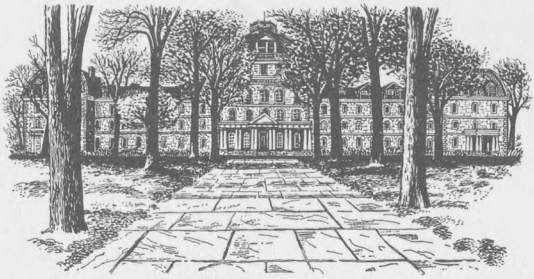
CATALOGUE ISSUE 1966-1967

SWARTHMORE COLLEGE BULLETIN



SWARTHMORE, PENNSYLVANIA

The BULLETIN, of which this publication is Volume LXIV, No. 1, is published twice in March and then monthly except February, June, August, and November by Swarthmore College, Swarthmore, Pennsylvania 19081.

Second Class postage paid at Swarthmore, Pennsylvania 19081.

Photographs by Walter Holt, James Purring, Leif Skoogfors, and Robert B. Cohen, '65.

(Printed in U. S. A.)

SWARTHMORE COLLEGE BULLETIN

CATALOGUE ISSUE ■ 1966-1967

SWARTHMORE, PENNSYLVANIA
19081

Volume LXIV ■ Number 1 ■ September 1966

DIRECTIONS FOR CORRESPONDENCE

For Information About:

GENERAL COLLEGE POLICY

Courtney Smith, *President*

ADMISSIONS AND SCHOLARSHIPS

Frederick A. Hargadon, *Dean of Admissions*

RECORDS, TRANSCRIPTS AND CATALOGUES

John M. Moore, *Registrar*

FINANCIAL INFORMATION

Edward K. Cratsley, *Vice-President*
G. Caroline Shero, *Associate Controller*

VOCATIONAL PLACEMENT AND GUIDANCE

Virginia Bullitt, *Director*

ALUMNI AFFAIRS AND PUBLIC RELATIONS

Joseph B. Shane, *Vice-President*

GENERAL INFORMATION

Maralyn Orbison Gillespie, *Director of News Office*

The Rhodes Scholarship Trust

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

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

TABLE OF CONTENTS

1966

OCTOBER

S	M	T	W	T	F	S
						1
2	3	4	5	6	7	8
9	10	11	12	13	14	15
16	17	18	19	20	21	22
23	24	25	26	27	28	29
30	31					

NOVEMBER

S	M	T	W	T	F	S
		1	2	3	4	5
6	7	8	9	10	11	12
13	14	15	16	17	18	19
20	21	22	23	24	25	26
27	28	29	30			

DECEMBER

S	M	T	W	T	F	S
				1	2	3
4	5	6	7	8	9	10
11	12	13	14	15	16	17
18	19	20	21	22	23	24
25	26	27	28	29	30	31

1967

JANUARY

S	M	T	W	T	F	S
1	2	3	4	5	6	7
8	9	10	11	12	13	14
15	16	17	18	19	20	21
22	23	24	25	26	27	28
29	30	31				

FEBRUARY

S	M	T	W	T	F	S
			1	2	3	4
5	6	7	8	9	10	11
12	13	14	15	16	17	18
19	20	21	22	23	24	25
26	27	28				

MARCH

S	M	T	W	T	F	S
			1	2	3	4
5	6	7	8	9	10	11
12	13	14	15	16	17	18
19	20	21	22	23	24	25
26	27	28	29	30	31	

APRIL

S	M	T	W	T	F	S
						1
2	3	4	5	6	7	8
9	10	11	12	13	14	15
16	17	18	19	20	21	22
23	24	25	26	27	28	29
30						

MAY

S	M	T	W	T	F	S
	1	2	3	4	5	6
7	8	9	10	11	12	13
14	15	16	17	18	19	20
21	22	23	24	25	26	27
28	29	30	31			

JUNE

S	M	T	W	T	F	S
				1	2	3
4	5	6	7	8	9	10
11	12	13	14	15	16	17
18	19	20	21	22	23	24
25	26	27	28	29	30	

JULY

S	M	T	W	T	F	S
						1
2	3	4	5	6	7	8
9	10	11	12	13	14	15
16	17	18	19	20	21	22
23	24	25	26	27	28	29
30	31					

AUGUST

S	M	T	W	T	F	S
		1	2	3	4	5
6	7	8	9	10	11	12
13	14	15	16	17	18	19
20	21	22	23	24	25	26
27	28	29	30	31		

SEPTEMBER

S	M	T	W	T	F	S
					1	2
3	4	5	6	7	8	9
10	11	12	13	14	15	16
17	18	19	20	21	22	23
24	25	26	27	28	29	30

OCTOBER

S	M	T	W	T	F	S
1	2	3	4	5	6	7
8	9	10	11	12	13	14
15	16	17	18	19	20	21
22	23	24	25	26	27	28
29	30	31				

NOVEMBER

S	M	T	W	T	F	S
			1	2	3	4
5	6	7	8	9	10	11
12	13	14	15	16	17	18
19	20	21	22	23	24	25
26	27	28	29	30		

DECEMBER

S	M	T	W	T	F	S
					1	2
3	4	5	6	7	8	9
10	11	12	13	14	15	16
17	18	19	20	21	22	23
24	25	26	27	28	29	30
31						

1968

JANUARY

S	M	T	W	T	F	S
	1	2	3	4	5	6
7	8	9	10	11	12	13
14	15	16	17	18	19	20
21	22	23	24	25	26	27
28	29	30	31			

FEBRUARY

S	M	T	W	T	F	S
				1	2	3
4	5	6	7	8	9	10
11	12	13	14	15	16	17
18	19	20	21	22	23	24
25	26	27	28	29		

MARCH

S	M	T	W	T	F	S
					1	2
3	4	5	6	7	8	9
10	11	12	13	14	15	16
17	18	19	20	21	22	23
24	25	26	27	28	29	30
31						

APRIL

S	M	T	W	T	F	S
	1	2	3	4	5	6
7	8	9	10	11	12	13
14	15	16	17	18	19	20
21	22	23	24	25	26	27
28	29	30				

MAY

S	M	T	W	T	F	S
			1	2	3	4
5	6	7	8	9	10	11
12	13	14	15	16	17	18
19	20	21	22	23	24	25
26	27	28	29	30	31	

JUNE

S	M	T	W	T	F	S
						1
2	3	4	5	6	7	8
9	10	11	12	13	14	15
16	17	18	19	20	21	22
23	24	25	26	27	28	29
30						

COLLEGE CALENDAR

Fall Semester 1966

September 21-24 ..... Freshman placement days
September 23-24 ..... Registration
September 23 ..... Meeting of honors students
September 26 ..... Classes and honors seminars begin
October 4 ..... Meeting of the Board of Managers
November 1 ..... Executive Committee of the Board of Managers
November 24-27 ..... Thanksgiving recess
December 6 ..... Annual Meeting of the Board of Managers
December 20 ..... Christmas recess begins, 6:00 p.m.

1967

January 4 ..... Christmas recess ends, 8:00 a.m.
January 4-17 ..... Reading period for course students (at the option of the instructor)
January 17 ..... Classes and seminars end
January 18 ..... Meeting of honors students
January 20 ..... Registration for spring semester
January 23 ..... Honors seminars begin for spring semester
January 23 ..... Mid-year examinations begin
February 2 ..... Mid-year examinations end

Spring Semester

February 6 ..... Classes begin
February 7 ..... Executive Committee of the Board of Managers
March 7 ..... Executive Committee of the Board of Managers
March 25 ..... Spring recess begins, 12:00 noon
April 3 ..... Spring recess ends, 8:00 a.m.
April 4 ..... Meeting of the Board of Managers
May 2 ..... Executive Committee of the Board of Managers
May 6 ..... Honors seminars end
May 8-20 ..... Reading period for course students (at the option of the instructor)
May 16 ..... Written honors examinations begin
May 20 ..... Classes end
May 22 ..... Enrollment in classes for fall semester
May 24 ..... Course examinations begin
May 27 ..... Written honors examinations end
June 1-3 ..... Oral honors examinations
June 3 ..... Course examinations end
June 5-7 ..... Senior comprehensive examinations
June 9 ..... Meeting of the Board of Managers
June 10 ..... Alumni Day
June 11 ..... Baccalaureate Day
June 12 ..... Commencement Day

COLLEGE CALENDAR (Tentative)

Fall Semester 1967

September 20-23 ..... Freshman placement days
September 22-23 ..... Registration
September 22 ..... Meeting of honors students
September 25 ..... Classes and honors seminars begin
October 3 ..... Meeting of the Board of Managers
November 7 ..... Executive Committee of the Board of Managers
November 23-25 ..... Thanksgiving recess
December 5 ..... Annual Meeting of the Board of Managers
December 19 ..... Christmas recess begins, 12:00 noon

1968

January 3 ..... Christmas recess ends, 8:00 a.m.
January 3-16 ..... Reading period for course students (at the option of the instructor)
January 16 ..... Classes and seminars end
January 17 ..... Meeting of honors students
January 19 ..... Registration for spring semester
January 22 ..... Honors seminars begin for spring semester
January 22 ..... Mid-year examinations begin
February 1 ..... Mid-year examinations end

Spring Semester

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

Philip T. Sharples Dining Hall

PERSONNEL OF

SWARTHMORE COLLEGE

THE CORPORATION

CLAUDE C. SMITH, *Chairman*
1617 Land Title Building, Philadelphia, Pa. 19110.
PHILIP T. SHARPLES, *Vice-Chairman*
Fidelity-Philadelphia Trust Bldg., 123 South Broad Street, Philadelphia, Pa. 19109.
ELEANOR STABLER CLARKE, *Secretary*
Crumwald Farm, Wallingford, Pa. 19086.
JOSEPH B. SHANE, *Assistant Secretary*
Swarthmore College, Swarthmore, Pa. 19081.
RICHARD B. WILLIS, *Treasurer*
Provident National Bank, 17th and Chestnut Streets, Philadelphia, Pa. 19103.
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.
MARY LIPPINCOTT GRISCOM, 314 East Central Avenue, Moorestown, N. J. 08057.
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, 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, 1966

CARROLL G. BOWEN, M. I. T. Press, Cambridge, Mass. 02142.
ROBERT M. BROWNING, 7305 Emlen Street, Philadelphia, Pa. 19119.
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.
*EUGENIA HARSHBARGER LEWIS, 3215 Fordham Road, Wilmington, Del., 19806.
*JOHN H. LIPPINCOTT, JR., 9 South Osborne Avenue, Margate City, N. J. 08400.

* Nominated by the Alumni Association.

Term Expires December, 1967

CLEMENT M. BIDDLE, 230 Oak Ridge Avenue, Summit, N. J. 07901.
GEORGE B. CLOTHIER, 1418 Packard Building, Philadelphia, Pa. 19102.
CARL K. DELLMUTH, Fidelity-Philadelphia Trust Co., Philadelphia, Pa. 19109.
WILLIAM POOLE, 350 Delaware Trust Bldg., Wilmington, Del. 19801.
ELIZABETH CARVER PRESTON, 60 Dogwood Lane, Swarthmore, Pa. 19081.
*THOMAS MCP. BROWN, 814 26th Place South, Arlington, Va. 22200.
*ISABEL LOGAN LYON, 70 East 90th St., New York, N. Y. 10028.

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., Highland and Kenmore Aves., Jenkintown, Pa. 19046.
THOMAS B. MCCABE, Tinicum Island Rd. and Industrial Highway, Philadelphia, Pa. 19113.
*KATHARINE SCHERMAN ROSIN, 691 West 247th St., New York, N. Y. 10471.
*WALTER O. SIMON, 15 Granite Road, Alapocas, Wilmington, Del. 19803.

Term Expires December, 1969

WILLIAM F. LEE, 5 Guernsey Road, Swarthmore, Pa. 19081.
KATHRYN SONNEBORN READ, 5407 Atlantic Avenue, Ventnor, N. J. 08400.
PHILIP T. SHARPLES, Fidelity-Philadelphia Trust Building, 123 South Broad Street, Philadelphia, Pa. 19109.
SUE THOMAS TURNER, Cook Road, Alfred Station, New York 14803.
RICHARD B. WILLIS, Provident National Bank, 17th and Chestnut Streets, Philadelphia, Pa. 19103.
*HELEN SHILCOCK POST, 241 W. Allens Lane, Philadelphia, Pa. 19119.
*ROBERT H. WILSON, 403 Cedar Lane, Swarthmore, Pa. 19081.

COMMITTEES OF THE BOARD

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

Executive

BOYD T. BARNARD
CLEMENT M. BIDDLE
ROBERT M. BROWNING
ELEANOR STABLER CLARKE
GEORGE B. CLOTHIER
CARL K. DELLMUTH
H. THOMAS HALLOWELL, JR.
HADASSAH M. L. HOLCOMBE
THOMAS B. MCCABE
ELIZABETH CARVER PRESTON
KATHRYN SONNEBORN READ
PHILIP T. SHARPLES
RICHARD B. WILLIS
HELEN GAWTHROP WORTH

Finance and Trusts Administration

RICHARD B. WILLIS
ROBERT M. BROWNING
GEORGE B. CLOTHIER
CARL K. DELLMUTH
H. THOMAS HALLOWELL, JR.
THOMAS B. MCCABE

Instruction and Libraries

CLEMENT M. BIDDLE
CARROLL G. BOWEN
THOMAS MCP. BROWN
KERMIT GORDON
HADASSAH M. L. HOLCOMBE
WILLIAM POOLE
CHARLES C. PRICE, III
SUE THOMAS TURNER
HELEN GAWTHROP WORTH

* Nominated by the Alumni Association.

Investment

THOMAS B. MCCABE
BOYD T. BARNARD
RICHARD C. BOND
H. THOMAS HALLOWELL, JR.
PHILIP T. SHARPLES
RICHARD B. WILLIS

Property

ROBERT M. BROWNING
BOYD T. BARNARD
VIRGINIA STRATTON CORNELL
WILLIAM F. LEE
KATHRYN SONNEBORN READ
WALTER O. SIMON
ROBERT H. WILSON

Student Activities

ELIZABETH CARVER PRESTON
CARROLL G. BOWEN
THOMAS MCP. BROWN
ELEANOR STABLER CLARKE
EUGENIA HARSHBARGER LEWIS
JOHN H. LIPPINCOTT, JR.
ISABEL LOGAN LYON
DOROTHY SHOEMAKER MCDIARMID
HELEN SHILCOCK POST
KATHARINE SCHERMAN ROSIN
SUE THOMAS TURNER

Nominating

VIRGINIA STRATTON CORNELL
WILLIAM F. LEE
CHARLES C. PRICE, III
KATHRYN SONNEBORN READ
RICHARD B. WILLIS
HELEN GAWTHROP WORTH

Development

CARL K. DELLMUTH
GEORGE B. CLOTHIER
VIRGINIA STRATTON CORNELL
H. THOMAS HALLOWELL, JR.
WILLIAM F. LEE
ISABEL LOGAN LYON
WILLIAM POOLE
PHILIP T. SHARPLES
WALTER O. SIMON
ROBERT H. WILSON

ALUMNI ASSOCIATION OFFICERS

1965-1967

President, ROBERT G. HAYDEN '47, 40 Woodbrook Rd., Swarthmore, Pa. 19081.
Vice-President for Men, THOMAS B. DARLINGTON '45, Box 156, New Lisbon, N. J. 08064.
Vice-President for Women, ANNA RICKARDS SENSENIG '30, 2609 Woodleigh Rd., Havertown, Pa. 19083.
Secretary, CORNELIA CLARKE SCHMIDT '46, 334 Dickinson Ave., Swarthmore, Pa. 19081

ALUMNI COUNCIL

TERM EXPIRES
JUNE

Zone A

1967 CHARLES P. CRYER '43, Box 388, Swarthmore, Pa. 19081.
WILLIAM T. SPOCK '51, Prices Lane, Moylan, Pa. 19065.
1968 FREDERICK S. DONNELLY, JR. '41, 615 N. School Lane, Lancaster, Pa. 17603.
FRANK H. ERDMAN '41, Lawrenceville Road, Princeton, N. J. 08540.
1969 PETER W. KAISER '43 921 Winding Lane, Media, Pa. 19063.
J. LAWRENCE SHANE '56, 201 Harvard Avenue, Swarthmore, Pa. 19081.
LAWRENCE A. YEARSLEY '48, R. D. 3, Coatesville, Pa. 19320.
1967 NANCY ROBINSON POSEL '51, 1060 Mill Road Circle, Jenkintown, Pa. 19046.
LAURA REPPERT UNGER '49, Valley Park Road, R. D. 2, Phoenixville, Pa. 19460.
1968 NANCY RITSCHARD HALL '51, 1010 Cedar Street, Riverton, N. J. 08077.
PATRICIA LUM TAYLOR '44, 525 Old Middletown Road, Lima, Pa. 19060.
1969 ELIZABETH DOBSON BROOMELL '37, Bethlehem Pike, R. F. D. 1, Ambler, Pa. 19002.
BOLLING BYRD CLARKE '49, 430 Strath Haven Ave., Swarthmore Pa. 19081.
YVONNE MOTLEY MCCABE '50, 412 Rogers Lane, Wallingford, Pa. 19086.

Zone B

1967 JAMES L. CRIDER, JR. '33, Peach Hill Road, Darien, Conn. 06820.
JOHN L. DUGAN, JR. '43, 5 Hillside Ave., Short Hills, N. J. 07078.
1968 ALDEN S. BENNETT '40, 4 Falcon Place, Huntington, N. Y. 11743.
DONALD J. LLOYD-JONES '52, 230 Villard Ave., Hastings-on-Hudson, N. Y. 10706.
1969 JAMES H. BEARDSLEY '38, Pine Hill Drive, R. F. D. 1, Katonah, N. Y. 10536.
1967 CAROL HOLBROOK BALDI '53, 1070 Third Avenue, New York, N. Y. 10021.
BARBARA TAYLOR CRAWFORD '45, 17 Westgate Road, Livingston, N. J. 07039.
1968 CHRISTINE ROSENBLATT DOWNING '52, Skyline Drive, Martinsville, N. J. 08836.
JANET MCCLOSKEY ROBBINS '43, 160 E. 89th Street, New York, N. Y. 10028.
1969 MURIEL ECKES ZACHARIAS '37, 433 Ridgefield Rd., Wilton, Conn. 06897.

Zone C

1969 THOMAS A. KERSHAW II '60, 1 Primus Avenue, Boston, Mass. 02114.
ELINOR JONES CLAPP '46, 309 Olney Street, Providence, R. I. 02906.

Zone D

1967 JOHN S. THOMSON '43, 23 Grafton Street, Chevy Chase, Md. 20015.
1968 DANIEL H. WINGERD '45, 13 Briar Road, Wilmington, Del. 19803.
1967 CAROLINE MORREL SHOEMAKER '52, 1406 W. Joppa Road, Riderwood, Md. 21204.
1968 NANCY EBERLE VALTIN '47, 1319 Woodside Drive, McLean, Va. 22101.

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

1967 CHRISTIAN H. PEDERSEN '49, 4401 Midnight Pass Rd., Sarasota, Fla. 33581.
1967 BARBARA DEATON ANDERSON '57, 3117 Oxford Drive, Durham, N. C. 27707.

Zone G

1967 EDWIN M. BUSH, JR. '49, 949 Fisher Lane, Winnetka, Ill. 60093.
1968 PAUL A. DEWALD '42, 60 Conway Lane, La Due, Mo. 63124.
1967 JULIA LANGE HALL '55, 1161 Pine St., Winnetka, Ill. 60093.
1968 JOAN BUESCHING MCNAGNY '46, 4621 Crestwood Drive, Fort Wayne, Ind. 46807.

Zone H

1968 GEORGE C. BOND '42, 1419 Wellington Avenue, Pasadena, Calif. 91103.
1969 WALTER M. DICKEY '61, 1749 Valpico Drive, San Jose, Calif. 95124.
1968 SUE DAVISON COOLEY '44, 01734 S.W. Riverdale Road, Portland, Ore. 97219.
1969 ALICE RICKEY JAKLE '39, 11634 Winding Way, Los Altos, Calif. 94022.

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. CRATSLEY, *Vice-President (Finance), Controller, and Professor of Economics* ..... 925 Strath Haven Avenue
B.A., College of Wooster; M.B.A. and D.C.S., Harvard University.

JOSEPH B. SHANE, *Vice-President (Public Relations and Alumni Affairs) and Professor of Education* ..... 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

MARGARET L. MACLAREN, *Associate Dean of Students and Director of Financial Aid* ..... 317 North Chester Road
B.A., Swarthmore College.

FREDERICK A. HARGADON, *Dean of Admissions and Lecturer in Political Science* Cunningham House
B.A., Haverford College.

DOUGLAS C. THOMPSON, *Assistant Dean of Admissions* ..... Swarthmore College
B.S., Swarthmore College.

EDITH TWOMBLY, *Assistant Dean of Admissions and Assistant in Biology* Swarthmore College
B.A., Swarthmore College; M.Ed., Harvard University.

JAMES F. GOVAN, *Librarian* ..... 730 Yale Avenue
B.A., The University of the South; M.A., Emory University; Ph.D., The Johns Hopkins University.

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* .... Anna Maria Island, Fla.
B.A., Oberlin College; M.A. and Ph.D., University of Pennsylvania.

EDWARD H. COX, *Edmund Allen Professor Emeritus of Chemistry,* 416 Park Avenue
B.S., Earlham College; M.A., Harvard University; Docteur ès Science, L'Université de Genève, Docteur honoris causa, L'Université de Montpellier; D.Sc., Earlham College.

HENRY JERMAIN MAUDE CREIGHTON, *Edmund Allen Professor Emeritus of Chemistry* ..... Tigh-Solas, Glen Margaret, Nova Scotia, Canada
B.A., M.A. and LL.D., Dalhousie University; M.Sc., University of Birmingham; D.Sc., Das eidgenössische Polytechnikum, Zürich; D.Sc., Swarthmore College.

ROBERT H. DUNN, *Associate Professor Emeritus of Physical Education for Men,* 811 Westdale Avenue
B.S., Temple University.

DUNCAN GRAHAM FOSTER, *Professor Emeritus of Chemistry* ..... 15 Crest Lane
B.A. and M.A., Harvard University; Ph.D., The Johns Hopkins University.

MILAN W. GARRETT, *Professor Emeritus of Physics,*
101 Orchard Drive, 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,*
221 N. Princeton Avenue
B.A., Huron College; M.A., University of Chicago; D.Litt., Huron College.

FREDRIC KLEES, *Professor Emeritus of English* ..... 220 South Chester Road
B.A., Bowdoin College.

WOLFGANG KÖHLER, *Professor Emeritus of Philosophy and Psychology,*
Lebanon, N. H.
Dr. Phil., University of Berlin; D.Sc., University of Pennsylvania, University of Chicago, Kenyon College, Swarthmore College.

HAROLD M. MARCH, *Susan W. Lippincott Professor Emeritus of French,*
46 Main St., Amherst, 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.

L. R. SHERO, *Professor Emeritus of Greek* ..... 651 North Chester Road
B.A., Haverford College; B.A., University of Oxford; M.A. and Ph.D., University of Wisconsin.

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.

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

MONROE C. BEARDSLEY, *Charles and Harriett Cox McDowell Professor of Philosophy* ..... 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.

PAUL H. BEIK, *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, *Isaiah V. Williamson Professor of Civil and Mechanical Engineering* ..... 612 Ogden Avenue
B.C.E., C.E. and M.S., Ohio State 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.

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.

FRÉDÉRIC J. GROVER, *Professor of French* ..... 521 Elm Avenue
L. ès L., University of Paris; Ph.D., University of California.

SAMUEL HYNES, *Professor of English* ..... 5 Whittier Place
B.A., University of Minnesota; M.A. and Ph.D., Columbia University.

HOWARD MALCOLM JENKINS, *Henry C. and J. Archer Turner Professor of Engineering* ..... 506 North Chester Road
B.A. and E.E., Swarthmore College.

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* ..... 506 Ogden Avenue
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.

FRANZ H. MAUTNER, *Professor of German* ..... 408 Walnut Lane
Dr. Phil., Univ. of Vienna.

JOHN D. MCCRUMM, *Howard N. and Ada J. Eavenson Professor of Engineering,* Swarthmore College
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, *Professor of Mechanical 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.

THOMAS P. PEARDON, *Distinguished Visiting Professor of Political Science* (Barnard College) ..... Swarthmore College
B.A., British Columbia University; M.A., Clark College; 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, *Centennial Professor of Economics* ..... 740 Ogden Avenue
B.A., Swarthmore College; Ph.D., Columbia University.

MARTIN A. POMERANTZ, *Visiting Professor of Astronomy* (Bartol Foundation) 1322 Knox Road, Wynnewood, Pa.
B.A., Syracuse University; M.S., University of Pennsylvania; Ph.D., Temple University.

HEDLEY H. RHYS, *Professor of Fine Arts* ..... 512 Elm Avenue
B.A., West Virginia University; M.A. and Ph.D., Harvard University.

