cultural and institutional development which has brought forth the world of today, and at the same time to provide some training in historical method and the use of evidence. Concerned as it is with these ends, the study of history in college emphasizes less the accumulation of data than the comprehension of those ideas and institutions—political, religious, social, economic—by which man has attempted to order his world.

The structure of the department's program derives from the belief that some knowledge of European history since classical times is both an important part of a general education and a valuable prelude to further historical work. History 1-2 is planned as an introduction to this subject, to the methods and problems of the historian, and to the study and use of historical materials; it is a prerequisite for all other departmental offerings except Courses 5, 6, 9, 38, 40, 44 and 45. Students contemplating further work in the department should, if possible, take History 1-2 in the freshman year; those who take the course in later years may, if they have successfully completed History 1, elect an additional history course in the second semester. Students who enter college with Advanced Placement in European history or who pass the departmental qualifying examination may, with the permission of the department, substitute a semester course in Medieval history for History 1-2.

The courses offered by the department fall into four general areas: Medieval and Early Modern Europe; Modern Europe; the Americas; Africa, Asia, and Latin America. The minimum requirement for acceptance for a major in History is the successful completion of the departmental prerequisite and a satisfactory standard of work in other departments. The work of the major in Course consists normally of not less than eight nor more than twelve semester courses in the department. The choice of courses is made, in consultation with the student's advisor, so as to prepare for a comprehensive examination in the spring of the senior year covering any three of the four fields described above.

Students entering the Honors program may elect History as a major in either the Division of the Humanities or the Division of the Social Sciences, and as a minor in cross divisional programs. Those who are considering a major or minor in History Honors should give timely consideration to the prerequisites of their other fields. Those who intend to continue their studies after graduation should bear in mind that a reading knowledge of one or two foreign languages is now generally required for admission to graduate school.

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† Absent on leave, 1968-69.

## COURSES

- 1-2. EUROPE. Members of the Department. *Year course*  
One of the basic courses in the College curriculum. The first semester considers the period from the fall of the Roman Empire to the end of the seventeenth century and the formation of a distinctively European civilization. The second semester, covering the period from the Enlightenment to the mid-twentieth century, deals with the development of this civilization and with its impact on the outer world.
5. THE UNITED STATES TO 1877. Mr. Bannister or Mr. Field. *Fall semester*  
The colonial experience; independence, a new society, and a new government; transcontinental expansion and the struggle between North and South.
6. THE UNITED STATES SINCE 1877. Mr. Bannister or Mr. Field. *Spring semester*  
Industrialism and its consequences; the United States as a great power; the problems of a shrinking world.
7. AMERICAN INTELLECTUAL HISTORY TO 1865. Mr. Tolles. *Fall semester*  
The history of ideas in the United States from the colonial period through the mid-nineteenth century. A general knowledge of the political and social history of the period is assumed.
8. AMERICAN INTELLECTUAL HISTORY SINCE 1865. Mr. Bannister. *Spring semester*  
The history of ideas in the United States from the mid-nineteenth century to the present time. A general knowledge of the political and social history of the period is assumed.
9. FRESHMAN-SOPHOMORE SEMINAR.  
Collaborative small group investigation of subjects within the particular fields of interest of members of the department. Offered as opportunity permits in each semester.
11. THE FORMATION OF MEDIEVAL CIVILIZATION. Mr. Smith. *Fall semester*  
The history of the early Middle Ages, from the Christian Roman Empire to the eleventh century crisis of Church and State.  
Not offered in 1968-69.
12. THE MATURING OF MEDIEVAL CIVILIZATION. Mr. Smith. *Spring semester*  
The period from about 1100 to the fifteenth century, with emphasis on Western Europe in the twelfth and thirteenth centuries.
13. ENGLAND TO 1485. Mr. Smith. *Fall semester*  
The political, cultural, and religious history of England from the Roman occupation to the accession of the Tudors.
16. THE RENAISSANCE. Mr. McCully.  
The birth of modern western civilization considered in terms of intellectual developments and their relation to economic, social, and political conditions.  
Not offered in 1968-69.
17. THE REFORMATION AND THE SEVENTEENTH CENTURY. Mr. McCully.  
The reformation of religion in Church and State and the cultural and social effects of secularization.  
Not offered in 1968-69.



22. EUROPE SINCE 1914. Mr. Williamson. *Fall semester*  
The social and political impact of the two great wars, attempts to solve the economic problems of the inter-war period by new political forms, the polarization of Europe after 1945, and the disintegration of the two hostile alliances.
24. MODERN ENGLAND. Mr. Lafore. *Fall semester*  
The development of constitutional government and the transition from an agricultural and aristocratic nation to an urban and socialist one.
25. MODERN RUSSIA. Mr. Beik.  
The course begins with the reign of Peter and gives half its time to the period since the Revolution.  
Not offered in 1968-69.
26. MODERN EUROPE. Members of the department. *Spring semester*  
Recent European problems and institutions examined primarily through the experiences of one nation in the nineteenth and twentieth centuries. In 1968-69 this nation will be Germany. Mr. Williamson.
27. THE FRENCH REVOLUTION AND NAPOLEON. Mr. Beik.  
The significance of the period from 1789 to 1815 in the development of modern European social theories and political institutions.  
Not offered in 1968-69.
30. AMERICAN DIPLOMATIC HISTORY. Mr. Field. *Fall semester*  
Official United States foreign policy considered as a part of the larger problem of American participation in world affairs.
34. AMERICA IN THE PROGRESSIVE ERA, 1896-1920. Mr. Bannister. *Spring semester*  
The attack on political privilege and the movement for the control of industry; urban poverty, the new immigration, the Negro, women's rights, temperance, and conservation; the emergence of America as a world power.
37. AMERICAN RELIGIOUS THOUGHT. Mr. Tolles. *Spring semester*  
The course of religious thought in the colonies and the United States, with appropriate reference to general intellectual history and American church history.
38. 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 1968-69.
40. AFRICA. Mr. Wright. *Fall semester*  
Aspects of African history and civilization with the emphasis on tropical Africa in modern times.
42. THE EXPANSION OF EUROPE. Mr. Wright. *Spring semester*  
A survey of European overseas expansion since 1415, and of its impact on non-European societies. The emphasis is on South and Southeast Asia.
44. THE FAR EAST IN THE NINETEENTH CENTURY. Mr. Yuan. *Fall semester*  
The impact of the West; internal disruption and adjustment; the beginnings of nationalism and of the process of modernization.

45. THE FAR EAST IN THE TWENTIETH CENTURY. Mr. Yuan. *Spring semester*  
The search for a new identity; the rise of militarism and imperialism in Japan and of communism in China.
46. ASIAN NATIONALISMS. Mr. Yuan. *Fall semester*  
A comparative study of middle eastern and far eastern Asian nationalisms, with emphasis on the Turkish, Arab, Chinese, and Japanese forms.
48. LATIN AMERICA. Mrs. Korn.  
The development of the Latin American countries from colonial times to the present.  
Not offered in 1968-69.
- 51-2. COLLOQUIUM. *Fall semester*  
A double-credit course of restricted enrollment which seeks, through intensive investigation of a limited topic, to illuminate an important historical field. Open to majors in Course in any department. Topics in 1968-69 are:  
A. Twentieth Century Wars. Mr. Field.  
B. Varieties of Historical Analysis. Mr. Lafore.
53. DIRECTED READING. Members of the department.  
Individual or group study in fields of special interest to the student not dealt with in the regular course offerings. The consent of the Chairman and of the Instructor is required.
67. THESIS. Members of the department.  
With the consent of the Chairman and of the supervising member of the department a thesis may be substituted for a course in the fall semester of the senior year.
- 68-69. SPECIAL TOPICS. *Spring semester*  
Group meetings of senior majors in their final semester to review, integrate, and supplement their programs. The readings and discussion center on the development of historical writing from the Middle Ages to the present, and on the relationship of the historian to his time.

### HONORS SEMINARS

The following seminars are offered by the department to juniors and seniors who are preparing 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 pre-requisite to all seminars. In addition, some preliminary reading is required for seminars 130, 132, and 134 if no work in American history has been previously elected.

Those who wish to specialize in international relations with a major in history (see page 127, last paragraph) should include in their programs at least three of the following seminars: 134, 126, 128, 140, 144.

111. MEDIEVAL EUROPE. Mr. Smith. *Spring semester*  
A study of the civilization that flourished in Western Europe between the eleventh and the fourteenth centuries.
116. THE RENAISSANCE AND REFORMATION. Mr. McCully. *Fall semester*  
The birth of Modern Europe as seen in such developments as the recovery of classical culture, the crisis of religion and the Church, the establishment of centralized states, and the origins of modern science.  
Not offered in 1968-69.

118. TUDOR AND STUART ENGLAND. Mr. McCully. *Spring semester*  
The English Renaissance and Reformation, constitutional developments, the Civil War and the Restoration.  
Not offered in 1968-69.
122. EUROPE 1760 TO 1870. Mr. Beik. *Fall semester*  
The disintegration of the old regime and the rise of liberalism.  
Not offered in 1968-69.
123. EUROPE 1870 TO 1945. Mr. Williamson. *Both semesters*  
Political and social changes in Europe through the Second World War.
124. ENGLAND SINCE 1785. Mr. Lafore. *Fall semester*  
The rise of the first modern industrial state. Its social, political, and economic problems.
126. DIPLOMATIC HISTORY OF EUROPE. Mr. Williamson or Mr. Lafore.  
The management of international affairs since 1870.  
Not offered in 1968-69.
128. EASTERN EUROPE. Mr. Beik. *Spring semester*  
The origins and consequences of the Russian Revolution and the development of the nations of East Central Europe.  
Not offered in 1968-69.
130. EARLY AMERICAN HISTORY. Mr. Tolles. *Spring semester*  
Political, economic, social, and cultural aspects of the period from the explorations to the end of the American Revolution.  
Not offered in 1968-69.
132. PROBLEMS IN AMERICAN HISTORY. Mr. Bannister or Mr. Field. *Both semesters*  
Selected topics in the history of the United States.
134. PROBLEMS IN AMERICAN HISTORY: FOREIGN. Mr. Field. *Spring semester*  
A study of the evolution since 1776 of American relations with the outer world, with emphasis on ideological, economic, and strategic developments.
140. MODERN AFRICA. Mr. Wright. *Fall semester*  
Studies in African history with emphasis on the period since 1800, the region south of the Sahara, and the European impact.
144. THE MODERN FAR EAST. Mr. Yuan. *Spring semester*  
Political, social, and intellectual movements in China and Japan since about 1840.
167. THESIS.  
With the permission of the department Honors students may write a thesis for either single or double course credit. Double credit theses will normally be written in the fall semester of the senior year for submission as papers to the visiting examiners. Honors students wishing to write a thesis for single credit should elect Course 67.

## 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.

These 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 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 4. INTERNATIONAL POLITICS
- Political Science 13. INTERNATIONAL LAW AND ORGANIZATION
- Political Science 14. AMERICAN FOREIGN POLICY
- Political Science 63. ADVANCED INTERNATIONAL POLITICS
- Economics 60. INTERNATIONAL ECONOMICS

### *Group II*

- Economics 11. ECONOMIC DEVELOPMENT
- History 25. MODERN RUSSIA
- History 30. AMERICAN DIPLOMATIC HISTORY
- History 40. AFRICA
- History 42. THE EXPANSION OF EUROPE
- History 44, 45. THE FAR EAST
- History 46. ASIAN NATIONALISMS

### *Group III*

- Economics 61. COMPARATIVE ECONOMIC SYSTEMS
- Political Science 3. COMPARATIVE POLITICS
- Political Science 18. POLITICS OF DEVELOPING NATIONS
- Political Science 19. COMPARATIVE COMMUNIST POLITICS
- Political Science 21. POLITICS OF AFRICA
- Political Science 55. MODERN POLITICAL THEORY
- Political Science 64. TOPICS IN INTERNATIONAL RELATIONS

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 chairman of their prospective major department.

# MATHEMATICS

PROFESSORS: HEINRICH BRINKMANN, *Chairman*  
DAVID ROSEN

ASSOCIATE PROFESSOR: STEVENS HECKSCHER

ASSISTANT PROFESSORS: ROLAND B. DI FRANCO  
THOMAS W. HAWKINS  
EUGENE A. KLOTZ ‡  
J. EDWARD SKEATH ‡  
JAMES T. WOOD

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.

The sequence consisting of courses 3, 4, 11, 12 forms the normal preparation for further work in mathematics as well as for work in physics and other sciences, and engineering. Courses 5, 6, 15, 16 are Honors courses and can be taken in place of courses, 3, 4, 11, 12 by properly qualified students.

A student who wishes to major in mathematics in Course must complete course 12 or course 16 in his sophomore year. In his junior and senior years he will take courses 23, 24, 51, 52, 55; these are required of all majors in course. It is also recommended that he take Physics 1, 2.

In order to be admitted to the Honors program with work in mathematics a student must have completed course 12 or course 16. A junior Honors student will normally take seminars 104 (Modern Algebra) and 101 (Calculus on Manifolds), or prepare for a paper by taking courses 51, 52. An Honors student whose major is mathematics will usually present four papers in mathematics; these must include seminar 105 (Complex Analysis) as well as the work just mentioned for the junior year. Such a student should also take Physics 1, 2 and it is furthermore highly desirable that he have a reading knowledge of French or German.

## 1. INTRODUCTION TO MATHEMATICS.

*Fall semester*

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. 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. CALCULUS.

This is an introductory course in calculus designed for students with normal preparation. Course 3 can be used as a prerequisite for Course 8.

‡ Absent on leave, 1968-69.

5, 6. CALCULUS (Honors Course).

This is an introductory course in calculus intended for students with superior preparation and aptitude in mathematics. Permission to enroll in this course must be obtained from the instructor.

8. 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.

Prerequisite: Course 3 or Course 5.

11. LINEAR ALGEBRA.

*Fall semester*

This is the normal course for the first semester of the second year. The subject matter of the Course is linear algebra and related topics.

Prerequisite: Completion of courses 3, 4 or 5, 6 with grade C or better.

Freshmen who obtain a score of 3 on the Advanced Placement Examination may also take this course.

12. INTERMEDIATE CALCULUS.

*Spring semester*

Linear differential equations and multivariate calculus are studied in this course.

Prerequisite: Satisfactory completion of one of courses 11, 15 or 17.

15. LINEAR ALGEBRA (Honors Course).

*Fall semester*

This course is designed for students who have done superior work in preceding courses.

Prerequisite: Superior work in courses 3, 4 or 5, 6; permission to enroll in this course must be obtained from the instructor.

16. INTERMEDIATE CALCULUS (Honors Course).

*Spring semester*

Linear differential equations and multivariate calculus are studied in this course. It is designed for students who have done superior work in preceding courses.

Prerequisite: Superior work in one of courses 11, 15 or 17; permission to enroll in this course must be obtained from the instructor.

17. SPECIAL COURSE.

*Fall semester*

This course is specifically designed for those freshmen who obtain a score of 5 or 4 on the Advanced Placement Examination. The content of the course is linear algebra and infinite series.

20. MULTIVARIATE CALCULUS.

*Spring semester*

Differential equations and multivariate calculus are studied in this course. Emphasis will be laid on applications to the social sciences.

Prerequisites: Satisfactory completion of one of courses 11, 15, or 17.

22. NUMERICAL METHODS.

*Spring semester*

This course will deal with the numerical solution of various mathematical problems, pure and applied. A laboratory period will be included.

Prerequisite: Course 12 or Course 16.

23. HIGHER GEOMETRY.

*Fall semester*

Various kinds of geometry (mostly in the plane) will be studied in this course, using both analytic and synthetic methods. A portion 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.

Prerequisite: Course 11 or 15 or 17.



24. HIGHER ALGEBRA.

*Spring semester*

The subject matter of this course consists of various topics of modern algebra, such as groups, rings, and fields. Note that linear algebra is studied in Mathematics 11, 15 and 17.

Prerequisite: Course 11 or 15 or 17.

51, 52. REAL AND COMPLEX ANALYSIS.

Among the topics covered in this course are multivariate calculus (including some vector analysis and differential geometry), the theory of functions of a complex variable, differential and integral equations, and boundary-value problems. One or both of these courses can be used to prepare for an Honors paper, possibly with some additional independent work.

Prerequisites: A year of calculus and a semester of linear algebra. Some knowledge of differential equations is also desirable.

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. CALCULUS ON MANIFOLDS.

*Fall semester*

The subject matter of this seminar includes the differential and integral calculus of functions of several variables as well as topics from the theory of infinite series.

102. TOPOLOGY.

*Spring semester*

This seminar is intended to bridge the gap between Advanced Calculus and certain topics in abstract mathematics. The topics covered will vary from year to year and may include such items as: Point set topology with some applications to functional analysis, homology and homotopy theory.

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.

105. COMPLEX ANALYSIS.

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.

Prerequisite: Seminar 101 or Courses 51, 52.

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. FUNCTIONAL ANALYSIS.

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.

#### 108A. SYMBOLIC LOGIC.

An examination of symbolic logic as (1) the theory of inference, (2) a tool of analysis, and (3) a foundation for mathematics. Emphasis will be placed on the fundamental concepts (e.g., the axiomatic method, consistency, decidability), major theorems (completeness and incompleteness), and problems of the foundations of logic.

NOTE: This seminar is given by the Department of Philosophy. Students who have taken 108B may not take this seminar.

#### 108B. FOUNDATIONS AND PHILOSOPHY OF MATHEMATICS.

This seminar will begin with a brief survey of the major results in foundations of mathematics: axiomatic development of symbolic logic and set theory, Gödel incompleteness theorem, consistency and independence of the axiom of choice and the continuum hypothesis. This will be followed by a comparison of the logicist, formalist and intuitionist view of foundations of mathematics.

NOTE: This seminar is offered jointly by the Departments of Philosophy and Mathematics. Students who have taken 108A may not take this seminar.

Prerequisite: One course in philosophy and Mathematics 24 or equivalent work with axiomatic mathematics.

Not offered in 1968-69.

#### 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.

#### 110. APPLIED MATHEMATICS.

This course is designed to acquaint the student with the methods of mathematical physics. The main emphasis will be the theory of functions of a complex variable and its many ramifications. Topics will include applications of the theory to potential theory and the Dirichlet problem as well as certain Differential Equations such as Bessels and Legendre's equation. Fourier and Laplace transforms will be considered as time permits.

#### 111. MATHEMATICS OF THE SOCIAL SCIENCES.

This seminar is concerned with mathematics which has arisen from problems in the social sciences. Possible topics include game theory, linear programming, learning theory, Markov chain models, utility theory, voting strength analysis, Arrow's social welfare problem, measurement theory, organization theory, and other models from economics, political science, psychology, and sociology-anthropology.

Prerequisites: Two years of mathematics and permission from the instructor.

Not offered in 1968-69.

### 113. GROUP REPRESENTATIONS.

The purpose of this seminar is to introduce the student to important aspects of modern algebra through the study of the specific problem of group representations. The emphasis will be on the classical case: finite groups, with the characteristic not dividing the order of the group. Although considerable care will be devoted to developing the appropriate algebraic background, a good knowledge of several areas of modern algebra will be required.

## MODERN LANGUAGES AND LITERATURES

PROFESSORS: HILDE D. COHN (German)  
FRANZ H. MAUTNER (German) ‡  
FRANCIS P. TAFOYA, *Chairman* (French)

ASSOCIATE PROFESSORS: GEORGE C. AVERY (German)  
JEAN ASHMEAD PERKINS (French)  
GEORGE KRUGOVY (Russian)  
PHILIP METZIDAKIS (Spanish)

ASSISTANT PROFESSORS: ELISA ASENSIO (Spanish)  
THOMPSON BRADLEY (Russian)  
ROBERT ROZA (French)  
RICHARD TERDIMAN (French)

INSTRUCTORS: SIMONE VOISIN SMITH (French)  
EWALD E. HAEUSSER (German)

VISITING LECTURERS: ROBERT P. NEWTON (German)  
HELEN P. SHATAGIN (Russian)

ASSISTANT: ANNE TEISSONNIÈRE (French)

The purpose of the departmental major is to acquaint the student with the important periods and major figures in the literature of France, the German-speaking countries, Russia, Spain and Latin-America, and to provide training in critical analysis while developing his appreciation of literary and cultural values.

Courses numbered 1 through 6 are primarily designed to help students acquire the linguistic competence necessary to pursue literary studies in a foreign language (and satisfy college and departmental requirements) through work with the language and selected literary texts. For a detailed description of the dual orientation in these courses see the Explanatory Note on language courses below. Courses numbered 11 or above stress the study of literature as a humanistic discipline but also have as one of their aims the achievement of competence in the spoken and written language.

Students who show unusual promise or a willingness to do intensive supplementary work can major or enter Honors seminars in a language started in college, but in general, students planning to major in a foreign language and its literature are advised to present enough credits upon admission to enable them to register for courses numbered 11 and 12 in their freshman year or at the very latest by the beginning of the sophomore year. Students who enter with no previous knowledge of Russian but who are interested in majoring in Russian should register for the sections of intensive Russian (1B-2B) in the course of their freshman year. Language courses numbered 1 through 5 do not count toward the minimum of eight courses required for the major.

Students are strongly urged to satisfy the language requirement upon admission; those who do not on the basis of scores in the College Entrance Examination or placement tests administered by the department during freshman orientation can satisfy the requirement by completing a course numbered 4 or 4A or *any* course at the end of which they make a satisfactory score in the achievement examinations. These examinations are administered at the end of each semester. Students who have not satisfied the language requirement upon admission or who want to continue a language begun elsewhere will be placed at the course level where they will profit best according to the rating of the College Entrance Examination or

‡ Absent on leave, 1968-69.

placement tests administered by the department. Students who place in courses numbered 1 through 4 must in addition take the Modern Language Aptitude Test during freshman orientation. Students beginning their study of a foreign language at Swarthmore are also required to take the Modern Language Aptitude Test.

Prerequisites for majors are noted under the listing of each of the literatures taught. Exceptions to course requirements are made for those who show competence in the language of specialization. Students who speak French, German, Russian or Spanish fluently should consult with the department before electing courses.

Majors are urged (a) to elect supporting courses in other literatures (classical or modern), History, Philosophy, Political Science, Anthropology, Sociology, Psychology, Art History and Music; (b) to investigate seriously the possibility of spending, after their sophomore year, at least a summer and a semester abroad. Interested students should request assistance of departmental advisors familiar with programs in foreign countries.

Students planning to do graduate work are reminded that, in addition to the language specialization, a reading knowledge of other languages is generally required for admission to advanced studies. Students who need advice concerning the choice of languages should consult with the department.

### CONTINENTAL EUROPEAN LITERATURE (Conducted in English)

Students acquainted with a particular foreign language would do best to elect the appropriate literature course taught in the original language and not the corresponding CEL 12 or CEL 50, though they might well take one in another literature. These courses cannot be substituted for the 11 or 12 level courses in the original languages to satisfy the departmental prerequisites for a major or minor, nor do they fulfill the distribution requirement. The CEL 50s may in some cases form an appropriate part of the upper-level work in the major in one of the foreign literatures or serve as the basis of preparation for an Honors paper. Students planning programs where such considerations would apply must consult with the Department.

CEL 12 and CEL 50 courses will be offered according to the following sequence:

1968-69			
<i>Fall</i>		<i>Spring</i>	
CEL 12	FRENCH	CEL 12	GERMAN
CEL 50	SPANISH	CEL 50	RUSSIAN
1969-70			
<i>Fall</i>		<i>Spring</i>	
CEL 12	SPANISH	CEL 12	RUSSIAN
CEL 50	FRENCH	CEL 50	GERMAN

### COURSES

12F. MAN AND SOCIETY IN FRENCH LITERATURE. Mr. Terdiman.  
*Fall semester, 1968*

An examination principally in works dating before 1900 of the double tradition of introspective individualism and deep social concern—and of the inevitable conflict between these impulses—in the works of such writers as Montaigne, Pascal, Molière, Diderot, Rousseau, Stendhal and Zola.

12G. THE QUEST FOR A TRADITION IN GERMAN LITERATURE. Mr. Avery.  
*Spring semester, 1969*

A selection of representative works written in German-speaking countries from the Middle Ages to the end of the nineteenth century. Emphasis on the

emergence of characteristically German themes and forms as a response to the influences of historical and cultural forces. Emphasis on similarities to a European literary tradition and on divergences from it. Authors will include Gottfried, Grimmshausen, Lessing, Schiller, Goethe, Keller, Fontane, and Wedekind.

- 12R. THE ORIGINS OF RUSSIAN LITERATURE AND POLITICAL THOUGHT.  
Mr. Krugovoy. *Spring semester, 1970*

A survey of Russian culture from the Kievan period to the nineteenth century. The Byzantine influence and the consequence of the introduction of Christianity. A brief consideration of medieval literature. Secularization of culture in the eighteenth century, Russian neoclassicism and Freemasonry. The Westernizer-Slavophile schism and the beginning of the great literary age in the early nineteenth century. Particular emphasis on Chaadaev, Khomiakov, Belinsky, Karamzin, Pushkin, Lermontov, and Gogol.

- 12S. THE DEVELOPMENT OF SPANISH LITERATURE. Mr. Metzidakis.  
*Fall semester, 1969*

A study of works representative of the most significant currents in Hispanic literature from the Renaissance through the nineteenth century. Special emphasis on Spain's unique contribution to world literature: the figure of the *pícaro*, *la Celestina*, *Don Juan* and *Don Quixote*. Includes selective prose works of the Realistic and Naturalistic periods.

13. MEDIEVAL COMPARATIVE LITERATURE. Mrs. Perkins. *Fall semester, 1968*

The tension between ideals and their realization as reflected in the literature of the Middle Ages, especially the epic (*Roland*, *Cid*, *Nibelungen*) and the romance (*Tristan*, *Yvain*, *The Grail*.)

- 50F. INTELLECTUAL TRENDS IN 20TH CENTURY FRENCH LITERATURE.  
Mr. Tafoya. *Fall semester, 1969*

Principal doctrines (Bergsonism, Surrealism, Marxism, Existentialism, Structuralism) as reflected in, or related to, the major literary or critical works and essays of Proust, Gide, André Breton, Louis Aragon, Malraux, Sartre, Camus, de Beauvoir, Roland Barthes, and Claude Lévi-Strauss.

- 50G. GERMAN LITERATURE SINCE 1900. Mr. Avery. *Spring semester, 1970*

A study of the reflection in German literature of the political and cultural crises that have dominated the century. Works by Rilke, Thomas Mann, Hesse, Kafka, Musil, Döblin, Brecht, Grass and Johnson.

- 50R. RUSSIAN LITERATURE AND REVOLUTIONARY THOUGHT. Mr. Bradley.  
*Spring semester, 1969*

A study of continuity and change: the relationship between the major political and social movements and the writers before and after 1917. Special attention will be given to the post-revolutionary literary and political struggle in the 1920's and the literary revival of the 1960's with emphasis on Herzen, Bakunin, Chernyshevsky, Trotsky, Babel, Olesha, Mayakovsky, Tertz and Solzhenitsyn.

- 50S. SPANISH THOUGHT AND LITERATURE OF THE 20TH CENTURY.  
Mr. Metzidakis. *Fall semester, 1968*

The struggle between traditionalism and liberalism, its background and manifestations in Spanish thought and letters from the turn of the century through the Civil War to the present day. Emphasis on Unamuno, Ortega y Gasset, Federico García Lorca, José Camilo Cela, Carmen Laforet and Juan Goytisolo.



## 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.

Not offered in 1968-69.

N.B. Expanded and revised offerings in Linguistics will be announced during the academic year 1968-69. Students interested in courses and/or seminars in Linguistics should consult with the department.

#### Explanatory Note on Language Courses Numbered 1 through 4

Beginning in the fall of 1968, most language courses (French, German and Russian) numbered 1 through 4 will be taught in sections with different orientations. The work load in either group of courses will be similar except that students in *A* sections will prepare a greater proportion of their daily assignments under the supervision of a qualified language specialist. Both types of work, as described below, satisfy the college requirement in language;

- a. Courses numbered 1 through 4 without a postscript capital combine the presentation or review of grammar essentials with extensive reading and translation of texts of literary, cultural or general interest. These courses meet three times per week with additional sessions in the language laboratory as assigned. These courses do not normally prepare students for the intermediate or advanced courses in literature taught in the original language. Admission contingent upon departmental testing.
- b. Courses numbered 1*A* through 4*A* are designed to impart an active command of the language and combine the study or review of grammar essentials and readings of literary texts with intensive practice to develop the ability to speak the language. This orientation is recommended for those interested in acquiring a thorough command of the language or in preparing for intermediate or advanced courses in literature taught in the original language. These courses (a) meet as one section for grammar presentation and in small groups for oral practice with a special instructor (b) require periodic work in the language laboratory. Admission contingent upon departmental testing.
- c. Courses numbered 1*B* through 3*B* (applicable only to Russian for the academic year 1968-69) are similar in orientation to those designated with a capital *A* but meet more frequently for extra credit. Three semesters in this sequence (Russian 1*B*, 2*B*, 3*B*) are the equivalent of two years of work at the college level. Recommended for students who want to progress rapidly and especially for those with no previous knowledge of the language who are considering majoring in Russian.

### French

French may be offered as a major in Course or as a major or minor in Honors. Prerequisites for both Course and Honors students are as follows:

Required:

French 6, 11 and 12; the equivalent, or evidence of special competence.

Recommended supporting subjects: see the introductory departmental statement. Majors in Course and Honors, as well as minors in Honors, are expected to be sufficiently proficient in spoken and written French to do all of their work in

French, i.e., discussions and papers in courses and seminars, and all oral and written examinations, including comprehensive and Honors examinations.

NOTE: Not all advanced courses are offered every year. Those announced for 1968-69 and 1969-70, guarantee adequate coverage for majors but do not preclude additional offerings or special arrangements to satisfy manifest interest. Students wishing to major or minor in French should plan their program in consultation with the department.

## COURSES

### 1-2. FIRST-YEAR FRENCH.

*Year course*

For students who begin French in college and for those who have had only one year in high school. Equivalent to two years of French in high school. See section *a* of the explanatory note on language courses in the introductory departmental statement. No credit is given for French 1 alone. Normally followed by French 3, 4, but students with exceptional qualifications may request permission to continue in 3A, 4A.

### 1A-2A. FIRST-YEAR FRENCH.

*Year course*

For students who begin French in college and for those who have had only one year in high school. Equivalent to two years of French in high school. See section *b* of the explanatory note on language courses in the introductory departmental statement. No credit is given for French 1A alone. Normally followed by French 3A, 4A.

### 3, 4. SECOND-YEAR FRENCH.

For students who have completed French 1-2 or the equivalent as determined by departmental testing. See section *a* of the explanatory note on language courses in the introductory departmental statement. Normally a terminal course designed to meet the language requirement but exceptionally qualified students may, with permission, take an appropriate sequential course. For the academic year 1968-69 students in sections of French 4 taught in *fall semester only* may freely elect to continue in sections of 11 or, with permission, 12 the following semester. French 3 is offered in fall semester only, French 4 and the sequential courses will be offered each semester.

### 3A, 4A. SECOND-YEAR FRENCH.

For students who have completed French 1A-2A or the equivalent as determined by departmental testing. See section *b* of the explanatory note on language courses in the introductory departmental statement. Completion of 4A satisfies the language requirement and the prerequisites for intermediate courses in French. Normally followed by French 11, but exceptionally qualified students may, with permission, take French 12. French 3A is offered in the fall semester only; for the academic year 1968-69, French 4A will be taught spring semester only, thereafter French 4A will be offered each semester. Sequential courses are taught each semester.

### 5. COMPOSITION AND DICTION.

Emphasis is placed on syntax, translation and composition. An effort is made to encourage fluency and to correct faulty pronunciation. (Does not count towards a French major.)

### 6. STUDIES IN STYLISTICS.

*For 1968-69, offered fall semester only.*

For majors or those who wish an advanced course to develop self-expression in the written and oral language. Original compositions are based on a stylistic study of texts (by representative French authors) from the XVIIIth Century to the present.

11. READINGS IN FRENCH LITERATURE. *Each semester*  
 The transition from language learning to literary study is facilitated through intensive readings in modern French literature (works by authors such as Beckett, Butor, Camus, Genet, Gide, Sartre or others). Frequent oral exposés and written compositions as well as extensive readings are assigned to improve fluency and accuracy in French. Prerequisite: French 4A, the equivalent, or special permission.
12. INTRODUCTION TO LITERARY STUDIES. *Each semester*  
 A comparative study of representative works by classical and modern authors: poetry (Ronsard, Baudelaire, Apollinaire), drama (Racine-Sartre, Molière-Romains), novel (Constant-Proust), essay (Pascal-Camus). Prerequisite: French 11, the equivalent or special permission.
14. L'HUMANISME DE LA RENAISSANCE. Mrs. Smith. *Spring semester, 1970*  
 The evolution of French thought from the optimism of Rabelais to the skepticism of Montaigne as reflected primarily in the prose works of the Renaissance.
15. LE THÉÂTRE CLASSIQUE. Mrs. Smith. *Fall semester, 1969*  
 The development of dramatic techniques in French drama from the sixteenth century through the age of Classicism. Emphasis on Corneille, Racine and Molière.
16. LE CLASSICISME. Mrs. Smith. *Fall semester, 1968*  
 The major writers of the 17th century, excluding the dramatists; Descartes, Pascal, La Fontaine, Boileau, La Rochefoucauld, La Bruyère, Mme. de La Fayette.
17. L'ESPRIT CRITIQUE DU 18<sup>e</sup> SIÈCLE. Mrs. Perkins. *Spring semester, 1969*  
 Development of the critical approach in the works of Montesquieu, Voltaire, Diderot and Rousseau.
19. ROMAN DU 19<sup>e</sup> SIÈCLE. Mr. Terdiman. *Spring semester, 1970*  
 A study of innovations in technique and form as well as the examination of moral problems arising from socio-political changes in 19th century France. Based primarily on the novels of Balzac, Stendhal, Flaubert and Zola.
20. ROMAN DU 20<sup>e</sup> SIÈCLE.  
 A study of aesthetic innovations and of principal themes in their ideological and sociological context. Readings to be chosen from the works of authors such as Beckett, Breton, Butor, Camus, Céline, Gide, Malraux, Queneau, Robbe-Grillet, Sarraute, Sartre or others.
21. THÉÂTRE MODERNE. Mr. Roza. *Fall semester, 1968*  
 Major trends in 20th Century drama with special emphasis on the works of Giraudoux, Anouilh, Sartre, Camus, and the Theatre of the Absurd.
22. POÉSIE DU MOYEN-ÂGE ET DE LA RENAISSANCE. Mrs. Perkins. *Fall semester, 1969*  
 Poetic doctrines and achievements from the Middle Ages through the period of the Renaissance (includes Neo-Platonism and the Pléiade) to the Baroque. Emphasis on the works of Villon, Marot, Scève, DuBellay and Ronsard.
23. POÉSIE SYMBOLISTE.  
 The evolution of symbolist aesthetics from Baudelaire through Apollinaire. Includes Rimbaud, Mallarmé, Verlaine, LaForgue and Valéry.
25. POÉSIE CONTEMPORAINE.  
 Major poets after Apollinaire: includes the Surrealists (Breton, Reverdy, Eluard, Aragon and Char) as well as Saint-John Perse, Supervielle and representative poets since World War II (Guillevic and Bonnefoy).

30. LITTÉRATEURS ENGAGÉS. Mr. Tafoya.

A study of the literature of commitment before and after World War II. Principally an examination of the literary manifestations of French Existentialism. Includes works by Malraux, Sartre, de Beauvoir, Camus or others.

50-51. COLLOQUIUM. Mr. Terdiman. *Spring semester, 1969*

Offered for double credit and devoted to the intensive investigation of subjects or topics not covered by the regular program. Enrollment is limited and subject to departmental approval.

The subject for the spring semester of 1968-69 is: *La Littérature narrative en France*.

Techniques of representation in French fiction. Works will be chosen from the medieval period (for example, the *Chanson de Roland*) to the most recent example of the new fiction (for example, Claude Simon's *Histoire*). No attempt at survey coverage will be made; however, extensive reading in critical works dealing with narrative will be expected.

52. SPECIAL TOPICS (for senior majors). *Spring semester, 1969*

The topic for spring semester, 1968-69 is: The Contemporary Continental European Novel. Similarities and divergences in the development of the novel in France, Germany, Russia and Spain. Readings in the original language and/or in translation. Discussions in English. Taught as a combined course for all departmental majors by Messrs. Avery, Bradley, Metzidakis and Tafoya.

### HONORS SEMINARS

100. LITTÉRATURE DU MOYEN AGE. Mrs. Perkins. *Spring semester, 1970*

Old French readings in lyric poetry, theatre and romance.

101. LA RENAISSANCE. Mrs. Smith.

Prose works of Rabelais, Marguerite de Navarre, and Montaigne. Poetic innovations from Marot through the Pléiade.

102. LE THÉÂTRE CLASSIQUE. Mrs. Smith.

Corneille, Racine, Molière.

103. L'ÂGE DES LUMIÈRES. Mrs. Perkins. *Fall semester, 1969*

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

104. STENDHAL AND FLAUBERT.

105. PROUST. Mr. Terdiman. *Spring semester, 1970*

106. POÉSIE MODERNE. Mr. Roza. *Fall semester, 1968*

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

108. LE ROMAN DU 20<sup>e</sup> SIÈCLE. Mr. Roza. *Spring semester, 1969*

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

### German

German may be offered as a major in Course or as a major or minor in Honors. Prerequisites for both Course and Honors students are as follows:

Required:

German 11 or 12, or equivalent work.

Recommended supporting subjects: see the introductory departmental statement.

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.

NOTE: Not all advanced courses or seminars are offered every year. Students wishing to major or minor in German should plan their program in consultation with the department.

## COURSES

NOTE: See the Explanatory Note on Language Courses numbered 1 through 4 in the introductory departmental statement.

### 1-2. FIRST-YEAR GERMAN.

*Year course*

For students who begin German in college. Equivalent to two years of German in secondary school. Normally followed by German 3, 4, but exceptionally qualified students may request permission to continue in German 3A, 4A. Emphasis on fundamentals of grammar; readings in literary and expository prose.

### 1A-2A. FIRST-YEAR GERMAN.

*Year course*

For students who begin German in college. Equivalent to two years of German in secondary school. Normally followed by German 3A, 4A. Five class meetings per week. Active practice in speaking and writing. Emphasis on fundamentals of grammar: readings in literary and expository prose.

### 3, 4. SECOND-YEAR GERMAN.

For students who have completed German 1-2 or its equivalent as determined by departmental testing. Normally a terminal course designed to meet the language requirement. Exceptionally qualified students may, with permission, take an appropriate sequential course. (Students in German 4 in the *fall semester*, 1968-69 may, without special permission, continue in German 11 in the spring semester.) German 3 is offered in the fall semester only; German 4 is normally offered in both semesters. Review of first-year grammar, followed by emphasis on special problems of grammar; literary and expository readings beginning with texts of moderate difficulty such as Hesse, *Knulp*; Brecht, *Kalendergeschichten*; Schweitzer, *Leben und Denken*.

### 3A, 4A. SECOND-YEAR GERMAN.

For students who have completed German 1A-2A or its equivalent as determined by departmental testing. Completion of German 4A fulfills the language requirement and the prerequisites for German 6, 11, or 12. German 3A is offered in the fall semester only; in 1968-69 German 4A will be offered in the spring semesters only; thereafter in fall and spring semesters. Grammar and readings similar to German 3, 4 but with emphasis on development of speaking and writing ability.