LAWRENCE H. SELTZER, *Distinguished Visiting Professor of Economics* (Wayne State University) ..... Swarthmore College
B.A., M.A. and Ph.D., University of Michigan.

FRANCIS P. TAFOYA, *Professor of French* ..... 15 Dartmouth Avenue
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.

PETER VAN DE KAMP, *Edward Hicks Magill Professor of Astronomy and Director of Sproul Observatory* ..... 602 Elm Avenue
Cand. and Docts., University of Utrecht; Ph.D., University of California; D. Phil., University of Groningen.

ROBERT M. WALKER, *Professor of Fine Arts* ..... 212 Elm Avenue
B.A. and M.F.A., Princeton University; Ph.D., Harvard University.

---

* Absent on leave, fall semester, 1966-67.
† Absent on leave, spring semester, 1966-67.

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.

CLAIR WILCOX, *Joseph Wharton Professor of Political Economy,* 510 Ogden Avenue
B.S., University of Pennsylvania; M.A., Ohio State University; Ph.D., University of Pennsylvania.

ASSOCIATE PROFESSORS

CARL BARUS, *Associate Professor of Electrical Engineering* .....8 Whittier Place
B.A., Brown University; M.S. in E.E., Massachusetts Institute of Technology.

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., University of Michigan.

THOMAS N. BISSON, *Associate Professor of History* .....519 Walnut Lane
B.A., Haverford College; M.A. and Ph.D., Princeton University.

‡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.

HILDE D. COHN, *Associate Professor of German* .....302 North Chester Road
Dr. Phil., University of Heidelberg.

DAVID COWDEN, *Associate Professor of English* .....312 Ogden Avenue
B.A., Swarthmore College; M.A. and Ph.D., Harvard University.

RAYMOND DOBY, *Associate Professor of Engineering* .....640 Magill Road
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.

E. J. FAULKNER, *Associate Professor of Physical Education for Men,*
235 Dickinson Avenue

CHARLES E. GILBERT, *Associate Professor of Political Science,*
223 Kenyon Avenue
B.A., Haverford College; Ph.D., Northwestern University.

MARK A. HEALD, *Associate Professor of Physics* .....420 Rutgers Avenue
B.A., Oberlin College; M.S. and Ph.D., Yale University

ELEANOR K. HESS, *Associate Professor of Physical Education for Women,*
302 N. Chester Road
B.S. and M.S., University of Pennsylvania.

OLGA LANG, *Associate Professor of Russian* .....410 Cedar Lane
Graduate, University of Moscow; Ph.D., Columbia University.

‡CLARK P. MANGELSDORF, *Associate Professor of Civil Engineering*
339 Riverview Road
B.S., Swarthmore College; M.S. and D.Sc., Massachusetts Institute of Technology.

PAUL C. MANGELSDORF, JR., *Associate Professor of Physics* ....110 Cornell Ave.
B.A., Swarthmore College; Ph.D., Harvard 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.

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* .....2 Crum Ledge
B.A., Swarthmore College; Ph.D., Harvard University.

‡JEAN ASHMEAD PERKINS, *Associate Professor of French* .....414 Drew Avenue
B.A., Swarthmore College; M.A. and Ph.D., Columbia University.

---

‡ Absent on leave, 1966-67.

KENNETH S. RAWSON, *Associate Professor of Zoology* .....8B Whittier Place
B.A., Swarthmore College; M.S., Cornell University; Ph.D., Harvard University.

DAVID ROSEN, *Associate Professor of Mathematics,* 336 North Princeton Avenue
B.A., New York University; M.A. and Ph.D., University of Pennsylvania.

JEROME A. SHAFFER, *Associate Professor of Philosophy* ...Benjamin West House
B.A., Cornell University; Ph.D., Princeton University.

DAVID G. SMITH, *Associate Professor of Political Science* .....519 Walnut Lane
B.A. and M.A., University of Oklahoma; Ph.D., Johns Hopkins University.

*CLAUDIO SPIES, *Associate Professor of Music and Director of Orchestra*
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* ....915 Harvard 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 Fine Arts*
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,*
Copples and Calendar Lanes, Wallingford, Pa.
B.C.E., University of Washington; M.S., Cornell University; Ph.D., Johns Hopkins University.

*HARRISON MORRIS WRIGHT, *Associate Professor of History* .....319 Cedar Lane
B.A., M.A. and Ph.D., Harvard University.

ASSISTANT PROFESSORS

†ELISA ASENSIO, *Assistant Professor of Spanish* ..500 Oakley Road, Haverford, Pa.
M.A., Middlebury College.

GEORGE C. AVERY, *Assistant Professor of German* .....6 Crum Ledge
B.A., M.A. and Ph.D., University of Pennsylvania.

ROBERT C. BANNISTER, *Assistant Professor of History* ....301 Dartmouth Avenue
B.A. and Ph.D., Yale University; B.A. and M.A., University of Oxford.

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.

†THOMPSON BRADLEY, *Assistant Professor of Russian*
240 Ridley Creek Road, Moylan, Pa.
B.A., Yale University; M.A., Columbia University.

GOMER H. DAVIES, *Assistant Professor of Physical Education for Men*
225 Cornell Avenue
B.S., East Stroudsburg State Teachers College; Ed.M., Temple University.

ROLAND B. DI FRANCO, *Assistant Professor of Mathematics* ....515 Elm Avenue
B.S., Fordham University; M.S., Rutgers University; Ph.D., Indiana University.

*JARL AVARD ELMGREN, *Assistant Professor of Physics* .....8 Crum Ledge
B.S., University of New Hampshire; Ph.D., Iowa State University.

JAMES H. HAMMONS, *Assistant Professor of Chemistry* .....336 Haverford Place
B.A., Amherst College; M.A. and Ph.D., The Johns Hopkins University.

PHOEBE JANE HARRIS, *Assistant Professor of Physical Education for Women,*
59 S. Overhill Road, Upper Providence, Pa.
B.A., University of Syracuse; M.A., Smith College.

---

* Absent on leave, fall semester, 1966-67.
† Absent on leave, spring semester, 1966-67.

‡STEVENS HECKSCHER, *Assistant Professor of Mathematics,*
Pritchard Lane, Wallingford, Pa
B.A., M.A. and Ph.D., Harvard University.

DONALD C. HELLMANN, *Assistant Professor of Political Science,*
317 North Chester Roa
B.A., Princeton University; M.A. and Ph.D., University of California.

TIMOTHY K. KITAO, *Assistant Profesor of Fine Arts* .....317 N. Chester Roa
B.A. and M.A., University of California; Ph.D., Harvard University.

EUGENE A. KLOTZ, *Assistant Professor of Mathematics* ..317 North Chester Roa
B.S., Antioch College; Ph.D., Yale University.

JEAN HERSKOVITS KOPYTOFF, *Assistant Professor of History* ..112 Rutgers Avenu
B.A., Swarthmore College; D. Phil., University of Oxford.

†GERALD R. LEVIN, *Assistant Professor of Psychology* .....3 Crum Ledg
B.A., Antioch College; M.A. and Ph.D., Columbia University.

ROBERT E. LEYON, *Assistant Professor of Chemistry* .....519 Walnut Lan
B.A., Williams College; M.A. and Ph.D., Princeton University.

RICHARD F. MALACREA, *Assistant Professor of Physical Education for Men*
307 Rutgers Avenu
B.S. Ed., West Chester State College; R.P.T., University of Pennsylvania.

JOHN J. MCLAUGHLIN, *Assistant Professor of English* .....7 Crum Ledg
B.A., Temple University; M.A., University of California.

THOMAS N. MITCHELL, *Assistant Professor of Classics* .....Swarthmore Colleg
B.A. and M.A., National University of Ireland; Ph.D., Cornell University.

‡JOHN A. NEVIN, *Assistant Professor of Psychology* .....311 Yale Avenu
B.E., Yale University; M.A. and Ph.D., Columbia University.

CLAIR W. NIELSON, *Assistant Professor of Physics* .....615 North Chester Roa
B.S. and Ph.D., Massachusetts Institute of Technology.

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 N. Chester Road
B.S. and M.S., Massachusetts Institute of Technology; Ph.D., The Johns Hopkins University.

STEVEN I. PIKER, *Assistant Professor of Anthropology* .....5 Crum Ledge
B.A., Reed College; Ph.D., University of Washington.

FREDERIC L. PRYOR, *Assistant Professor of Economics* .....Swarthmore College
B.A., Oberlin College; M.A. and Ph.D., Yale University.

*ALBURT M. ROSENBERG, *Assistant Professor of Natural Science,*
609 Hillborn Avenue
B.A., Harvard University; M.S., University of Florida; Ph.D., University of Pennsylvania.

ROBERT ROZA, *Assistant Professor of French* .....502 Cedar Lane
B.A., University of Toronto; M.A. and Ph.D., Princeton University.

ROBERT E. SAVAGE, *Assistant Professor of Biology* .....Swarthmore College
B.A., Oberlin College; M.S. and Ph.D., University of Wisconsin.

J. EDWARD SKEATH, *Assistant Professor of Mathematics,*
11 Benjamin West Avenue
B.A., Swarthmore College; M.A. and Ph.D., University of Illinois.

SUSAN BROOKE SNYDER, *Assistant Professor of English* ..302 North Chester Road
B.A., Hunter College; M.A. and Ph.D., Columbia University.

AILYN TERADA, *Assistant Professor of Physical Education for Women,*
231 E. Avon Rd., Parkside, Chester, Pa.
B.S., Russell Sage College; M.S., University of Wisconsin.

NICHOLAS S. THOMPSON, *Assistant Professor of Psychology* ..307 Vassar Avenue
B.A. and Ph.D., University of California.

JOHN G. WILLIAMSON, *Assistant Professor of History* ....317 N. Chester Road
B.A., Cornell University; Ph.D., The Johns Hopkins University.

THOMAS ARTIN, *Instructor in English* .....317 North Chester Road
B.A. and M.A., Princeton University.

---

* Absent on leave, fall semester, 1966-67.
† Absent on leave, spring semester, 1966-67.
‡ Absent on leave, 1966-67.

Instructors

James D. Freeman, *Instructor in Music* ..... Swarthmore College
B.A. and M.A., Harvard University.

Lewis R. Gaty, II, *Instructor in Economics* ..... 221 Haverford Avenue
B.A., Swarthmore College.

Thomas W. Hawkins, Jr., *Instructor in Mathematics* ..... 515 Elm Avenue
B.A., Houghton College; M.S., University of Rochester.

James R. Hutchison, *Instructor in Chemistry* ..... Benjamin West House
B.S., Wittenberg University.

Robert O. Keohane, *Instructor in Political Science* .... 317 North Chester Road
B.A., Shimer College; M.A. and Ph.D., Harvard University.

William C. Kerr, *Instructor in Civil Engineering and Director of the Computer Center* ..... 915 Harvard Avenue
B.S. and M.S., Michigan State University; C.E., Massachusetts Institute of Technology.

George E. McCully, *Instructor in History* ..... 915 Harvard Avenue
B.A., Brown University; M.A. and Ph.D., Columbia University.

Charles Raff, *Instructor in Philosophy* ..... Swarthmore College
B.A., University of Rochester; M.A., Brown University.

Richard Schuldenfrei, *Instructor in Philosophy* ..... Swarthmore College
B.A. and M.A., University of Pennsylvania.

John S. Shackford, *Instructor in English* ..... 835 Harvard Avenue
B.A., Carleton College; M.A., Indiana University.

Charles J. Siegman, *Instructor in Economics* ..... 307 Kent Road, Cynwyd, Pa.
B.A., City College of New York.

†Simone V. Smith, *Instructor in French* ..... Swarthmore College
Licence ès Lettres, University of Grenoble.

Marie José Southworth, *Instructor in French* ..... 146 Park Avenue
Cand. Cours Supérieurs, Luxembourg; M.A., Western Reserve University.

Jon Van Til, *Instructor in Sociology* ..... Swarthmore College
B.A., Swarthmore College; M.A., University of North Carolina.

James T. Wood, *Instructor in Mathematics* ..... 915 Harvard Avenue
B.A., Amherst College; M.A., University of Pennsylvania.

Lecturers and Assistants

Harriet Shorr Baguskas, *Director of Studio Arts,*
214 N. Jackson St., Media, Pa.
B.A., Swarthmore College; B.F.A., Yale School of Art and Architecture.

Alice Brodhead, *Lecturer in Education and Director of Student Teaching,*
316 Ogden Avenue
B.S. and M.A., University of Pennsylvania.

John B. Clothier, Jr., *Lecturer in Engineering,*
222 N. Highland Ave., Lansdowne, Pa.
B.S., University of Pennsylvania.

Brooke P. Cottman, *Assistant in Physical Education for Men* .... 315 Yale Ave.
B.A., Duke University.

Frances de Graaff, *Visiting Lecturer in Russian* (Bryn Mawr and Haverford),
10 Railroad Avenue, Haverford, Pa.
Ph.D., University of Leyden.

Richard B. Du Boff, *Visiting Lecturer in Economics* (Bryn Mawr),
438 West Montgomery Avenue, Haverford, Pa.
B.A., Dartmouth College; M.S., Columbia University; Ph.D., University of Pennsylvania.

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.

Robert C. Forwood, *Assistant in Physical Education for Men,*
911 13th Street, Prospect Park, Pa.
B.S., West Chester State College; M.A., Temple University.

† Absent on leave, spring semester, 1966-67.

ARTHUR M. FREEDMAN, *Visiting Lecturer in Economics* (University of Pennsylvania) .....106 South Rolling Road, Springfield, P
B.A., University of Toledo; M.A., University of Cincinnati; Ph.D., Universi of Pennsylvania.

WILLIAM J. GINNANE, *Visiting Lecturer in Philosophy* (The Australian Nation University) .....Swarthmore Colle
B.A. and M.A., University of Melbourne; B.Phil., University of Oxford.

HELEN HALL, *Consultant in Reading and Language* .....407 Hillborn Aven
B.A., Wellesley College; M.A., Swarthmore College; Ph.D., Universi of Pennsylvania.

DUDLEY HEATH, *Assistant in Physical Education for Men,*
509 Smedley Ave., Media, P
B.A., Dartmouth College; Ed.M., Temple University.

GABRIELE S. HOENIGSWALD, *Lecturer in Classics* .....908 Westdale Aven
M.A., Bryn Mawr College; D.Litt., University of Florence.

HELEN MANNING HUNTER, *Lecturer in Economics,*
Featherbed Lane, Haverford, P
B.A., Smith College; Ph.D., Radcliffe College.

GILBERT KALISH, *Visiting Associate in Performance* (Music) .Swarthmore Colle
B.A., Columbia University.

DONALD W. KENT, JR., *Visiting Lecturer in Physics* (Bartol Foundation)
210 Cornell Aven
B.S., Yale University; M.A. and Ph.D., Temple University.

ARTHUR J. KOMAR, *Lecturer in Music* .....328 Park Aven
B.A., Columbia University; M.Mus., Yale University; M.F.A., Princeto University.

PEGGY K. KORN, *Lecturer in History* .....1446 Rydal Road, Rydal, P
B.A., Beaver College; M.A. and Ph.D., University of Pennsylvania.

SARAH LEE LIPPINCOTT, *Lecturer and Research Associate in Astronomy,*
510 Elm Aven
B.A., University of Pennsylvania; M.A., Swarthmore College.

JAMES W. LUKENS, JR., *Assistant in Physical Education for Men,*
319 Palmers Lane, Wallingford, P
B.S.E.E., University of Louisville; LL.B., Washington and Lee University.

LEONARD R. MANN, *Visiting Lecturer in Engineering* (Pennsylvania Militar College) .....110 Westminster Drive, Sproul Estat
B.S., Virginia Polytechnic Institute; M.S., North Carolina State College.

JAMES J. MCADOO, *Assistant in Physical Education for Men;*
513 East Bringhurst, Germantown, P
ROBERT P. NEWTON, *Visiting Lecturer in German* (University of Pennsylvania) .....13 Park Aven
B.A. and M.A., Rice University; Ph.D., The Johns Hopkins University.

MICHAEL OSSAR, *Lecturer in German* .....402 Long Lane, Upper Darby, P
B.A., Cornell University; M.S., University of Pennsylvania.

JOHN H. POLLARD, *Visiting Lecturer in Physics* (Bartol Foundation),
300 Avondale Road, Wallingford, P
B.Sc., Bristol University; Ph.D., Aberdeen University.

ADRIENNE RICH, *Adviser in Creative Writing* .....Swarthmore Colleg
B.A., Radcliffe College.

FREDRICK J. ROBERTS, *Visiting Lecturer in Political Science* (University of Delaware) .....Swarthmore Colleg
B.A., Wilkes College.

ENID CURTIS BOK SCHOETTLE, *Lecturer in Political Science,*
330 Spruce Street, Philadelphia 3, P
B.A., Radcliffe College.

HELEN P. SHATAGIN, *Visiting Lecturer in Russian* .....307 Cornell Aven
ROBERT M. SMART, *College Organist* .....18 Oberlin Aven
B.A., Curtis Institute of Music; M.A., Westminster Choir College.

TSING YUAN, *Lecturer in History* .....Swarthmore Colleg
B.A. and M.A., George Washington University.

PAUL ZUKOFSKY, *Visiting Associate in Performance* (Music),
Swarthmore Colleg
B.M. and M.S., Juilliard School of Music.

Divisions and Departments

I. Division of the Humanities—Hedley H. Rhys, *Chairman*

Classics, Helen F. North, *Chairman.*
English Literature, George J. Becker, *Chairman.*
Fine Arts, Robert M. Walker, *Chairman.*
History, James A. Field, Jr., *Chairman.*
Mathematics, Heinrich Brinkmann, *Chairman.*
Modern Languages, Francis P. Tafoya, *Chairman.*
Music, Peter Gram Swing, *Chairman.*
Philosophy and Religion, Monroe C. Beardsley, *Acting Chairman.*
Psychology and Education, Dean Peabody, *Chairman.*

II. Division of the Social Sciences—Frank C. Pierson, *Chairman, first semester*
Harrison M. Wright, *Chairman, second semester*

Economics, Clair Wilcox, *Chairman.*
History, James A. Field, Jr., *Chairman.*
Mathematics, Heinrich Brinkmann, *Chairman.*
Philosophy and Religion, Monroe C. Beardsley, *Acting Chairman.*
Political Science, J. Roland Pennock, *Chairman.*
Psychology and Education, Dean Peabody, *Chairman.*
Sociology and Anthropology, Leon Bramson, *Chairman.*

III. Division of Natural Sciences—David Rosen, *Chairman*

Astronomy, Peter van de Kamp, *Chairman.*
Biology, Norman A. Meinkoth, *Chairman.*
Chemistry, Walter B. Keighton, Jr., *Chairman.*
Engineering, Samuel T. Carpenter, *Chairman.*
Mathematics, Heinrich Brinkmann, *Chairman.*
Philosophy and Religion, Monroe C. Beardsley, *Acting Chairman.*
Physics, William C. Elmore, *Chairman.*
Psychology and Education, Dean Peabody, *Chairman.*

IV. Division of Engineering—Samuel T. Carpenter, *Chairman*

Engineering, Samuel T. Carpenter, *Chairman.*
Chemistry, Walter B. Keighton, Jr., *Chairman.*
Mathematics, Heinrich Brinkmann, *Chairman.*
Physics, William C. Elmore, *Chairman.*

Standing Committees of the Faculty

Academic Requirements: Moore, *Chairman.*
Barr, Barus, Cobbs, Cohn, Kopytoff, Lange, Livingston, Pennock (1st semester
J. Williams.

Admissions and Scholarships: Hargadon, *Chairman.*
Barr, Carpenter, Cobbs, Flemister, Gaty, Lange, Leyon, MacLaren, Moor
North, Pagliaro, Skeath, Stott, Willis.

Athletics: Stetson, *Chairman.*
Barr, Cratsley, Faulkner, Hess, Morrill, Shane, Walker, Weber, Willis.

Awards and Prizes: van de Kamp, *Chairman.*
Avery, Cohn, Elverson, Keighton, Keohane, MacLaren, Moll.

Collection: Shane, *Chairman.*
Beik, Hellmann, Lange, Rawson, Snyder, Swing, P. Thompson.

Computer: Kerr, *Chairman.*
Barus, Lippincott, Meinkoth, Nielson, Rosen.

Cooper Foundation: Swing, *Chairman.*
Blackburn, Keohane, Lippincott, McCrumm, Shane, Tafoya.

Curriculum: Shaffer, *Chairman.*
Bisson, Bramson, Cobbs, Klotz, Lafore (2nd semester), Meinkoth, Moor
Morrill, Snyder.

Faculty and Staff Benefits: Cratsley, *Chairman.*
Cook, Davies, Hammons, Livingston, Ostwald, Peabody, Rhys, C. Shero.

Swarthmore Fellowships: Wallach, *Chairman.*
Cowden, Flemister, Hammons, Kerr, Klotz, Siegman.

Fellowships from Other Institutions: Beik, *Chairman.*
Blackburn, Gillespie *(Secretary),* Keighton, MacLaren, Malacrea, Morrill, Sieg
man, Urban.

Instruction: Courtney Smith, *Chairman.*
Carpenter, Cobbs, Moore, Peabody, Rhys, Pierson (1st semester), Rawson
Rosen, Wright (2nd semester).

Library: Becker, *Chairman.*
Bilaniuk, Bisson, Govan, Oberdiek, Ostwald, Tafoya, Tolles, Willis.

Master of Arts: Enders, *Chairman.*
Elmore, Lippincott, Mautner, P. Thompson, Tolles, Walker.

Pre-Medical Program: Leyon, *Chairman.*
Bowie, Bullitt *(Assistant to Chairman),* Kopytoff, Malacrea, Nielson, Skeath
Stott, Weber.

Research: Weber, *Chairman.*
Bannister, Cratsley, Grover, McCrumm, J. Williams.

Schedule of Classes: Moore, *Chairman.*
Avery, Bannister, Becker, Elmore, Fehnel, Hess, Jenkins.

Student Affairs: Barr, *Chairman.*
Cobbs, Gaty, Lange, Pagliaro, Urban.

Student Summer Research: J. Williams, *Chairman.*
Barus, Beik, Cowden, Enders, Lang, Shaffer, Wallach.

Teacher Education: Cobbs, *Chairman.*
Becker, Brinkmann, Brodhead, Davies, Levin, Moore, Shane.

Travel Allowance: Grover, *Chairman.*
Brinkmann, Enders, Jenkins, Mautner, Terada.

Use of College Facilities by Outside Organizations: Cook, *Chairman.*
Davisson, Hess, Lange, Shane, Stanton, Stetson, P. Thompson.

Secretary to the Faculty: Jenkins.

ADMINISTRATIVE OFFICERS AND ASSISTANTS

President's Office

President, Courtney Smith, B.A., M.A. and Ph.D., Harvard University; LL.D, L.H.D., and Litt.D.

Administrative Assistant to the President, Gilmore Stott, B.A. and M.A., University of Cincinnati; B.A. and M.A., University of Oxford; M.A. and Ph.D., Princeton University.

Secretary, Martha H. Decrouez, B.S., University of Minnesota.

Vice-Presidents' Office

Vice-President—(Finance) and Controller, Edward K. Cratsley. B.A., College of Wooster; M.B.A. and D.C.S., Harvard University.

Vice-President—Public Relations and Alumni Affairs, Joseph B. Shane. B.A., Swarthmore College; M.A., University of Pennsylvania.

Secretaries, Pauline M. Carroll, Mildred A. Scott.

Deans' Offices

Dean, Susan P. Cobbs, B.A., Randolph-Macon Woman's College; M.A., New York University; Ph.D., University of Chicago.

Associate Dean and Registrar, John M. Moore, B.A., Park College; B.D., Union Theological Seminary; M.A., Harvard University; Ph.D., Columbia University.

Dean of Men, Robert A. Barr, Jr., B.A., Swarthmore College; M.A., University of Pennsylvania.

Dean of Women, Barbara Pearson Lange.

Associate Dean of Students and Director of Financial Aid, Margaret L. MacLaren, B.A., Swarthmore College.

Dean of Admissions, Frederick A. Hargadon, B.A., Haverford College.

Assistant Dean of Admissions, Douglas C. Thompson, B.S., Swarthmore College.

Assistant Dean of Admissions, Edith Twombly, B.A., Swarthmore College; M.Ed., Harvard University.

Administrative Assistant, Margaret W. Moore, B.A., Park College; M.A., Ph.D., Columbia University.

Consultant for Testing and Guidance, Gloria Carey Evans, B.A., Western Washington College of Education; M.S., University of Washington; Ph.D., Stanford University.

Consultant in Reading and Language, Helen Hall, B.A., Wellesley College; M.A., Swarthmore College; Ph.D., University of Pennsylvania.

Head Residents in Dormitories:

Simone V. Smith, Woolman House; Licence ès Lettres, University of Grenoble.
Lynn S. Mitchell, Robinson House; B.A., Trenton State College; M.S.T., Cornell University.
Nancy Palmer, Worth Hall; B.A., Wells College.
Virginia von Frankenberg, Parrish Hall; B.A., University of Nebraska.
Mayme R. Williams, Willets Hall.