### 6. WRITING AND SPEAKING GERMAN.

Oral discussions and writing practice based on general and literary topics of contemporary interest. For students who want to consolidate their skills of expression. Prerequisite: German 3A, 4A or its equivalent.

### 7-8. ELEMENTARY GERMAN (Special Reading Course.)

*Year 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. INTRODUCTION TO GERMAN LITERATURE (19th and 20th Centuries).

A study of representative prose fiction, poetry, and drama from the German Romantics to Kafka. Discussion, papers. Not a survey course. Prerequisite: German 4A or its equivalent.

12. INTRODUCTION TO GERMAN LITERATURE (Goethe and his Age).  
A study of works by Lessing, Goethe, and Schiller. Discussion, papers. Not a survey course. Prerequisite: German 4A or its equivalent.

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.\*

16. DIE DEUTSCHE NOVELLE SEIT GOETHE.\*

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.\*

20. DIE DEUTSCHE KOMÖDIE.\*

21. KAFKA UND BRECHT.  
A study of the principal works of each author with stress on the interpretation of major themes and the examination of literary craftsmanship. Includes consideration of the cultural and social environment in which the works were written.

30. HERMAN HESSE. *Half-course*

A study of the central themes and the development of narrative technique in Hesse's novels. Works to be examined will include: *Knulp*, *Demian*, *Siddhartha*, *Der Steppenwolf*, and *Die Morgenlandfahrt*. Prerequisite: German 11 or 12, or SAT score of 650. Primarily for freshmen and sophomores; meets 1½ class hours per week.

50-51. COLLOQUIUM.  
Offered from time to time in response to student and faculty interests. Devoted to an intensive examination of subjects or topics not covered in the regular program. Enrollment is limited and subject to departmental approval.

52. SPECIAL TOPICS.  
In 1968-69, taught as a combined course for all departmental majors. See the description which appears under French 52.

### HONORS SEMINARS

(Also open to advanced students in Course)

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 role in German intellectual history will be studied.

\* Also taught as seminars.



105. DIE DEUTSCHE ROMANTIK.  
Romanticism as the dominant movement in German literature, thinking, and the arts of the first third of the nineteenth century. Authors: Hölderlin, Novalis, Tieck, Arnim, Brentano, Eichendorff.
106. "BIEDERMEIER" UND "REALISMUS."  
Studies in the works of Grillparzer, Mörike, Stifter, Keller, Meyer, and Storm. Emphasis on the *novelle*.
107. MODERNE PROSA.  
The emergence of modern trends as reflected primarily in the prose works of Schnitzler, Hofmannsthal, Rilke, Mann, Kafka, Döblin and Grass.
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 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.
110. DIE DEUTSCHE NOVELLE.  
A study of significant examples of this typically German genre. Authors: Goethe, Eichendorff, Kleist, Stifter, Keller, Meyer, Storm, Thomas Mann, and contemporary writers.
111. DIE DEUTSCHE LYRIK.  
A study of selected examples of German poetry. The interrelation of form and content.
112. MODERNES DRAMA UND LYRIK DES XX. JAHRHUNDERTS.  
The emergence of modern trends as reflected primarily in the poetic and dramatic works of Hauptmann, George, Hofmannsthal, Rilke, Trakl, Sternheim, Benn and Brecht.

## Russian

Russian may be offered as a major in Course or as a major or minor in Honors. Prerequisites for both Course and Honors students are as follows:

Required:

Russian 11, 12 and 13, or evidence of equivalent work.

Recommended supporting subjects: see the introductory departmental statement.

NOTE: Not all advanced courses or seminars are offered every year. Students wishing to major or minor in Russian should plan their program in consultation with the Department.

## COURSES

NOTE: See the explanatory note on language courses numbered 1 through 4 in the introductory departmental statement.

### 1-2. FIRST-YEAR RUSSIAN.

*Year course*

For students who begin Russian in college. Equivalent to two years of Russian in secondary school. Normally followed by Russian 3, 4; emphasis on fundamentals of grammar; readings in literary and expository prose.

### 1B, 2B, 3B. FIRST-YEAR RUSSIAN (Intensive Course).

For students who begin Russian in college. Designed to impart an active command of the language. Combines the study of grammar with intensive oral practice and readings in literary and expository prose. Classes and drill sessions meet seven and one-half hours per week. Periodic language laboratory attendance required. Each semester carries one and one-half credits; three semesters of work satisfy the language requirement and prerequisites for intermediate and advanced courses in literature taught in Russian. Recommended for students who want to progress rapidly and especially for those with no previous knowledge of Russian who are considering majoring in Russian. Admission contingent upon satisfactory scores in the Modern Language Aptitude test or special permission. Normally followed by Russian 6 and 12.

### 3, 4. SECOND-YEAR RUSSIAN.

For students who have completed Russian 1-2 or the equivalent as determined by departmental testing. See Section *a* of the explanatory note on language courses in the introductory departmental statement. Normally a terminal course designed to meet the language requirement but exceptionally qualified students may, with permission, take an appropriate sequential course. Students who complete Russian 4 during the academic year 1968-69 may freely elect to continue in sections of 11 or 12.

### 5, 6. ADVANCED RUSSIAN.

For majors and those primarily interested in perfecting their command of language. Advanced conversation, composition, translation and stylistics. Readings of dramas and newspapers. Conducted in Russian.

### 11. INTRODUCTION TO LITERATURE.

Classical poetry and short-prose fiction from the end of the eighteenth century to 1880. Emphasis on the poetic works of Pushkin, Lermontov, Tiutchev, Fet Nekrasov and the short works of Pushkin, Gogol, Turgenev, Dostoevsky, and Tolstoy. Conducted in Russian with intensive work in translation and composition.

### 12. INTRODUCTION TO LITERATURE.

The modern short story and innovations in poetry from 1880 to the present. Particular emphasis on Chekhov, Bunin, Babel, Solzhenitsyn, Kazakov and Aksenov and the major twentieth century poets. Conducted in Russian with oral reports and intensive work in composition.

### 13. RUSSIAN NOVEL.

Lectures and reading in English. The Russian majors will be required to read a part of the material in Russian.

### 52. SPECIAL TOPICS.

In 1968-69 taught as a combined course for all departmental majors. See the description which appears under French 52.

## HONORS SEMINARS

(Open to majors in Course.)

### 101. TOLSTOY.

### 102. CHEKHOV AND GORKY.

### 103. PUSHKIN AND LERMONTOV.

### 104. DOSTOEVSKY.

### 105. LITERATURE OF THE SOVIET PERIOD.

## Spanish

Spanish may be offered as a major in Course or as a major or minor in Honors. Prerequisites for both Course and Honors students are as follows:

Required: Spanish 11, 12.

Recommended supporting subjects: see the introductory departmental statement.

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.

NOTE: Not all advanced courses or seminars are offered every year. Students wishing to major or minor in Spanish should plan their program in consultation with the department.

### COURSES

#### 1A-2A. FIRST-YEAR SPANISH.

*Year course*

For students who begin Spanish in college and for those who have had only one year in high school. Equivalent to two years of Spanish in high school. See Section *b* of the Explanatory Note on language courses in the introductory departmental statement. No credit is given for Spanish 1A alone. Followed by Spanish 3A, 4A.

#### 3A, 4A. SECOND-YEAR SPANISH.

For students who have completed Spanish 1A-2A or the equivalent as determined by departmental testing. See section *b* of the Explanatory Note on language courses in the introductory departmental statement. Completion of 4A satisfies the language requirement and the prerequisites for intermediate courses in Spanish, *i.e.*, Spanish 9, 11 or 12.

#### 9. ADVANCED COMPOSITION AND DICTION.

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

#### 11, 12. INTRODUCTION TO SPANISH LITERATURE.

Representative texts of modern Spanish and Latin American writers. Conducted in Spanish with frequent written work in Spanish.

#### 13. EL TEATRO MODERNO.

Plays of the major Spanish writers in the nineteenth and twentieth centuries.

#### 14. LA NOVELA HISPANOAMERICANA.

Representative novelists from Mármol in Argentina to Yáñez 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.

22. LA NOVELA EN EL SIGLO XIX.

Realism and Naturalism in nineteenth century prose fiction. Works by Alarcón, Valera, Pérez Galdós, Pardo Bazán, Clarín, Blasco Ibáñez and others.

52. SPECIAL TOPICS FOR SENIOR MAJORS.

In 1968-69, taught as a combined course for all departmental majors. See the description which appears under French 52.

HONORS 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: Some seminars treat the same subject as the courses, but readings required in both the texts and critical material is more extensive. The work of a seminar corresponds to that of two courses.

## MUSIC

ASSOCIATE PROFESSORS: CLAUDIO SPIES  
PETER GRAM SWING, *Chairman*

INSTRUCTOR: JAMES D. FREEMAN

LECTURER: PAUL LANSKY

ASSOCIATES IN PERFORMANCE: GILBERT KALISH  
ROBERT SMART  
PAUL ZUKOFSKY

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 work with musical materials, to understand modes of organization in compositions, and to evolve methods of musical analysis. History courses and seminars introduce students to methods of studying the development of musical styles and genres, and the relationship of music to other arts and areas of thought. Performance is assumed as part of the training in understanding music and is included in classroom work. The Department also encourages its students to develop performing skills through private study and through participation in the orchestra, chorus and chamber music coaching program which it staffs and administers. The Department administers scholarships to assist music majors who are talented instrumentalist or singers finance the cost of private instruction. Members also coach individual performers and chamber music groups organized by the students for Bond concerts and other public performances.

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

### REQUIREMENTS FOR MAJORS AND MINORS

Two semester courses in theory are prerequisite for acceptance as a major. Majors will normally take six semester courses (including Music 61-62) in theory, four semester courses (including Music 15, 16) in history and meet the basic piano requirement.

*Majors in Honors:* A student intending to major in Honors should plan to take Music 11-12, 13-14 and 15, 16 (or the equivalent) in the first two years. If he takes all three courses he will stand for three papers in music. If he is excused from one of the three introductory courses (by demonstrating competence on an examination given by the Department) he can elect to stand for four papers in music. He will take Music 61-62 preferably in the junior year in preparation for a paper on the material covered.

*Minors in Honors:* A minor in Honors will normally stand for two papers in music. Music 15 or 16 and a full course in Theory, is prerequisite for History seminars. Music 1 may, with permission of the department, be substituted for the Theory course.

*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.

*Proficiency on an instrument:* All majors in music will be expected to play a keyboard instrument 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, also vocal music in four clefs, and realize figured basses. Students with exceptional proficiency in an instrument other than the piano, or in singing, will not be expected to meet the performing standards of pianists.

*The basic piano program:* This program is designed to develop keyboard proficiency to a point where a student can effectively use the piano as a tool for study, also to help students meet the keyboard requirements outlined above. There are two classes, one for beginning students, one for advanced students, each meeting two hours a week. These classes are open to freshmen and sophomores planning to major in music. No academic credit is given specifically for basic piano, the classes being, in effect, laboratories for courses.

### CREDIT FOR PERFORMANCE

A student who has taken Music 1, or Music 11-12 (or who has equivalent prior training) has the option to receive credit for: (1) study of an instrument or voice, (2) participation in the Department's chamber music coaching program, (3) participation in the Swarthmore College Orchestra, (4) participation in the Swarthmore College Chorus. The amount of credit received will normally be a half-course in any one semester, and will generally be granted only to students participating for a full year in a particular activity. Students applying for credit will be given an audition at the beginning of the semester and will fulfill requirements established for each activity, i.e. regular attendance at rehearsals and performances and participation in any supplementary classes held in connection with the activity. Students will be graded on a pass-fail basis.

A student applying for credit for study of an instrument or voice will first demonstrate to the Department his ability to undertake such study at least at an intermediate level. He will arrange to work with a teacher of his choice, subject to approval of the Department. The Department will then supervise the course of study in any semester for which credit is to be given. The teacher will submit a written report of the student's work at the close of the semester to be used by the Department in making its evaluation. The Department may use public performance or a final audition as additional evidence for evaluating work. The College does not undertake to pay for instruction; the student is expected to make his own financial arrangements directly with the teacher.

### COURSES AND SEMINARS

NOTE: All seminars are open to qualified course students for double credit.

1. INTRODUCTION TO MUSIC. Mr. Swing. *Fall semester*  
Mr. Freeman. *Spring semester*

A course combining study of the materials of music (including fundamentals) with training in listening and analysis. Students will work with a selected repertory of compositions from different eras. The course assumes no prior training in music.

Open to all students. (Music 1 cannot be counted in a major program)

### Theory and Composition

- 11-12. HARMONY. Mr. Lansky.

*Year 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 analyzed.



- 13-14. COUNTERPOINT. Mr. Spies. *Year course*  
 A course in strict counterpoint involving the five species, and some mixtures, in two, three and four-part writing. Students will be required to submit exercises regularly.  
 NOTE: Music 11-12 and 13-14 can be taken concurrently.
- 61-62. INTERMEDIATE THEORY. Mr. Lansky. *Fall semester*  
 Mr. Spies. *Spring semester*  
 A continuation of Music 11-12 and 13-14 covering specialized areas of harmony, counterpoint and analysis.  
 Prerequisites: Music 11-12, Music 13-14 (or the equivalent).

### HONORS SEMINARS

163. ADVANCED THEORY. Mr. Spies.  
 181. COMPOSITION. Mr. Spies.  
 Offered as a tutorial to qualified students. Prerequisite: Music 61-62.

### History of Music

15. INTRODUCTION TO THE HISTORY OF MUSIC. Mr. Swing. *Spring semester*  
 The history of music in Western civilization from the Middle Ages to 1750.  
 Prerequisite: Music 1 (or the equivalent).
16. INTRODUCTION TO THE HISTORY OF MUSIC. Mr. Freeman. *Fall semester*  
 A continuation of Music 15 covering the period from 1750 to the present.  
 Prerequisite: Music 1 (or the equivalent).
22. CONTEMPORARY MUSIC. Mr. Spies.  
 An examination of a selected group of compositions. Rather than attempt a survey based on stylistic considerations, or on aesthetic evaluation, the course will deal with the analysis of individual solutions to common compositional problems.  
 Prerequisite: Music 11-12, (or 13-14).
23. CONTEMPORARY OPERA. Mr. Spies. *Fall semester*  
 A comparative study of five operas: Berg's *Wozzeck* and *Lulu*, Schoenberg's *Moses und Aron* and *Von Heute auf Morgen*, and Stravinsky's *The Rake's Progress*. A reading knowledge of German is recommended.  
 Prerequisite: Music 11-12, (or 13-14).
27. J. S. BACH. Mr. Swing.  
 A study of representative compositions (including the *Mass in B minor* and the *Passion according to St. Matthew*) coordinated with readings in primary and secondary sources. A reading knowledge of German is desirable, but not essential.  
 Prerequisite: Music 1, (or 11-12).
40. ANALYSIS, RESEARCH, PERFORMANCE. Mr. Freeman and Mr. Swing. *Fall semester*  
 An examination of the relevances of analytical and historical research to intelligent performance through study of selected compositions. Ability to perform instrumentally or vocally is required, though it need not have reached an exceptionally skilled level.  
 Prerequisite: Music 11-12, (or 13-14), or Music 1 plus a course in Music History.
41. ANALYSIS, RESEARCH, PERFORMANCE.  
 A continuation of Music 40 with different content.

## HONORS SEMINARS

122. STUDIES IN TWENTIETH CENTURY MUSIC. Mr. Spies.  
Prerequisite: Music 11-12 and 13-14.
128. W. A. MOZART. Mr. Swing.  
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.  
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, Schoenberg, Webern, and Carter.
151. MEDIEVAL AND RENAISSANCE MUSIC. Mr. Swing.  
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.
152. MUSIC IN THE BAROQUE ERA. Mr. Freeman. *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: MONROE C. BEARDSLEY  
JOHN M. MOORE

VISITING PROFESSOR: EDWIN B. ALLAIRE

ASSOCIATE PROFESSORS: DANIEL BENNETT  
P. LINWOOD URBAN, JR., *Acting Chairman*

ASSISTANT PROFESSORS: PATRICK HENRY, III  
HANS OBERDIEK ‡  
CHARLES RAFF  
RICHARD SCHULDENFREI

INSTRUCTOR: UWE HENKE

LECTURER: GILMORE STOTT

### Philosophy

The study of philosophy consists in attempts to resolve problems that arise when one reflects on scientific and common-sense views of man and the world; the varieties of human experience; the extent and nature of human knowledge; and certain social, political and moral questions which are of current concern.

Completion of two semester courses in philosophy is normally requisite for admission to the department as a major in Course or Honors. Philosophy majors are normally required to complete at least one course or its equivalent in the fields of Logic, History of Ancient and Modern Philosophy, and Moral or Social Philosophy. In addition, philosophy majors normally are required to elect course 52 in their senior year. Majors are encouraged to submit a thesis.

1. INTRODUCTION TO PHILOSOPHY. The staff. *Each semester*  
Methods of philosophical investigation are introduced through discussion of typical philosophical problems, such as: the problem of freedom, the arguments for the existence of God, the nature of logic and mathematics, the sources and limits of human knowledge, the justification of moral judgments. Readings include classical and current sources.  
NOTE: Introduction to Philosophy is a prerequisite for all other philosophy courses except Logic.
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. Henke. *Spring semester*  
An introduction to the principles of deductive logic with equal emphasis on the syntactic and semantic aspects of logical systems. Topics include the notions of logical truth, logical consequence, and proof. Some attention is given to the development of axiomatic theories and selected topics in the philosophy of logic.

‡ Absent on leave, 1968-69.

13. **SELECTED MODERN PHILOSOPHERS.** Mr. Allaire. *Spring semester*  
 A history of modern philosophy is presented through the metaphysical and epistemological problems common to Descartes, Leibniz, Spinoza, Locke, Berkeley, Hume and Kant. One or more of these philosophers may be selected for separate, detailed examination.
14. **ANCIENT PHILOSOPHY.** Mr. Henke. *Fall semester*  
 The philosophy of Plato and Aristotle is emphasized together with treatment of the pre-Socratics as background. Primary attention is given to metaphysical and epistemological issues.
15. **PHILOSOPHY OF SCIENCE.** Mr. Schuldenfrei. *Fall semester*  
 The focus of the course is on recent systematic attempts to solve certain major and related problems concerning science. Among these problems are distinguishing scientific from non-scientific bases for the acceptance or rejection of claims, determining the proper field for scientific inquiry, and determining the foundation of scientific knowledge.
16. **PHILOSOPHY OF RELIGION.** Mr. Moore. *Spring semester*  
 See Religion 16.
17. **AESTHETICS.** Mr. Beardsley. *Fall 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. **PHILOSOPHY OF THE SOCIAL SCIENCES.** Mr. Beardsley. *Spring semester*  
 Philosophical problems that arise in the application of scientific methods to human behavior; i.e., problems concerning concepts, laws, theories, values, explanation and prediction in the social sciences and history; and the differences and similarities between social and natural science.
19. **MEDIEVAL PHILOSOPHY.** Mr. Urban. *Fall semester*  
 See Religion 19.
20. **RELIGION, EXISTENTIALISM AND ANALYTICAL PHILOSOPHY.** Mr. Urban. *Spring semester*  
 See Religion 20.
21. **SOCIAL AND POLITICAL PHILOSOPHY.** Mr. Bennett. *Fall semester*  
 An analysis of conceptual and moral problems that socio-political life poses for many. Among the problems studied are the relation of ethics to political/social philosophy; the justification of democracy; the nature and basis of political obligation, political freedom, equality, rights, justice, and social institutions.
22. **PHILOSOPHY IN AMERICA.** Mr. Oberdiek. *Spring semester*  
 A critical examination of thinkers representative of the major philosophic traditions in America, with special emphasis on Peirce, James, and Dewey. The primary aim is to understand and evaluate the philosophic worth of their views; some attention is also given to their relation to American culture.  
 Not offered in 1968-69.
23. **CONTEMPORARY PHILOSOPHY.** Mr. Raff. *Fall semester*  
 A study of current attempts to resolve fundamental philosophical issues. Readings include articles and books by major 20th century philosophers, such as G. E. Moore, Bertrand Russell, and Ludwig Wittgenstein.