Secretaries to the Deans:

Emily Bonsall.
Rosamond W. Garrett, B.A., Wilson College.
Winifred J. Hall.
Mildred Irwin.
Myrtle R. Keeny, B.A., Dickinson College.
Jean C. Naylor, B.A., Swarthmore College.
Ruth Nylin.

Registrar's Office

Registrar, John M. Moore, B.A., Park College; B.D., Union Theological Seminary M.A., Harvard University; Ph.D., Columbia University.

Secretaries, Marjorie L. Webb, B.A., University of Delaware.
Jane H. Thompson, B.A., Swarthmore College.
Edith Bartholomew.

Library Staff

College Library

Librarian: James F. Govan, B.A., University of The South; M.A., Emor University; Ph.D., Johns Hopkins University.

Associate Librarian: Martha A. Connor, B.S., M.A., University of Pennsy vania; B.S. in L.S., Drexel Institute.

Technical Services Division: Librarian: Martha A. Connor.
Assistant Librarians:
Cataloging: Doris Beik, B.A. and B.S. in L.S., State University of Ne York at Albany.
Elizabeth L. Harrar, B.A., University of Delaware; M.A., Universit of Pennsylvania; B.S. in L.S., Drexel Institute.
Mildred Hirsch, B.S. in L.S., Columbia University.
Elizabeth S. Sharpless, B.A., Swarthmore College; B.S. in L.S., Drexe Institute.
Order: Mary C. Kerbaugh, B.A., University of Pennsylvania; M.S. i L.S., Drexel Institute.
Assistants: Doris Pitman Moist; Faith E. Diaz; Pauline Marshall B.S., Simmons College; Madge Spencer; Charlotte Weiss.

Readers Services Division: Librarian: Howard H. Williams, B.A., Lak Forest College; M.A. and B.S. in L.S., Columbia University.
Assistant Librarians:
Circulation: Catherine J. Smith, B.A., Swarthmore College; B.S. i L.S., Drexel Institute.
George K. Huber, B.A., University of Pennsylvania; M.S. in L.S., Drexe Institute.
Periodicals: Anne Perkins, University of Delaware.
Assistants: Josephine Smith, B.A., Swarthmore College; Elizabeth H Phillips, B.A., Swarthmore College; Virginia Von Frankenberg B.A., University of Nebraska; Caroline Caven; Cornelia Johnson

Science Librarian: Eleanor A. Maass, B.A. M.S., University of Illinois Ph.D., University of Wisconsin.
Assistant: Cornelia T. Stadler.

Friends Historical Library

Director: Frederick B. Tolles, B.A., M.A. and Ph.D., Harvard University D.Litt., Haverford College.

Associate Director: Dorothy G. Harris, B.A., Wellesley College; B.S. i L.S., Drexel Institute; M.A., University of Pennsylvania.

Secretarial Assistant: Elizabeth S. Macpherson, B.A., Ursinus College.

Assistants: Eleanor B. Mayer, B.A., Ohio Wesleyan University; Jane M Thorson, Cornell College.

Swarthmore College Peace Collection:
Curator: Ardith L. Emmons, B.A., William Penn College; M.A., Mill College.
Assistant: Claire B. Shetter, Philadelphia Musical Academy.

Honorary Curators of the Friends Historical Library

Anna Pettit Broomell, Frances Williams Browin, Henry J. Cadbury, Anna Griscom Elkinton, LaVerne Forbush, Lucretia Franklin, James R. Frorer, William Hubben, Caroline Biddle Malin, Gerald McDonald, Richmond P. Miller, Hadassah M. L. Holcombe, Edith Williams Way.

Advisory Council of the Swarthmore College Peace Collection

Courtney Smith, *Chairman;* Irwin Abrams, Anna Cox Brinton, Merle Curti, Alfred Hassler, Ernst Posner, Joseph B. Shane, Frederick B. Tolles, E. Raymond Wilson, Norman Whitney.

Computer Center

Director, William C. Kerr, B.S. and M.S., Michigan State University.
Supervisor, Ronald Anton.

Business Office

Associate Controller, Accounting and Finance, G. Caroline Shero, B.A., Swarthmore College; M.B.A., University of Pennsylvania.

Accountant, Harold L. Frederick, Jr., B.S., Juniata College.

Assistants, Anna Jeffries, Freda Thomas, Margaret A. Thompson, Ellen R. Augsberger.

Associate Controller, Purchasing and Personnel, Lewis T. Cook, Jr., B.A., St. Lawrence University; M.S., Pennsylvania State College.

Secretary, Ruth B. Walker.

Manager of Bookstore, Normund L. Bandrevics, B.B.A., University of Latvia;

Assistants, Daisy S. Jeffery, Margaret Whelpley.

Stenographic Staff, Marguerite Cliffford, Edith Cohen, Olga A. Hummer, Ruth Ann Moffett, Edith Woodland.

Switchboard Operators, Judy Grace Feiy, Ayme Gosman, Dorothy H. Olson.

Postmistress, Vera B. Morrison.

House Director's Office

House Director, Kathryn A. Davisson.

Assistants to the House Director, Carrie F. Amberg, June Carnall, Edna B. Heale, Lily Mari, Mayme R. Williams, Phyllis Woodcock.

Superintendent's Office

Superintendent of Buildings and Grounds, William M. Stanton, Jr., B.A., University of Wisconsin.

Planning Engineer, Joseph E. Spafford, B.S., University of Missouri.

Consulting Engineer, Andrew Simpson, B.A., Swarthmore College; M.S. Cornell University.

Director of Arthur Hoyt Scott Horticultural Foundation, John C. Wister, B.A., Harvard University; D.Sc., Swarthmore College.

Secretary, Elaine E. Innes.

Consulting Horticulturist, Harry Wood.

Assistants to the Superintendent, Franklin H. Briggs, B.A., Earlham College; Richardson Fields, Clifford Renshaw, Jr., David Melrose.

Secretaries, Veronica Sullivan, Francis Kavanagh, Margaret R. Shaw.

Alumni and Fund Offices

Director, Kathryn Bassett.

Alumni Recorder, Esther Kelley.

Secretaries, Elizabeth Campbell, Elinor B. Eleniewski.

News Office

Director, Maralyn Orbison Gillespie, B.A., Swarthmore College.

Assistant Director, Virginia Bullitt.

Secretary, Mildred Strain.

Vocational Guidance and Placement

Director, Virginia Bullitt.

Health Service

College Physician, Morris A. Bowie, B.A., University of Colorado; M.D., Harva
University.

Associate College Physicians:

Kent F. Balls, B.A., Haverford College; M.D., Cornell University
Harold C. Roxby, B.S., Pennsylvania State University; M.D., Temp
University.

Consulting Orthopedic Surgeon:

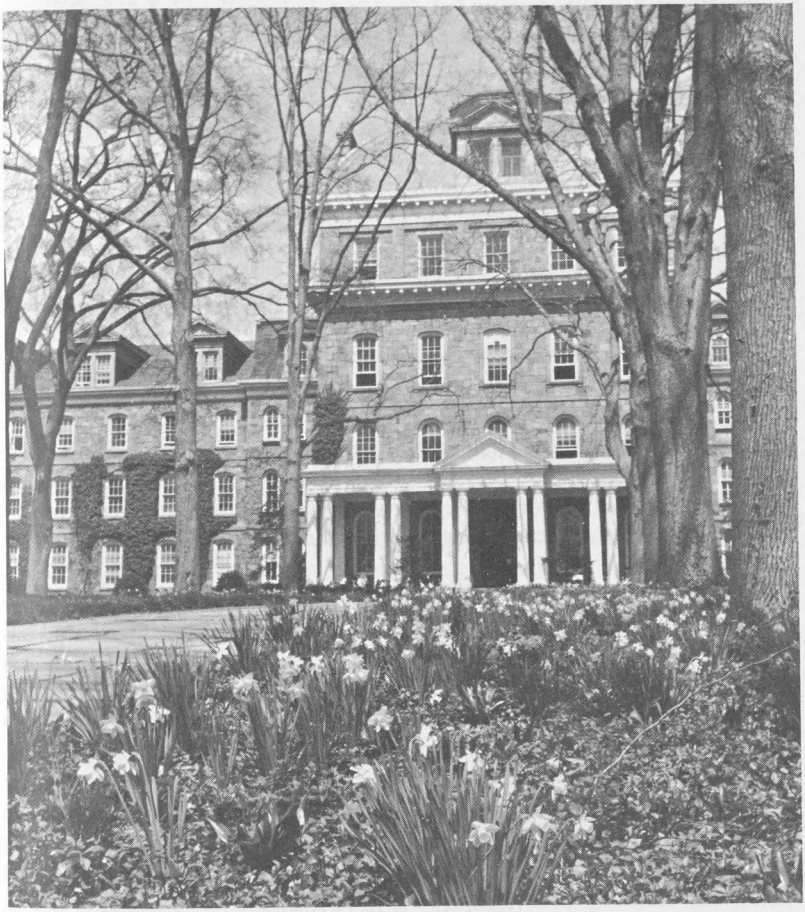
Erwin R. Schmidt, Jr., B.S., Yale University, M.D., University of Wisconsin.

Consulting Psychiatrists:

Leon J. Saul, B.A. and M.A., Columbia University; M.D., Harvard Universit
J. W. Lyons, B.A., University of Scranton; M.D., University of Pennsylvani
Silas L. Warner, B.A., Princeton University; M.D., Northwestern Universit

Nurses:

Elizabeth Cozine, R.N., Elizabeth F. McConnell, R.N., E. Elizabet
McGeary, R.N., Helen R. Martin, R.N., Ida Moore Thomas, R.N.



Parrish Hall

INTRODUCTION TO

SWARTHMORE COLLEGE

INTRODUCTION TO SWARTHMORE COLLEGE

Swarthmore College, founded in 1864 by members of the Religious Society of Friends, is a co-educational college occupying a campus of about 300 acres of rolling wooded land in and adjacent to the borough of Swarthmore in Delaware County, Pennsylvania. It is a small college by deliberate policy. Its present enrollment is about 1025 students, of whom 475 are women and 550 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.

A college is never static. Its purposes and policies are always changing to meet new demands and new conditions. The founders of Swarthmore would find in it today many features which they never contemplated when they shaped the College in the middle of the nineteenth century. Swarthmore, if it is to remain effective, must be forever changing. The goal is to achieve for each generation, by means appropriate to the times, that unique contribution and that standard of excellence which have been the guiding ideals of Swarthmore from its founding.

ADMISSION

Inquiries concerning admission and applications should be addressed the Dean of Admissions, Swarthmore College, Swarthmore, Pennsylvani

General Statement

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

It is the policy of the college to have the student body represent n only different parts of the United States but many foreign countrie both public and private secondary schools, and various economic, soci religious, and racial groups. The college is also concerned to include each class sons and daughters of alumni and of members of the Socie of Friends.

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

Admission to the freshman class is normally based upon the satisfacto completion of a four-year secondary school program preparatory to a vanced liberal study. Under exceptional circumstances, students who ha virtually completed the normal four-year program in three years will considered for admission, provided they meet the competition of oth candidates in general maturity as well as readiness for a rigorous acadeı program.

All applicants are selected on the following evidence:

1. Record in secondary school.
2. Recommendations from the school principal, headmaster, or guidan counselor and from two teachers.
3. Rating in the Scholastic Aptitude Test and in three Achieveme Tests of the College Entrance Examination Board.
4. Personal interview with one of the Deans or an appointed rep sentative.
5. Reading and experience, both in school and out.

Applicants must have satisfactory standing in school, and in aptitu and achievement tests, and should show strong intellectual interests. Th should also give evidence of sturdiness of character, promise of grow initiative, seriousness of purpose, and a sense of social responsibility. future members of the college community, they should represent var 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.
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

Preliminary applications (requests for application papers and remittance of $10.00, which is not refundable) must be filed no later than January 1 of the year in which the candidate wishes to be admitted. The formal application papers must be completed and returned no later than January 15. Swarthmore does not have an "early decision program."

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 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. The Writing Sample will not be accepted as one of the three examinations.

Candidates who take Achievement Tests in May of the junior year in subjects completed by that time may submit the results to the Admission Office, but 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 1966-67 these tests will be given in various centers throughout this country and abroad on December 3, January 14, March 4, May 6, and July 8. 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 35-44.

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 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 February 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.

* 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 (Alt. Rt. 1), 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.

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. Students admitted by transfer are not eligible for financial assistance during their first year at Swarthmore.

EXPENSES

Charges for the academic year 1966-67 (two semesters):

Tuition	$1,775
General Fee	175
Board and Room	950
Total Resident Charges	$2,900*

While a general charge for board and room is made, this may be divided into $550 for board and $400 for room. The general fee of $175 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 breakage fees, etc., may do so by maintaining a student deposit account at the Business Office against which charge checks may be drawn. Cash withdrawals may also be made. Students will be notified when overdrafts occur and no cash withdrawals may be made unless a cash balance is maintained. A minimum deposit of $75.00 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 2¾% 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 John C. Paige & Company of Boston, Massachusetts. Accident coverage alone costs $6.50 per year (12 months) for women, and $12.50 for men. The combined accident and sickness policy is available at an annual cost of $23.50 for women and $27.50 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 $3,000 annually. Approximately thirty per cent of the total student body are currently receiving scholarship aid from the College, with stipends averaging about $1,100 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, or P. O. Box 1025, Berkeley, California. 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 summer earnings. These are budgeted against a normal total expense of $3,300 for the college year. This allows $400 for incidental expenses exclusive of travel and for the total college charge of $2,900, which includes tuition, board and room, and a very comprehensive college fee which 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 fac in the matter of reaching decisions concerning admission to the colle

For the academic year 1966-67 the college has granted approximat $375,000 in scholarships. About two-thirds of that sum was provided special gifts and the endowed scholarships listed below. Funds from t federal government are administered for needy students who are eligil for Educational Opportunity Grants and those who wish to take part in t Work-Study program. Applicants are not required to apply for spec scholarships but will be considered for all scholarship opportunities eit from endowed scholarships or from general college scholarship fun *Financial need is a requirement for all scholarships listed below unl otherwise indicated.*

Swarthmore College National Scholarships

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

The amount of the annual award varies from $100 to $3,000 accordi to the financial need of the winner. In those cases where there is financial need, National Scholarships will be awarded on an honor basis and carry an annual stipend of $100.

Other Scholarships Open to Men and Women

The Frank and Marie Aydelotte Scholarship is awarded bienni to a new student who shows promise of distinguished intellectual atta ment based upon sound character and effective personality. The aw is made in honor of Frank Aydelotte, President of the College from 19 1940, and originator of the Honors program at Swarthmore, and of Ma Osgood Aydelotte, his wife.

The Curtis Bok Scholarship was established in the College's C tennial Year 1964 in honor of the late Philadelphia attorney, author a jurist, who was a Quaker and honorary alumnus of Swarthmore. T scholarship is assigned annually to a junior or senior man or wom whose qualities of mind and character indicate a potential for huma tarian service such as Curtis Bok himself rendered and would have wis to develop in young people. Students in any field of study, and fr any part of this country or from abroad, are eligible. The scholarshi renewable until graduation.

The Edna Pownall Buffington Fund was established during College's Centennial Year of 1964. The income from this Fund is u

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 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 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.

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

The 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 PITTENGER 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. A scholarship has been established at Swarthmore by friends of Edward Clarkson Wilson, '91, formerly Principal of the Baltimore Friends School. It will be awarded each year to a former student of the Baltimore Friends School, who has

been approved by the faculty of the school, on the basis of high character and high standing in scholarship.

The CHI OMEGA SCHOLARSHIP provides an award 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 Mr. 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 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 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 $1,775 (tuition) or up to $3,000 depending on need, will be made to residents of Delaware or the Eastern Shore counties of Maryland or Virginia. One award, providing an annual grant of up to $3,000 depending on need, will be made to a resident of Maine, New Hampshire, or Vermont.

The Philip T. Sharples Scholarship, a four-year scholarship open to entering freshmen, is designed to honor and encourage young men in engineering or physical science. The committee, in making its selections, will have regard for candidates who rank highest in scholarship, character, personality, leadership, and physical vigor. At least one scholarship will be given each year.

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. Students in good standing who do not receive sufficient scholarship assistance to meet financial need are encouraged to apply for loans through the financial aid officer. 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 1966-67 the College has made approximately 125 loans in amounts averaging about $400.

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 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 SWARTHMORE COLLEGE LIBRARY, in part the gift of Andrew Carnegie, contains reading rooms, offices and a collection of 295,000 volumes. Some 12,000 volumes are added annually. About 1,400 periodicals are received regularly. The general collection, including all but the scientific and technical books and journals, is housed in the library building, situated on the front campus. An addition providing storeroom for 150,000 volumes was erected in 1935. The 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.

The THOMAS B. AND JEANNETTE E. L. MCCABE LIBRARY, with a capacity for 600 readers and approximately 425,000 volumes, is at present under construction and should be ready for occupancy in September, 1967.

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

The BIDDLE MEMORIAL LIBRARY is an attractive fireproof structure of stone and steel given by Clement M. Biddle, '96, in memory of his father, Clement M. Biddle, who served for over twenty years as a member of the Board of Managers or as an officer of the Corporation of the College.

This building houses the Friends Historical Library, which includes th Swarthmore College Peace Collection.

The FRIENDS HISTORICAL LIBRARY, founded in 1871 by Anson Lapham is one of the outstanding collections in the United States of manuscripts books, pamphlets, and pictures relating to the history of the Society o Friends. The library is a depository for records of Friends Meeting belonging to Philadelphia Yearly Meeting. More than 2,000 record book have been deposited; many of them have been reproduced on microfilm for which three reading machines are available. The William Wad Hinshaw Index to Quaker Meeting Records indexes the material o genealogical interest in the records of 307 meetings in various parts o the United States. Notable among the other holdings are the Whittie Collection (first editions and manuscripts of John Greenleaf Whittier the Quaker poet), the Mott Manuscripts (over 400 autograph letters o Lucretia Mott, antislavery and women's rights leader), and the Hick Manuscripts (more than 300 letters of Elias Hicks, a famous Quake minister). The Library's collection of books and pamphlets by and abou Friends numbers approximately 30,000 volumes. About 162 Quake periodicals are currently received. There is also an extensive collectio of photographs of meetinghouses and pictures of representative Friends It is hoped that Friends and others will consider the advantages of givin to this Library any books and family papers which may throw light o the history of the Society of Friends.

The SWARTHMORE COLLEGE PEACE COLLECTION is of special interes to research students and others seeking the records of the Peace Move ment. The personal papers of Jane Addams of Hull House, Chicago (approximately 10,000 items) formed the original nucleus of the Collec tion, which now contains documentation on the history of the organize peace movement from its beginnings *circa* 1815, to the present time, a well as correspondence and writings of many workers for internationa peace and arbitration. The Collection includes files of some 1,200 peac periodicals published in the United States and abroad over the past 15 years; approximately 162 such periodicals in eleven languages are currentl received from twenty-five countries. This collection is the official depos tory for the archives of leading peace organizations in the United State A more complete description of the Collection will be found in the *Guid to the Swarthmore College Peace Collection,* published by the College an available on request.

The WILLIAM J. COOPER FOUNDATION provides a varied program o lectures and concerts which enriches the academic work of the colleg The Foundation was established by William J. Cooper, a devoted frien of the college, whose wife, Emma McIlvain Cooper, served as a membe of the Board of Managers from 1882 to 1923. Mr. Cooper bequeathe to the college the sum of $100,000 and provided that the income shoul be used "in bringing to the college from time to time eminent citizen

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 Class of 1910 Room provides suitable quarters for student government, and other rooms are provided for student publications and other extra-curricular activities.

The COMPUTER CENTER, located in Beardsley Hall, is equipped with an I.B.M. 1620 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 who show unusual promise as instrumentalists or vocalists. In the year 1966-67 part of the fund is being used to bring to the campus two visiting Associates in Performance for weekly concerts of chamber music and for instruction for instrumentalists in the College Orchestra.

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 seven 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, Ashton House on Elm Avenue, and two buildings on the former Mary Lyon School property. Two additional dormitories, Dana and Hallowell, are under construction.

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; 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 programs 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 p. 35.)

The college psychiatric consultants hold office hours by appointment each week. The purpose of this service is to be of help in all types of emotional problems and three visits are offered without charge. The consulting psychiatrists have an office in the Worth Health Center.

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. Helen Hall and Mrs. Gloria Evans are experienced counselors who are glad to assist students with problems of academic adjustment, study skills and reading proficiency. They also can give aptitude and interest tests on request. Appointments may be made at their offices 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 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 which authorizes cars for the use of student organizations and in some cases for special needs such as jobs dependent upon cars. Day students may use cars for commuting to College, but special arrangements for stickers must be made for campus parking. More detailed information may be had from the Office of the Deans.

5. At evening concerts, 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 by ruling that if two undergraduates marry, only one may remain in college. Some exceptions have been provided in the case of upperclass students and information about them may be obtained from the Office of the Deans.

College rules which affect the entire student community are discussed and formulated for the approval of the Administration by the Student Affairs Committee, which is composed of Deans and Faculty members appointed by the President and students 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. The Curriculum Committee cooperates with a similar committee of the faculty in the discussion of matters relating to the academic program of the college. In addition to these, there are several joint Faculty-Student Committees, whose student membership is appointed by the Council: Collection, Cooper Foundation, Men's Athletics, Admissions Policy, and Student-Faculty Relations.

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.

Social Committee

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

Extra-Curricular Activities

In addition to the foregoing organizations, Swarthmore students have an opportunity to participate in a program of extra-curricular activities wide enough to meet every kind of interest. 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. No credit is given for work in such varied fields as sculpture, acting, publishing the college newspaper or playing in the orchestra. 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 Director of Studio Arts, Mrs. Harriet Baguskas, arranges for classes in applied arts and for exhibits in the Arts Center, and acts as an adviser to other organizations. The Director of Dramatics guides the activities of the Little Theater Club, which include at least two major performances, a one-act play contest, and student directed programs of an experimental nature. Many other student groups for the discussion of public affairs, the integration of the sciences, and the editing of college publications conduct their own programs with occasional advice from the faculty.

Extra-curricular musical activities at Swarthmore are numerous and well-supported. The college chorus is led by Professor Swing, and the college orchestra by Professor Spies. There are chamber music groups, madrigal groups, and public performances of the musical works of students in composition. There 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, and student tickets are available for concerts of the Philadelphia Orchestra in the Academy of Music.

Athletics

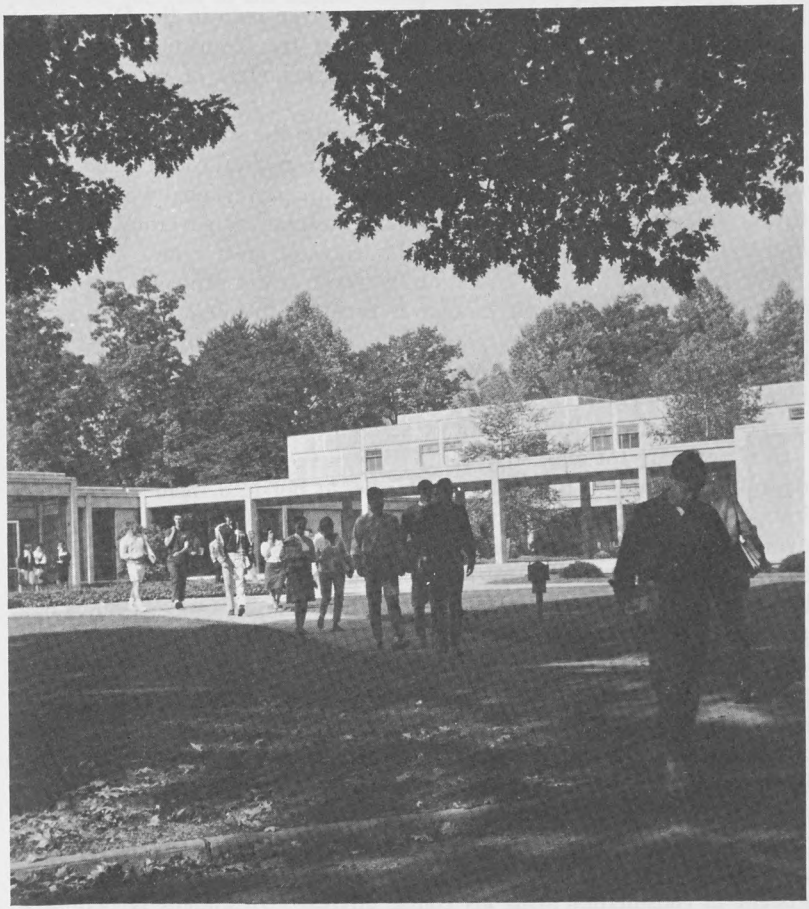
Swarthmore's athletic policy is based on the premise that any intercollegiate program must be justified by the contribution which it can make to the educational development of the individual student who chooses to participate. In keeping with this fundamental policy, Swarthmore's athletic program is 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 intercollegiate 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

SWARTHMORE COLLEGE

GENERAL STATEMENT

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

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

The purpose of a liberal education, however, is not primarily to provi vocational instruction, even though it provides the best foundation f one's future vocation. Its purpose is to help students fulfill their respons bilities as citizens and grow into cultivated and versatile individuals. liberal education is concerned with our cultural inheritance, the wor of thought, and the development of aesthetic, moral, and spiritual value

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

All students during the first half of their college program are expect to complete the general college requirements, to choose their major a minor subjects, and to prepare for advanced work in these subjects taking certain prerequisites. The normal program consists of five cours each semester during the freshman and sophomore years, chosen by t student in consultation with his course adviser. A student is permitt to take four instead of five courses, however, during two of the fo semesters, or to withdraw from one course before the middle of the s mester (if he is taking five) with the approval of his course adviser. H will therefore complete from eighteen to twenty half courses (semest courses) during his first two years.