24. THEORY OF KNOWLEDGE. Mr. Allaire. *Fall semester*  
 Current epistemological issues and some metaphysical issues which underlie them are treated in detail. Readings include classical and current sources.
25. ADVANCED LOGIC. Mr. Henke. *Spring semester*  
 Topics include selected problems in deductive logic, detailed development of principles of inductive logic and the logic of decision.
26. PHILOSOPHY OF LANGUAGE. *Fall semester*  
 Topics include the role of investigation of natural and artificial languages in the solution of philosophical problems; investigation into the conceptual framework necessary to any adequate theory of ordinary language; relationships between natural and formal languages; recent attempts to found linguistics on a scientific basis.  
 Not offered in 1968-69.
27. METAPHYSICS. Mr. Bennett. *Spring semester*  
 The classical topics of metaphysics, addressed as current philosophical issues.
50. DIRECTED READING. The staff. *Each semester*
51. THESIS. The staff. *Each semester*
52. SENIOR CONFERENCE. Mr. Schuldenfrei. *Spring semester*

#### HONORS SEMINARS

101. MORAL PHILOSOPHY. Mr. Oberdiek. *Fall semester*  
 An examination of the principal theories about value and moral obligation, and of their justification; of the concepts of justice and human rights; of the implications for ethics of different theories about the freedom of the will. Works of representative theorists, both classical and contemporary, will be read.  
 Not offered in 1968-69.
102. ANCIENT PHILOSOPHY. Mr. Henke. *Fall semester*  
 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. MODERN PHILOSOPHY. Mr. Raff. *Fall semester*  
 Metaphysical and epistemological problems about the nature of minds and bodies, the varieties of knowledge and freedom, are approached through the philosophical systems of Descartes, Spinoza, Leibniz, Locke, Berkeley, Hume, Reid, Kant.
104. CONTEMPORARY PHILOSOPHY. Mr. Raff. *Spring semester*  
 Some current philosophical problems are investigated in light of the work of Bradley, Moore, Wittgenstein, and the most recent contributions.
105. PHILOSOPHY OF SCIENCE. Mr. Schuldenfrei. *Spring semester*  
 A consideration of the nature of scientific inquiry through a study of its fundamental concepts, among them theory, evidence, explanation, causation, induction. Emphasis will also be given to the distinctions between empirical and non-empirical science and between scientific and non-scientific inquiry.
106. AESTHETICS. Mr. Beardsley. *Spring semester*  
 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. PHILOSOPHY OF THE SOCIAL SCIENCES. Mr. Beardsley. *Fall semester*  
 Philosophical problems that arise in the application of scientific methods to human behavior (see Course 18). The discussion will focus on the nature of human action.
- 108A. SYMBOLIC LOGIC. Mr. Schuldenfrei. *Fall semester*  
 An examination of symbolic logic as (1) the theory of inference, (2) a tool of analysis, and (3) a foundation for mathematics. Emphasis will be placed on the fundamental concepts (e.g., the axiomatic method, consistency, decidability), major theorems (completeness and incompleteness), and problems of the foundation of logic.  
 (Note: Students who have taken 108B may not take this seminar.)
- 108B. FOUNDATIONS AND PHILOSOPHY OF MATHEMATICS. Mr. Schuldenfrei and Mr. di Franco.  
 This seminar will begin with a brief survey of the major results in foundations of mathematics: axiomatic development of symbolic logic and set theory, Gödel incompleteness theorem, consistency and independence of the axiom of choice and the continuum hypothesis. This will be followed by a comparison of the logicist, formalist and intuitionist views of the foundations of mathematics.  
 (Note: This seminar is offered jointly by the Departments of Philosophy and Mathematics. Students who have taken 108A may not take this seminar.)  
 Prerequisites: one course in philosophy and Mathematics 14 or equivalent work with axiomatic mathematics.  
 Not offered in 1968-69.
109. METAPHYSICS. Mr. Bennett. *Fall semester*  
 Some current metaphysical problems are selected for detailed investigation.
110. MEDIEVAL PHILOSOPHY. Mr. Urban. *Fall semester*  
 See Religion 110.
111. PHILOSOPHY OF RELIGION. Mr. Bennett. *Spring semester*  
 Current techniques of philosophical analysis are brought to bear on the philosophical issues raised by religious belief and experience.
112. PHILOSOPHY OF MIND. Mr. Allaire. *Spring semester*  
 The nature and variety of experience is examined with an end to discovering what is peculiar to human experience and to the objects of human experience, the nature of judgment and of persons, the relations between minds and bodies.
120. THESIS.  
 A thesis may be submitted by majors in the department in place of one Honors paper, upon application by the student and at the discretion of the department.

## Religion

The academic discipline of religion consists of several methodologies applied to a broad subject matter. Understanding of religion is achieved by philosophical, historical, literary, and sociological analysis of religious experience, thought, texts, rites and ceremonies, institutions. Department offerings are designed to provide illustrations of the various ways in which religion can be studied in an academic setting.

Any course numbered 3 through 6 may be taken as an introduction to the field, and successful completion of one of these will normally be required for admission to



courses numbered 11 and above. The normal prerequisite for religion as a Course major, or an Honors major or minor, will be completion of two courses. For advanced work in some areas of religion, foreign language facility will be very useful, especially French and German. For advanced work in biblical studies and early Christian history, knowledge of one of the ancient languages—Greek, Latin, Hebrew—would also be useful.

While the department itself intends to provide a good introduction to the study of religion and a chance for some advanced work as well, the attention of majors is also called to relevant offerings in the departments of philosophy, history, sociology and anthropology, and fine arts, and to courses reflecting other scholarly specialties in departments of religion at neighboring institutions, particularly the University of Pennsylvania and Haverford College.

3. INTRODUCTION TO THE OLD TESTAMENT. Mr. Henry. *Fall semester*  
The literature and history of the people of Israel. Early traditions, the law and the prophets, the emergence of Judaism. Primary emphasis will be on developing familiarity with the text.
4. INTRODUCTION TO THE NEW TESTAMENT. Mr. Henry. *Spring semester*  
The literature and history of early Christianity. The formation of the gospels, the life and teachings of Jesus, the Christian movement in the apostolic age, with special attention to the theology of Paul. Primary emphasis will be on developing familiarity with the text.
5. 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.
6. PROBLEMS OF RELIGIOUS THOUGHT. Mr. Urban. *Each semester*  
The purpose of this course is to study various answers to the chief religious problems of the 20th century. Problems include: faith and reason, the existence of God, religion and morality, science and religion, and the problem of evil. Answers include those given by Martin Buber, Rudolph Bultmann, Soren Kierkegaard, Reinhold Niebuhr, Paul Tillich and others. The student is encouraged to find his own answers and to work out his own religious beliefs. This course was formerly listed as Problems of Christianity Today.
11. HISTORY OF CHRISTIANITY TO THE FIFTH CENTURY. Mr. Henry. *Fall semester*  
The development of Christian thought and institutions from the end of the first century to the Council of Chalcedon (A.D. 451). Subjects covered will include major thinkers, doctrinal development and dogmatic definition, heresy, church and empire, ecclesiastical organization, sacraments, councils, beginnings of monasticism.
12. CHRISTIANITY SINCE THE REFORMATION. Mr. Henry. *Spring semester*  
Each year this course is offered it will view the major developments in Christianity since the 16th century from a particular perspective. For 1969-70 the perspective will be that of the history of Roman Catholicism from the Council of Trent to the Second Vatican Council.  
Not offered in 1968-69.
16. PHILOSOPHY OF RELIGION. Mr. Moore. *Spring semester*  
The nature of religion; the psychology and interpretation of religious experience; the problem of religious knowledge; the validity and difficulties of Christian theology and ethics. (Also listed as Philosophy 16.)

18. THE REFORMATION. Mr. Urban. *Spring semester*

A study of the rise and development of the Protestant Reformation during the 16th century; its history and thought with special attention to the work and thought of Luther and Calvin.

19. MEDIEVAL PHILOSOPHY. Mr. Urban. *Fall semester*

Philosophical thought from Augustine to the 15th 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. (Also listed as Philosophy 19.)

20. RELIGION, EXISTENTIALISM, AND ANALYTICAL PHILOSOPHY. Mr. Urban.

A study of the two most influential philosophical movements of the 20th century and their impact on religious thought. Among analytical philosophers attention will be given to the writings of R. B. Braithwaite, R. M. Hare, John Hick, Alasdair MacIntyre and John Wisdom. Among existentialists the writings of Rudolph Bultmann, Martin Heidegger, John Macquarrie and Paul Tillich will be read. Lectures, discussion and reports. (Also listed as Philosophy 20.)

Not offered in 1968-69.

21. STUDIES IN OLD TESTAMENT. Mr. Henry.

An advanced course in some special topic in Old Testament, which may vary from year to year.

Not offered in 1968-69.

22. STUDIES IN NEW TESTAMENT. Mr. Henry. *Spring semester*

An advanced course in some special subject in New Testament, which may vary from year to year. Subject for 1968-69: Luke-Acts as a source for Christian history in the apostolic age.

23. STUDIES IN HISTORY OF CHRISTIANITY. Mr. Henry.

An advanced course in some special topic in history of Christianity, which may vary from year to year. Probable subject for 1969-70: The Era of Justinian (6th century).

Not offered in 1968-69.

24. STUDIES IN HISTORY OF RELIGIONS. Mr. Moore.

An advanced course in some special area of history of religions.

Not offered in 1968-69.

25. RELIGIOUS CLASSICS. Mr. Urban. *Spring semester*

An advanced course in the study of one or two great religious thinkers. Subject for 1968-69: Martin Buber.

- HISTORY 37. AMERICAN RELIGIOUS THOUGHT. Mr. Tolles. *Spring semester*

The course of religious thought in the colonies and the United States, with appropriate reference to general intellectual history and American church history.

- HISTORY 38. 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 1968-69.

51. SPECIAL TOPICS.

From time to time special topics may be offered as courses at the discretion of the faculty or as a result of sufficient student interest.

52. THESIS.

Majors in religion are strongly encouraged to write a thesis as a part of their program.

53. DIRECTED READING.

54. SENIOR CONFERENCE. Mr. Urban, Mr. Moore and Mr. Henry.

*Spring semester*

A colloquium for majors in the second semester of the senior year. The conference is not designed specifically for preparation for the comprehensive examination; rather, opportunity will be given for discussion of topics of interest to members of the colloquium.

### HONORS SEMINARS

101. THE OLD TESTAMENT. Mr. Henry.

*Spring semester*

A general introduction to major issues in Old Testament interpretation, followed by detailed investigations of particular subjects, chosen as far as possible on the basis of an individual student's interests, and leading to the production of a substantial research paper. Discussions are designed to familiarize the entire seminar with each student's special project.

Not offered in 1968-69.

102. THE NEW TESTAMENT. Mr. Henry.

*Spring semester*

The New Testament dealt with according to the format outlined for the Old Testament in Religion 101.

103. EARLY CHRISTIANITY. Mr. Henry.

*Fall semester*

A study of the development of Christian thought and institutions from the end of the first century to the Council of Chalcedon (A.D. 451). Specific subjects covered will depend on the students' interests. Among topics which might be considered are church and empire, missionary expansion, episcopacy, sacraments and liturgy, councils, doctrinal development and dogmatic definition, heresy, beginnings of monasticism. Greek and/or Latin, as well as French and German, while not required, can be employed extensively.

Not offered in 1968-69.

104. CHRISTIAN DIVISIONS EAST AND WEST. Mr. Henry.

*Fall semester*

This seminar is part of a large project, which is a study of the doctrinal, cultural, political, and ecclesiastical factors that caused divergence between Greek and Latin Christianity, and led to eventual schism. The specific subject matter will vary from year to year. For 1968-69 this seminar will deal with Origen and Augustine as sources and illustrations of the special characteristics of Greek and Latin theology.

105. THE IDEA OF GOD IN WESTERN THOUGHT. Mr. Urban.

*Spring semester*

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.

106. CONTEMPORARY RELIGIOUS PHILOSOPHERS. Mr. Urban.

*Fall semester*

The seminar will concentrate on representative thinkers and schools of thought in the present century. These will include Karl Barth, Martin Buber, Rudolph Bultmann, Reinhold Niebuhr, Paul Tillich, and others.

Not offered in 1968-69.

110. MEDIEVAL PHILOSOPHY. Mr. Urban. *Fall semester*

Philosophical thought from Augustine to the 15th 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 primary emphasis will be historical, attention will be paid to the contemporary relevance of medieval thought. (Also listed as Philosophy 110.)

111. PHILOSOPHY OF RELIGION. Mr. Bennett. *Spring semester*

(See Philosophy 111.)

120. THESIS.

Honors candidates are strongly urged to write a thesis as preparation for one of their papers.

# PHYSICAL EDUCATION FOR MEN

PROFESSOR: EDWIN J. FAULKNER

DIRECTOR OF ATHLETICS AND PHYSICAL EDUCATION FOR MEN AND  
ASSOCIATE PROFESSOR: WILLIS J. STETSON

ASSOCIATE PROFESSOR: LEWIS H. ELVERSON

ASSISTANT PROFESSOR: GOMER DAVIES

INSTRUCTOR: DOUGLAS M. WEISS

ASSISTANTS: EDWARD H. AYRES  
BROOKE P. COTTMAN  
J. D. HOFFSTEIN  
JAMES W. LUKENS, JR.  
JAY S. MACDOWELL

JAMES J. McADOO  
ROBERT McCOACH  
JAMES W. NOYES  
JOHN P. UDOVICH  
RICHARD WRIGHT

COLLEGE PHYSICIAN: DR. MORRIS A. BOWIE

TEAM PHYSICIAN: DR. HAROLD C. ROXBY

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

Adapted Physical Education	†Folk Dance	†Tennis
†Aquatics	*Football	Touch Football
†Archery	†Golf	Track
Badminton	†Modern Dance	
*Cross Country	**Soccer	

\* Intercollegiate competition only.

\*\* Intercollegiate competition and course instruction.

† Some co-ed sections.

## WINTER I AND II ACTIVITIES

Adapted Physical Education	†Folk Dance	†Volleyball
†Aquatics	†Modern Dance	Weight Training
†Badminton	*Swimming	**Wrestling
**Basketball	†Tennis	

## SPRING ACTIVITIES

Adapted Physical Education	*Lacrosse	**†Tennis
†Aquatics	†Modern Dance	**Track
*Baseball	Softball	†Volleyball
**†Golf		

\* Intercollegiate competition only.  
 \*\* Intercollegiate competition and course instruction.  
 † Some co-ed sections.



# PHYSICAL EDUCATION FOR WOMEN

ASSOCIATE PROFESSORS: ELEANOR K. HESS, *Chairman*  
IRENE MOLL

ASSISTANT PROFESSOR: MARY ANN YOUNG

LECTURERS: PATRICIA BOYER  
JANICE FELLMAN

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 sports, dance 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 intercollegiate competition, as well as for public performances and demonstrations.

Freshmen and sophomores take three periods of activity each week. These may be elected from classes listed below with the stipulation that they take swimming until a test is passed; take a dance activity; take a team sport; take an individual sport; and take developmental gymnastics if the posture grade or motor skill test indicates a need for it.

In addition to the departmental requirements, the faculty regulations state the following: "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 her senior year with a deficiency in physical education."

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.

## ACTIVITIES

ARCHERY.*	<i>Fall and Spring</i>
Class and Varsity.	
BADMINTON.	<i>Winter</i>
Class and Varsity.	
BASKETBALL.	<i>Winter</i>
Class and Varsity.	
BOWLING.	<i>Winter</i>
Class.	
CONDITIONING EXERCISES.	<i>Fall, Winter and Spring</i>
DEVELOPMENTAL MOVEMENT.	<i>Winter</i>
Required of all first-year students whose posture grade or motor ability test indicates a need for it.	

\* Co-ed classes.

FENCING.	<i>Winter</i>
FOLK AND SQUARE DANCING.*	<i>Fall, Winter and Spring</i>
Class and Performance Group.	
GOLF.*	<i>Fall and Spring</i>
Class.	
HOCKEY.	<i>Fall</i>
Class and Varsity.	
LACROSSE.	<i>Spring</i>
Class and Varsity.	
MODERN DANCE.*	<i>Fall, Winter and Spring</i>
Class and Performance Group. Open to men students.	
SOCCER.	<i>Winter</i>
Class.	
SOFTBALL.	<i>Spring</i>
Class and Varsity.	
SWIMMING.	<i>Fall, Winter and Spring</i>
Beginning, intermediate and advanced classes in strokes and diving. Class and Varsity.	
American Red Cross Life Saving and Water Safety. (Upon successful completion of these courses, American Red Cross certificates will be awarded.)	
TENNIS.	<i>Fall, Winter and Spring</i>
Class and Varsity.	
VOLLEYBALL.*	<i>Fall and Winter</i>
Class and Varsity.	
WATER BALLET.*	<i>Fall and Spring</i>
Class and Performance Group.	

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\* Co-ed classes.

## PHYSICS

PROFESSOR: WILLIAM C. ELMORE

ASSOCIATE PROFESSORS: OLEXA-MYRON BILANIUK  
MARK A. HEALD, *Chairman*  
PAUL C. MANGELSDORF, JR. ‡  
ALBURT M. ROSENBERG

ASSISTANT PROFESSORS: JOHN R. BOCCIO  
CYRUS D. CANTRELL

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 or 16 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. Satisfactory work in Physics 1, 2 or its equivalent is prerequisite for all further work in the department, and Chemistry 2 or 4 is a prerequisite for Physics 112 and 114.

Honors students majoring in physics normally take Physics 102, 106, 112, in that order, and Mathematics 51, 52, and 104. Physics 114 or a second mathematics seminar is encouraged but not required. Other seminars and courses in the program may be chosen to meet the interests of the student. Normally a student will present four papers in physics and two in mathematics to the visiting examiners. 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; Chemistry 61, 62; and Physics 51, 52, 54, 71, 72. It is recommended that Physics 60 or additional work in engineering or chemistry be included in the program of course students who intend to do graduate work in physics. This program provides a well-rounded study of physics, and by requiring less intensive concentration than an honors program offers

‡ Absent on leave, 1968-69.

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.

1, 2. GENERAL PHYSICS. Mr. Boccio, Mr. Heald, and Staff.

An introductory course in basic physics. During the first semester special emphasis is placed on mechanics, conservation principles, harmonic motion, wave motion and heat. During the second semester the topics include basic concepts in electricity and magnetism, direct current circuits, alternating current circuits, optics and modern 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: First Year Mathematics taken concurrently, or adequate preparation in mathematics.

7, 8. CONCEPTS AND THEORIES IN PHYSICAL SCIENCE. Mr. Rosenberg.

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, atomicity of charge, Bohr's model of the atom, radioactivity, elementary particles, the nuclear atom and nuclear energy, stellar energy.

This course is designed as a terminal course in physical science to meet the needs of non-science majors and fulfills the group 1 distribution requirement. It is not intended to fulfill the physics requirement of medical schools, and cannot be used as a prerequisite for further work in the Division of the Natural Sciences.

Three lectures and one three-hour laboratory per week.

10. TOPICS IN BIOPHYSICS. Mr. Rosenberg. *Spring semester*

Applications of physical tools and analysis to living systems. Emphasis will be at the subcellular level of integration. The course is intended for physical science, mathematics, and engineering students. Previous biological training is not required. Three lectures per week. In lieu of laboratory work, visits will be made to nearby biophysical laboratories.

11, 12. MECHANICS AND WAVE MOTION. Mr. Cantrell 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. Three lectures and a laboratory period weekly.

Prerequisite: Second Year Mathematics taken concurrently.

51, 52. MODERN PHYSICS. Mr. Bilaniuk, Mr. Boccio and Mr. Cantrell.

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: Second Year Mathematics and consent of the instructor.

54. THERMAL PHYSICS. Mr. Mangelsdorf.

Continuum properties of matter and of thermal energy. Thermodynamics and statistical mechanics of mechanical, chemical, electrical and magnetic systems. Entropy, fluctuation theory, irreversible thermodynamics. Brownian motion, diffusion theory, transport processes. Three lectures and one conference section weekly.

Not offered in 1968-69.

Prerequisite: Second Year Mathematics.

58. QUANTUM MECHANICS.

*Spring semester*

Review of classical mechanics. The postulates of quantum mechanics; the Schrödinger equation; the uncertainty principle. Applications to the harmonic oscillator, square well potential problems and the hydrogen atom. Perturbation theory; transition probabilities; electron spin and the Pauli exclusion principle; selected applications. This course develops further the concepts and methods of quantum mechanics, treated at an introductory level in Physics 51.

Prerequisite: Physics 51.

60. SPECIAL PROJECT. Staff.

Laboratory work directed toward the acquisition of knowledge and skills that will be useful in future research. The project will involve development of apparatus and the performance of an experiment of contemporary significance in physics. An oral and written report will be presented to the instructor.

61. DIRECTED READING. Staff.

This course is to provide an opportunity for individual students to do special work in fields not covered by the undergraduate courses listed above. Weekly topics and problems will be assigned, and the student will present oral and written reports to the instructor.

71. CIRCUIT THEORY. Mr. McCrumm.

*Fall semester*

Transient and steady-state analysis of electric circuits and networks with emphasis on Laplace and Fourier methods and s-plane interpretation. Network topology, equilibrium equations, theorems, network functions and their properties. Energy in electric networks. Introduction to synthesis.

Three class periods and a laboratory each week.

Prerequisite: Physics 12.

72. ELECTROMAGNETIC THEORY.

*Spring semester*

Application of Maxwell's equations. Macroscopic field treatment of magnetic, dielectric and conducting bodies. Forces, motion and energy storage. Field basis of circuit theory. Electromagnetic waves; wave-guides, transmission lines and antennas.

Three class periods and a laboratory each week.

Prerequisite: Physics 12.

### HONORS SEMINARS

102. ELECTRICITY AND MAGNETISM. Mr. Heald.

*Fall 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: Second Year Mathematics, and Physics 11, 12.

106. ATOMIC AND NUCLEAR PHYSICS. Mr. Bilaniuk. *Spring semester*

Special theory of relativity. Wave-particle duality. Introduction to wave mechanics, the hydrogen atom, structure and spectra of many-electron atoms. Elements of solid state physics. Properties and systematics of nuclei, nuclear reactions, nuclear forces and models. Introduction to fundamental particles, their symmetries and inter-actions. The accompanying laboratory includes basic experiments in atomic and nuclear physics.

Prerequisite: Physics 102, or equivalent preparation in the Honors program in Engineering Sciences.

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 four-vector formulation of the special theory of relativity. Thermodynamics and statistical mechanics. Thermal radiation, and quantum statistics with applications. Accompanied by a full-day laboratory each week.

Prerequisites: Chemistry 2 or 4, and Physics 106.

114. QUANTUM MECHANICS. Mr. Cantrell and Mr. Boccio. *Spring semester*

Advanced classical dynamics. Classical vs. quantum physics, correspondence principle. Heisenberg's and Schrödinger's versions of quantum mechanics. Observables and quantum mechanical operators. Eigenfunctions and eigenvalues. Approximation methods. Identical particles and spin. Scattering and the Born approximation. Quantum mechanics of the nucleon-nucleon interaction and nuclear structure. Accompanied by experimental and computational projects.

Prerequisite: Physics 112.



## POLITICAL SCIENCE

PROFESSORS: J. ROLAND PENNOCK, *Chairman*  
CHARLES E. GILBERT †  
DAVID G. SMITH

ASSISTANT PROFESSORS: RAYMOND F. HOPKINS  
ROBERT O. KEOHANE †  
RICHARD W. MANSBACH

INSTRUCTOR: PAUL LUTZKER

LECTURERS: FREDERICK A. HARGADON  
NANNERL O. HENRY

Courses and seminars offered by the Political Science Department deal with the place of politics in society and contribute to an understanding of the purposes, organization, and operation of political institutions, domestic and international. For the beginning student, the Department offers a general introduction to the nature of politics, to its major institutions and moving forces, and to the key concepts of the discipline, followed by a more detailed examination of these elements in a particular institutional setting. In appropriate places throughout the curriculum, attention is focused on problems of change (evolutionary and revolutionary), freedom and authority, war and peace—and to the development of political institutions that are responsive to the needs of our day. For those who become majors and for others who take additional work in political science, courses are provided that will permit giving special attention to political theory, comparative political systems, politics and government in the United States, and international relations.

### REQUIREMENTS AND RECOMMENDATIONS FOR MAJORS

Political Science 1, followed by Political Science 2, 3, or 4, is prerequisite to all other work in the Department, except that students wishing a one semester *terminal* course providing some knowledge of and insight into a particular field may take Political Science 2, 3, or 4 without prerequisite. Students who intend to major in political science should take the introductory course during the freshman year if possible. Political Theory, either in seminar or in course (Political Science 54), is required of all majors. Course majors must take Course 60-61.

### 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 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. A thesis or other form of independent work is strongly recom-

† Absent on leave, 1968-69.

mended. 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 4—International Politics  
Political Science 13—International Law and Organization  
Political Science 14—American Foreign Policy  
Political Science 63—Advanced International Politics  
Economics 60—International Economics

### *Group II*

Economics 11—Economic Development  
History 25—Modern Russia  
History 30—American Diplomatic History  
History 40—Africa  
History 42—The Expansion of Europe  
History 44, 45—The Far East  
History 46—Asian Nationalisms

### *Group III*

Economics 61—Comparative Economic Systems  
Political Science 3—Comparative Politics  
Political Science 18—Politics of Developing Nations  
Political Science 19—Comparative Communist Politics  
Political Science 21—Politics of Africa  
Political Science 55—Modern Political Theory  
Political Science 64—Topics in International Relations

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 chairman of their prospective major department.

## COURSES

### 1. INTRODUCTION TO POLITICAL SCIENCE. Staff. *Fall semester*

A study of the basic institutions, concepts, and moving forces of politics, combined with some consideration of the analytical tools and methods of the discipline. The works of major historical figures in the development of political ideas and of contemporary political scientists will be read. Except as noted below, this course is prerequisite to all other courses offered by the Department. Credit is given for this course only when combined with Political Science 2, 3, or 4.

### 2. POLICY-MAKING IN AMERICA. Staff. *Spring semester*

Consideration of basic elements of American national politics, and of ways of defining and explaining the functions and results of American politics. Major attention will be devoted to electoral organizations, voting behavior and opinion formation, legislation and presidential leadership.

### 3. COMPARATIVE POLITICS. Staff. *Spring semester*

An introduction to the theory of comparative politics, and to the data used in comparing political systems. Major attention will be given to Great Britain, India, France, and the USSR. The course will focus on political culture, the party system, and the legislative and executive institutions of the central government.

4. INTERNATIONAL POLITICS. Staff. *Spring semester*

An introduction to the analysis of the contemporary international system and its evolution since 1945. The course will consider the foreign policies of major powers and their interaction, contemporary forces influencing the nature of international relations, and the role of ideologies. Various approaches to world order, such as diplomacy, collective security, disarmament and world government will be considered.

11. PROBLEMS IN COMMUNITY GOVERNMENT. Mr. Lutzker. *Spring semester*

The social, economic, and legal setting of local government. Politics and administration at state and local levels. Problems of federalism and metropolitan areas. The course emphasizes special research projects, such as field work in nearby communities.

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

An analysis of international law and organization in the context of the international political system. Special attention will be given to the political process of the United Nations and to its accomplishments, limitations, and prospects. The course will also consider the relations between international politics and international law, and the theory and practice of regionalism.

14. AMERICAN FOREIGN POLICY. Mr. Keohane or Mr. Mansbach.  
*Alternate years, fall semester*

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

18. POLITICS OF DEVELOPING NATIONS. Mr. Hopkins. *Fall semester*

An examination of theories of political modernization and their various applications to developing societies, including examples from Asia, Africa, and Latin America. Among the questions to be studied are the nature and causes of social change, psychological, sociological, and economic factors affecting political development and the relative role of leadership, ideology, and social structure in shaping the political process.

19. COMPARATIVE COMMUNIST POLITICS. Mr. Hargadon. *Spring semester*

A comparative study of the political organization of the Soviet Union, China, and the Eastern European states, with emphasis on the Party structure, state bureaucracy, policy formation, and political communication.

21. POLITICS OF AFRICA. Mr. Hopkins. *Spring semester*

The analysis of political processes in a variety of African states, including a brief examination of traditional systems, the colonial situation and the rise of independence movements, and an analysis of contemporary political patterns.

51. PUBLIC ADMINISTRATION. Mr. Gilbert or Mr. Smith.  
*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.

52. AMERICAN CONSTITUTIONAL LAW. Mr. Smith. *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.

53. AMERICAN PARTY POLITICS. Mr. Lutzker. *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 MONTESQUIEU. Mrs. Henry or Mr. Smith. *Fall semester*

The development of political thought based on the work of the chief political philosophers from Plato to Montesquieu. The course will consider classical, medieval, and early modern theories concerning: the sources of authority and obedience; the origins and functioning of the polity; the role of law in government; the relationship between the state and the individual; and the character of the good state.

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. Mrs. Henry or Mr. Smith. *Spring semester*

Political theory from Rousseau to the present. Special attention will be given to the development of liberalism, socialism, democratic theory, and the sociological theories of politics. Authors studied include Rousseau, Burke, Tocqueville, Marx, and J. S. Mill, as well as other nineteenth- and twentieth-century authors.

56. JURISPRUDENCE. Mr. Pennock.

A study of the sources and nature of law; historical, sociological and philosophical approach 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 juniors and seniors only, except by special arrangement.

59. MARXISM. Mr. Smith. *Half course, fall semester*

A study of Marxist political theory and philosophy. Primary emphasis is placed on the works of Marx, Lenin, and Mao Tse-tung. 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.

60-61. 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.

62. POLITICAL SOCIOLOGY. Mr. Gilbert. *Spring semester*

The relations of politics to basic social structures, processes, and traditions. Study of problems, concepts, and theories about politics viewed as human behavior. The specific topics will vary from year to year.

Not offered in 1968-69.

63. ADVANCED INTERNATIONAL POLITICS. Mr. Keohane.

*Alternate years, fall semester*

A theoretical approach to the abiding and changing patterns of relations among states and the various factors that affect them, drawing both on classical and contemporary writings. The contemporary international system will be subjected to a detailed analysis.

Prerequisite: Course 4 or the equivalent.

Not offered in 1968-69.

64. TOPICS IN INTERNATIONAL RELATIONS.

*Alternate years, spring semester*

An analysis of certain problems of international relations chosen by the instructor. Possibilities include: comparative foreign policy, war, international relations of developing nations, regionalism.

Prerequisite: Course 4 or the equivalent and Course 63.

69. DIRECTED READINGS IN POLITICAL SCIENCE.

Available on an individual or group basis, subject to the approval of the Chairman and the Instructor.

70-71. COLLOQUIUM. Mr. Pennock.

*Spring semester*

Philosophical, legal, and other aspects of the problem of privacy in the modern polity.

### HONORS WORK

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

101. (a) and (b). POLITICAL THEORY. Mr. Pennock or Mr. Smith. *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. Considerable attention is given to modern democratic theory. It is desirable but not required for students planning to take 101b to take Political Science 54 during their sophomore year.

102. POLITICS AND LEGISLATION. Mr. Lutzker.

*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 or Mr. Smith.

*Fall semester*

Problems of administrative organization, policy-making and responsibility, with primary reference to the United States and to selected fields of policy.

104. INTERNATIONAL POLITICS. Mr. Mansbach.

*Fall semester*

An inquiry into the principles and problems of international politics, this seminar will consider theories of international stability and disorder, the relationship between foreign policies and the international system, and approaches to international order such as diplomacy, international law, and collective security. Basic to the analysis will be the question: what are the causes of war and the conditions of peace?

Prerequisite: Course 4 or the equivalent.

105. AMERICAN FOREIGN POLICY. Mr. Mansbach. *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. COMPARATIVE COMMUNIST POLITICS. Mr. Hargadon. *Fall semester*

A comparative study of the political organization of the Soviet Union, China, and the Eastern European states, with emphasis on the Party structure, state bureaucracy, policy formation, and political communication.

108. COMPARATIVE GOVERNMENT.

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 transnational political movements.

109. POLITICAL DEVELOPMENT. Mr. Hopkins. *Spring semester*

A comparative study of the politics of societies undergoing change and modernization. Various theories, approaches, and methods of explanation are examined and considered in the context of states in Asia, Africa, the Middle East and Latin America.

110. URBAN SOCIOLOGY AND POLITICS. Mr. Gilbert and Mr. Van Til.

*Fall semester*

The impact of urbanization on contemporary politics and social structure, from the perspectives of political science and sociology. Emphasis will be placed on empirical study of selected problems such as physical planning, social welfare, and political organization.

Not offered in 1968-69.

129. THESIS. All members of the department.

Approval must be secured early in the student's junior year.



## PSYCHOLOGY AND EDUCATION

PROFESSORS: DAVID ROSENHAN  
JOSEPH B. SHANE  
HANS WALLACH, *Acting Chairman*

ASSOCIATE PROFESSORS: SHELDON FELDMAN  
KENNETH J. GERGEN, † *Chairman*  
GERALD R. LEVIN  
DEAN PEABODY

ASSISTANT PROFESSOR: NICHOLAS S. THOMPSON

INSTRUCTOR: JOSEPH W. BERNHEIM

LECTURER AND DIRECTOR OF STUDENT TEACHING: ALICE K. BRODHEAD

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

### REQUIREMENTS AND RECOMMENDATIONS

The course Introduction to Psychology is normally required before advanced work may be taken. However, students whose grades are generally in the honors range and who have had significant background in either the natural or social sciences may apply to individual instructors for entrance to courses beyond the elementary level.

Majors should include advanced work in two areas of psychology: (a) basic processes underlying human and animal behavior, such as perception, learning and motivation; (b) human behavior in its social context, such as personality, child psychology, social psychology. Majors in course should take at least two courses and majors in Honors, at least one seminar from each area. It is highly desirable for all majors to take at least one course providing them with experience in basic research (e.g. courses with laboratories or Psychology 69). In addition, all majors in Course are encouraged to enroll in Psychology 64 during the spring semester of their senior year. This course is especially suited for preparation for the comprehensive examinations.

*Education:* Courses in education—11, 12, 14, 15, 16, and 17 will not be credited toward a major in psychology. Education alone may not be elected as a major subject, and not more than four courses in education will be accepted for credit toward the bachelor's degree.

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† Absent on leave, 1968-69.

Swarthmore students may fulfill the Pennsylvania requirements in Education for the college provisional certificate for secondary school teachers by taking the four courses:

- Psychology 3—Introduction to Psychology.
- Education 11—Educational Psychology
- Education 14—Introduction to Teaching.
- Education 16—Student Teaching.

plus two out of three of the following:

- Education 12—Principles and Methods of Secondary Education.
- Education 15—History of Education.
- Education 17—Problems in Urban Education.

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

- Psychology 3—Introduction to Psychology.
- Psychology 15—Child Psychology.
- Education 11—Educational Psychology.
- Education 14—Introduction to Teaching.
- Education 16—Student Teaching.

## Psychology

3. INTRODUCTION TO PSYCHOLOGY. Staff. *Fall semester*  
An introduction to the study of the behavior and experience of the individual. The broader significance of psychology will be emphasized. Two lectures, plus conference hours to be arranged.
12. MOTIVATION.  
The determination of behavior by maturation, early experience, deprivation, stimulation, and reward. The concepts of instinct, homeostasis, drive, reinforcement, arousal, and incentive are analyzed with reference to data drawn largely from animal experimentation. Some reference is made to recent findings in the physiology of drive and reinforcement. Term paper or an original experiment is required.
13. STATISTICS FOR PSYCHOLOGISTS.  
The logic and the application of standard statistical tests in the analysis of data. Emphasis is placed on the relations between experimental and statistical procedures. No mathematics required.
14. LEARNING AND BEHAVIOR THEORY. Mr. Bernheim. *Spring semester*  
The experimental analysis of the major phenomena of learning and conditioning is studied mainly at the animal level. Specific empirical and theoretical issues are considered in detail, and the major theories of learning are evaluated. The laboratory is designed to acquaint students with the major processes considered.
15. CHILD PSYCHOLOGY. Mr. Levin. *Fall semester*  
Cognitive development, the socialization process, and the influence of child-rearing practices will be emphasized. Observing of preschool children will be required.

36. PRIMATE SOCIAL BEHAVIOR. Mr. Thompson. *Spring semester*  
 A course in seminar format. Students will read primarily from original reports of field studies and laboratory investigations into the social organization and communications systems of monkeys, apes, and prosimians.
- 36A. SELECTED TOPICS IN COMPARATIVE SOCIAL ORGANIZATION  
 Mr. Novick, Mr. Rawson and Mr. Thompson. *Half course, spring semester*  
 Evening film and lecture series on the social organization of various animal species, including man. Films, speakers, readings, and discussions concerning the environmental and structural forces which shape social groups. Designed for students who have had, or are taking concurrently, Sociology-Anthropology 23, Psychology 36, or Zoology 60.
38. ABNORMAL PSYCHOLOGY. Mr. Rosenhan. *Fall semester*  
 Several views of abnormality are considered, including those that allow conceptions of normality. Biological and learned bases of positive and negative abnormality are considered.
41. COMPARATIVE PSYCHOLOGY. Mr. Thompson. *Fall semester*  
 The course considers determinants of behavior in the individual animal. It will explore in detail experimental and field studies of behavior in a few selected animal species. In each species, the adult behavior of the individual animal will be shown to be the result of the complex interaction of genetic, maturational, developmental, and social effects. Weekly laboratory and field work. Sophomores admitted by permission of the instructor.
42. PHYSIOLOGICAL PSYCHOLOGY. Mr. Thompson. *Spring semester*  
 The physiological foundations of human behavior and its disorders. The course starts with a review of the anatomy and physiology of the human nervous system. Each student then prepares and reads a theoretical paper in which he collects, integrates, and interprets the most recent experimental and clinical information on some facet of the operation of the nervous system. Tutorial meetings in addition to regular class meetings. Sophomores admitted by permission of the instructor.
43. PSYCHOLINGUISTICS AND COMMUNICATION. Mr. Feldman. *Fall semester*  
 A study of the modes, processes, and effects of inter-individual communication and of the problems of measuring semantic meaning, the psychological aspects of language structure, and the learning thereof. Readings will include both theoretical and empirical studies in psychology and linguistics.
45. GROUP DYNAMICS. Mr. Peabody. *Fall semester*  
 (By application only.) The course will deal with the psychological aspects of behavior in groups. Issues such as intimacy, solidarity, group problem solving, leadership development, scapegoating, splinter-group formation, and phases of group development will all receive attention. Classroom sessions will focus on the ongoing behavior within the group itself. Outside reading and papers will be used to illuminate processes within the group and to raise significant theoretical problems.
46. COGNITIVE PROCESSES. Mr. Peabody. *Spring semester*  
 Centers on those processes the individual uses to understand the world. Emphasizes those processes used in dealing with people, and their relation to those dealing with impersonal objects.
50. PERCEPTION. Mr. Wallach. *Spring semester*  
 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.