The program for upper class students affords a choice between tw methods of study: Honors Work, leading to a degree *with Honors,* a General Courses. An Honors student concentrates on three related su jects which he normally studies by the seminar method. At the end his senior year he must take a battery of eight examinations on the wo of his seminars, set by outside examiners. (The system will be explain more fully below.)

* For groupings of departments, see page 21.

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

The program for engineering students follows a similar basic plan, with certain variations which are explained on page 96. 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. 144-146) and must attend the Collection exercises of the college (see p. 51).

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. From the four groups listed below, and from Mathematics, the student chooses work in at least six departments. At least two half-courses (or one full course) must be taken from each group.

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

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 Examination Board, or by a placement examination given at the college by the appropriate department. The desired standard is normally met on

---

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

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.

No student may take more than four half-courses (or two year-courses) in any one department during the first two years. Applications for exceptions in unusual cases may be made to the Committee on Academic Requirements.

In addition to the requirements listed above, prerequisites must be completed for the work of the last two years in major and minor subjects, and sufficient additional electives must be taken to make up a full program.

It is expected that, after 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 p. 68 and in the statements of the departments of Physical Education.

Program for Juniors and Seniors

Work in Course

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

A student must choose his major subject at the end of the sophomore year, and apply formally through the Registrar to be accepted by the division concerned. The decision will be based on an estimate of his ability in his major subject as well as on his record. If a student does not secure divisional approval, he cannot be admitted to the junior class.

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

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

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

Reading for Honors

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

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

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

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

devote half of his working time during a semester to each of his fields of study.

In practice three avenues toward an Honors degree are open:

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

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

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

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

A candidate for admission to Honors should consult the chairmen of his prospective major and minor departments during the second semester

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

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

The following courses are among the minimum requirements of most medical schools: Biology 1-2, Chemistry 1-2, Chemistry 28-29, Mathematics 3-4 or 5-6, Physics 1-2, English (two semester courses; literature courses in foreign languages do not meet medical school requirements). The foreign language requirements of medical schools are automatically met when the student has satisfied the college language requirement, which includes language course 4 or its equivalent. In addition, some medical schools require quantitative analysis (Chemistry 26) or comparative anatomy (Zoology 11). Advanced work in biology, chemistry and mathematics is recommended where the student's program and interests permit. The student is urged to familiarize himself with the specific requirements of those medical schools in which he is interested in planning his program.

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

Although some students have been admitted to medical schools upon the completion of three years of college work, most medical schools strongly advise completion of four years of college, and in practice admit very few with less.

Writing and Speaking

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

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

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 stu-

dents 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 fo engineering firms and laboratories in Europe during summer vacations Students are paid living expenses by the employing firm in the currenc of the country in which they work; they pay their own travel costs. Appli cations must be made by January 1 for work the following summer, an students are notified of the Association's decision by March 31. Fo further information, students should consult the chairman of the Depart ment of Engineering.

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

FACULTY REGULATIONS

Attendance at Classes and Collection

Members of the faculty will hold students responsible for regular at tendance at classes and will report to the Deans the name of any studen 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 whic places a heavy responsibility on all students to make sure that their wor is not suffering as a result of absences. Since freshmen must exercis particular care in this respect and since the faculty recognizes its greate responsibility toward freshmen in the matter of class attendance, it expected that freshmen, especially, will attend *all* their classes.

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

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

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

Grades

Instructors report to the Deans' office at intervals during the year upo the work of students in courses. Informal reports during the semester tak the form of comments on unsatisfactory work. At the end of each s mester formal grades are given in each course under the letter systen by which *A* means excellent work, *B* good work, *C* satisfactory work *D* passing but below the average required for graduation, and *E* failur *W* signifies that the student has been permitted to withdraw from th course by the Committee on Academic Requirements. *X* designates condition; this means that a student has done unsatisfactory work in th the first half of a year course, but by creditable work during the secon

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 must secure permission to extend the time for making up an incomplete until the second term following. This permission must be given in writing and filed in the Office of the Registrar. Any not made up within a year from the time it was imposed shall be recorded as *E,* a failure which cannot be made up.

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

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

Registration

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

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

Applications involving 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 eighteen to twenty half courses in the first two years and sixteen half courses or eight seminars in the last two years.

2. He must have an average grade of *C* on the courses counted for graduation.

3. He must have complied with the course requirements for the first two years.

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 examination 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 requirements set forth on page 68 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 division of Engineering.

The Phi Beta Kappa Prize is awarded by the Swarthmore Chapter to the member of the junior class who had the best academic record for the first two years. The value of the prize is $40.

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

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

The KATHERINE B. SICARD PRIZE of $5, endowed by the Delta Gamma Fraternity in memory of Katherine B. Sicard, '34, is awarded annually to the 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 Contest 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 48.

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 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 facul of the Department of Physical Education for Women.

FELLOWSHIPS

Three fellowships are awarded annually by the faculty, on recommend tion of the Committee on Fellowships, to seniors or graduates of the colleg for the pursuit of advanced work. The proposed program of study mu have the approval of the faculty. Applications for fellowships must b in the hands of the committee by April 15. Applicants for any one o these fellowships will be considered for the others as well.

These three fellowships are:

The HANNAH A. LEEDOM FELLOWSHIP of $900, founded by the beque of Hannah A. Leedom.

The JOSHUA LIPPINCOTT FELLOWSHIP of $1,100, founded by Howar W. Lippincott, of the Class of 1875, in memory of his father.

The JOHN LOCKWOOD MEMORIAL FELLOWSHIP of $1,100, founded b the bequest of Lydia A. Lockwood, New York, in memory of her brothe John Lockwood. It was the wish of the donor that the fellowship b awarded to a member of the Society of Friends.

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

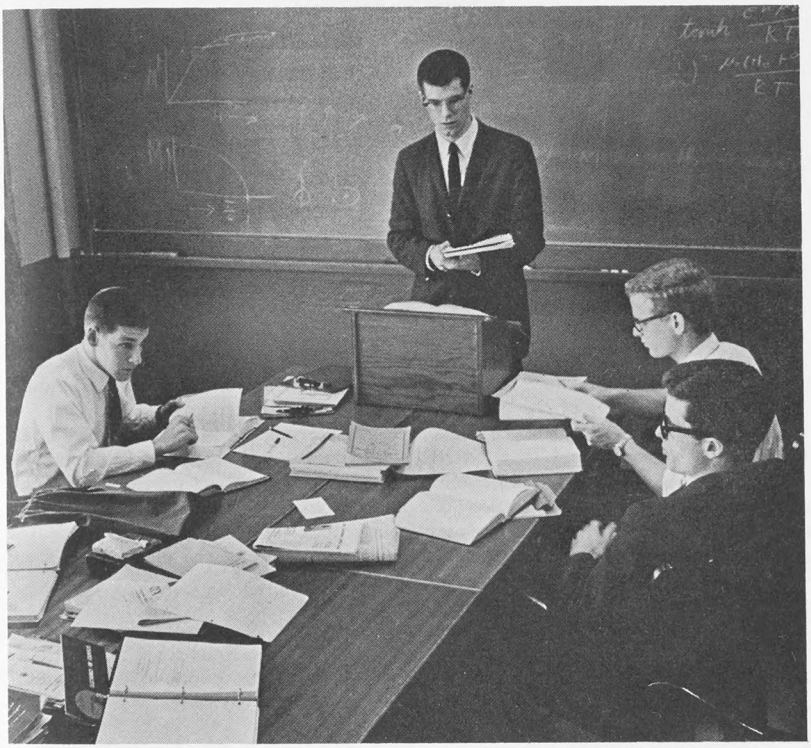
The LUCRETIA MOTT FELLOWSHIP, founded by the Somerville Literar Society and sustained by the contribution of its life members, has yielde an annual income since its foundation of $525 or more. It is awarde each year by a committee of the faculty to a woman graduate of that yea who is to pursue advanced study at some other institution approved by thi committee.

The MARTHA E. TYSON FELLOWSHIP, founded by the Somervill Literary Society in 1913, is sustained by the contributions of life membe of the society and yields an income of $500 or more. It is awarded bien nially by a committee of the faculty to a woman graduate of that year wh plans to enter elementary or secondary school work. The recipient of th award is to pursue a course of study in an institution approved by th Committee of Award.

SIGMA XI RESEARCH FELLOWSHIP. The Swarthmore Chapter of Sigm Xi appoints, from time to time, as funds are available, Fellows wit research grants with a maximum value of $1,000. The holders of thi fellowship are usually associates of the chapter who have shown con spicuous ability in graduate studies. The purpose of the chapter in award ing these fellowships is to relieve worthy students from teaching an other distracting duties so that they may concentrate as much as possibl upon their research. Applications for these fellowships should be mad

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 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.



An Honors Seminar in Engineering

COURSES OF INSTRUCTION

Numbering of Courses and Seminars

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

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

---

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

ASTRONOMY

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

VISITING PROFESSOR: MARTIN POMERANTZ ‡

RESEARCH ASSOCIATE AND LECTURER: SARAH LEE LIPPINCOTT

RESEARCH ASSISTANT: NAHIDE G. GÖKKAYA

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 Obseratory research program.

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

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

REQUIREMENTS FOR MAJORS

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

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

COURSES

1–2. DESCRIPTIVE ASTRONOMY. Mr. van de Kamp. *Full course*

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

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

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

14. PROBLEMS OF GALACTIC STRUCTURE. Miss Lippincott.

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

‡ Spring semester, 1966-67.

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. Mr. Pomerantz.

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

110. Research Project. Staff.

Graduate Work

In conformity with the general regulations for work leading to the Master's degree (see page 69), 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
LUZERN G. LIVINGSTON
NORMAN A. MEINKOTH, *Chairman*
NEAL A. WEBER

ASSOCIATE PROFESSOR: KENNETH S. RAWSON

ASSISTANT PROFESSOR: ROBERT E. SAVAGE
ASSISTANT: EDITH TWOMBLY

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

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

REQUIREMENTS FOR MAJORS IN COURSE

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

Biology

1–2. GENERAL BIOLOGY. Staff. *Full course*

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

Three lectures and one three-hour laboratory per week.
Credit is not given for a single semester of this course.

20. GENETICS. *Fall semester*

A study of the fundamental principles of inheritance as they apply to living organisms generally. The course includes a detailed consideration of the principles of Mendelian inheritance, an analysis of the underlying chromosomal

mechanisms, the gene theory, and the relationship of the principles of genetics to evolution, to plant and animal improvement, and to man.

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

Prerequisite: Biology 1-2.

Botany

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.

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.

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

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

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

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

68. BIOLOGY OF BACTERIA. Mr. Livingston *Alternate years, 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 two laboratory periods per week.

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

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.

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

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

111. PLANT PHYSIOLOGY. Mr. Livingston.

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

112. PROBLEMS OF PLANT GROWTH AND DEVELOPMENT. Mr. Livingston.

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

113. GENETICS. Staff.

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

114. EXPERIMENTAL EVOLUTION.

A study of the mechanism of evolution. Discussion traces the development of the concept of evolution and the modifications imposed by paleontology, morphology, cytology, genetics, and ecology. The problems involved in the development of a stable classification are discussed as are the implications of evolutionary thought for disciplines other than Biology. Field studies of natural populations are supplemented by laboratory work with experimental populations.

115. MICROBIOLOGY. Mr. Livingston.

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

118. PLANT ECOLOGY. Mr. Livingston.

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.

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

11. COMPARATIVE VERTEBRATE ANATOMY. *Fall semester*

This course normally follows General Biology. It deals with the comparative and unique aspects of the anatomy of the integument, skeleton, muscular, digestive, respiratory, circulatory, excretory, reproductive and nervous systems of the various vertebrate types. Classification, phylogeny and adaptive radiation are considered with stress placed on anatomical adaptations to the various habitats. The protochordates, lamprey, dogfish and cat are studied as repre-

sentative forms in the laboratory. The course has three lecture and one laboratory meeting per week, plus extra time for dissection.

12. VERTEBRATE PHYSIOLOGY. Mr. Flemister. *Spring semester*

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

51. HISTOLOGY. Mr. Weber. *Fall semester*

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

Prerequisites: 1-2, 11.

52. EMBRYOLOGY. Mr. Enders or Mr. Weber. *Spring semester*

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

53. ENTOMOLOGY. Mr. Weber. *Spring semester*

The study of insects and their relatives, their morphological and physiological adaptations and their effect on man. 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.

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.

55. 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.

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

A course designed to acquaint the student with the fundamental morphology, classification, phylogeny and special problems of the invertebrate phyla.

Three lectures and one laboratory period per week. Occasional field trips.

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: Comparative Anatomy and Organic Chemistry.

58. PHYSIOLOGICAL ECOLOGY. Mr. Flemister. *Spring semester*

A course of lectures, discussions and experiments concerning the physiological adaptations of representative animals to environmental stress. Requirements

and availability of optimum conditions of temperature, oxygen, food-stuffs and the maintenance of ionic independence are appraised.

Two lectures and two laboratory periods per week.

Prerequisite: 57 Comparative Physiology.

59. CYTOLOGY. *Alternate years, fall semester*

A study of the structure and function of cells as units of biological organization, and relationships within tissues and organs. In the laboratory the student learns some of the techniques by which information about cells is arrived at, and observes the characteristics of cells as units, and as parts of organized tissues.

Three lectures and one laboratory period per week.

Prerequisites: Biology 1-2, Biology 11 or 20, Chemistry 1-2.

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: Genetics or Comparative Anatomy.

61. BIOLOGY FOR SENIORS. Mr. Enders. *Spring semester*

A course, patterned on the seminar plan, designed to broaden and integrate the student's knowledge of biology. Each student must present three topics and lead the discussion. A weekly summary of reading is required.

63, 64. SPECIAL TOPICS. Staff. *Full or half course*

For advanced students. Open to those who, on account of fitness, have arranged a program of special work in the department.

HONORS WORK

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

Students anticipating an honors program in Zoology must complete in the first two and a half years the following: Biology 1-2 and Zoology 11, Chemistry 1-2, Mathematics 3-4, and Physics 1-2. In addition, to qualify for minor seminars in the departments indicated, Chemistry requires Chemistry 28-29, Mathematics and Physics require Mathematics 11-12, and Psychology requires Psychology 1, and another half course.

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

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

102. CYTOLOGY.

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

103. EMBRYOLOGY. Mr. Weber.

An analysis of reproduction and development. The laboratory work includes individual projects by the students, a study of developmental anatomy of the chick, pig and frog, and the observation of living material under normal and experimental conditions.

104. COMPARATIVE PHYSIOLOGY. Mr. Flemister.

An intensive consideration of the physical and chemical phenomena underlying the function of animals. A comparative approach is maintained in order to consider the progression from more general to the most specialized adjustments, acclimatizations and adaptations of animals to physical, chemical and biological stresses in the environment. The terminal portion of the laboratory program is devoted to the pursuit of original, independent work by the student. Prerequisites for this seminar are courses in Comparative Anatomy and Organic Chemistry.

Offered in the fall term.

106. ENTOMOLOGY. Mr. Weber.

Following a survey of insects in general, a detailed study of one aspect of the field will be undertaken. This will involve use of a scientific library, independent work on one topic, and discussions of current research.

107. INVERTEBRATE ZOOLOGY. Mr. Meinkoth.

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

108. SENSORY PHYSIOLOGY. Mr. Rawson.

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

109. BIOLOGY OF ANIMAL COMMUNITIES. Mr. Rawson.

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
ROBERT E. LEYON

INSTRUCTOR: JAMES R. HUTCHISON

The aim of the Department of Chemistry is to provide a sound training in th 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 o 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 o astronomy, botany, engineering, mathematics, medicine, physics, or zoology These students should consult with their major department and with the Chemistry department concerning the chemistry courses most suitable to their needs
3. Students who consider chemistry their major interest. These students should take Chemistry 1, 2 and Mathematics in their freshman year; Chemistry 28-29 Mathematics 11, 12 and Physics 1, 2 in their sophomore year; Chemistry 26, 27 and Chemistry 61, 62 in their junior year. Some students interested in Chemistry as a scientific study of general educational value, but with no intention o pursuing chemistry as a profession, will find these basic courses sufficient fo their needs. The minimum requirements of the American Chemical Society for professional training in chemistry are satisfied by these courses together with Chemistry 66 and an additional semester of advanced chemistry. Mathematics 51, 52 and Physics 11, 12 are strongly recommended. Major students are expected to have a reading knowledge of German before the beginning o their senior year.*

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

A study of the central concepts and basic principles of chemistry, including the interpretation of chemical properties and reactions in terms of atomic and molecular structure, equilibrium constants, oxidation potential, free energy and heats of reaction, chemical thermodynamics and reaction kinetics. In the laboratory in the first semester a number of quantitative experiments are worked, in the second semester the principles of chemical equilibria are applied to qualitative analysis.

Students who enter college with advanced training in chemistry are encouraged to take a placement examination during freshman orientation week. If sufficiently well prepared they may omit all or part of the introductory course.

Prerequisite for all other courses in Chemistry.

Three lectures and one laboratory period weekly.

2B. PHYSICAL APPROACH TO INTRODUCTORY CHEMISTRY. Mr. Thompson.
Spring semester

A course designed for students with exceptional high school training in physical science and mathematics and demonstrated ability in chemistry.

Admission by invitation of the staff.

---

* This may be demonstrated by completing German 4 or 8 or by an examination given by the Department of Chemistry.

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. Prerequisite: Chemistry 2 or 2B; Chemistry 61, 62 taken concurrently is highly desirable.

Three lectures and one laboratory period weekly.

28–29. ORGANIC CHEMISTRY. Mr. Fehnel and Mr. Hammons. *Full course*

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.

Prerequisite: Chemistry 2 or 2B.

Three lectures and one laboratory period weekly.

61, 62. THEORETICAL CHEMISTRY. Mr. Hutchison and Mr. Thompson.

The principles of physical chemistry are studied and a number of numerical exercises are worked; the gaseous, liquid and solid states, solutions, colloids, elementary thermodynamics, chemical equilibria, electrochemistry, the kinetics of chemical reactions.

Prerequisites: Second year mathematics and general physics.

Three lectures and 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.

Three hours of discussion weekly.

65. ADVANCED INORGANIC CHEMISTRY. Mr. Hutchison. *Spring semester*

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

Prerequisite: Chemistry 61.

Three lectures or conferences and one laboratory period weekly.

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

Classroom and laboratory study of the characterization and systematic identification of organic compounds. Emphasis is placed on the correlation of structure and properties of organic molecules and on the theoretical principles

underlying various chemical and physical methods of isolation and identi cation. A reading knowledge of German is desirable.

Prerequisite: Chemistry 28-29.

Two lectures and two laboratory periods weekly.

67. ADVANCED ORGANIC CHEMISTRY. Mr. Hammons. *Spring semest*

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

Prerequisite: Chemistry 28-29.

Three hours of discussion weekly.

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

An elective half-course, which provides an opportunity for qualified advance students to undertake original investigations or to make detailed literatu studies of selected topics in the fields of inorganic, organic, analytical, an physical chemistry. The course is designed to give the student practical e perience in the solution of a research problem, to develop facility in the use the chemical literature and in the interpretation and communication of exper mental results, and to stimulate interest in current developments in chemic research. Students who propose to take this course should consult with th appropriate instructor during the semester preceding that in which the work to be done.

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

HONORS WORK

Before admission to honors work the chemistry major will have completed Chem istry 1, 2 or 2B, 28, 29, Mathematics 3, 4, 11, 12, and Physics 1, 2. The honor program includes Chemistry 101, 105 in the junior year and Chemistry 106 and 10 in the senior year, with four other seminars usually in biology, mathematics, o physics.

101. THEORETICAL CHEMISTRY. Mr. Thompson. *Fall semeste*

The gaseous, liquid, and solid states, solutions, colloids, elementary thermo dynamics, chemical equilibria, electrochemistry, the kinetics of chemical re actions.

Prerequisites: Second year mathematics and general physics.

One seminar and seven hours of laboratory weekly.

105. CHEMICAL ANALYSIS. Mr. Leyon. *Spring semeste*

The material covered is essentially the same as in courses 26 and 27: th principles and practice of volumetric and gravimetric analysis, optical an electrical methods of analysis, separation techniques, and the analysis o organic compounds. The analytical chemistry of the common elements studied to illustrate the application of analytical methods.

Prerequisite: Chemistry 2 or 2B, and 101.

One seminar and eight hours of laboratory weekly.

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

An intensive study of essentially the same subject matter as is covered i courses 66 and 67. A reading knowledge of German and a familiarity wit physical chemistry are desirable.

Prerequisites: Chemistry 28-29 and senior standing.

One seminar and seven hours of 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 six hours of laboratory weekly.

CLASSICS

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

ASSISTANT PROFESSOR: THOMAS N. MITCHELL

LECTURER: GABRIELE S. HOENIGSWALD

The Department of Classics offers instruction in the various fields which constitut the study of Greek and Roman culture. Courses numbered from 1 to 20 are devote to the Greek and Latin languages and literatures. Courses numbered from 31 on wards presuppose no knowledge of the Greek or Latin languages and are ope 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 classica literature in translation.

REQUIREMENTS AND RECOMMENDATIONS FOR MAJORS

Greek or Latin may be offered as the major subject either in course or in honor work. Major students in course are normally required to complete during the firs two years either Intermediate Greek (course 11-12) or Introduction to Latin Litera ture (course 11-12). Both of these courses are prerequisite for honors seminar for a major student and one of them for honors seminars for a minor student.

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

Greek

1–2. ELEMENTARY GREEK. Miss North. *Full cours*

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

9, 10. GREEK PROSE COMPOSITION. Staff. *Each semeste*

A non-credit course, meeting one hour a week. This course is recommende in conjunction with courses at the intermediate level or above, to provid the student with grammatical and stylistic exercise.

11, 12. INTERMEDIATE GREEK. Mr. Ostwald.

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

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

The works read are determined by the interests and needs of the members o the class. These readings are supplemented by a survey of the history, o Greek Literature. Credit is given for each semester.

15, 16. GREEK POETS. Miss North, Mr. Ostwald.

The works read are determined by the interests and needs of the member of the class. Credit is given for each semester. The course is offered onl when required.

20. SPECIAL TOPICS. Staff.

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

Latin

1–2. ELEMENTARY LATIN. Mr. Mitchell. *Full course*

The course is designed for students who begin Latin in college or who are not prepared to enter Intermediate Latin, and it normally covers the equivalent of two years' work in secondary school.

4. INTERMEDIATE LATIN. Mrs. Hoenigswald. *Fall semester*

The study of Virgil's *Aeneid* and a review of the principles of Latin Grammar.

9, 10. LATIN PROSE COMPOSITION. Staff. *Each semester*

A non-credit course, meeting one hour a week. This course is recommended in conjunction with courses at the intermediate level or above, to provide the student with grammatical and stylistic exercise.

11, 12. INTRODUCTION TO LATIN LITERATURE. Miss Cobbs.

The course aims to give some conception of the scope and characteristic qualities of Latin literature. The reading includes a comedy and the *Cena Trimalchionis* from Petronius' *Satyricon* in the first semester and the *Odes* of Horace in the second. Credit is given for each semester. It is open to students who have had four years of preparatory Latin or who have completed Intermediate Latin.

13. CATULLUS AND ELEGY. Mr. Mitchell. *Fall semester*

A study of the poems of Catullus and the elegiac poets.

14. LITERATURE OF THE EMPIRE. Mrs. Hoenigswald. *Spring semester*

Readings in the prose and poetry of the Silver Age of Latin literature.

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 Middl Ages, Boethius, Prudentius, Bede, the chief figures of the Carolingian Renais sance, and the writers of Mediaeval Latin hymns and secular poetry. Th course is normally given in alternate years.

36. Classical Mythology in Literature and Art. Miss North.
Spring semest

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

42. Greece in the Fifth Century B.C. Mr. Ostwald. *Spring semest*

An intensive study, chiefly on the basis of primary sources, of Athens and th Greek world from the reforms of Cleisthenes to the end of the Peloponnesia War. Special emphasis is placed on the political, social, and econom institutions of the Athenian democracy and on the problems of the Delia League, both internal and in its relation to the Greek and non-Greek worl

Prerequisite: Classics 31 or its equivalent.