52. HUMAN LEARNING AND THINKING.  
An examination of the phenomena of association, memory, problem solving, thinking and language.
53. FIELD WORK IN ZOOSEMIOTICS. Mr. Thompson. *Half course, fall semester*  
After a brief review of the problems encountered in studying an alien communication system, the class will plan, execute, interpret, and write up its own investigations of the communication system of the common crow.
56. SOCIAL PSYCHOLOGY. Mr. Feldman. *Fall semester*  
An examination of theory and research relevant to the understanding of social interaction from a psychological viewpoint. Special emphasis will be placed on social perception and its distortion, attitude development and change, conformity, the relationship of personality to social interaction, and social motivation.
57. PSYCHOLOGY OF ATTITUDES.  
The course will concentrate on topics designed to supplement Psychology 56, Social Psychology, with particular attention to social and political attitudes.
58. PERSONALITY. Mr. Rosenhan. *Spring semester*  
An examination of contrasting theories of the human personality. Theories of Freud, Jung, Lewin, Rogers and others will be discussed, and special attention will be given to current empirical work.
- 62-63. COLLOQUIUM IN LEARNING.  
In consultation with the instructor, students select a problem in the analysis of learned behavior for study in the laboratory. In weekly class meetings, they discuss the rationale, methods, and results of their work as it progresses, relating it to the research literature and to general theoretical issues. A paper reviewing the pertinent literature and describing the experimental work is required. Those desiring to enroll must see the instructor before registration; enrollment will be limited to eight students. Double credit.
64. HISTORY AND SYSTEMS OF PSYCHOLOGY. Staff. *Spring semester.*  
Reading and discussion on a tutorial basis intended to provide integration of different fields of psychology and to help majors prepare for comprehensives. Historical treatment will concentrate on the major systematic points of view. Special consideration will be given to problems overlapping several areas of psychology.
67. SOCIAL PSYCHOLOGY OF SOCIAL ISSUES.  
A course in seminar format. Students consider the scientific approach to issues of social significance. Areas such as race relations, international conflict, poverty, urbanism, drugs, and revolution may all be discussed. (Enrollment limited.)
68. TUTORIAL. Staff. *Each semester*  
Any student may, with the consent of a member of the Department, work under a tutorial arrangement for a single semester. The student is thus allowed to select a topic of particular interest to him, and in consultation with a faculty member, prepare a reading list and work plan. Tutorial work may include field experience outside Swarthmore.
69. INDEPENDENT RESEARCH. Staff. *Each semester*  
Students conduct independent research projects. They typically study problems with which they are already familiar from their course work. Students must submit a written report of their work. Registration for Independent Research requires the sponsorship of a faculty member who agrees to supervise the work.

## Education

11. EDUCATIONAL PSYCHOLOGY. Mr. Levin. *Alternate years*  
The application of psychology to education. The psychology of learning and psychometrics will be stressed. Projects will be required.  
Prerequisite: Psychology 3.
12. PRINCIPLES AND METHODS OF SECONDARY EDUCATION. Mr. Shane.  
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 (term minimum of 36 hours) assisting in a classroom in the local schools. This course meets the requirement for basic reading instruction.
15. HISTORY OF EDUCATION.  
Educational thought in our western culture from the Greeks to the present day. Weekly seminar in which members of the Classics, History, Philosophy and Religion departments participate.
16. STUDENT TEACHING. Mrs. Brodhead.  
Secondary level: In cooperation with Springfield School District and Swarthmore-Rutledge School District, 30 hours of guided observation in the spring followed by six weeks (120 hours) of full-time teaching in the summer school in both remedial and enrichment classes. Students should enroll for this course at the January registration. They must be recommended by the college department whose subject they plan to teach.  
Elementary level: In cooperation with Springfield School District, a six weeks program of full-time teaching (120 hours) under close supervision by master teachers in the Springfield Elementary Summer School which embraces both remedial and enrichment reading and arithmetic, as well as science, geography, and creative writing.  
Prerequisite: Education 14 and recommendation of the department of psychology and education.
17. PROBLEMS IN URBAN EDUCATION. Mrs. Brodhead. *Fall semester*  
This course considers the problems of schools in big cities, related to topics such as financial support, community relations, professional staff, curricular changes, pupil personnel. A weekly seminar, individual study, and field investigation in the City of Philadelphia.  
Limited enrollment.

## HONORS SEMINARS

101. PERCEPTION. Mr. Wallach. *Fall semester*  
Reading and discussion combined with independent experimental projects. The student is expected to know the basic facts about human perceptual mechanics, 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 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. Bernheim. *Spring semester*  
The major phenomena of learning and conditioning—taken largely from the animal level—are discussed. An attempt is made to systematize the experi-

mental literature on each topic. The relationship of motivational concepts to learning is discussed and the major theories of learning and some recent mathematical theories are considered. The laboratory acquaints students with problems and methods of experimentation in learning. An opportunity for original research is provided.

103. ABNORMAL PSYCHOLOGY. Mr. Rosenhan. *Spring semester*

Two conceptions of abnormal behavior, the psychoanalytic and the social psychological, are examined, mainly from a developmental point of view. Problems of state and trait, and of cognitive, affective, and behavioral change are considered.

104. INDIVIDUAL IN SOCIETY. Mr. Peabody. *Fall semester*

The relationship between man and his society. Basic processes including the understanding of other persons, theories of cognitive consistency, group influence and conformity, the psychology of language. Applications to political attitudes, group prejudice. The relation of attitudes and personality. The relation of psychology to the social sciences.

105. PERSONALITY. Mr. Levin. *Spring semester*

A scrutiny of attempts to build an objective basis for "understanding the person as a whole." Contrasting theoretical orientations, techniques of observation, and specific problems will be examined. Theoretical orientations: psychoanalysis, factor analysis, learning theory, phenomenology. Observation techniques: interviews, questionnaires, fantasy material. Problems: aggression, need achievement, prediction, psychotherapy, and psychological maturity.

106. DEVELOPMENT. Mr. Levin. *Fall semester*

The development of complex psychological processes in the individual will be studied. Problems of intellectual, linguistic, and social development will be stressed. While the focus will be on the child, relevant studies of other species will also be examined. Observing of preschool children will be required.

107. PSYCHOLINGUISTICS AND COMMUNICATION. Mr. Feldman. *Spring semester*

An intensive study of certain communication processes and of the psychological aspects of human language. Specific topics include: words as motivational signs, the meaning of compounds, non-verbal signs and style as a determinant of perceptual and logical processes. Some individual experimental research is anticipated.

108. MEMORY, THINKING, LANGUAGE.

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.

109. COMPARATIVE AND PHYSIOLOGICAL PSYCHOLOGY. Mr. Thompson.

The genetic, developmental, and physiological determinants of animal behavior. The seminar will explore in detail experimental and field studies of behavior in a few selected animal species. Generalizations derived from the study of animal behavior will be brought to bear on problems in human behavior and behavior pathology.

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 three 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 (see p. 73). 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.

# SOCIOLOGY AND ANTHROPOLOGY

ASSOCIATE PROFESSOR: LEON BRAMSON, *Chairman* †

ASSISTANT PROFESSORS: ASMAROM LEGESSE  
ROBERT C. MITCHELL  
STEVEN PIKER

INSTRUCTORS: VICTOR NOVICK  
JON VAN TIL

Although Sociology and Anthropology arose initially out of divergent historical traditions, they are engaged in a common task. Studies in the Department are directed toward the discovery of the general principles which help to explain the order, meaning, and coherence of human social and cultural life. To that end, work in the Department will emphasize the comparative analysis of societies and social institutions; the structure and functioning of human communities; the principles of social organization and disorganization; and the conditions which tend to foster continuity and change, consensus and conflict. Emphasis will also be laid on the relevance of Sociology and Anthropology to social problems in the modern age, particularly to the question of the nature, conditions and limits of human freedom.

## REQUIREMENTS AND RECOMMENDATIONS

Course 1 is prerequisite to all other work in the Department. Beginning with the class of 1969, Course majors will customarily write a thesis in their senior year. Course majors will take a minimum of eight courses in the Department, including the introductory course and Course 98-99 (thesis). In general, students who take a course may not take the corresponding seminar.

## COURSES

1. INTRODUCTION TO SOCIOLOGY AND ANTHROPOLOGY. *Fall semester*  
Members of the Department.  
An exploration of fundamental factors in human group life and the context of human development in families, communities, castes, classes; folk, peasant and urban societies. Among topics to be studied comparatively are child-rearing, urbanism, social stratification, and cultural change.
22. RACE AND ETHNIC RELATIONS IN THE UNITED STATES. Mr. Van Til.  
Ethnic and minority relations in America, their structure and patterns of change. Particular emphasis will be placed on the American Negro: the development of subcultures, effects of racial discrimination on the individual, and social movements arising out of the acculturation process. The experience of other ethnic groups, the melting-pot thesis, and the persistence of religious subcultures will also be studied.  
Not offered in 1968-69.
23. COMPARATIVE SOCIAL ORGANIZATION. Mr. Novick. *Spring semester*  
Examination of the social, economic, and political systems of primitive hunting-gathering and simple agriculture societies. Effects of environment on demography and complexity of organization. Comparison with primate societies.

† Absent on leave, spring semester, 1968-69.

23A. SELECTED TOPICS IN COMPARATIVE SOCIAL ORGANIZATION.

Mr. Novick, Mr. Rawson, Mr. Thompson. *Half course, spring semester*

Evening film and lecture series on the social organization of various animal species, including man. Films, speakers, readings, and discussions concerning the environmental and structural forces which shape social groups. Designed for students who have had, or are taking concurrently, Sociology-Anthropology 23, Psychology 36, or Zoology 60.

24. SOCIETIES AND CULTURES OF AFRICA. Mr. Legesse. *Spring semester*

A survey of the major traditional institutions of Africa. Special attention will be given to the contributions of African studies to theories of social structure and personality. Representative societies will be discussed in detail, including the Tiv, Nuer, Galla, and Amhara.

25. COMMUNITY STUDIES: LATIN AMERICA. Mr. Novick. *Spring semester*

An examination of ethnographic accounts of rural communities in Latin America, with emphasis on theoretical issues associated with the definition of types of communities. Detailed study of social, economic, and political organization of these communities. Topics will include interpretation of local community organization in a national and international context; social stratification; and the process of change, including directed change and "community development."

26. SOCIETIES AND CULTURES OF SOUTHEAST ASIA. Mr. Piker. *Spring semester*

This course will deal with the cultures of Theravada Southeast Asia (Ceylon, Burma, Thailand, Cambodia, and Laos). Particular emphasis will be given to the development of contemporary social, political, and religious institutions; to the interplay of Indian and Chinese influences in the emergence of modern Southeast Asia; and to the significance of traditional institutions for current trends in that region.

27. SOCIAL CHANGE. Mr. Mitchell. *Fall semester*

Classical and contemporary theories of social change, with case studies. Among topics to be considered: equilibrium and conflict models of society, causes and types of response to change, industrialization and modernization. Particular attention will be given to the modernization process in Africa.

28. CITIES AND SOCIETY. Mr. Van Til. *Spring semester*

The historical growth of cities, the social structure of urban areas, impact of urbanization on social relations, and the emergent ideologies of city life considered from the main perspectives of urban sociology. Topics of special interest include the structure and process of metropolitan life, the consequences of urbanization for rural life and small towns, the prospects for urban planning, and the contemporary crisis of the cities.

29. SOCIOLOGY OF RELIGION. Mr. Mitchell. *Spring semester*

Examination of the relationship between religion and society. Sociological theories of religion, religious organization and behavior, religion and social change, processes of institutionalization and secularization.

50. MODERN SOCIAL THEORY. Mr. Bramson. *Fall semester*

The social and intellectual background of the rise of social science, with consideration of selected social theorists and emphasis on the relation of ideology to theory and research. Among the topics discussed are individualism, progress, elitism, racism, collectivism, and war.

56. SOCIAL PSYCHOLOGY. Mr. Feldman. *Fall semester*  
 An examination of theory and research relevant to the understanding of social interaction from a psychological viewpoint. Special emphasis will be placed on social perception and its distortion, attitude development and change, conformity, the relationship of personality to social interaction, and social motivation.
- 57-8. COLLOQUIUM: CROSS-CULTURAL STUDY OF YOUTH. Mr. Legesse. *Spring semester*  
 An anthropological examination of the structural, cultural, and psychological responses to conflict between generations. Among topics to be discussed are: the functions of initiation ceremonies; the role of youth cultures in social change; age sets, gangs and secret societies in preliterate as well as in urban-industrial societies.
60. METHODS OF SOCIAL RESEARCH. Mr. Mitchell. *Spring semester*  
 An introduction to the empirical study of society. Among topics for study are: the philosophical basis of social inquiry, the design of social research, problems of sampling, measurement, data-collection and interpretation, ethnographic field methods, cross-cultural method, and the role of social research in contemporary society. Students will participate in research projects.
62. POLITICAL SOCIOLOGY. Mr. Gilbert. *Spring semester*  
 The relation of politics to basic social structures, processes and traditions. Study of problems, concepts and theories about politics viewed as human behavior. The specific topics will vary from year to year.  
 To be offered in 1969-70.
63. PSYCHOLOGICAL ANTHROPOLOGY. Mr. Piker. *Fall semester*  
 A study of cultural differences from the standpoint of the socialization process. A comparative analysis of the ways in which patterns of behavior are transmitted through the family and related institutions. An assessment of the significance of this approach for fields of social and cultural anthropology.
66. DIRECTED READING. Members of the Department.  
 Individual or group study in fields of special interest to the students not dealt with in the regular course offerings. Consent of the Chairman and of the instructor is required.
- 67-8. COLLOQUIUM: HUMAN RESOURCES. Mr. Bramson. *Fall semester*  
 A research colloquium emphasizing the study of the intersection of the educational system and the occupational structure. Specific problems will include improvement of the educational system, military manpower policy, the human career, and professionalization. Each member of the colloquium will do a project.
69. THEORIES OF CULTURAL EVOLUTION. Mr. Novick. *Spring semester*  
 The development of types of evolutionary theory in anthropology and its precursors in the 19th and 20th centuries. Attention will be given to the writings of Darwin, Lamarck, Tylor, Morgan, Engels, Spencer, White, Steward, Sahlins, Service, and other evolutionary theorists. Special emphasis will be placed on contemporary theories and research in cultural evolution, and on topics such as the origins of urbanism and of the state.
- 98-99. THESIS. Members of the Department.  
 Theses will be required of all course majors beginning with the class of 1969. Seniors will normally take two consecutive semesters of thesis tutorial (Course 98-99) during their senior year. Students are urged to have their thesis proposals approved as early as possible during the junior year.

## HONORS SEMINARS

102. SOCIAL STRUCTURE. Mr. Legesse. *Fall semester*  
The nature of human social organization. Case materials will be drawn from a variety of culture types and areas. Special emphasis will be given to non-Western social structure and to recent theoretical developments in the analysis of social organization.
103. RACE AND CULTURE. Mr. Van Til. *Spring semester*  
A comparative study of the patterns of ethnic and minority relations in society, with consideration of the factors underlying persistence and change. Race and culture will be related through an examination of conflicts of values, social hierarchies, and the maintenance of subcultures.
104. PSYCHOLOGICAL ANTHROPOLOGY. Mr. Legesse, Mr. Piker. *Spring semester*  
The significance of psychological theories for the analysis of social and cultural systems. Special emphasis will be given to personality and social structure, religious belief systems, and comparative socialization within a variety of cultural settings.
105. MODERN SOCIAL THEORY. Mr. Bramson. *Spring semester*  
The social and intellectual background of the rise of social science, with consideration of selected social theorists and emphasis on the relation of ideology to theory and research in sociology.  
To be offered in 1969-70.
106. CULTURAL ECOLOGY. Mr. Novick. *Fall semester*  
An examination of cultural systems viewed as adaptations to the physical, social, and political environment. Consideration will be given to theoretical issues of cause and explanation in ecological studies; social and cultural adjustments to factors such as nutritional needs, population size and density, and natural resources. Case material will be drawn from the anthropological literature on primary bands, tribal societies, and pastoral nomads.
107. SOCIOLOGY OF RELIGION. Mr. Piker. *Spring semester*  
An exploration of the relationship between religion and society. Special emphasis will be given to the social and historical determinants of changes in religious institutions, and to the adaptive qualities of religious institutions in periods of social upheaval. Case materials will be drawn largely from societies and religions of South and Southeast Asia, principally Hinduism and Buddhism. Work in the seminar will include a research project.
111. URBAN SOCIOLOGY. Mr. Van Til. *Spring semester*  
The historical growth of cities, the social structure of urban areas, impact of urbanization on social relations, and the emergent ideologies of city life considered from the main perspectives of urban sociology. Topics of special interest include the structure and process of metropolitan life, the consequences of urbanization for rural life and small towns, the prospects for urban planning, and the contemporary crisis of the cities.
120. THESIS. Members of the Department.  
Honors students who choose to do so will customarily write theses during the senior year. Students are urged to have thesis proposals approved as early as possible during the junior year.



*Dana and Hollowell Dormitories for Men*

REFERENCE SECTION

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SWARTHMORE  
COLLEGE



SWARTHMORE COLLEGE  
SWARTHMORE, PENNSYLVANIA

Visiting Examiners—1968

**ASTRONOMY:** PROFESSOR SERGE A. KORFF, *New York University*; DR. KAJ AA STRAND, *United States Naval Observatory*.

**BIOLOGY:** DR. JOHN M. FOSTER, *National Science Foundation*; PROFESSOR FREDERICK J. GOTTLIEB, *University of Pittsburgh*; DR. RICHARD L. PENNEY, *New York Zoological Society*; PROFESSOR MICHEL RABINOVITCH, *Rockefeller University*; DR. JOHN A. ROMBERGER, *Forest Service, U.S.D.A.*; PROFESSOR MELVIN SANTER, *Haverford College*.

**CHEMISTRY:** PROFESSOR JAY M. ANDERSON, *Bryn Mawr College*; PROFESSOR HAROLD W. HEINE, *Bucknell University*; PROFESSOR FREDERICK C. STRONG, III, *University of Bridgeport*.

**CLASSICS:** PROFESSOR W. ROBERT CONNOR, *Princeton University*; PROFESSOR JAMES W. HALPORN, *Indiana University*.

**ECONOMICS:** PROFESSOR MORTON S. BARATZ, *Bryn Mawr College*; PROFESSOR RALPH E. BEALS, *Amherst College*; PROFESSOR HOLLAND HUNTER, *Haverford College*; DR. VAN DOORN OOMS, *Yale University*; DR. JOSEPH A. PECHMAN, *The Brookings Institution*.

**ENGINEERING:** PROFESSOR L. PAUL BOLGIANO, *University of Delaware*; PROFESSOR J. S. LEE, *North Carolina State University*; PROFESSOR STEPHEN S. WOLFF, *The Johns Hopkins University*; DR. HSUAN YEH, *University of Pennsylvania*.

**ENGLISH LITERATURE:** PROFESSOR ALVIN B. KERNAN, *Yale University*; PROFESSOR ISABEL MACCAFFREY, *Bryn Mawr College*; PROFESSOR MARK SPILKA, *Brown University*; PROFESSOR HELEN VENDLER, *Boston University*.

**FINE ARTS:** PROFESSOR ROBERT A. KOCH, *Princeton University*; DR. KENNETH D. MATTHEWS, JR., *University Museum, University of Pennsylvania*; PROFESSOR JOHN W. MCCOUBREY, *University of Pennsylvania*; PROFESSOR JAMES E. SNYDER, *Bryn Mawr College*; PROFESSOR A. RICHARD TURNER, *Princeton University*.

**HISTORY:** PROFESSOR JEREMY ADAMS, *Yale University*; PROFESSOR HILARY CONROY, *University of Pennsylvania*; PROFESSOR DAVID DONALD, *The Johns Hopkins University*; PROFESSOR ROBERT FORSTER, *The Johns Hopkins University*; PROFESSOR GRAHAM IRWIN, *Columbia University*; PROFESSOR ALEXANDER RIASANOVSKY, *University of Pennsylvania*; PROFESSOR EUGENE RICE, *Columbia University*; PROFESSOR CAROLINE ROBBINS, *Bryn Mawr College*.

**MATHEMATICS:** PROFESSOR ORHAN ALISBAH, *Rutgers, The State University*; PROFESSOR MURRAY GERSTENHABER, *University of Pennsylvania*; PROFESSOR SAUL GORN, *University of Pennsylvania*.

MODERN LANGUAGES

**FRENCH:** PROFESSOR MICHEL E. GUGGENHEIM, *Bryn Mawr College*; PROFESSOR ARMAND HOOG, *Princeton University*.

**GERMAN:** PROFESSOR THEODORE ZIOLKOWSKI, *Princeton University*.

**RUSSIAN:** PROFESSOR GEORGE GIBIAN, *Cornell University*; PROFESSOR FRANK SEELEY, *University of Pennsylvania*.

**SPANISH:** PROFESSOR JOAQUIN GONZÁLEZ-MUELA, *Bryn Mawr College*.

**MUSIC:** PROFESSOR JAMES HAAR, *University of Pennsylvania*; PROFESSOR DAVID LEWIN, *State University of New York, Stony Brook*.

**PHILOSOPHY:** PROFESSOR NUEL D. BELNAP, JR., *University of Pittsburgh*; PROFESSOR DANIEL BENNETT, *University of Massachusetts*; PROFESSOR RUSSELL M. DANCY, *University of Pittsburgh*; PROFESSOR HOWARD KEE, *Drew University Theological School*; PROFESSOR JOHN MACQUARRIE, *Union Theological Seminary*; PROFESSOR JAMES PRITCHARD, *University of Pennsylvania*; PROFESSOR MURRAY JEROME STOLNITZ, *University of Rochester*.

**PHYSICS:** PROFESSOR STEFAN MACHLUP, *Case Western Reserve University*; PROFESSOR DAVID T. WILKINSON, *Princeton University*.

**POLITICAL SCIENCE:** PROFESSOR PETER BACHRACH, *Bryn Mawr College*; PROFESSOR DANIEL CHEEVER, *Carnegie Endowment for International Peace*; PROFESSOR HOLLAND HUNTER, *Haverford College*; PROFESSOR FRANCIS ROURKE, *The Johns Hopkins University*; PROFESSOR DANKWART RUSTOW, *Columbia University*; PROFESSOR PAUL E. SIGMUND, *Princeton University*.

**PSYCHOLOGY:** DR. KURT BACK, *Rockefeller University*; PROFESSOR BRENDAN MAHER, *Brandeis University*; PROFESSOR HAROLD G. MCCURDY, *University of North Carolina at Chapel Hill*; DR. EDITH NEIMARK, *Douglass College, Rutgers, The State University*; PROFESSOR PAUL ROZIN, *University of Pennsylvania*; PROFESSOR CARL B. ZUCKERMAN, *Brooklyn College*.

**SOCIOLOGY AND ANTHROPOLOGY:** PROFESSOR FRANCIS L. K. HSU, *Northwestern University*; PROFESSOR THOMAS KIRSCH, *Princeton University*; PROFESSOR PETER H. ROSSI, *The Johns Hopkins University*; PROFESSOR KURT H. WOLFF, *Brandeis University*; PROFESSOR J. MILTON YINGER, *Oberlin College*.

## DEGREES CONFERRED

June 10, 1968

BACHELOR OF ARTS

*In the Division of the Humanities*

EMILY ELIZABETH ALBRINK (Philosophy)	KATHERINE SPENCER LARNER (History)
MICHAEL CHARLES ALEXANDER (History)	PATRICIA LAYNE (English Literature)
FLORENCE DALY BATTIS (Greek)	LUCY JEAN ANN LEU (French)
EDWIN ALLEN BATTLE (English Literature)	JOAN ELIZABETH FOLEY LEWIS * (Fine Arts)
FRANCES RUTH BATZER (Fine Arts)	LORRAINE CAROL LIDOFF (Religion)
NANCY WINSHIP BENNETT (Fine Arts)	JULIAN M. LOPEZ-MORILLAS (English Literature)
ALFRED G. BRAUCH (Philosophy)	LISE LUBORSKY (Latin)
EMILY FLORENCE BROWER (Fine Arts)	KATHY JEAN MACLEOD (English Literature)
MELISSA ANN CANNON (English Literature)	JEAN CELIA MARANISS (Russian)
JEFFREY BURNHAM CARTER (English Literature)	JOHN F. MCDIARMID (History)
CAROLINE JEAN CIANCUTTI (English Literature)	PETER JACOB MEYER (History)
DAVID M. COHEN (English Literature)	LENORE MILLER (Fine Arts)
COLIN ALDER CONNERY * (Religion)	SANDRA ELIZABETH MILLER (French)
LINDA BERGLING CREASEY (English Literature)	ELEANOR LINCOLN MORSE (English Literature)
ROBIN DARR (Fine Arts)	MARTHA WILLIAMS MUNDY (Greek)
KAREN VIRGINIA DAVIS (Fine Arts)	BARBARA PATTERSON NEVLYN (Religion)
JONATHAN STEWART DEWALD (History)	MARGARET ELAINE NEWCOMB (Fine Arts)
NANCY LOUISE EICHHORN (English Literature)	LEONARD H. ORR (Philosophy)
NORMA ELIAS (English Literature)	NANCY MARION PEPPER (English Literature)
BARRY FELDMAN (Fine Arts)	JAMES MYRON PERRY (English Literature)
RICHARD GODDARD FIGIEL (English Literature)	ROBERT EMIL POLLOCK (Music)
DONNA ELAINE FISCHER (English Literature)	PAUL R. PRINZHORN (Philosophy)
BARBARA S. GARD (Philosophy)	FRANCES KATHERINE RACINE (Greek)
SUSAN MONTEITH GIBSON (English Literature)	BARBARA RICKARDS (Fine Arts)
GEORGE E. GILL (History)	ROBERT PHILIP ROBERTSON (French)
GLENNA ELIZABETH GIVEANS (Spanish)	ROBERT CHARLES ROPER (History)
KENNETH KELLS GUILMARTIN (English Literature)	DIANA ROYCE (English Literature)
KATHLEEN HALL (English Literature)	SUSAN JO RUSSELL (English Literature)
MARTHA OLIPHANT HASTINGS (Latin)	LUCY ELISABETH SCHNEIDER (English Literature)
TERESA HEALY (English Literature)	CAROL SHLOSS (English Literature)
PAUL JAN HORSTING (English Literature)	MARY MELINDA SOLBERG (History)
SARAH BRONWYN HURD (Latin)	SARAH INGLEHART STEEVER (Fine Arts)
CAROLYN ALICE JONES (Greek)	SUSAN GELLETLY STEINBROOK (Music)
DORINE KEITH (History)	MARIA GIZELLA L. SZILAGYI (Fine Arts)
EMILY RUTH KLENIN (Russian)	BARBARA LYNN THEIM (Religion)
	PAUL R. THIM (English Literature)
	APRIL ANE WALL * (French)

\* As of the Class of 1967.

JAMES HERMAN WATERS (Psychology)	THOMAS WOLF (History)
JANET MARGARET WEISS (English Literature)	ANITA H. WYZANSKI * (Fine Arts)
	EDITH T. YOUNG (Religion)

*In the Division of the Social Sciences*

WALTER LUIZ ADAMSON (Political Science)	JAY ROSS KAPLAN (Economics)
STEPHEN L. ALLOY (History)	CHRISTOPHER LOWELL KING (Sociology-Anthropology)
SUSAN WHITIN ALMY (Sociology-Anthropology)	HAROLD JOSEPH KWALWASSER (Political Science)
RICHARD TAYLOR ANDREWS, III (Political Science)	T. KERMIT LARSEN (Psychology)
J. STANNARD BAKER (History)	PAUL LEAVIN (Political Science)
ROBERT EDWARD BARTKUS (Economics)	SUSAN DWORKIN LEVERING (Sociology-Anthropology)
JULIE ANDREA BIDDLE (Psychology)	RONA LIEBERMAN (Psychology)
ERIC STOWELL BLUMBERG (Sociology-Anthropology)	ROBERT RUSSELL MACLEOD, JR. (Economics)
DANIEL RAY BOTSFORD, JR. (Political Science)	RAY PRATT MCCLAIN (History)
MARY IMOGEN BOWERS (Psychology)	DAPHNE JEAN McDONNELL (Sociology-Anthropology)
DELMER REN BROWN (History)	SANDRA MARTIN McLANAHAN (Sociology-Anthropology)
FRANK IRA BROWN (Political Science)	NANINE MEIKLEJOHN (History)
KATHERINE CONNER (Sociology-Anthropology)	FRED HUGGETT MONTGOMERY (Economics)
PAUL COURANT (History)	ROBERT FORDER NAGEL (Political Science)
ALBERT JAMES DAVIS (Economics)	WILLIAM E. PETERSON (Economics)
RONALD J DIAMOND (Psychology)	WAYNE KIEF PATTERSON (History)
WILLIAM HENRY LANIER DORSEY (Sociology-Anthropology)	JANE S. PRICHARD (Sociology-Anthropology)
MAURÉEN J. DURHAM (Psychology & Sociology-Anthropology)	JOHN DAVID REED, JR. (History)
WILLIAM J. EDGAR (History)	BRUCE WILLIAM REEDY (Political Science)
LYNN MORGAN ETHEREDGE (Economics)	ANTHONY ROBERTI (History)
DANIEL FULTON EUBANK (Economics)	BRUCE LINDSLEY ROCKWOOD (History)
PETER HOWLAND FRASER (History)	KIRK BURNS ROOSE (Philosophy)
CHARLES AUGUSTUS FLOTO (Philosophy)	ALTA RENEE MARGULIS ROSS (Political Science-International Relations)
JOYCE YVONNE FRISBY (Mathematics)	WILLIAM DAVID RUBINSTEIN (History)
CARL FREDERICK GOODWIN (History)	SAMUEL SYLVESTER SHEPHERD, JR. (Sociology-Anthropology)
PETER W. GUTTERMAN (History)	NEAL PHILIP SHERMAN (Political Science)
JOSEPH HENRY HAFKENSCHIEL, III (Economics)	DAVID W. SINGLETON (Sociology-Anthropology)
MICHAEL DAVID HALPERN (Political Science)	MARK STEPHEN SMITH (Mathematics)
HARRIET ANN HEISLER (Sociology-Anthropology)	SUSAN LOUISE SMITH (History)
SARAH ELIZABETH HOLLISTER (Sociology-Anthropology)	MARC JAY SONNENFELD (Economics)
ROBERT MYRWANG HOLUM (Economics)	JONATHAN EDWARD SUMMERTON (Economics)
WENDY JEAN HYATT (Sociology-Anthropology)	JOYA KIKUE TANAKA (Political Science)
JOAN BAILEY INGRAM (Economics)	RALPH JEFFREY TEUTSCH (Mathematics)
JANE JEWELL (Political Science)	BRUCE CAMPBELL TIFT (Sociology-Anthropology)
MEREDITH JOCELYN JONES (Economics)	

\* As of the Class of 1967.

MARGARET CARLIE UPDIKE  
(Psychology)  
CORINNE COLES WEBSTER  
(Psychology)

ROBERTA REVELEY WELTE  
(Psychology)  
JOSEPH DURANT COOPER WILSON, III  
(Economics)

*In the Division of the Natural Sciences*

DIANE BRETT ALEXANDER  
(Mathematics)  
ANDREA LYNN ALLEN  
(Biology)  
VYTENIS BABRAUSKAS  
(Physics)  
MARY LEE BANNISTER  
(Biology)  
CRAIG JOHN BENHAM  
(Mathematics)  
MARSHA A. MCAFEE BERA  
(Mathematics)  
AGNES MARY BREZAK  
(Zoology)  
ROBERT RANDALL CADMUS, JR.  
(Physics)  
WILLIAM JOSEPH COMBI  
(Psychology)  
ALMA DOMJAN  
(Chemistry)  
ELLIS FREDERICK FEINSTEIN  
(Mathematics)  
ARTHUR JABLOW FINK  
(Physics)  
WILLIAM FRANKLIN FINZER, JR.  
(Physics)  
JENNIFER JEAN HAINES  
(Zoology)  
DAVID FRANK HASTINGS  
(Zoology)  
TIMOTHY KEITH-LUCAS  
(Psychology)  
DAVID SOUNG KIM  
(Zoology)  
LEO MARX LEVA  
(Zoology)  
LEWIS M. LUTTON  
(Zoology)  
JOHN CROMWELL MATHER  
(Physics)  
RICHARD ROSS MCCURDY  
(Mathematics)  
JEAN MCLAUGHLIN  
(Zoology)

JOHN DOUGLAS MELBOURNE  
(Zoology)  
CHRISTOPHER MILLER  
(Physics)  
GEOFFREY SETA MWAUNGULU  
(Zoology)  
ROBERT HOWARD POLLACK  
(Biology)  
JOSEPH GRIFFIN ROSENBAUM  
(Mathematics)  
LEE A. SANDERS  
(Chemistry)  
JORGE LOUIS SARMIENTO  
(Chemistry)  
JOHN OTTO SCHAIRER  
(Physics)  
CRAIG ANDREW SCHRAUF  
(Chemistry)  
JOHN JOSEPH SEIDENFELD  
(Chemistry)  
KENNETH MARC SHELL  
(Chemistry)  
LAWRENCE JAMES SMITH  
(Physics)  
WILLIAM HENRY STANTON  
(Psychology)  
ROBERT BOWEN SUTER  
(Zoology)  
DAVID ERNEST SWANSON  
(Physics)  
CAROL JEAN MCKNIGHT TALMAGE  
(Psychology)  
PATRICIA LYNN TOLINS  
(Zoology)  
JEAN LOUISE WARREN  
(Physics)  
EILEEN JOYCE WHALEN  
(Chemistry)  
FARIS WORTHINGTON  
(Mathematics)  
CHITRA YANG  
(Biology)

BACHELOR OF SCIENCE

*In the Division of Engineering*

SAMUEL AMOS BRACKEEN, III  
(Civil Engineering)  
CARLOS CHUCUYAN GUERRA  
(Mechanical Engineering)  
BRUCE JAMESON CONNOR  
(Civil Engineering)  
HUGH DEXTER FARLEY, JR.  
(Mechanical Engineering)  
RICHARD LANE GREGOR  
(Mechanical Engineering)  
ROGER HILLSON  
(Electrical Engineering)  
ROBERT HOE, VI  
(Mechanical Engineering)

VALENTINE JAMES MILLER  
(Mechanical Engineering)  
JOHN THOMAS OLDENBURG  
(Electrical Engineering)  
WILBUR GUY STREAMS  
(Mechanical Engineering)  
JOHN VAN NESTE TALMAGE, III  
(Mechanical Engineering)  
JOHN WINFIELD WEISEL  
(Electrical Engineering)  
GARY S. YABLICK  
(Electrical Engineering)  
WILLIAM E. ZIMMER  
(Mechanical Engineering)

MASTER OF ARTS

JESUS FRANCISCO VILLAMEDIANA RINCON

Astronomy

HONORARY DEGREES

DOCTOR OF LAWS  
DOCTOR OF LAWS  
DOCTOR OF LAWS  
DOCTOR OF LAWS  
DOCTOR OF LAWS

JOHN KING FAIRBANK  
ALBERT BRANSON MARIS  
HOWARD CHARLES PETERSEN  
WILLIAM COURTNEY HAMILTON PRENTICE  
LEON HOWARD SULLIVAN



# AWARDS AND DISTINCTIONS

June 10, 1968

## HONORS AWARDED BY THE VISITING EXAMINERS

### HONORS:

Michael Charles Alexander, Susan Whitin Almy, Robert Edward Bartkus, Nancy Winship Bennett, Frank Ira Brown, Jeffrey Burnham Carter, Katherine Conner, Albert James Davis, Ronald J Diamond, Alma Domjan, Nancy Louise Eichhorn, Daniel Fulton Eubank, Ellis Frederick Feinstein, Arthur Jablow Fink, Michael David Halpern, Ray Pratt McClain, Daphne Jean McDonnell, Lenore Miller, John Thomas Oldenburg, Leonard H. Orr, Nancy Marion Pepper, Jane S. Prichard, Bruce Lindsley Rockwood, Diana Royce, William David Rubinstein, Susan Jo Russell, John Otto Schairer, Samuel Sylvester Shepherd, Jr., Susan Louise Smith, Marc Jay Sonnenfeld, Susan Gelletly Steinbrook, David Ernest Swanson, Bruce Campbell Tift, Margaret Carlie Updike, Gary S. Yablick.

### HIGH HONORS:

Walter Luiz Adamson, Craig John Benham, Melissa Ann Cannon, Paul Courant, Jonathan Stewart Dewald, William J. Edgar, Lynn Morgan Etheredge, William Franklin Finzer, Jr., Jennifer Jean Haines, Carolyn Alice Jones, Emily Ruth Klenin, Harold Joseph Kwalwasser, Leo Marx Leva, Jean Celia Maraniss, Sandra Martin McLanahan, Robert Forder Nagel, Frances Katherine Racine, Robert Charles Roper, Lucy Elisabeth Schneider, Craig Andrew Schrauf, Neal Philip Sherman.

### HIGHEST HONORS:

John Cromwell Mather, John F. McDiarmid, Mark Stephen Smith.

## DISTINCTION IN COURSE AWARDED BY THE FACULTY

Diane Brett Alexander, Florence Daly Battis, Agnes Mary Brezak, Karen Virginia Davis, Susan Monteith Gibson, Glenna Elizabeth Giveans, Joan Bailey Ingram, Lucy Jean Ann Leu, Lise Luborsky, Kathy Jean MacLeod, Valentine James Miller, Eleanor Lincoln Morse, Martha Williams Mundy, Lee A. Sanders, Carol Shloss, Janet Margaret Weiss, Roberta Reveley Welte.

## ELECTIONS TO HONORARY SOCIETIES

### PHI BETA KAPPA:

Walter Luiz Adamson, Diane Brett Alexander, Michael Charles Alexander, Florence Daly Battis, Agnes Mary Brezak, Melissa Ann Cannon, Katherine Conner, Jonathan Stewart Dewald, William J. Edgar, William Franklin Finzer, Jr., Glenna Elizabeth Giveans, Jennifer Jean Haines, Joan Bailey Ingram, Carolyn Alice Jones, Emily Ruth Klenin, Harold Joseph Kwalwasser, Lucy Jean Ann Leu, Jean Celia Maraniss, John Cromwell Mather, Ray Pratt McClain, John F. McDiarmid, Daphne Jean McDonnell, Martha Williams Mundy, Robert Forder Nagel, Nancy Marion Pepper, Robert Charles Roper, Lee A. Sanders, Lucy Elisabeth Schneider, Neal Philip Sherman, Mark Stephen Smith, Janet Margaret Weiss.

### SIGMA XI:

Diane Brett Alexander, Mary Lee Bannister, Agnes Mary Brezak, Robert Randall Cadmus, Jr., Alma Domjan, Arthur Jablow Fink, William Franklin

Finzer, Jr., David Frank Hastings, John Cromwell Mather, Christopher Miller, Valentine James Miller, Geoffrey Seta Mwaungulu, John Thomas Oldenburg, Lee A. Sanders, John Otto Schairer, Mark Stephen Smith, Robert Bowen Suter, David Ernest Swanson, Jesus Francisco Villamediana, Jean Louise Warren.

SIGMA TAU:

Robert Hoe, VI, Valentine James Miller, John Thomas Oldenburg, John Winfield Weisel, Gary S. Yablick.

SWARTHMORE COLLEGE FELLOWSHIP AWARDS

*The Hannah A. Leedom Fellowship to* AGNES MARY BREZAK.  
*The Joshua Lippincott Fellowship to* MARTHA WILLIAMS MUNDY.  
*The John Lockwood Memorial Fellowship to* NANCY WINSHIP BENNETT.  
*The Lucretia Mott Fellowship to* LUCY ELISABETH SCHNEIDER.  
*The Martha E. Tyson Fellowship to* JENNIFER JEAN HAINES.