44. Rome in the Age of Augustus. Mr. Mitchell. *Spring semest*

This course treats in detail the political, economic, social, and cultural develo ment of Rome and the Roman world from the death of Julius Caesar to th accession of Tiberius. Special emphasis is placed on Octavian's rise to powe the nature of the principate, the relationship of the ruling city to her province Rome's changing social structure, and the problems of political stability an the transference of power. Some attention is paid to literary, artistic, an religious movements. Readings are chiefly in primary sources in translatio 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 the Silver Age with intensive study of selected books of Livy and Tacitu both as examples of Roman historiography and as sources for Roman histor The seminar is given in the spring semester.

103. Latin Epic. Mr. Mitchell.

This seminar traces the development of Roman epic poetry, with particula emphasis on the *De Rerum Natura* of Lucretius and the *Aeneid* of Virgi Some attention is also given to early Roman epic, as represented by th *Annales* of Ennius, and to the later epic, typified by Lucan's *Pharsalia.* Th seminar is given in the fall semester.

104. Latin Comedy and Satire. Mr. Mitchell.

Representative comedies of Plautus and Terence are read, and a study of th *Satires* and *Epistles* of Horace and the *Satires* of Juvenal is supplemente by a general survey of the development of Roman satire. The seminar given in the fall semester.

107. Ancient Rhetoric and Literary Criticism. Miss North.

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

108. MEDIAEVAL LATIN. Mr. Mitchell.

The works studied in this seminar are chosen from the principal types of mediaeval Latin literature (including religious and secular poetry, history and chronicles, saints' lives, satire, philosophy, and romances). Some attention is paid to their origins in late antiquity and their influence on the early Renaissance.

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. Miss North.

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

113. GREEK HISTORIANS. Mr. Ostwald.

The greater part of the work of this seminar is devoted to Herodotus and Thucydides, but portions of Xenophon's *Hellenica* and of Polybius are also studied, 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†
CLAIR WILCOX, *Chairman*

DISTINGUISHED VISITING PROFESSOR: LAWRENCE H. SELTZER**

ASSISTANT PROFESSOR: FREDERIC L. PRYOR

INSTRUCTORS: LEWIS R. GATY
CHARLES J. SIEGMAN

LECTURER: HELEN M. HUNTER

VISITING LECTURERS: RICHARD B. DUBOFF
ARTHUR M. FREEDMAN***

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

Course 1-2 is prerequisite to all other work in the department except courses 3 and 4. Students intending to major in economics are advised to take Political Science 1-2 and courses in accounting, statistics or mathematics. Majors in course are required to take courses 50 and 51 in the junior year. Majors in honors are advised to take seminars 103 and either 101 or 102.

1–2. INTRODUCTION TO ECONOMICS. Messrs. Pierson, Wilcox, Pryor, Gaty, Siegman, DuBoff, and Mrs. Hunter.

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

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

11. ECONOMIC DEVELOPMENT. Mr. Wilcox. *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, 1966-67.
** Fall semester, 1966-67.
*** Spring semester, 1966-67.

50. ECONOMIC THEORY. Mr. Gaty. *Fall semester*

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

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. Seltzer. *Fall semester*

Revenues and expenditures of Federal, state, and local governments. Principles of taxation. Borrowing and debt management. Fiscal policy.

54. BUSINESS FINANCE. *Fall semester*

Corporate finance, investment banking, and the securities markets.

Not offered in 1966-67.

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. Wilcox. *Spring semester*

The extent, consequences, and causes of poverty, inequality, and insecurity. An appraisal of reforms: social insurance, medical care, public housing, rural development. The economics of discrimination and of educational opportunity.

Not offered in 1966-67.

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.

Not offered in 1966-67.

58. PUBLIC CONTROL OF BUSINESS. Mr. Wilcox. *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.

59. BUSINESS CYCLES. *Spring semester*

Analysis of business fluctuations and long-term economic change. Public policies for stabilization and growth.

60. INTERNATIONAL ECONOMICS. Mr. Siegman. *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. *Spring semester*

A comparative study of the economic systems of the Soviet Union, China, India, the United Kingdom, and the United States.

HONORS WORK

101. FINANCE. Mr. Seltzer. *Fall semester*

Revenues and expenditures of Federal, state and local governments. The principles of taxation. Problems of the Federal debt. Corporation finance, investment banking, and the securities markets. Public regulation of financial practices.

102. ECONOMIC STABILITY AND GROWTH. Mr. Freedman. *Spring semeste*

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. Gaty. *Each semeste*

Contemporary theory: price determination, the functional distribution of in come, the level of employment. Evaluation of theory in the light of simplify ing assumptions and empirical evidence. The relevance of theory to socio economic problems.

104. PUBLIC CONTROL OF BUSINESS. Mr. Wilcox. *Spring semeste*

The maintenance of competition in American industry. The moderation o competition in agriculture, the extractive industries, and the distributive trades The regulation of public utilities, transport, and communications. Public owner ship and operation of industry.

Not offered in 1966-67.

105. INTERNATIONAL ECONOMICS. Messrs. Siegman and Wilcox. *Each semeste*

Theory and practice in international economic relations. The pure theory o international trade. The balance of payments and the mechanism of inter national exchange. Restrictionism and discrimination. Regionalism. Relation with controlled economies. International investment and foreign aid.

106. COMPARATIVE ECONOMIC SYSTEMS. Mr. Pryor. *Spring semeste*

Economic organization, resource allocation, and growth in an advance planned economy: the USSR. Economic development in a backward planne economy: China. Economic development in a backward mixed economy India. An advanced socialist-welfare economy: the United Kingdom. Th changing economy of the United States.

107. LABOR AND SOCIAL ECONOMICS. Messrs. Pierson and Wilcox. *Fall semeste*

The organization of labor. Analysis of wage policies. Government control o labor relations. Poverty, inequality, and insecurity. Social insurance, medica care, public housing, and rural development.

108. MATHEMATICAL ECONOMICS. *Spring semeste*

Econometrics, difference and differential equations, and other applications o mathematics to economics.

Prerequisites: Mathematics 12 and Economics 103.

Not offered in 1966-67.

ENGINEERING

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

ASSOCIATE PROFESSORS: CARL BARUS
DAVID L. BOWLER‡
RAYMOND DOBY
CLARK P. MANGELSDORF‡
M. JOSEPH WILLIS

ASSISTANT PROFESSOR: G. STUART PATTERSON, JR.
INSTRUCTOR: WILLIAM C. KERR
LECTURER: JOHN B. CLOTHIER, JR.
VISITING LECTURER: LEONARD R. MANN**

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.

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 Sequences).

(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 sequences 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.

---

‡ Absent on leave, 1966-67.

* 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.

** Fall semester, 1966-67.

A candidate for a degree in Engineering must meet the general requiremen of the College as specified for the Division of Engineering (pp. 59-61). Cu ricular plans for the first two years must take two objectives into consideratio (1) the basic engineering science courses should meet the prerequisite requir ments for advanced work in Engineering at the upper-class level, and (2) t general College requirements should normally be fulfilled prior to junior standin The first two years of "Engineering Curriculum" (see following pages) will ge erally provide the background for the Engineering student to engage in any the various plans of study and furnish the prerequisites for the advanced work the junior and senior years. Modifications of the basic four year program a possible in individual cases but such changes must be approved by the studen course adviser and the Department of Engineering. During the second semest of the sophomore year the Engineering student, following College procedure, w apply for a Course program with a major in Engineering, or he may apply to re for Honors in Engineering.

Course Programs

All four year programs lead to the degree of Bachelor of Science with the maj in Engineering. The thirty-six semester courses are distributed as follows: Fo semesters of mathematics, three semesters of Chemistry, three semesters of Physi eight semesters of required Engineering common-core subjects, four semesters approved Engineering electives and four semesters of free electives chosen fr College-wide areas of instruction including Engineering. Except for the cour required to meet the College general requirements (pp. 59-61), the remaining cour are unrestricted, but it is recommended that they be selected from the humanit and social sciences.

The required courses, with the normal sequence of study, are shown in t following outline of the Engineering curriculum.

Engineering Curriculum

First Year

Fall Semester	*Spring Semester*
Introduction to Engineering	Mechanics I
Physics 1	Physics 2
Mathematics 5	Mathematics 6
Elective	Elective
Elective	Elective

Second Year

Electrical Science	Lumped-parameter Systems
Mechanics II	Mathematics 16
Mathematics 15	Chemistry 2
Chemistry 1	Elective
Elective	Elective

Third Year

Distributed-parameter Systems	Physical Chemistry
Thermodynamics	Elective
Elective	Elective
Elective	Elective

Fourth Year

Modern Physics	Materials Science
Elective	Elective
Elective	Elective
Elective	Elective

Course Advising and Approval of Programs

Students are advised to make their educational goals known to their Engineering 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 basic plan of upper-class 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 applying to become candidates for a degree with Honors should present their proposed program to the Division of Engineering for approval, after consulting with the Chairman of the Department of Engineering.

Each student must present an educationally sound program along with a statement of his reasons for believing that his program is appropriate to his goals. Reading for Honors in Engineering will normally require the scheduling of eight related seminars and should include seminars in Engineering, Physics or Chemistry, and Mathematics. The passing of the Honors examinations, with one paper for each seminar, leads to the Bachelor of Science degree with Honors, High Honors, or Highest Honors, in the Division of Engineering. Honors work in Engineering is customarily carried on in seminars of three or more students; a minimum of three students is thought to be desirable for the students to develop the full educational benefits of the seminar method of study.

Elective Sequences in the Course Program

The required courses in Mathematics, Physics and Chemistry, and the required eight semester courses of the Engineering core provide the supporting subjects upon which to base a total program meeting particular needs and educational interests. The following suggested sequences of study beyond the required courses are listed to indicate the flexibility of choice open to the student. Other sequences may also be arranged beyond the suggested plans. At least four elected and approved courses in Engineering beyond the required courses must be included in the elected sequence. The four free electives are also available for inclusion in these sequences. Electives in the Humanities, Social Sciences and Life Sciences can also contribute, in many cases, to the central aims of a sequence. A course in Special Topics is available for meeting special interests or needs.

Suggested Elective Sequences

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
Transportation Systems
Urban and Regional Planning
Water Resources

The minimum course sequence is Structural Mechanics I, Earth Science, Civil Engineering Design, with a fourth course chosen from Fluid Mechanics, Structural Mechanics II, or Soil Engineering. The minimum sequence provides the prerequisites for an additional elective sequence in Structures, Water Resources and Environmental Control, Regional and Urban Planning, Transportation Systems, Pre-Architecture, or General Civil Engineering, as desired by the student. 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

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.

Psychology
Physics

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*

Introduction to engineering design, analysis, and decision making. Computer programming and numerical methods. Students will use the college's IBM-1620 digital computer.
Graphical communication and sketching. Shop processes.
Student projects in engineering design using the computer, graphics and shop.
Three class periods and one three-hour 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 one three-hour 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 one three-hour laboratory each week.
Prerequisite: Mechanics I.

4. ELECTRICAL SCIENCE.

The experimental and theoretical basis of electricity and magnetism; elementary electrostatics and magnetostatics; foundations of circuit theory, principles of energy conversion, and transient analysis of linear networks.
Three class periods and one laboratory each week.
Prerequisites: Physics 1 and 2, and to be preceded or accompanied by Integral Calculus.

5. LUMPED-PARAMETER SYSTEMS. *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 and the treatment of the linear 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, 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 one laboratory each week.

7–8. PRINCIPLES AND PROBLEMS OF MODERN TECHNOLOGY. *Full course*

This course is designed to meet the needs of non-science majors and fulfills the group 1 distribution requirement. (See pp. 59-61.) 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. The interactions among science, technology, and society will be considered in terms of the past, present, and future. 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. Possible topics are world communications, water resources, energy conversion and energy resources.

Three class periods and one three-hour laboratory period each week.

51. DISTRIBUTED-PARAMETER SYSTEMS. *Fall semester*

A study of a class of physical systems that can be represented by simple distributed-parameter models. Phenomena common to fluid, elastic, electromagnetic, thermal, and other such systems are treated with emphasis on their physical analogy and their consequent mathematical unity. The partial differential equations governing such phenomena are developed from basic principles, introducing vector calculus. Application is made to realistic engineering situations.

Three class periods and one laboratory each week.

Prerequisite: Engr. 5—Lumped-Parameter Systems.

52. 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.

53. MATERIALS SCIENCE. *Spring 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 one laboratory each week.

Prerequisites: Physical Chemistry, Modern Physics.

54. SYSTEMS ANALYSIS.

A study of advanced mathematical procedures useful in analyzing the behavior of physical systems. Included will be such topics as Laplace and Fourier methods, auto- and cross-correlation of stochastic signals, phase-plane analysis, the Z-transform, signal flow graphs, concepts of optimization, etc. The systems to which the above procedures apply may be linear or nonlinear, and subjected to precisely defined or to random types of disturbances.

Three class periods and one computation period each week.

Prerequisites: Engr. 5 and Engr. 51.

55. Operations Research.

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 simulation, 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.

59. Mechanics of Solids.

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 one three-hour laboratory each week.

Prerequisites: Mechanics I and II.

62. Structural Mechanics I.

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

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

63. Structural Mechanics II.

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 one three-hour laboratory each week.

Prerequisite: Structural Mechanics I.

64. Earth Science.

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 one laboratory each week.

65. Civil Engineering Design.

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 one three-hour laboratory each week.

66. Structural Design.

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 one three-hour laboratory each week.

Prerequisites: Engr. 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 one laboratory each week.

68. TRANSPORTATION SYSTEMS.

The essentials of transportation planning, design and operation are introduced with the major emphasis on urban systems. Specific topics include traffic forecasting, geometric design of highways, theory of traffic flow and control, intersection design and operation of mass transportation facilities and terminals.

Three class periods and one laboratory each week.

Prerequisite: Engr. 55, but may be taken concurrently.

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 one laboratory each week.

Prerequisite: Engr. 64.

71. CIRCUIT THEORY.

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 one laboratory each week.

Prerequisites: Engr. 5, or Physics 12.

72. ELECTROMAGNETIC THEORY.

Maxwell's equations and their application. Macroscopic field treatment of magnetic, dielectric and conducting bodies. Forces, motion, and energy storage. Calculation of circuit parameters. Skin effect. Electromagnetic waves; their propagation, guidance, and radiation.

Three class periods and one laboratory each week.

Prerequisite: Engr. 51, or equivalent.

73. ELECTRONICS I.

Electronic circuit analysis. Emphasis is placed on the use of small-signal and piecewise linear models to represent transistors and vacuum tubes. Steady-state and transient responses of circuits are analyzed.

Three class periods and one laboratory each week.

Prerequisite: Engr. 5, or equivalent.

74. ELECTRONICS II.

Further study of electronic circuit analysis, with emphasis on the use of transistors at high frequencies and in the switching mode. Topics in communication theory may be included.

Three class periods and one laboratory each week.

Prerequisite: Engr. 73.

75. ELECTROMECHANICAL ENERGY CONVERSION I.

Principles and physical aspects of electromechanical energy conversion; basic concepts of rotating machine performance and the analysis of ideal rotating electrical machinery and the dynamics of coupled systems.

Three class periods and one laboratory each week.

Prerequisite: Engr. 5.

76. ELECTROMECHANICAL ENERGY CONVERSION II.

Transformers, D-C machines, analysis of performance and applications, synchronous machines, performance, effects of saturation and saliency; polyphase induction machines; fractional horsepower motors; rotating control devices; and self-synchronous machines.

Three class periods and one laboratory each week.

Prerequisites: Engr. 5 and Engr. 75.

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 one laboratory each week.

Prerequisites: Engr. 72 and Engr. 74.

78. AUTOMATIC CONTROL.

An introduction to automatic control systems using the Laplace transform and signal flow graphs. System design is studied by means of the Nyquist diagram, frequency response methods, and the root locus method. Other topics include compensation networks, multiple input systems and system optimization. Advanced topics are introduced: nonlinear and sample data systems, adaptive control, etc.

Three class periods and one laboratory each week.

Prerequisites: Engr. 5 and Engr. 51.

79. 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 one laboratory each week.

Prerequisite: Physics 51.

81. INTRODUCTION TO FLUID MECHANICS AND CONVECTIVE HEAT TRANSFER.

The fundamentals of the transfer of momentum, heat, and mass; the mechanics of the fluid state of matter. The continuum; stress, deformation rate, continuity, the Navier-Stokes equations. Application to inviscid, incompressible flow and viscous flow and convective heat transfer.

Three class periods and one laboratory each week.

Prerequisite: Engr. 51.

82. ADVANCED FLUID MECHANICS.

A study of the more specialized areas of fluid mechanics; boundary layer theory, turbulence, and compressible flow.

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

Prerequisite: Engr. 81.

83. CONTINUUM MECHANICS.

A study of the formulation and solution of the governing equations for the mechanics of a continuous medium. Stress, deformation, rheological models, constitutive equations, conservation laws, and applications.

Four class periods each week.

Prerequisite: Engr. 81 or Engr. 59.

84. ADVANCED THERMODYNAMICS.

An extension of the basic core thermodynamics, Engr. 52. The fundamental laws of thermodynamics are applied to conventional systems of energy con-

version. Principles of irreversible thermodynamics are developed and applied to systems of direct energy conversion.

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

Prerequisite: Engr. 52.

85. 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.

88. 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.

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

Prerequisites: Engr. 51, 52.

89. MACHINE DESIGN.

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

Three class periods and one three-hour 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 one three-hour 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.

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

101. MECHANICS OF SOLIDS.

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

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

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.

103. THERMODYNAMICS.

Fundamental concepts, properties of substances, equations of state, first and second laws of thermodynamics and their applications, entropy, gas and vapor cycles, Maxwell equations, availability, Onsager's theorem, applications to direct energy conversion.

104. FLUID MECHANICS.

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

105. LINEAR SYSTEMS.

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

106. STRUCTURAL MECHANICS.

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

Prerequisite: Engr. 101—Mechanics of Solids.

107. MECHANICAL DESIGN.

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

108. EARTH SCIENCE.

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

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

110. CONTINUUM MECHANICS.

Study of the mechanics of a continuous material. Stress, deformation, strain, rheological models, constitutive equations, conservation laws, and applications, with particular attention to elastic materials and Newtonian fluid mechanics.

111. CIRCUIT THEORY.

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

112. ELECTROMAGNETIC THEORY.

Development and application of Maxwell's equations. Fields in bounded space and in dielectric, magnetic and conducting materials. Wave propagation and

reflection. Radiation. Electromagnetic energy storage and electromechani energy conversion.

113. ELECTRONICS.

A study of electronic devices and circuits. Subject matter includes physi theory of electron tubes, semiconductor devices, and other electronic circ elements; design of electronic circuits applicable to communications, inst mentation, information processing systems, etc.; transient and steady-st analysis of electronic circuits and systems; introductory topics in the the of communication and information. The seminar is accompanied by a fu day laboratory.

Prerequisite: Engr. 111, or equivalent.

Engineering Curricula

FOR STUDENTS WHO HAVE ENTERED IN SEPTEMBER 1965 OR BEFO

Three educational plans are offered:

(1) The Course program with a major in Civil, Electrical, or Mechani 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 stu

A candidate for a degree in Engineering must meet the general requirements the College as specified for the Division of Engineering (pp. 59-61) and t requirements of the particular discipline or program in which he is a major. Th curricular plans for the first two years must take two objectives into considerati (1) the basic engineering science courses must provide a foundation and m the prerequisite requirements for advanced work at the upper-class level, and (the general College requirements should be essentially fulfilled prior to juni standing. Experience has shown that the suggested "Basic Engineering Curriculu of the First Two Years" (page 107) will meet the needs of the usual engineeri student in any one of the three plans and will clear the way for the advanc work of the junior and senior years. Modifications of the basic program, as w as those of the major disciplines, are possible in individual cases but such chang must be justified and approved by the student's course adviser. At the end of t sophomore year, the student will enter the Course program in a major field 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, Mechanical Engineering; these curricula are accredited by the Engineers' Coun for Professional Development. Over the four years, the student will take abo one-quarter of his work in the Divisions of the Humanities and Social Scienc one-quarter in the Departments of Chemistry, Mathematics, and Physics, and t remainder in the Department of Engineering. All students devote their last tw years: (1) to certain basic courses required of all engineers; (2) to fulfillin the major requirements of one of the disciplines of Engineering; (3) to developi their special interests. After completing the basic program of the first two yea the student follows the curriculum outlined on the following pages under t 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 61. 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	*Spring Semester*
Freshman Year	
Mathematics 3 (or 5)	Mathematics 4 (or 6)
Physics	Physics
Chemistry *	Chemistry
Introduction to Engineering	Mechanics I
Elective	Elective

* Chemistry may be deferred until the sophomore year.

Fall Semester *Spring Semester*

Sophomore Year

Mathematics 11 (or 15)	Mathematics 12 (or 16)
Mechanics II	Engineering Measurements
Materials Science	Electrical Engineering Science
Elective	Elective
Elective	Elective

Civil Engineering

STANDARD PROGRAM FOR COURSE STUDENTS

Fall Semester *Spring Semester*

Junior Year

CE51 Mechanics III	CE52 Structural Theory
EE63 Electronic Circuits	CE54 Soil Mechanics and Foundations
ME51 General Thermodynamics	ME54 Fluid Mechanics
EE55 Engineering Analysis	EL10 Writing and Speaking

Senior Year

CE53 Structural Mechanics	CE58 Special Topics
CE55 Civil Engineering Design I	CE56 Civil Engineering Design II
CE57 Water Resources	GE57 Operations Research and Engineering Economy
Elective	Elective

Electrical Engineering

STANDARD PROGRAM FOR COURSE STUDENTS

Fall Semester *Spring Semester*

Junior Year

EE53 Circuit Theory I	EE54 Circuit Theory II
EE55 Engineering Analysis	EE56 Field Theory
EE59 Electronics	EE60 Electronics
ME51 General Thermodynamics	EL10 Writing and Speaking

Senior Year

EE57 Electrical Machinery I	EE58 Electrical Machinery II
EE61 Waves and Transmission Lines	Electrical Engineering Elective
Ph51 Modern Physics	Technical Elective
Elective	Non-technical Elective

Mechanical Engineering

STANDARD PROGRAM FOR COURSE STUDENTS

Fall Semester *Spring Semester*

Junior Year

CE51 Mechanics III	ME52 Advanced Thermodynamics
ME51 General Thermodynamics	ME54 Fluid Mechanics
EE55 Engineering Analysis	ME62 Advanced Strength of Materials
Non-technical Elective	Non-technical Elective

Fall Semester	*Spring Semester*
Senior Year	
ME53 Heat and Mass Transfer	ME64 Engineering Design II
ME55 Advanced Fluid Mechanics	ME66 Mechanical Engineering Problems
ME63 Engineering Design I	EE64 Automatic Control
EE63 Electronic Circuits	Non-technical Elective

ENGLISH LITERATURE

PROFESSORS: GEORGE J. BECKER, *Chairman*
SAMUEL HYNES

ASSOCIATE PROFESSORS: DAVID COWDEN
HAROLD E. PAGLIARO

ASSISTANT PROFESSORS: THOMAS H. BLACKBURN
JOHN J. MCLAUGHLIN
SUSAN B. SNYDER

INSTRUCTORS: THOMAS ARTIN
JOHN S. SHACKFORD

This department might more properly be called the Department of Literatu in English, since it offers a study both of literature originally written in t English language and of works translated from other tongues. Literature is co sidered as a fine art, as a cultural record, and as a guide to the student's interpret tion of his own experience in life. The program of courses and seminars compris four approaches to the subject: the intensive study of the work of major write examination of the literature produced in certain limited periods, the historic development of the major literary types, and the grouping of various types forms on the basis of their subject matter or point of view. The general purpos of this study are the broadening of the student's understanding and enjoyme of literature, the development of a basis for intelligent criticism, and the provisi of a foundation for further study in the field. Stress is also laid upon accurate rea ing and writing through critical explication of texts and criticism of student pape

REQUIREMENTS FOR MAJORS IN COURSE

The work of the major in course consists of at least eight semester courses the department. It is recommended that majors take The Development of Engli Literature (3-4) in the freshman year, one of the type courses (21-30) duri the sophomore year, Chaucer or Milton in the junior year, and Shakespeare a Problems of Literary Study in the final year. The comprehensive examination the end of the senior year is based on this body of work, but also includes questio on other courses offered by the department for those prepared in those fields.

COURSES

1. INTRODUCTION TO LITERARY STUDY. Staff. *Each semest*

An examination of the principal types of literature based on a comparison modern and traditional works.
This course is not open to students who elect 3-4. Either 1 or 3-4 is pr requisite to all other literature courses offered by the department.

3–4. THE DEVELOPMENT OF ENGLISH LITERATURE. Staff. *Full cour*

An introduction to literary study by means of the traditional materials English literature from the Renaissance to the twentieth century.
Recommended for English majors; not open to students taking course 1.

5, 6. ENGLISH FOR FOREIGN STUDENTS.

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

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

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

21. THE ART OF POETRY. *Fall semester*

A study of the language, syntax, forms, and genres of poetry. Readings will be drawn from a wide range of literature. Suggested as a prerequisite to courses and seminars in poetry.

22. RENAISSANCE POETRY. Miss Snyder. *Spring semester*

Development of forms and ideas in English non-dramatic poetry of the sixteenth and seventeenth centuries, with emphasis on Spenser, Sidney, Donne, Shakespeare, Herbert, and Marvell. Primarily for sophomores.

24. NINETEENTH-CENTURY POETRY. Mr. Pagliaro. *Spring semester*

A study of ideas and language in the major English Romantic poets.

25. THE ENGLISH NOVEL. Mr. Cowden. *Fall semester*

A study of the beginnings of the novel, concentrating on works of the eighteenth century and romantic period. Primarily for sophomores.

26. THE ENGLISH NOVEL. Mr. Cowden. *Spring semester*

A study of the chief Victorian and Edwardian novelists. Primarily for sophomores.

27. ENGLISH DRAMA TO 1700. Mr. McLaughlin. *Spring semester*

Most of the plays read are drawn from the Elizabethan and Jacobean periods, but included are a few works from the medieval and Restoration periods. Primarily for sophomores.

28. MODERN DRAMA (Ibsen and after). Mr. McLaughlin. *Fall semester*

The main emphasis is on Ibsen, Chekhov, Shaw, and O'Neill; but there is a wide range of plays by European, English, and American dramatists of the modern period. Primarily for sophomores.

29. THE LITERATURE OF THE MIDDLE AGES. Mr. Artin. *Spring semester*

The emergence of vernacular literature in English in its relation to English and classical sources. Primarily for sophomores.

30. ENGLISH LITERATURE OF THE EIGHTEENTH CENTURY. Mr. Pagliaro. *Fall semester*

The developing sensibility and literary forms of the period. Primarily for sophomores.

40. ADVANCED COMPOSITION. *Spring semester*

An intensive course in the writing of expository prose. Open only to sophomores.

42. SHAKESPEARE. Staff. *Each semester*

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

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

A study of major American writers of the nineteenth and twentieth centuries.

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

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

55. CHAUCER. Mr. Artin. *Fall semester*

Reading of *Troilus and Criseyde, The Canterbury Tales,* and some of the minor poems in the original Middle English, with greater attention to the literary than to the linguistic aspects. Open to juniors and seniors.

56. MILTON. Mr. Blackburn. *Spring semester*

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

57. MODERN POETRY. Mr. Hynes. *Fall semester*

Poetry in English since the end of the nineteenth century. Open to juniors and seniors.

58. MODERN FICTION. Mr. Cowden. *Spring semester*

A study of the technical innovations in the forms of fiction, beginning with Joyce. Open to juniors and seniors.

60. SPECIAL TOPICS. Staff.

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

61–62. SHAKESPEARE. Staff. *Fall semester*

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

63–64. PROBLEMS OF LITERARY STUDY. Staff. *Spring semester*

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

HONORS WORK

Prerequisites: The course requirements for a major in Honors are the same as for a major in course.

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

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

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

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

Group I

101. SHAKESPEARE. Staff. *Each semester*

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

103. CHAUCER. Mr. Artin. *Fall semester*

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

104. MILTON. Mr. Blackburn. *Spring semester*

An examination of the poetic achievement of John Milton.

106. DRAMA. Mr. McLaughlin. *Spring semester*

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

108. RENAISSANCE POETRY. Miss Snyder. *Spring semester*

Modes and preoccupations of English poetry from Wyatt and Surrey through Marvell.

109. THE ENGLISH AUGUSTANS. Mr. Pagliaro. *Fall semester*

The interests, sensibility, and literary practice of such figures as Dryden, Swift, Pope, Fielding, Johnson.

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.

115. MODERN COMPARATIVE LITERATURE. Mr. Becker. *Fall semester*

Using the realistic movement as a starting point, this seminar considers some of the major themes and philosophic attitudes embodied in recent literature. The chief figures studied are Flaubert and Zola, Tolstoy and Dostoevsky, Kafka and Mann, Joyce and Faulkner.

116. AMERICAN LITERATURE. Mr. Shackford. *Fall semester*

A study of the themes, forms and aesthetic premises of selected writings, and their relations to the cultural situations in which they were created.

118. MODERN POETRY. Mr. Hynes. *Spring semester*

A study of the modern tradition in English and American poetry from Yeats to the present. The seminar will concentrate on the work of a few major poets.

119. SPECIAL TOPICS IN LITERATURE. Staff.

Occasional seminars will be given in special fields not part of the regular program.

120. THESIS.

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

FINE ARTS

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

ASSOCIATE PROFESSOR: JOHN W. WILLIAMS

ASSISTANT PROFESSOR: TIMOTHY K. KITAO

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

Since it is the objective of the Department to foster an intelligent comprehension of the visual arts rather than to develop technical skills, no courses in drawing, painting and sculpture are offered for credit. Instruction in such work, however, is available under the Studio Arts Program.

REQUIREMENTS AND RECOMMENDATIONS

Prerequisites: Majors in course and majors and minors in honors must take two half-courses, one of which must be either Fine Arts 1 or 2. This requirement must be fulfilled before the Junior year. For other students the prerequisite for all other courses is Fine Arts 1 or 2, Introduction to Art History, with the exception of Fine Arts 38, Modern Architecture, which is open to Engineers without any prerequisite.

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

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

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

COURSES

1. INTRODUCTION TO ART HISTORY. Mr. Walker, Mr. Williams and Mr. Kitao.
Fall semester

Consideration is given in the first four weeks to the basic problems of the nature of the work of art, the factors of influence upon its conception, formation, and development (geographic, social, economic, etc.) the principles of value judgments, and methods of analysis. A limited number of representative examples of architecture, sculpture, and painting are studied within the historical context of the civilizations and cultural epochs which produced them: Ancient Egypt, Greece and Rome, and Medieval France.

Three hours of lecture a week and one bi-weekly conference hour.

2. INTRODUCTION TO ART HISTORY. Mr. Rhys, Mr. Williams and Mr. Kitao. *Spring semester*

European and American architecture, sculpture, and painting from the fifteenth century to the present day are studied from the same points of view and with the same methods as in the first semester.

Three hours of lecture a week and one bi-weekly conference.

11. DESIGN IN DRAWING AND PAINTING. Mr. Rhys. *Fall semester*

The basic elements of design and their function in drawing and painting. Types of harmony, sequence and balance such as linear, tonal and special. The methods of design and representation that characterize the various historical styles. Practical exercises required demand no special technical aptitude, since the purpose of the course is to develop a critical understanding of drawing and painting and not technical skill.

13. ANCIENT ART. Mr. Walker. *Fall semester*

The development of the forms of architecture, sculpture and painting as expressing various cultural patterns of the ancient civilizations of Greece and Rome.

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.

17. ROMANESQUE AND GOTHIC ART. Mr. Williams. *Spring semester*

The art and architecture of Western Europe from about 1000 to about 1350 A.D.

18. ITALIAN RENAISSANCE ART. Mr. Kitao. *Fall semester*

A study of painting, sculpture and architecture in Italy from 1400 to 1600. Major attention will be given to the developments in Florence and Rome as expressed in the work of the masters from Masaccio to Palladio.

20. NORTHERN RENAISSANCE ART. Mr. Walker. *Spring semester*

Developments in painting and the graphic arts of drawing and print making during the fifteenth and sixteenth centuries in England, France, the Netherlands, Germany, and Spain through 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 European painting, sculpture and architecture of the 17th and early 18th centuries. Emphasis is given to the work of such major artists as Caravaggio, Rubens, Bernini, Borromini, Poussin, Rembrandt, Velasquez, and Christopher Wren.

36. 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.

38. MODERN ARCHITECTURE. Mr. Walker *Spring semester*

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

The prerequisite of Fine Arts 1 or 2 is waived for students in Engineering.

51. MODERN PAINTING. Mr. Rhys. *Spring semester*

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

52. 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.

Open only to Juniors and Seniors who have a prerequisite of either Fine Arts 1 or Fine Arts 2.

60. SENIOR READING. Staff. *Spring semester*

61–62. SENIOR THESIS. Staff. *Full course*

With the approval of the Department, a thesis may be written during the senior year with credit for one half-course each semester.

HONORS SEMINARS

101. ANCIENT ART. Mr. Walker. *Fall semester*

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

103. MEDIEVAL ART. Mr. Williams. *Fall semester*

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

104. HIGH RENAISSANCE AND MANNERISM. Mr. Kitao. *Fall semester*

A study of art and architecture in Italy from the late 15th century to the end of the 16th century. Special emphasis is given to (a) the art of the High Renaissance as represented by Raphael, Michelangelo and Bramante in the Rome of Julius II, and (b) the problems of Mannerism and anti-classical tendencies in Central Italy.

105. NORTHERN RENAISSANCE PAINTING. Mr. Williams. *Spring semester*

Developments in painting and the graphic arts of drawing and print making during the fifteen and sixteenth centuries in England, France, the Netherlands, Germany, and Spain through an intensive study of individual masters such as the Van Eycks, Roger van der Weyden, Jerome Bosch, Pieter Bruegel, Jean Fouquet, Martin Schongauer, Albrecht Dürer, Hans Holbein, and El Greco.

106. THE BAROQUE. Mr. Kitao. *Spring semester*

A study of the Baroque style in art and architecture of Western Europe with special emphasis on its genesis and development in Rome between 1590 and 1660. Major attention will be given to Caravaggio, the Carracci, Rubens, Poussin, and Bernini.

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. MASTER PRINT MAKERS. Mr. Walker. *Spring semester*

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

HISTORY

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

ASSOCIATE PROFESSORS: THOMAS N. BISSON
HARRISON M. WRIGHT *

ASSISTANT PROFESSORS: ROBERT C. BANNISTER
JEAN H. KOPYTOFF
JOHN G. WILLIAMSON

INSTRUCTOR: GEORGE E. MCCULLY

LECTURERS: PEGGY K. KORN
TSING YUAN

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 necessary 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, 24, 35 and 36. Students contemplating further work in the Department should, if possible, take History 1-2 in the freshman year; those who take the course as sophomores 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 may, with the permission of the department, substitute *either* History 11 *or* History 12 for History 1–2.

The courses open to sophomores, numbered 5 to 36, deal with our heritage from England, offer a choice of approaches to the history of the United States, and provide basic coverage of other important broad areas. Courses 51-65, normally restricted to juniors and seniors, are designed for more intensive and specialized study of a variety of subjects.

The minimum requirement for acceptance as a major in history is the successful completion of History 1-2 and a satisfactory standard of work in other departments. The work of the major in Course consists of not less than eight nor more than twelve courses in the Department, including History 1-2, a course in American history, a course in English history, and Special Topics; while considerable latitude is permitted in the planning of individual programs, it should be noted that the Comprehensive Examination assumes some knowledge of these basic fields. For those contemplating work in Honors, history can serve as a major or minor field in either the Humanities or the Social Sciences or as a bridge in cross-divisional programs.

* Absent on leave, fall semester, 1966-67.

Students 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.

Courses

1–2. Introduction to History. Members of the department. *Full course*

One of the basic courses in the curriculum. The subjects considered proceed in generally chronological order from the fall of the Roman Empire to the mid-twentieth century.

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.

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.

Not offered in 1966-67.

11. The Formation of Medieval Civilization. Mr. Bisson. *Fall semester*

The history of the early Middle Ages, from the Christian Roman Empire to the eleventh century crisis of Church and State.

12. The Maturing of Medieval Civilization. Mr. Bisson. *Spring semester*

The period from about 1100 to the fifteenth century, with emphasis on Western Europe in the twelfth and thirteenth centuries.

13. Russia. Mr. Beik. *Fall semester*

The history of modern Russia. The course begins with the reign of Peter and gives half its time to the period since the Revolution.

16. England since 1558. Mr. Lafore or Mr. Williamson. *Spring semester*

The development of constitutional government and the transition from an agricultural and aristocratic nation to an urban and socialist one.

22. 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.

24. 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 1966-67.

26. LATIN AMERICA. Mrs. Korn. *Spring semester*

The development of the Latin American countries from colonial times to the present.

32. 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.

35. 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.

36. 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.

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.
A. The Middle Ages. Mr. Bisson.
B. The Nineteenth Century. Mr. Field.

54. THE CONSTITUTIONAL HISTORY OF MEDIEVAL ENGLAND. Mr. Bisson.

English society, law, and government from their origins to 1485.
Not offered in 1966-67.

55. SECULARIZATION AND THE SEVENTEENTH CENTURY. Mr. McCully. *Spring semester*

The 15th and 16th century secularization of thought and society and its influence upon the 17th century.

56. 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 1966-67.

57. MODERN EUROPE.

Recent European problems and institutions examined primarily through the experiences of one nation in the nineteenth and twentieth centuries.
A. Germany. Mr. Williamson. *Fall semester*
B. France since Napoleon. Mr. Beik. *Spring semester*

61. 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.

63. BRITAIN AND AMERICA, 1880-1920. Mr. Bannister. *Spring semester*

An investigation, by means of a comparative approach to significant developments, of the nature and importance of the Anglo-American connection. Stress will be laid on such topics as the rise of Liberalism and the causes and consequences of the First World War.

65. AFRICA. Mrs. Kopytoff. *Fall semester*

Aspects of African history and civilization with the emphasis on tropical Africa in modern times.

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 prerequisite to all seminars. In addition, some preliminary reading is required for seminars 101, 102, and 103 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 121, last paragraph) should include in their programs at least three of the following seminars: 103, 126, 127, 131.

101. EARLY AMERICAN HISTORY. Mr. Tolles. *Spring semester*

Political, economic, social, and cultural aspects of the period from the explorations to the end of the American Revolution.

102. PROBLEMS IN AMERICAN HISTORY. Mr. Bannister or Mr. Field. *Both semesters*

Selected topics in the history of the United States.

103. 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.

111. MEDIEVAL ENGLISH CONSTITUTIONAL HISTORY. Mr. Bisson.

The development of society, law, and government to 1485.
Not offered in 1966-67.

112. TUDOR AND STUART ENGLAND. Mr. McCully. *Spring semester*

The English Renaissance and Reformation, constitutional developments, the Civil War and the Restoration.

113. ENGLAND SINCE 1785. Mr. Lafore. *Spring semester*

The rise of the first modern industrial state. Its social, political, and economic problems.

121. MEDIEVAL EUROPE. Mr. Bisson. *Spring semester*

A study of the civilization that flourished in Western Europe between the eleventh and the fourteenth centuries.

122. 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 the Church, the rise of national monarchies, and the origins of modern science.

124. EUROPE 1760 TO 1870. Mr. Beik. *Fall semester*

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

125. EUROPE 1870 TO 1939. Mrs. Kopytoff or Mr. Williamson. *Both semesters*

Political and social changes in Western Europe prior to the Second World War.

126. Diplomatic History of Europe. Mr. Williamson.

The management of international affairs since 1870.
Not offered in 1966-67.

127. Eastern Europe. Mr. Beik. *Spring semester*

The origins and consequences of the Russian Revolution and the development of the nations of East Central Europe.

131. Modern Africa. Mrs. Kopytoff. *Fall semester*

Studies in African history with emphasis on the period since 1800, the region south of the Sahara, and the European impact.

141. Thesis.

A thesis may be substituted for one of the Honors seminars by permission of the department. The topic should be selected and approved before the end of the junior year. The thesis must be completed during the first semester of the senior year.

Graduate Work

The Department of History offers work leading to the Master's degree for graduate students who wish to use the research resources of the Friends Historical Library for a thesis. In addition to the thesis the candidate normally takes three Honors seminars. For the general regulations concerning the Master's degree see pages 69-70.

INTERNATIONAL RELATIONS

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

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

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

Group I

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

Group II

Economics 11. ECONOMIC DEVELOPMENT
History 11. RUSSIA
History 32. THE EXPANSION OF EUROPE
History 36. THE FAR EAST
History 61. AMERICAN DIPLOMATIC HISTORY
History 65. AFRICA

Group III

Economics 61. COMPARATIVE ECONOMIC SYSTEMS
Political Science 15. COMPARATIVE GOVERNMENT
Political Science 18. POLITICS OF DEVELOPING NATIONS
Political Science 19. SOVIET POLITICS
Political Science 20. GOVERNMENT AND POLITICS OF EAST ASIA
Political Science 55. MODERN POLITICAL THEORY

Students who plan to enter the Honors program will find it possible to select similar combination of courses and seminars in the field of international relatio In planning such programs, they should consult with the chairman of their prospecti major department.

MATHEMATICS

PROFESSOR: HEINRICH BRINKMANN, *Chairman*

ASSOCIATE PROFESSOR: DAVID ROSEN

ASSISTANT PROFESSORS: ROLAND B. DI FRANCO
STEVENS HECKSCHER ‡
EUGENE A. KLOTZ
J. EDWARD SKEATH

INSTRUCTORS: THOMAS W. HAWKINS
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 a possible preparation for further work in mathematics as well as for work in physics and other sciences, and engineering.

The sequence consisting of courses 5-6, 15, 16 forms a more rigorous preparation for further work in mathematics as well as for the sciences and engineering. It is the preferable sequence for students who expect to major in mathematics or who intend to apply for an honors program containing seminars in mathematics.

For students who intend to major in mathematics in course, the normal sequence of courses is the following: Freshman year, courses 5-6; Sophomore year, courses 15, 16; Junior and Senior years, courses 13, 14, 51, 52, 55, these are required of all majors in course. The completion of Physics 1, 2 is strongly recommended.

In order to be admitted to honors seminars in mathematics, either as a major or as a minor, a student must have completed courses 11, 12 or preferably 15, 16. Mathematics 17-18 can be used for this purpose by suitably prepared Freshmen. A junior honors student will normally take the seminar in Calculus on Manifolds or the seminar in Advanced Analysis; these seminars are offered each year. The remaining seminars are offered as they are required. An honors student whose major is mathematics will usually take four seminars in mathematics; the following seminars must form part of his program: Calculus on Manifolds, Modern Algebra, Complex Analysis. Such a student must also take Physics 1,2 and it is furthermore highly desirable that he have a reading knowledge of French or German.

1–2. INTRODUCTION TO MATHEMATICS. *Full course*

The purpose of this course is to acquaint the student with some of the principles and fundamental concepts of mathematics. The main topics for study will be an introduction to logic and sets, linear algebra, the basic ideas of the calculus, with probability theory and statistics as an application. Pertinent topics from algebra and trigonometry will be studied as needed.

‡ Absent on leave, 1966-67.

The course is designed as a terminal course in mathematics and cannot b used as a prerequisite for any course offered by the Department of Mathematics

3–4. First Year Mathematics. *Full cours*

The subject matter of this course consists of calculus combined with appropriat material from analytic geometry. It is an introductory course and (as opposed to Mathematics 5-6) is designed for students whose preparation is less extensiv and who want a somewhat less theoretical treatment of the subject.

5–6. First Year Mathematics (Advanced). *Full cours*

The subject matter of this course consists of calculus and some material from analytic geometry. It is an introductory course but the treatment of th subject is more rigorous than that given in Mathematics 3-4 and it require a somewhat better preparation on the part of the student.

11, 12. Second Year Mathematics. *Full cours*

In these courses the student continues the study of calculus and analyti geometry as begun in Mathematics 3-4. Some work on differential equation is included.

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

13. Higher Geometry. *Spring semeste*

Various kinds of geometry (mostly in the plane) will be studied in thi course, using both analytic and synthetic methods. A portion of the work will deal with projective geometry and its relation to metric and othe geometries. The conic sections will be studied in some detail. This cours is not open to freshmen except by special permission.

Prerequisite: Course 14, or Course 15, or permission of the instructor.

14. Higher Algebra. *Fall semeste*

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 i Mathematics 15.

Prerequisite: Course 12, or Course 15, or permission of the instructor.

15, 16. Second Year Mathematics (Advanced).

These courses follow Mathematics 5-6. The subject matter of Mathematic 15 is linear algebra and related topics such as applications to analytic geometry In Mathematics 16 differential equations and multivariate calculus are studied

Prerequisite: Courses 5-6, passed with a grade of C or better.

17–18. Honors Course in Calculus. *Full cours*

This course is designed for those Freshmen who obtain a score of 5 or on the Advanced Placement Examination in Mathematics. Students with equivalent preparation may take this course by special permission.

22. Numerical Methods. *Spring semeste*

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

Prerequisite: Course 16 or permission of the instructor.

51, 52. Advanced Analysis.

These courses deal with the differential and integral calculus of functions o several variables. An introduction to the theory of functions of a complex variable is also given. The treatment is sufficiently rigorous to develop the student's mathematical maturity and strengthen his understanding of the principles of analysis.

Prerequisites: Courses 11, 12 or 15, 16 or 17-18. These courses must b passed with a grade of C or better.

54. PROBABILITY AND STATISTICS.

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

Prerequisite: Course 51 which may be taken concurrently.

55. SENIOR CONFERENCE. *Spring semester*

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

60. READING COURSE IN MATHEMATICS.

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

HONORS SEMINARS

101. 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.

103. ADVANCED ANALYSIS. *Fall semester*

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

104. MODERN ALGEBRA.

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

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.

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.

108. SYMBOLIC LOGIC.

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

109. PROBABILITY AND STATISTICS.

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

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: FRÉDÉRIC J. GROVER (French)
FRANZ H. MAUTNER (German)
FRANCIS P. TAFOYA, *Chairman* (French)

ASSOCIATE PROFESSORS: HILDE D. COHN (German)
OLGA LANG (Russian)
JEAN ASHMEAD PERKINS ‡ (French)

ASSISTANT PROFESSORS: ELISA ASENSIO (Spanish) †
GEORGE C. AVERY (German)
THOMPSON BRADLEY † (Russian)
ROBERT ROZA (French)

INSTRUCTORS: SIMONE VOISIN SMITH † (French)
MARIE JOSE SOUTHWORTH (French)

VISITING LECTURERS: FRANCES DE GRAAFF (Russian)
ROBERT P. NEWTON (German)
MICHAEL OSSAR (German)
HELEN P. SHATAGIN (Russian)

The Department of Modern Languages and Literatures aims to give its majors a comprehensive view of the literature and culture represented by these languages, in relation to other humanistic studies. Literature courses listed in the separate sections are conducted in the language concerned, and achieving an active command of the spoken and written language is always one of the aims.

The elementary and intermediate courses are designed to prepare the students for advanced work in literature as well as to meet college and departmental requirements. It is possible with supplementary work, to major or to enter honors seminars in a language started in college, but elementary and intermediate courses (numbered 1 to 4) do not count toward the minimum of eight half courses required of a major.

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

MODERN LANGUAGE COURSE (conducted in English)

13. MEDIEVAL COMPARATIVE LITERATURE.

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

MODERN LANGUAGE SEMINAR (conducted in English)

130. LINGUISTICS. *Spring semester—even years*

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.

† Absent on leave, spring semester, 1966-67.
‡ Absent on leave, 1966-67.

French

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

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

Required:

French 6, 11, and 12 or evidence of equivalent work.

Recommended supporting subjects:

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

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. Students wishing a major or minor in French should plan their course carefully in advance with the department in order to get a well rounded program.

COURSES

1–2. ELEMENTARY FRENCH.

For students who begin French in College and for those who have had only one year in high school. Equivalent to two years' French in high school. The initial approach is oral but a foundation is laid for a reading knowledge. No credit is given for French 1 alone.

3, 4. INTERMEDIATE FRENCH.

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

5. ADVANCED COMPOSITION 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 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 XVIIth Century to the present.

11, 12. INTRODUCTION TO LITERATURE.

In Course 11 the transition is made from reading as an aid to language learning to the consideration of literary values. The material is selected from works

of the nineteenth and twentieth centuries, but it is not a systematic survey course.

Prerequisite: French 4 or equivalent. (Offered each semester.)

In course 12 the treatment is more historical with selected readings from the Middle Ages to the eighteenth century. (Offered each semester.)

14. L'Humanisme De La Renaissance.

The evolution of French prose and thought from the optimism of Rabelais to the skepticism of Montaigne.

15. Le Théâtre Classique.

Corneille, Racine, Molière.

16. Le Classicisme.

The major writers of the 17th century, excluding the dramatists: Descartes, Pascal, La Fontaine, Boileau, La Rochefoucauld, La Bruyère, Mme. de La Fayette.

17. Le 18e Siècle.

The development of narrative prose and the theatre in the works of Montesquieu, Prévost, Marivaux, Voltaire, etc.

19. Roman du 19e Siècle.

Balzac, Stendhal, Flaubert, Zola, and others.

20. Roman du 20e Siècle.

Representative 20th century novelists.

21. Théâtre Moderne.

The theater since the classic period.

22. Poésie Lyrique.

Poets of the Middle Ages and the Renaissance.

23. Poésie Lyrique.

Poets of the modern period.

52. Special Topics. (For senior majors.)

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

Honors Seminars

100. Littérature du Moyen Age.

Old French readings in lyric poetry, theater and fiction.

101. La Renaissance.

102. Le Théâtre Classique.

Corneille, Racine, Molière.