SPECIAL AWARDS

*The Ivy Award to* RAY P. MCCLAIN.  
*The Oak Leaf Award to* DIANA ROYCE.  
*The McCabe Engineering Award to* VALENTINE JAMES MILLER.  
*The Sarah Kaighn Cooper Scholarship to* MICHAEL S. SCHUDSON.  
*The John Russell Hayes Poetry Prizes:* first prize, DONALD E. MITCHELL; second prize, PAUL J. DIMAGGIO.  
*The Lois Morrell Poetry Award:* LEONARD H. ORR.  
*The William Plumer Potter Public Speaking Fund Awards:*  
The Potter One-Act Play Contest: prizes awarded to PAUL LEAVIN, LUCY E. SCHNEIDER, and MARC S. WALTER.  
The Potter Short Story Contest: prizes awarded to RICHARD G. FIGIEL, LEONARD H. ORR, and MICHAEL S. SCHUDSON.  
The Potter Poetry Reading Contest: first prize, GARTH S. MACDONALD; second prize, SUSAN L. FOSTER; third prize, R. PHILIP ROBERTSON.  
*The Brand Blanshard Prize to* CHARLES A. FLOTO.  
*The Phi Beta Kappa Prize to* NANCY Y. BEKAVAC.  
*The Scott Award to* WALTER C. BOND.

## Enrollment of Students by Classes—1967-68

	<i>Men</i>	<i>Women</i>	<i>Total</i>
Seniors .....	124	83	207
Juniors .....	134	113	247
Sophomores .....	157	120	277
Freshmen .....	155	125	280
<hr/>			
Total undergraduates ..	570	441	1,011
Special Students .....	4	5	9
Graduate Students .....	3	1	4
<hr/>			
Totals .....	577	447	1,024

## Geographical Distribution—1967-68

Pennsylvania .....	200	Mississippi .....	1
New York .....	181	North Dakota .....	1
New Jersey .....	85	Utah .....	1
California .....	53	Wyoming .....	1
Connecticut .....	42	Canal Zone .....	1
Massachusetts .....	41	Virgin Islands .....	1
Maryland .....	39	<hr/>	
Ohio .....	33	Total U.S.A. ....	972
Virginia .....	30	Canada .....	8
Illinois .....	26	Japan .....	5
Delaware .....	24	Greece .....	4
District of Columbia .....	20	Colombia .....	3
Michigan .....	17	Germany .....	3
North Carolina .....	14	England .....	2
Texas .....	14	India .....	2
Colorado .....	13	Nicaragua .....	2
Minnesota .....	12	Peru .....	2
Washington .....	12	Afghanistan .....	1
Florida .....	10	Algeria .....	1
Indiana .....	9	Belgium .....	1
Maine .....	8	Brazil .....	1
Missouri .....	8	Chile .....	1
Vermont .....	8	Ecuador .....	1
Wisconsin .....	8	France .....	1
Iowa .....	7	Ghana .....	1
Tennessee .....	6	Guatemala .....	1
South Carolina .....	5	Italy .....	1
Hawaii .....	4	Malawi .....	1
New Hampshire .....	4	Mexico .....	1
New Mexico .....	4	Netherlands .....	1
Oregon .....	4	Panama .....	1
West Virginia .....	4	Portugal .....	1
Georgia .....	3	Rhodesia .....	1
Kentucky .....	3	Seychelles .....	1
Nebraska .....	3	Spain .....	1
Alabama .....	2	Switzerland .....	1
Arizona .....	2	Taiwan .....	1
Kansas .....	2	Venezuela .....	1
Oklahoma .....	2	<hr/>	
Rhode Island .....	2	Total from abroad .....	52
Alaska .....	1	Grand Total .....	1,024
Louisiana .....	1		

## Index

- Absence from Classes and Collection, 70  
Absence from Examinations, 71  
Academic Requirements, Committee on, 22, 71  
Addams, Jane, Peace Collection (See Swarthmore College Peace Collection)  
Administrative Officers, 24-28  
ADMISSIONS PROCEDURE, 32-35  
    Application Dates, 33, 34  
    Scholastic Aptitude and Achievement Tests, 33-34  
    School Subjects Recommended, 33  
Advanced Degrees, 73-74  
Advanced Placement, 35  
Advanced Standing, 35  
Advisers, 55-56  
Alumni Association, Officers of, 11  
Alumni Council, 11  
Alumni Office, 27, 55  
Arthur Hoyt Scott Horticultural Foundation, 50-51  
Art History, 80-82  
Art, Studio, 83  
Arts Center, 51  
Astronomical Observatory, 48, 84  
Astronomy, Courses in, 84-85  
Athletic Fields, see Map, 196  
Attendance at Classes and Collection, 70  
Automobiles, Regulations concerning, 56  
Awards and Prizes, 74-76, 190-191
- Bachelor of Arts Degree, 72  
Bachelor of Science Degree, 72  
Barnard Music Fund, 52  
Bartol Research Foundation, 48  
Benjamin West House, 51, 196  
Benjamin West Lecture, 51  
Biology, Courses in, 86-91  
Board of Managers, Committees of, 9, 10  
Board of Managers, Members, of, 8, 9  
Botany, Courses in, 88-89  
Buildings, see Map, 196
- Calendar, College, 5-6  
Chemistry, Courses in, 92-95  
Churches, 54  
Classics, Courses in, 96-100  
Collection Attendance, Regulation concerning, 54, 70  
College Entrance Examinations, 33-34  
College Jobs, 47  
Committees of the Board of Managers, 9, 10  
Committees of the Faculty, 22-23  
Comprehensive Examination, 63, 72  
Computer Center, 51  
Cooper (William J.) Foundation, 49-50  
Cooperation with Neighboring Institutions, 68  
Corporation, Officers of, 8  
Course Advisers, 55, 63  
Courses of Instruction, 79-182  
Curriculum, 62ff  
Cutting (Bronson M.) Collection, 51
- Degrees Offered, 72-74  
Degrees Conferred, 186-189  
Dining Hall, 53  
Directions for Correspondence, 2  
Directions for Reaching the College, 34  
Distinction in course, 65  
Divisions and Departments, 23  
Dormitories, 53  
Dramatics, 59
- duPont (Pierre S.) Science Building, 48  
Economics, Courses in, 101-103  
Education, Courses in, 172, 176  
Educational Program, 62ff  
Emeritus Professors, 13  
Engineering, Courses in, 104-116  
Engineering, Degrees in, 63, 72-74, 104  
English Literature, Courses in, 117-121  
Entrance Requirements, 32-35  
Examination Regulations, 71-72  
Examinations, College Board, 33-34  
Exclusion from College, 72  
Expenses, 36  
Extra-Curricular Activities, 58
- Faculty, Members of, 13-21  
Faculty Regulations, 56, 70-72  
Fees (Tuition, Residence, etc.), 36, 73  
Fellowships, 76-77  
Financial Aid, 37  
Fine Arts, see Art History  
Foreign Language Requirements, 63-64  
Foreign Students, 192  
Foreign Study, 68-69  
Fraternities, 60  
French, Courses in, 136-139  
Friends Historical Library, 25, 48  
Friends Meeting, 54
- Geographical Distribution of Students, 192

## Index

- German Language and Literature, Courses in, 139-142
- Grades, 70
- Graduate Study, 73-74
- Graduation, Requirements for, 72
- Greek Language and Literature, Courses in, 96
- Health, Care of Students, 54-55
- History, Courses in, 122-126
- Honors, Reading for, 65-67
- Honors Examiners, 184-185
- Housing, 53
- Insurance, 53
- Insurance, Accident and Sickness, 37, 55
- International Relations, Courses in, 127, 166
- Language Laboratory, 51
- Latin Language and Literature, Courses in, 97-98
- Libraries, 25, 48
- Linguistics, 136
- Loans to Students, 46
- Managers, Board of, 8, 9
- Map of College Grounds, 195
- Martin Biological Laboratory, 48
- Mathematics, Courses in, 128-132
- McCabe Library, 48
- Meeting House, 54, 196
- Men's Student Government, 57
- Music, Courses in, 146-149
- National Scholarships, 38
- News Office, 55
- Objectives and Purposes, 30
- Observatory, Astronomical, 48, 84
- Overstreet Fund, 52
- Philosophy, Courses in, 150-157
- Physical Education for Men, 158-159
- Physical Education for Women, 160-161
- Physical Education Requirements, 72, 158-161
- Physics, Courses in, 162-165
- Plan of College Grounds, 196
- Poetry workshop, 120
- Political Science, Courses in, 166-171
- Potter Collection of Recorded Literature, 51
- Pre-Medical Program, 67
- Prizes, 74-75, 191
- PROGRAM OF STUDY, 62-67
- For Freshmen and Sophomores, 63-64
- For Juniors and Seniors, 64-67
- Honors Work, 65-67
- Pre-Medical Program, 67
- Psychology, Courses in, 172-178
- Public Speaking Prizes, 75, 191
- Religion, Courses in, 153-157
- Religious Life, 52
- Requirements for Admission, 32-34
- Requirements for Graduation, 72
- Residence, Regulations concerning, 53
- Rhodes Scholarship Trust, 2
- Russian, Courses in, 142-143
- Scholarships, 37-46
- Scholastic Aptitude Test, 33-34
- Scott (Arthur Hoyt) Horticultural Foundation, 50
- Sharples Dining Hall, 53
- Social Committee, 58
- Sociology and Anthropology, 179-182
- Spanish, Courses in, 144-145
- Spock (Betty Dougherty) Memorial Fund, 52
- Sproul Observatory, 48, 84
- States, Summary of Students by, 192
- Student Activities Bulletin, 60
- Student Council, 57
- Student Employment, 47
- Studio Arts, 83
- Study Abroad, 68-69
- Summer School Work, 72
- Swarthmore College Peace Collection, 25, 48
- Tarble Social Center, 57
- Theater Workshop, 120
- Transfer, Application for, 35
- Tuition and Other Fees, 36
- Vocational Advising, 55
- West, Benjamin, Lecture, 51
- Women's Student Government Association, 58
- Worth Health Center, 54
- Zoology, Courses in, 89-91



# Swarthmore College Grounds

## Key to the Map

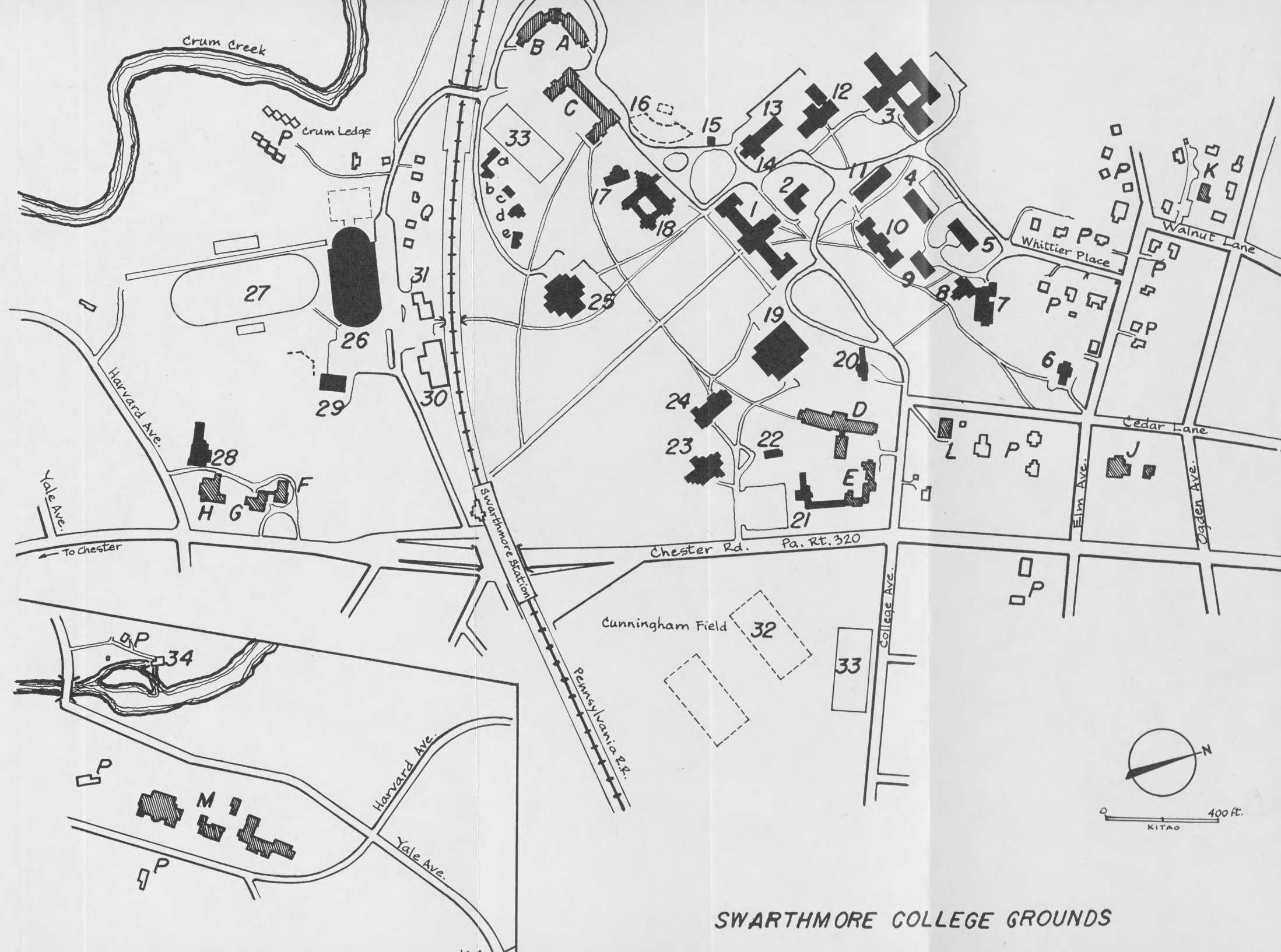
- |  |                             |
|--|-----------------------------|
| 1 Parrish Hall                           | 21 Bond Memorial and Lodges |
| 2 Parrish Hall Annex                     | 22 Benjamin West House      |
| 3 DuPont Science Building                | 23 Worth Health Center      |
| 4 Hicks Hall                             | 24 Tarble Social Center     |
| 5 Bartol Foundation                      | 25 Sharples Dining Hall     |
| 6 President's House                      | 26 Lamb-Miller Field House  |
| 7 Whittier House                         | 27 Clothier Fields          |
| 8 Friends Meeting House                  | 28 Prep Gymnasium           |
| 9 Student Arts Center                    | 29 Barn                     |
| Pearson Theatre                          | 30 Service Building         |
| Wilcox Gallery                           | 31 Heating Plant            |
| 10 Trotter Hall                          | 32 Hockey Fields            |
| 11 Beardsley Hall                        | 33 Tennis Courts            |
| 12 Martin Building and Animal Laboratory | 34 Hydraulic Laboratory     |
| 13 Sharples Pool                         |                             |
| 14 Hall Gymnasium                        |                             |
| 15 Scott Foundation Building             |                             |
| 16 Scott Outdoor Auditorium              |                             |
| 17 Sproul Observatory                    |                             |
| 18 Clothier Memorial                     |                             |
| 19 McCabe Library                        |                             |
| 20 Students Observatory                  |                             |

## Dormitories

- A Dana Dormitory
- B Hallowell Dormitory
- C Wharton Hall
- D Willets Dormitory
- E Worth Dormitory
- F Palmer Hall
- G Pittenger Hall
- H Roberts Hall
- J Ashton House
- K Woolman House
- L Robinson House
- M Mary Lyon Buildings
- P Professors' Residences
- Q Employees' Houses

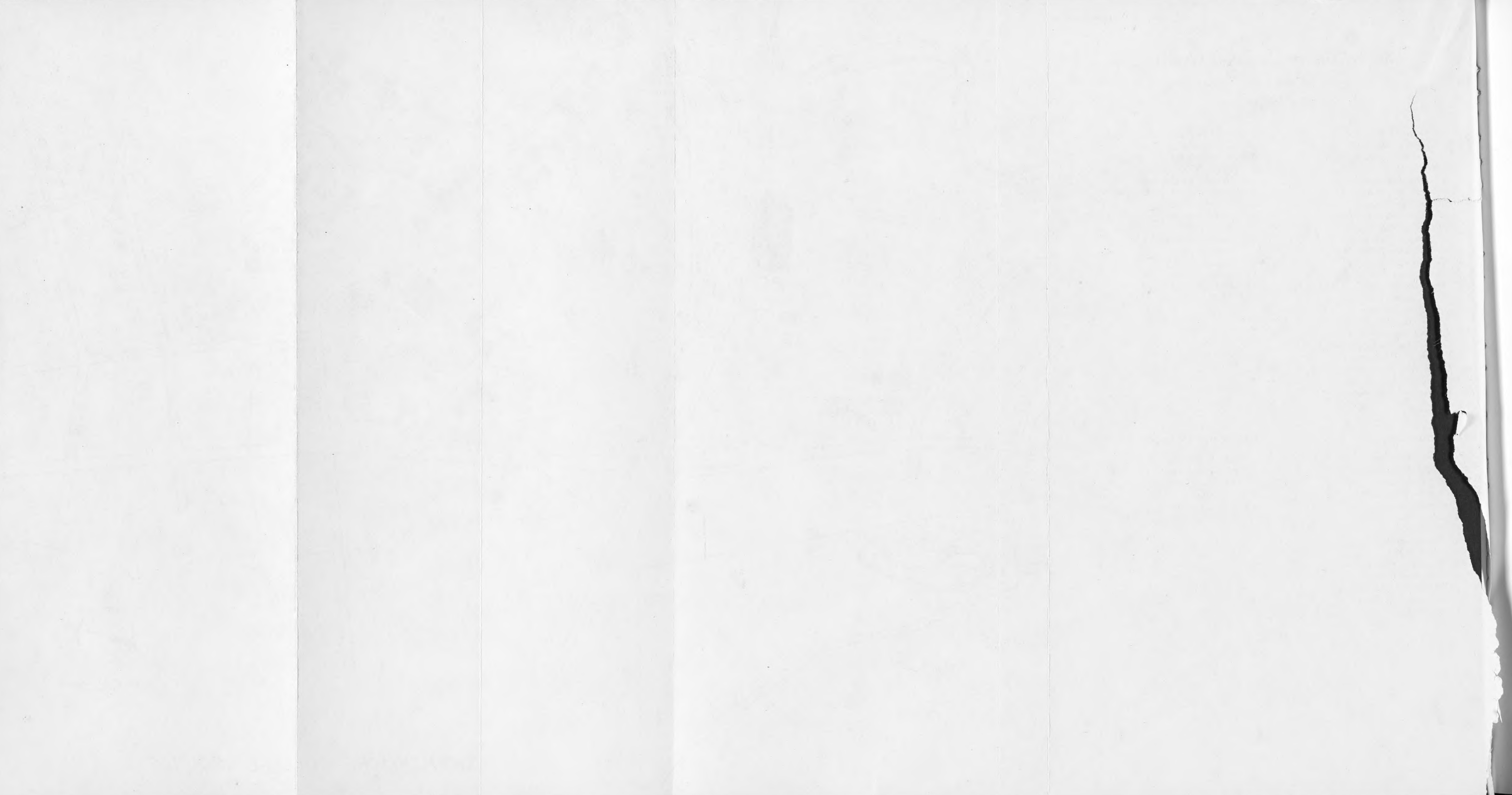
## Fraternity Lodges

- a Kappa Sigma Pi
- b Tau Alpha Omicron
- c Phi Sigma Kappa
- d Delta Upsilon
- e Phi Omicron Psi



SWARTHMORE COLLEGE GROUNDS







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