103. L'Age des Lumières.

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

104. Stendhal and Flaubert.

105. Proust.

106. POÉSIE MODERNE.

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

108. LE ROMAN DU 20e SIÈCLE.

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

German

All students offering German for entrance are placed at the level where they can presumably profit best by the course, according to their rating in the College Entrance Examination or a test given by the department. As far as possible, German is the language of the classroom, with the exception of German 7-8.

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

Required:

German 11 or 12. Introduction to German Literature or equivalent work.

Recommended supporting subjects:

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

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: Since not all advanced courses and seminars are offered every year, students wishing a major or minor in German should plan their course of studies carefully in advance with the department in order to get a well-rounded program.

COURSES

1–2. ELEMENTARY GERMAN.

For students who begin German in college. Equivalent to two years' German in secondary school. Fundamentals of grammar; easy literary prose, such as Max Frisch, *Brandstifter* or Schnitzler, *Der blinde Geronimo.*
NOTE: German 2 is usually also offered in the fall semester for students not ready for German 3.

3. INTERMEDIATE GERMAN.

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

4. INTERMEDIATE GERMAN.

Fulfills the college requirement. Literary narrative, drama, poetry, expository prose of greater difficulty, conversation. Some grammar review.
Prerequisite: German 3 or equivalent.

6. WRITING AND SPEAKING GERMAN.

Composition and conversation in connection with contemporary literature.
Prerequisite: Course 3-4 or equivalent.

7–8. ELEMENTARY GERMAN (Special Reading Course.)

A special course designed for those who wish to acquire only a reading knowledge of German. German 7-8 may be used to fulfill the requirements

of certain departments or of graduate schools, but not the college foreign language requirement.

11, 12. INTRODUCTION TO GERMAN LITERATURE.

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

Prerequisite: German 4 or equivalent.

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

13. DIE GOETHE-ZEIT.

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

14. GOETHES FAUST, ERSTER UND ZWEITER TEIL.

An intensive study of *Faust, I and II*. Also for students who only know *Faust, Part One*.

15. DIE DEUTSCHE ROMANTIK.

An introductory study of the Romantic movement in Germany, with readings from representative authors such as Hölderlin, Novalis, Tieck, Arnim, Brentano, Eichendorff.

16. DIE DEUTSCHE NOVELLE SEIT GOETHE.

A study of significant examples of this typically German genre. Authors: Goethe, Eichendorff, Kleist, Stifter, Keller, Meyer, Storm, Thomas Mann, Kafka, Brecht.

17. MODERNE DEUTSCHE LITERATUR.

A study of leading German writers of the twentieth century, including Hauptmann, Thomas Mann, Rilke, Hofmannsthal, Kafka.

18. DIE DEUTSCHE LYRIK.

A study of German poetry through the ages. The interrelation of form and "contents." Readings will include, among others, Goethe, Schiller, Hölderlin, Eichendorff, Heine, Mörike, Meyer, George, Rilke, and contemporary poets.

20. DIE DEUTSCHE KOMÖDIE.

Outstanding comedies from Goethe to the present time will be studied in their own right, as examples of the *genre,* and as illustrations of German intellectual history.

21. KAFKA.

A study of the novels and of a representative selection of the shorter prose works. Emphasis on literary analysis. Supplementary readings from Kafka's letters and journals.
Class discussion and papers. Prerequisite: German 11 or equivalent.

51. SPECIAL TOPICS.

Readings selected to fit the specific needs of students with an advanced knowledge of the German language. Not designed to prepare for any specific type of comprehensive examination.

HONORS SEMINARS

101. LITERATUR DES MITTELALTERS.

Elements of Middle High German grammar as introduction. A study of mediaeval epics and other poetry, especially *Nibelungenlied, Parzival, Tristan, Minnesang,* and Walther von der Vogelweide.

103. DEUTSCHES BAROCK UND AUFKLAERUNG.

A study of German literature in the seventeenth and early eighteenth centuries. The lyric poetry of the period, the mysticism of Angelus Silesius and Jakob Böhme, the plays of Gryphius, and the prose of Grimmelshausen; a study of Lessing.

104. GOETHE.

Goethe's most significant works and his rôle in German intellectual history will be studied.

105. DIE DEUTSCHE ROMANTIK.

Romanticism as the dominant movement in German literature, 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. DEUTSCHE LITERATUR SEIT 1900.

The chief writers from naturalism to expressionism: Hauptmann's dramas; Thomas Mann's prose; Rilke's poetry; Hofmannsthal's prose and poetry; Kafka; Brecht.

108. DAS DEUTSCHE DRAMA.

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

109. DIE DEUTSCHE 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.

Studies in German poetry. Methods and problems of interpretation.

Russian

Russian may be offered as a major in course or as a major or minor in Honors work. Prerequisites and recommended subjects are the same for both course and Honors students.

Required: Russian 11, 12. Introduction to Russian Literature, Russian 13, Russian Novel.

Recommended supporting subjects: Russian History, The Soviet System.

Recommended for minors in Honors: Russian Novel, Russian History, The Soviet System.

1–2. ELEMENTARY RUSSIAN. *Full course*

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

3, 4. INTERMEDIATE RUSSIAN.

Readings in Russian literature and history. Review of grammar. Conversation. Reports. Composition. Translation. Conducted in Russian.

Prerequisite: Russian 1-2 or its equivalent.

5, 6. ADVANCED RUSSIAN.

For majors and those who are not primarily interested in literature. Advanced conversation, composition, style and translation. Readings of newspapers and Russian dramas. Conducted in Russian.

11, 12. INTRODUCTION TO LITERATURE.

A study of Russian classical and modern short stories and poetry. Intensive work in translation and composition. Reports. Conducted in Russian.

Prerequisite: Russian 5, 6 or its equivalent.

13. RUSSIAN NOVEL.

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

51. SPECIAL TOPICS.

Readings selected to fit the specific needs of students.

HONORS SEMINARS

(Open to majors in course.)

101. TOLSTOY.

102. CHEKHOV AND GORKY.

103. PUSHKIN AND LERMONTOV.

104. DOSTOEVSKY.

Spanish

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

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

Required: Spanish 11, 12 Introduction to Literature.

Recommended supporting subjects:

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

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

COURSES

1–2. ELEMENTARY SPANISH.

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

3, 4. INTERMEDIATE SPANISH.

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

9. ADVANCED COMPOSITION AND DICTION.

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

11, 12. INTRODUCTION TO SPANISH LITERATURE.

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

13. EL TEATRO MODERNO.

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

14. LA NOVELA HISPANOAMERICANA.

Representative novelists from Mármol in Argentina to 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.

52. SPECIAL TOPICS FOR SENIOR MAJORS.

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

SEMINARS

101. LA NOVELA HISPANOAMERICANA.

102. LA NOVELA EN EL SIGLO XX.

103. LAS OBRAS DE CERVANTES.

104. EL TEATRO MODERNO.

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

106. LA POESIA EN EL SIGLO XX.

107. LA LITERATURA DE LA EDAD MEDIA.

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

MUSIC

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

INSTRUCTOR: JAMES D. FREEMAN

LECTURER: ARTHUR KOMAR

VISITING ASSOCIATES IN PERFORMANCE: GILBERT KALISH
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. While the Department does not give course credit for instruction in instruments or voice, it encourages its students to develop performing skills through private study and through participation in the orchestra and chorus, both of which are conducted by members of the Department. Members also coach individual performers and chamber music groups organized by the students for Bond concerts and other public performances They also hold informal chamber music readings at home.

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

One full course in Theory is prerequisite for acceptance as a major. Majors will normally take three full courses (including Music 61-62) in Theory, four half-courses (including Music 15,16) in History. All seminars are open to qualified course students for double-credit. Music 1 cannot be counted in a major program.

Majors in Honors: A student planning 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 honors examinations in music. A student who is excused from one of the three introductory courses (by demonstrating competence on an examination given by the Department) can elect to stand for four honors examinations in music. He will take Music 61-62 in course, preferably in the junior year, in preparation for an honors examination on the material covered.

Minors in Honors: A minor in honors will normally stand for two examinations 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.

---

* Absent on leave, fall semester, 1966-67.

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 as well as vocal music in four clefs. 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: Music majors, and also freshmen and sophomores planning to major in music, are eligible for individual instruction in the basic piano program. This program, administered by the Department, is designed to develop keyboard proficiency to a point where the student can effectively use the piano as a tool for study. It is further designed to help students meet the keyboard requirements outlined above. No academic credit will be given for work in the program.

Courses and Seminars

1. Introduction to Music. Mr. Freeman. *Each semester*

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

Open to all students.

Theory and Composition

11–12. Harmony. Mr. Komar. *Full course*

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

13–14. Counterpoint. Mr. Freeman. *Full course*

An introductory course offering training in Modal Counterpoint with reference to sixteenth-century practice, and in Tonal Counterpoint with specific reference to the style of J. S. Bach. Students will be required to submit exercises at regular intervals. Toward the end of the course they will compose several two-part Inventions. In addition to exercises there will be analyses of a variety of compositions for vocal and instrumental media. This course may be taken concurrently with Music 11–12.

61–62. Intermediate Theory. Mr. Komar and Mr. Spies. *Full course*

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. (Music 15 will normally be offered in the fall semester.)
Prerequisite: Music 1 (or the equivalent).

16. Introduction to the History of Music. Mr. Freeman. *Spring semester*

A continuation of Music 15 covering the period from 1750 to the present.
Prerequisite: Music 1 (or the equivalent).
Not offered in 1966-67, offered 1967-68.

22. Contemporary Music. Mr. Spies. *Spring semester*

An examination of a selected number of compositions by a few important composers. The course will not encompass all twentieth century trends, and will not seek to be an inclusive survey. Rather, it will deal with works that represent mastery in our century. Much music will be listened to, some will be performed in class, and scores will be studied. A reading knowledge of music is essential.

Open to students with permission of the instructor.

27. J. S. Bach. Mr. Swing. *Spring semester*

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.

Music 22 and 27 are designed for students who have taken Music 1, or a course in theory wishing to do further work in special areas or music history. They can be counted for credit in a major-in-course program.

Honors Seminars

122. Studies in Twentieth Century Music. Mr. Spies. *Spring semester*

Prerequisite: Music 11-12 and 13-14.

128. W. A. Mozart. Mr. Swing. *Fall semester*

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

132. History of the String Quartet. Mr. Swing. *Spring semester*

This seminar traces the development of the string quartet from the middle of the 18th century to the present through study of selected quartets by Haydn, Mozart, Beethoven, Schubert, Brahms, Bartók, Schoenberg, Webern, and Carter.

151. Medieval and Renaissance Music. Mr. Swing. *Fall semester*

An introduction to the study of music from the 9th century to the middle of the 16th century. Emphasis will be placed on analysis of selected compositions, related problems in performance practice, the function of music in the Catholic liturgy and the relationship of music to the thought and art of the times.

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, *Acting Chairman*
JOHN M. MOORE

ASSOCIATE PROFESSORS: JEROME A. SHAFFER
P. LINWOOD URBAN

ASSISTANT PROFESSOR: HANS OBERDIEK

INSTRUCTORS: CHARLES RAFF
RICHARD SCHULDENFREI

LECTURER: GILMORE STOTT

VISITING LECTURER: WILLIAM GINNANE ***

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

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

REQUIREMENTS AND RECOMMENDATIONS FOR MAJORS AND MINORS

The minimum prerequisite to admission as a major in either philosophy or religion will normally be the completion of one year's work in the department. Students who major in philosophy must obtain permission in order to count for credit in fulfillment of their major requirement more than one course in religion; and students who major in religion must obtain permission in order to count for credit in fulfillment of their major requirement more than one course in philosophy. (Courses 25, 26 and 27 may be counted either as philosophy or as religion.) Philosophy majors in course must elect course 52 in their senior year, and are normally required to take courses 11, 12, 13, and 14. It is recommended that course 12 be taken before the middle of the junior year, and that course 13 be taken by the end of the junior year. Honors majors who do not take course 12 must acquire familiarity with the material by summer study.

Philosophy Courses

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

Several of the most important problems of philosophy, and alternative answers to them, are discussed. Typical examples are: the problem of free

*** Spring semester, 1966-67.

will, the arguments for the existence of God, the nature of logic and mathematics, the sources and kinds of knowledge, the justification of ethical judgments.

NOTE: Course 1 is a prerequisite for course 11 and courses 13 through 27. Other courses may be taken in any order that is convenient. Members of the department will offer advice on request concerning an order of courses to suit individual needs. Students planning to do honors work should not take courses dealing with material to be covered in honors seminars.

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. Oberdiek. *Fall semester*

An introduction to the principles of deductive logic; the methods of both traditional logic and modern symbolic logic will be used in the evaluation of deductive arguments. Some attention will be given to the axiomatic development of logic, as well as to informal topics such as the fallacies of relevance and ambiguity, and to definition.

13. SELECTED MODERN PHILOSOPHERS Mr. Ginnane. *Spring semester*

The history of modern philosophy, with primary attention given to the problem of the foundations, scope and limits of human knowledge, as examined by Descartes, Locke, Berkeley, Hume and Kant.

14. ANCIENT PHILOSOPHY. Mr. Raff. *Fall semester*

The main emphasis will be on Plato and Aristotle, with some treatment of the pre-Socratics as background. Primary attention will be given to metaphysical and epistemological issues.

15. 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.

16. CONTEMPORARY PROBLEMS. Mr. Ginnane. *Spring semester*

A study of contemporary discussions of fundamental problems, such as the theory of meaning, the foundations of knowledge, the perception of physical objects, the nature of the self. Readings in the articles and books of major living philosophers, including Russell, Lewis, Ayer, and Ryle.

17. AESTHETICS. Mr. Beardsley. *Spring semester*

A study of some problems that arise in describing, interpreting, and evaluating aesthetic objects, including literature, music and fine arts. Among these problems are the clarification of such terms as "form," "style," and "meaning," an examination of current attempts to subsume aesthetic objects under the general theory of signs, and the analysis of the reasoning by which value judgments about aesthetic objects are supported and defended.

18. PHILOSOPHY OF THE SOCIAL SCIENCES. Mr. Beardsley. *Spring semester*

A survey of philosophical and methodological problems arising from the study of the behavior and history of human individuals and societies. Such problems as the nature of explanation and prediction in the social sciences and history, the role of value judgment in the social sciences, the conceptual apparatus necessary for the description of human behavior, and the possibility of "scientific" history, are discussed.

Not offered in 1966-67.

19. RECENT PHILOSOPHICAL MOVEMENTS. Mr. Shaffer. *Fall semester*

An examination of some of the basic trends in recent thought such as Pragmatism, Positivism, Analytical Philosophy, and Existentialism. Special emphasis will be placed upon the degree of adequacy of these systems in dealing with questions concerning the nature, scope, and limits of human knowledge.

Not offered in 1966-67.

20. PHILOSOPHY OF LANGUAGE. Mr. Ginnane *Spring semester*

An examination of philosophical and logical problems in the study of "natural" languages. Topics may include: (1) the role of the investigation of language in the solution of traditionally philosophical problems, (2) investigations into the conceptual framework necessary to any adequate theory of ordinary language, (3) the relationships between natural and formalized or artificial languages, (4) recent attempts to found linguistics on a scientific basis.

21. SOCIAL AND POLITICAL PHILOSOPHY. Mr. Oberdiek. *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. Among those studied are Edwards, Jefferson, Emerson, Thoreau, Sumner, Royce, 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 1966-67.

23. HISTORY OF SCIENCE. *Spring semester*

A survey of the development of physics and astronomy in the 16th and 17th centuries, emphasizing the nature of the scientific revolution, the revolt against Aristotle, the new role of mathematics within science, the role of experiment, and the gradual development of concepts like mass, force, universal gravitation, and the heliocentric universe. The philosophical and sociological origins of the scientific revolution will also be studied. Readings will be drawn mainly from the writings of Copernicus, Kepler, Galileo, Descartes and Newton.

Not offered in 1966-67.

Philosophy-Religion Courses

25. PHILOSOPHY OF RELIGION. Mr. Moore. *Spring semester*

The nature of religion; the psychology and interpretation of religious experience; the problem of religious knowledge; the validity and difficulties of Christian theology and ethics.

26. MEDIEVAL PHILOSOPHY. Mr. Urban. *Spring semester*

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

Not offered in 1966-67.

27. THEOLOGY AND ANALYTICAL PHILOSOPHY. Mr. Moore or Mr. Urban. *Fall semester*

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

Not offered in 1966-67.

Religion Courses

31. PROBLEMS OF CHRISTIANITY TODAY. Mr. Urban. *Each semester*

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

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

33. EARLY CHRISTIAN THOUGHT. Mr. Urban. *Fall semester*

The rise and development of Christian thinking to the 13th century, the influence of Judaism and Greek philosophy, the formation of the creeds, Scholasticism, Augustine and Aquinas.

34. LUTHER TO BARTH. Mr. Urban. *Spring semester*

The development of Christian thought from the Reformation to the twentieth century, with emphasis upon the relationship between Christian and secular thinking; the main ideas of the Reformation, church and sect in the Reformation, Roman Catholic development, Protestant orthodoxy, Protestant liberalism.

35. HISTORY OF RELIGIONS. Mr. Moore. *Fall semester*

An historical and comparative study of the world's religions: primitive religions, Hinduism, Buddhism, Chinese and Japanese religion, Islam. Stress will be placed upon the ethical and philosophical teaching of these religions and their role in the interaction of modern cultures. Comparisons and contrasts will be made between these religions and Judaism and Christianity.

36. THE OLD TESTAMENT AND THE RISE OF JUDAISM. *Fall semester*

An introduction to the literature and history of the people of Israel. Early traditions, the law and the prophets, the emergence of Judaism.

37. THE NEW TESTAMENT. *Spring semester*

An introduction to 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.

---

51. SPECIAL TOPICS. Staff.

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

52. SENIOR CONFERENCE. Staff. *Spring semester*

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

HISTORY 22. AMERICAN RELIGIOUS THOUGHT. Mr. Tolles.

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

HISTORY 24. QUAKERISM. Mr. Tolles.

The history of the Society of Friends to the present day. The characteristic religious and social ideas of the Quakers are considered in their historical setting. (May be counted toward a major in religion.)

HONORS WORK

For admission to honors in philosophy, the requirement is normally two semester courses drawn from those numbered from 1 to 27. For admission to honors work in religion, the requirement is normally two semester courses selected from among courses numbered 1, and 25 to 45.

101. MORAL PHILOSOPHY. Mr. Oberdiek. *Spring 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.

102. ANCIENT PHILOSOPHY.

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.

Not offered in 1966-67.

103. HISTORY OF MODERN PHILOSOPHY. Mr. Raff. *Each semester*

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

104. CONTEMPORARY PROBLEMS. Mr. Shaffer. *Each semester*

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

105. PHILOSOPHY OF SCIENCE. Mr. 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. *Fall 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. *Fall semester*

A survey of philosophical and methodological problems arising from the study of the behavior and history of human individuals and societies. Such problems as the nature of explanation and prediction in the social sciences and history, the role of value judgments in the social sciences, the conceptual apparatus necessary for the description of human behavior, and the possibility of "scientific" history, are discussed.

108. 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 foundations of logic.

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

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

111. THE IDEA OF GOD IN WESTERN THOUGHT. Mr. Urban. *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.

112. CONTEMPORARY RELIGIOUS PHILOSOPHERS. Mr. Urban. *Fall semester*

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

Not offered in 1966-67.

120. THESIS.

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

PHYSICAL EDUCATION FOR MEN

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

ASSOCIATE PROFESSORS: LEWIS H. ELVERSON
EDWIN J. FAULKNER

ASSISTANT PROFESSORS: GOMER DAVIES
RICHARD F. MALACREA

ASSISTANTS: CHARLES ASSIFF
BROOKE P. COTTMAN
ROBERT B. FORWOOD
NORMAN FRANK, JR.
DUDLEY HEATH
JOSEPH LEITNER
JAMES W. LUKENS, JR.
JAMES C. MAYER
JAMES J. MCADOO
ROBERT MCCOACH
COSTA N. MILLER
JAMES W. NOYES

COLLEGE PHYSICIAN: DR. MORRIS A. BOWIE

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

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

FACULTY REQUIREMENTS

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

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

FALL ACTIVITIES

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

WINTER ACTIVITIES

Badminton	*Swimming	Volleyball
*Basketball	Tennis	*Wrestling

SPRING ACTIVITIES

*Baseball	Softball	*Track
*Golf	*Tennis	Volleyball
*Lacrosse		

* Indicates intercollegiate competition.

PHYSICAL EDUCATION FOR WOMEN

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

ASSISTANT PROFESSORS: PHOEBE JANE HARRIS
AILYN TERADA

COLLEGE PHYSICIAN: DR. MORRIS A. BOWIE

The aim of the Department is to contribute to the education of all women students through the medium of physical activity. We believe this contribution can best be achieved through participation in a broad program of 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.

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. Miss Harris. *Fall and Spring*
Class and Varsity.

BADMINTON. Miss Hess, Mr. Faulkner. *Winter*
Class and Varsity.

BASKETBALL. Miss Moll, Miss Hess. *Winter*
Class and Varsity.

BOWLING. Staff. *Winter*
Class.

DEVELOPMENTAL MOVEMENT. Miss Terada. *Winter*
Required of all first-year students whose posture grade or motor ability test indicates a need for it.

FOLK AND SQUARE DANCING. Miss Moll. *Fall and Winter*
Class and Performance Group. Open to men students who have fulfilled the requirements of the Men's Physical Education Department.

GOLF. Miss Moll. *Fall and Spring*
Class and Course Golf.

HOCKEY. Miss Hess. *Fall*
Class and Varsity.

LACROSSE. Miss Hess. *Spring*
Class and Varsity.

MODERN DANCE. Miss Terada. *Fall, Winter and Spring*
Class and Performance Group. Open to men students who have fulfilled the requirements of the Men's Physical Education Department.

RECREATIONAL MATERIALS AND RESOURCES. Staff. *Winter and Spring*

SOCCER. Miss Hess. *Winter*
Class.

SOFTBALL. Miss Moll. *Spring*
Class and Varsity.

SWIMMING. Miss Harris, Miss Hess, Miss Terada. *Fall, Winter and Spring*
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. Miss Terada, Mr. Faulkner, Miss Hess, Miss Moll. *Fall, Winter and Spring*

VOLLEYBALL. Miss Moll. *Fall and Winter*
Class and Varsity.

WATER BALLET. Miss Terada. *Fall and Spring*
Class and Performance Group.

PHYSICS

PROFESSOR: WILLIAM C. ELMORE, *Chairman*

ASSOCIATE PROFESSORS: OLEXA-MYRON BILANIUK
MARK A. HEALD
PAUL C. MANGELSDORF, JR.

ASSISTANT PROFESSORS: JARL A. ELMGREN *
CLAIR W. NIELSON

VISITING LECTURERS: DONALD W. KENT, JR.
JOHN H. POLLARD

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. A grade of C or better in Physics 1, 2 is normally prerequisite for all further work in the department, and Chemistry 2 is a prerequisite for Physics 112 and 114.

Honors students majoring in physics normally take Physics 102, 106, 112, in that order, and Mathematics 101 or 103, and 104. Physics 114 or a third mathematics seminar is encouraged but not required. An honors student who has been unable to schedule Physics 11, 12 should plan to take Physics 111. Other seminars in the program are normally chosen from astronomy, biology, chemistry, engineering, experimental psychology, or philosophy. Such a program is a particularly satisfactory way of preparing for graduate or other professional work in physics or mathematics. However, it constitutes in itself an effective educational program, since the aim throughout is to achieve an understanding of fundamental ideas and concepts, as distinct from the mastery of information, skills, and techniques in a limited segment of science.

Course students majoring in physics normally complete the following courses in their junior and senior years: Mathematics 51, 52; Chemistry 61, 62; and Physics

* Absent on leave, fall semester, 1966-67.

51, 52, 53, 54, 56. 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 the student the opportunity to extend his work outside the Division of the Natural Sciences. It should also meet the needs of those who wish to teach science in secondary school.

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

Course Statement

1, 2. General Physics. Mr. Bilaniuk, Mr. Mangelsdorf, 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.

Full course

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

The second semester considers the evolution of modern physics: physical properties of light, aspects of relativity, the wave versus the quantum theory of light, certain electrical phenomena, 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.

Not offered in 1966-67.

9. Order and Symmetry in Physical Systems. Mr. Rosenberg.

Analysis of the forms and principles involved in order and symmetry. Examples selected from molecular systems, crystals, atoms, nuclei, and elementary particles. The IBM 1620 computer will be used in analysis and simulation of patterns. The course is designed exclusively for the non-science student. This course may be used in combination with Chemistry 1 or Physics 1 to satisfy the group 1 distribution requirement. Three lectures and one three-hour laboratory per week.

Offered spring semester 1966-67.

10. Topics in Biophysics. Mr. Rosenberg.

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.

Offered spring semester 1966-67.

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

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

Prerequisite: Second Year Mathematics taken concurrently.

51, 52. MODERN PHYSICS. Mr. Kent and Mr. Elmgren.

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.

53. CIRCUIT THEORY I. Mr. Jenkins. *Fall semester*

Transient and steady state analysis of electric circuits based upon the differential equations of the circuit arising from Kirchhoff's Laws. Classical treatment is followed by Laplace transform analysis giving system response as a function of complex frequency. Pole-zero concepts are introduced. Extensive study is made of linear network analysis by the superposition integral, convolution, the Fourier integral, etc. Three phase systems and symmetrical components. Three class periods and a laboratory weekly.

Prerequisite: Physics 12.

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.

Offered spring semester 1966-67, and in alternate years thereafter.

Prerequisite: Second Year Mathematics.

56. ELECTROMAGNETIC FIELD THEORY. Mr. Barus. *Spring semester*

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

Prerequisites: Physics 12 and 53.

60. SPECIAL TOPICS. Staff.

A semester course that may be elected by senior physics majors. Readings and problems will be assigned in areas of physics not covered in other courses. The associated laboratory work will be directed toward the acquisition of knowledge and skills that will be useful to future research, and normally will involve the development of apparatus and the performance of an experiment of contemporary significance in physics. A carefully written report of the experiment, together with solutions of assigned problems, is required in lieu of a final examination.

Honors Seminars

102. Electricity and Magnetism. Mr. Elmore. *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 (or 111).

106. Atomic and Nuclear Physics. Mr. Nielson. *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.

111. Classical Mechanics and Waves.

This seminar covers substantially the same material as Physics 11,12. It is offered for students unable to schedule the course, and who desire further work in physics as part of an Honors program. One full-day laboratory each week. Offered spring semester 1966-67, and fall semester in subsequent years.

Prerequisite: Second Year Mathematics.

112. Radiation and Statistical Physics. Mr. Mangelsdorf. *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 and Physics 106.

114. Quantum Mechanics. Mr. Bilaniuk. *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

PROFESSOR: J. ROLAND PENNOCK,† *Chairman*

DISTINGUISHED VISITING PROFESSOR: THOMAS P. PEARDON

ASSOCIATE PROFESSORS: CHARLES E. GILBERT
DAVID G. SMITH

ASSISTANT PROFESSOR: DONALD C. HELLMANN

INSTRUCTOR: ROBERT O. KEOHANE

LECTURERS: FREDERICK A. HARGADON
FREDRICK J. ROBERTS ***
ENID CURTIS BOK SCHOETTLE

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. 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 1-2 (A, B, or C) 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 (A, B, or C) without prerequisite. Students who intend to major in political science should take the introductory course during the freshman year if possible, and Course 11 in the sophomore year. However, Course 11 may be taken by sophomores concurrently with the second half of the introductory course. Students who desire to concentrate on international affairs without taking the full International Relations Program referred to below may substitute Comparative Government (Political Science 15) or Soviet Politics (Political Science 19) or Government and Politics of East Asia (Political Science 20) for Course 11. Majors are also advised to take Economics 1-2. Courses in Statistics (Economics 4) and history are recommended. 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.

† Absent on leave, spring semester, 1966-67.
*** Spring semester, 1966-67.

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

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

Group I

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

Group II

Economics 11—Economic Development
History 11—Russia
History 32—The Expansion of Europe
History 36—The Far East
History 61—American Diplomatic History
History 65—Africa

Group III

Economics 61—Comparative Economic Systems
Political Science 15—Comparative Government
Political Science 18—Politics of Developing Nations
Political Science 19—Soviet Politics
Political Science 20—Government and Politics of East Asia
Political Science 55—Modern Political Theory

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

Courses

1. Introduction to Political Science. All members of the department.

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 (A, B, or C.).

2A. Policy-Making in America.

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.

2B. Comparative Government. (For description, see Political Science 15.)

2C. International Politics. (For description, see Political Science 12.)

11. PROBLEMS IN COMMUNITY GOVERNMENT. Mr. Gilbert. *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.

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

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

13. INTERNATIONAL LAW AND ORGANIZATION. Mr. Keohane. *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.

15. COMPARATIVE GOVERNMENT. Mr. Peardon.

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

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

An examination of theories of political modernization and their application to developing societies, particularly those in South and Southeast Asia and Africa. The relation between the total social process and the emergence of nationalist movements will be studied, and the political processes will be functionally analyzed and compared in terms of such categories as political culture, ideology, leadership, and social mobilization.

19. SOVIET POLITICS. Mr. Hargadon. *Spring semester*

An analysis of Soviet political theory, the structure and development of the Communist Party of the Soviet Union, Soviet political and administrative leadership, and selected policy problems.

20. GOVERNMENT AND POLITICS OF EAST ASIA. Mr. Hellmann. *Spring semester*

A comparative analysis of the political systems of China, Japan, and Korea in upheaval. Emphasis is on the various kinds of nationalist movements and their traditional, revolutionary, communist, and liberal-democratic components.

51. PUBLIC ADMINISTRATION. Mr. Gilbert. *Alternate years, fall semester*

An analysis of policy-making and administration in modern governments with illustrative material drawn chiefly from the national government of the United States and with particular reference to recent developments. Problems of administrative organization, conduct of regulatory and managerial activities, financial administration, personnel, public relations, administrative law, politics and administration.

Open to juniors and seniors only, except by special arrangement.

Not offered in 1966-67.

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. Sophomores carrying five courses will be relieved of the term paper requirement.

53. American Party Politics. Mr. Gilbert. *Alternate years, fall semester*

An historical and functional analysis of American political parties. The study of interest groups, public opinion and voting behavior, electoral systems and representation, the legislative process.

54. Political Theory: Plato to Rousseau. Mr. Smith. *Fall semester*

The development of thought on the nature of the state and of individual rights and duties, based largely on readings of the chief political philosophers from Plato to Rousseau. Topics studied include: Greek and Roman political thought; medieval universalism and the divine right of kings; the Reformation and the development of contractual theory; natural law and natural rights.

Open to sophomores planning to take the "Modern and Analytical" version of the Political Theory honors seminar; otherwise to juniors and seniors only, except by special arrangement.

55. Modern Political Theory. Mrs. Schoettle or Mr. Smith. *Spring semester*

Political theory from the Enlightenment to the present. Idealism and romantic and conservative nationalism; anarchism, Marxism, and later socialist doctrines; Utilitarianism and "revisionist" Liberalism; elite theory and pragmatic and sociological theories of politics, including Max Weber, Karl Mannheim, and more contemporary theoretical models of the political systems; conservative critics of democracy; and authoritarian and totalitarian political theories.

56. Jurisprudence. Mr. Pennock.

A study of the sources and nature of law; historical, sociological and philosophic approaches to legal theory; the nature of the judicial process; key problems of jurisprudence illustrated by case study in selected areas of American constitutional law.

Open to sophomores by arrangement with the instructor.

Not offered in 1966-67.

57–58. American Foreign Policy. Mr. Keohane. *Alternate years, full course*

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

Not offered in 1966-67.

59. Marxism. Mr. Smith.

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

60–61. 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.

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 1966-67.

Honors Work

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

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

The nature of the state, the bases of political obligation, sovereignty and the nature of law, liberty, equality, rights, democracy, totalitarianism—all in the light of the theories set forth by writers on these subjects from Plato to the present. This seminar is given in two versions, one (101a) beginning with Plato and proceeding chronologically, and the other (101b, designated "Modern and Analytical") starting with Machiavelli and organized in more topical fashion. It is desirable but not required for students planning to take 101b to take Political Science 54 during their sophomore year.

102. POLITICS AND LEGISLATION. Mr. Gilbert. *Spring semester*

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

103. PROBLEMS IN GOVERNMENT AND ADMINISTRATION. Mr. Gilbert. *Fall semester*

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. Keohane. *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?

105. AMERICAN FOREIGN POLICY. Mr. Keohane. *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.

Not offered in 1966-67.

107. SOVIET POLITICS. Mr. Hargadon. *Fall semester*

An analysis of Soviet political theory, the structure and development of the Communist Party of the Soviet Union, Soviet political and administrative leadership, and selected policy problems.

108. COMPARATIVE GOVERNMENT. Mr. Peardon.

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. Hellmann. *Fall semester*

An examination of theories of political modernization and their application to developing societies.

120. THESIS. All members of the department.

Approval must be secured early in the student's junior year.

PSYCHOLOGY AND EDUCATION

PROFESSORS: JOSEPH B. SHANE
HANS WALLACH

ASSOCIATE PROFESSOR: DEAN PEABODY, *Chairman*

ASSISTANT PROFESSORS: GERALD R. LEVIN †
JOHN ANTHONY NEVIN ‡
NICHOLAS S. THOMPSON

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 to groups. For those students planning for graduate and professional work in psychology the courses and seminars of the department are designed to provide a sound basis of understanding of psychological principles and a grasp of research method. Other students learn the nature of psychological inquiry and the psychological approach to various problems encountered in the humanities, the social sciences and the life sciences.

REQUIREMENTS AND RECOMMENDATIONS

Both semesters of the course Introduction to Psychology are required of all students who wish to take other courses or seminars in the department. At present the two semesters of this course may be taken in either sequence; credit is given for either semester, and either semester may be used to fulfill the general curriculum requirement. It is intended in 1967-68 to change to a sequence that begins with Psychology 1 in the fall.

Majors in course are required to take at least one course with a laboratory and majors in Honors one of the seminars in experimental psychology: 101, 102, or 108.

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

Swarthmore students may fulfill the Pennsylvania requirements in Education for the college provisional certificate for secondary school teachers by taking:

Psychology 1 or 2—Introduction to Psychology.

Education 11—Educational Psychology.

Education 14—Introduction to Teaching.

Education 12—Principles and Methods of Secondary Education.

Education 15—History of Education.

Education 16—Student Teaching.

† Absent on leave, spring semester, 1966-67.
‡ Absent on leave, 1966-67.

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

Psychology 1 or 2—Introduction to Psychology.
Psychology 55—Child Psychology.
Education 11—Educational Psychology.
Education 14—Introduction to Teaching.
Education 16—Student Teaching.

Psychology

1. INTRODUCTION TO PSYCHOLOGY. Staff. *Spring semester*

An introduction to the basic processes underlying human and animal behavior: sensation and perception, learning and thinking, emotion and motivation. Open to freshmen.

Three lectures plus weekly conference hour to be arranged.

2. INTRODUCTION TO PSYCHOLOGY. Staff. *Fall semester*

An introduction to the study of human behavior in its social context. Topics to be stressed: Personality dynamics, structure and development, conflict and psychopathology; the social psychology of the individual in society, attitudes and social action. Open to a limited number of freshmen by special permission.

Three lectures plus weekly conference hour to be arranged.

12. MOTIVATION. Mr. Nevin, Mr. Thompson. *Spring semester*

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. Mr. Nevin.

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. Nevin. *Fall 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. COMPARATIVE PSYCHOLOGY. Mr. Thompson.

The comparative study of the behavior of the individual animal.

50. PERCEPTION. Mr. Wallach.

Laboratory section one afternoon per week to be arranged. The major facts and some problems of visual perception are outlined and used to acquaint the student with experimental research.

52. HUMAN LEARNING AND THINKING.

An examination of the phenomena of association, memory, problem solving, thinking and language.

55. CHILD PSYCHOLOGY. Mr. Levin. *Alternate years*

Cognitive development, the socialization process, and the influence of child-rearing practices will be emphasized. Observing of preschool children will be required.

56. Social Psychology. Mr. Peabody.

A study of the individual in relation to 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.

58. Personality. Mr. Levin, Mr. Peabody. *Fall semester*

Representative theories, methods, and findings related to such topics as personality structure, the self, aggression, and the achievement motive will be examined.

59. Psychology of Attitudes. Mr. Peabody.

The course will concentrate on topics designed to supplement Psychology 56, Social Psychology, with particular attention to social and political attitudes. Topics will include some aspects of the psychology of language, the concept and measurement of attitudes and opinions, attitudes and political behavior, the organization of attitudes and personal ideologies.

62–63. Colloquium in Learning. Mr. Nevin. *Spring semester*

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.

64–65. Colloquium in History and Systems of Psychology. Mr. Peabody. *Spring semester*

Reading and discussion 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. Double credit.

69. Independent Research. Staff.

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 approval of the department and the sponsorship of a faculty member who agrees to supervise the work.

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

42. Applied Social Psychology. *Spring semester*

This course deals with communications within groups, leadership, attitudes and propaganda, wage payment plans, consumer motivation and behavior, and the structure of organizations. Attention will be given to the application of concepts that have been drawn from the laboratory study of motivation, perception, and learning.

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: Course 1.

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

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

14. INTRODUCTION TO TEACHING. Mrs. Brodhead. *Each semester*

Current educational theory and practice. Weekly seminar plus three hours a week (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. Mrs. Brodhead. *Each semester*

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.

HONORS SEMINARS

101. PERCEPTION. Mr. Wallach.

Reading and discussion combined with independent experimental projects. The student is expected to know the basic facts about human perceptual mechanisms, particularly visual ones, by the time he has completed this seminar. Specific topics covered are: color vision, grouping and form, depth and distance, size, movement, influences of learning and 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. Nevin, Mr. Thompson.

The major phenomena of learning and conditioning—taken largely from the animal level—are discussed. An attempt is made to systematize the experimental 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.

104. INDIVIDUAL IN SOCIETY. Mr. Peabody.

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, Mr. Peabody.

A scrutiny of attempts to build an objective basis for "understanding the person as a whole." Contrasting theoretical orientations, techniques of obser-

vation, 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.

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.

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 syntatic processes.

120. THESIS. All members of the department.

May be presented as a substitute for one seminar, provided the student is doing major work in psychology with four seminars, and provided some member of the department is available to undertake the direction of the thesis.

MASTER'S DEGREE

A limited number of students may be accepted for graduate study toward the Master's degree in psychology. Students receiving the Bachelor's degree from Swarthmore are not normally eligible for this work.

The program of work for the Master's degree requires the completion of four seminars, or their equivalent. One of the seminars must be a research seminar leading to a Thesis. The work of the seminars is judged by external examiners. The requirements for the Master's degree can normally be completed in one year.

SOCIOLOGY AND ANTHROPOLOGY

ASSOCIATE PROFESSOR: LEON BRAMSON

ASSISTANT PROFESSOR: STEVEN PIKER

INSTRUCTOR: 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 1-2 is prerequisite to all other work in the department. A number of additional courses and seminars will be offered during the academic year 1967-68.

COURSES

1–2. INTRODUCTION TO SOCIOLOGY AND ANTHROPOLOGY. Staff. *Full course*

An exploration of fundamental factors in human group life. Topics will range from background materials in animal studies and primate social behavior through the context of human development in families, communities, castes, classes, and larger social structures. Examples of the latter will include pre-literate societies and modern nation-states. Among topics to be studied comparatively are child-rearing, work and occupations, urbanism, organized hostility, and cultural change.

21. CONTEMPORARY SOCIAL PROBLEMS. Mr. Van Til. *Fall semester*

An attempt to relate social problems to an analysis of the structure of modern societies. Emphasis will be on values and institutions as determinants of social problems, and on self-fulfilling prophecies regarding inequality, poverty and delinquency. Topics include social disorganization, crime, deviance, and evaluation of proposals for directed social change: education, welfare, structural reform.

22. RACE AND ETHNIC RELATIONS IN THE UNITED STATES. Mr. Van Til. *Spring semester*

Ethnic and minority relations in America, their structure and patterns of change. Particular emphasis will be placed on the American Negro: the development of Negro 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.

51. CITIES AND SOCIETY. Mr. Van Til. *Fall semester*

The historical growth of cities, the social structure of urban areas, impact of urbanization on social relations, and 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, and the prospects for urban planning.

61. COMPARATIVE SOCIAL ORGANIZATION. Mr. Piker. *Fall semester*

Examples of societal types ranging from primitive hunting-and-gathering to pre-industrial urban will be considered. Special emphasis will be given to the important socio-cultural features of each type, ecological determinants of societal types, and patterns of transition from one type to another.

62. POLITICAL SOCIOLOGY. Mr. Gilbert.

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 1966-67.

63. PSYCHOLOGICAL ANTHROPOLOGY. Mr. Piker. *Spring semester*

The 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 other fields of social and cultural anthropology.

HONORS WORK

102. SOCIAL STRUCTURE. Mr. Piker. *Fall semester*

The nature of human social organization. Case materials will be drawn from a variety of culture types and areas, including Middle America, Melanesia, India and Theravada Buddhist Southeast Asia. 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. May be taken in addition to Course 22, Race and Ethnic Relations in the United States.

104. PSYCHOLOGICAL ANTHROPOLOGY. 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. May not be taken in addition to Course 63, Psychological Anthropology.

105. MODERN SOCIAL THEORY. Mr. BRAMSON. *Spring semester*

The social and intellectual background of the rise of social science, with consideration of selected social ideologies and their relation to theory and research in sociology and anthropology.

Magill Walk

REFERENCE SECTION

SWARTHMORE COLLEGE

SWARTHMORE COLLEGE

SWARTHMORE, PENNSYLVANIA

Visiting Examiners—1966

ASTRONOMY: PROFESSOR WILLIAM C. PROTHEROE, *University of Pennsylvania;* DR. KAJ A. STRAND, *U. S. Naval Observatory.*

BIOLOGY: PROFESSOR PIERRE DANSEREAU, *New York Botanical Garden;* PROFESSOR PHILIP B. DUNHAM, *Syracuse University;* DR. MARLIN A. ESPENSHADE, *Wyeth Laboratories;* PROFESSOR DONALD R. GRIFFIN, *The Rockefeller University;* PROFESSOR JAMES W. LASH, *University of Pennsylvania;* PROFESSOR DANIEL J. O'KANE, *University of Pennsylvania;* MR. JOHN A. ROMBERGER, *U.S.D.A., Forest Service;* DR. JACK SCHULTZ, *Institute for Cancer Research.*

CHEMISTRY: PROFESSOR JOHN P. CHESICK, *Haverford College;* PROFESSOR ALEX NICKON, *Johns Hopkins University;* PROFESSOR CHARLES N. REILLEY, *University of North Carolina;* DR. JOHN T. YATES, *Bureau of Standards.*

CLASSICS: PROFESSOR BERTHE MARTI, *University of North Carolina;* PROFESSOR WESLEY D. SMITH, *University of Pennsylvania.*

ECONOMICS: PROFESSOR THOMAS F. DERNBURG, *Oberlin College;* PROFESSOR FRANKLIN M. FISHER, *Massachusetts Institute of Technology;* DR. GARTH L. MANGUM, *Upjohn Institute;* DR. FREDERICK L. PRYOR, *Yale University.*

ENGLISH LITERATURE: PROFESSOR ALAN DOWNER, *Princeton University;* PROFESSOR JOHN HOLLANDER, *Yale University;* PROFESSOR R. W. B. LEWIS, *Yale University;* PROFESSOR A. WALTON LITZ, *Princeton University;* PROFESSOR ISABEL MACCAFFREY, *Bryn Mawr College.*

FINE ARTS: PROFESSOR CHRISTOPHER GRAY, *Johns Hopkins University;* PROFESSOR TIMOTHY K. KITAO, *Rhode Island School of Design;* PROFESSOR WILLIAM LOERKE, *University of Pittsburgh.*

HISTORY: PROFESSOR JEFFREY E. BUTLER, *Wesleyan University;* PROFESSOR ROBERT D. CROSS, *Columbia University;* PROFESSOR JOHN A. LUKACS, *Chestnut Hill College and La Salle College;* PROFESSOR STANLEY I. MELLON, *Yale University;* PROFESSOR DAVID OWEN, *Harvard University;* PROFESSOR CHARLES T. WOOD, *Dartmouth College.*

MATHEMATICS: PROFESSOR NATHAN FINE, *Pennsylvania State University;* PROFESSOR ROBERT P. LANGLANDS, *Princeton University;* PROFESSOR EDGAR R. MULLINS, JR., *Grinnell College.*

MODERN LANGUAGES

FRENCH: PROFESSOR JEAN-JACQUES DEMOREST, *Cornell University;* PROFESSOR MARIO MAURIN, *Bryn Mawr College.*

GERMAN: PROFESSOR THEODORE ZIOLKOWSKI, *Princeton University.*

LINGUISTICS: PROFESSOR HENRY M. HOENIGSWALD, *University of Pennsylvania.*

SPANISH: PROFESSOR JOAQUIN GONZALEZ-MUELA, *Bryn Mawr College.*

MUSIC: PROFESSOR ROBERT MOEVS, *Rutgers University.*

PHILOSOPHY: PROFESSOR HENRY D. AIKEN, *Brandeis University;* PROFESSOR RICHARD CARTWRIGHT, *Wayne State University;* PROFESSOR JAEGWON KIM, *Cornell University;* PROFESSOR CLAUDE WELCH, *University of Pennsylvania.*

PHYSICS: PROFESSOR ERNEST D. COURANT, *Brookhaven National Laboratory;* PROFESSOR JOHN J. HOPFIELD, *Princeton University.*

POLITICAL SCIENCE: PROFESSOR ALFRED DIAMANT, *Haverford College;* PROFESSOR ROBERT GOOSTREE, *American University;* PROFESSOR HOLLAND HUNTER, *Haverford College;* PROFESSOR NORTON E. LONG, *Brandeis University;* PROFESSOR PAUL E. SIGMUND, *Princeton University;* PROFESSOR GLENN SNYDER, *State University of New York.*

PSYCHOLOGY: PROFESSOR HARRY BEILIN, *Brooklyn College;* PROFESSOR WILLIAM W. CUMMING, *Columbia University;* PROFESSOR THEODORE NEWCOMB, *University of Michigan;* DR. DAVID ROSENHAN, *Educational Testing Service;* PROFESSOR CARL ZUCKERMAN, *Brooklyn College.*

DEGREES CONFERRED

June 6, 1966

Bachelor of Arts

In the Division of the Humanities

Barbara Bowditch Alden (French)
Thomas Adams Allaway (Psychology)
Carol Lee Anschuetz (Russian)
John Gates Bennett (Philosophy)
Kathryn Alice Biberstein (German)
Peter Anthony Bloom * (Music)
Eleanor Bly (Russian)
Susan Booth (Fine Arts)
C. Elena Williams Campbell (English Literature)
Melissa Carroll (Russian)
Susan Elizabeth Chady (English Literature)
Alice Whitcomb Clark (History)
Pamela Suzanne Corbett (Psychology)
David Bruce Cratsley (Fine Arts)
Elizabeth Osborne Daniel (English Literature)
Rea Ann Scovill DePuma (English Literature)
Elsa Jane Dixler (History)
Vincent O. Eareckson, III (Religion)
Susannah Stone Eldridge † (English Literature)
Michael Kelvin Ferber (Greek)
Rachel Alice Folsom (Fine Arts)
Arthur P. Foster (History)
Marjorie Beth Garber (English Literature)
Stephen Lindeman Gessner (English Literature)
Claudia Stewart Gordon (Psychology)
Janet Redfield Griffin (French)
Linda Lynes Groetzinger (German)
Catherine Mary Hagerty (Psychology)
Jeanne Frances Henshaw (Fine Arts)
Helen Heusner (English Literature)
Kate Donnelly Hickey (English Literature)
Shelby Fiske Hoffman * (Fine Arts)
Ann Shepard Houston (Philosophy)
Joy Beardslee Huffman (Philosophy)
Marilyn Patricia Hughes (Russian)
Barbara Ann Jahnel (Mathematics)
Martha Jo Pullen Jenkins (French)
Christine J. Jordan (English Literature)
Paul R. Katz (Fine Arts)
Thomas Corbin Kennedy (English Literature)
L. Hunter Kevil, Jr. (French)
Sarah Cuthbert Van Keuren Kevil (Fine Arts)
Edward Arthur Klein (Fine Arts)
Margaret Klein (English Literature)
Robert Edward Levering (Philosophy)
Antony W. Lob (Russian)
Suzanne Gabrielle Lorant * (English Literature)
Patricia Jean Lykens (Fine Arts)
Holly Maguigan (History)
Elizabeth King Marsh (Greek)
Roger McKean Mastrude (History)
Catherine A. McClelland (Greek)
J. B. Mitchell (Latin)
John Newton Morrel (English Literature)
Christopher D. Morris (English Literature)
William Andrew Nelson (English Literature)
Robert Alan Nussbaum (English Literature)
Ross Hunter Ogden (English Literature)
Sara Saunders Orr (German)
Toby Jensen Perkins (English Literature)
Rodney Britton Perry (English Literature)
Judith Ann Petsonk (English Literature)
Brenda Joan Porster (History)
Wendy Ann Prindle (English Literature)
Barbara Probst (French)
Ann Howell Purvis (English Literature)
Marcia Mae Quade (Philosophy)
Margaret Jill Robinson (English Literature)
Elizabeth Dare Rust (English Literature)

* As of the Class of 1965.
† As of the Class of 1964.

RICHARD PAUL SCHEINMAN (English Literature)
WILMA WAY SHEN (History)
ELIZABETH BOWDEN SMITH (English Literature)
JANE WOOD SPAVINS (History)
MARGARET LOUISE SPRAGUE (English Literature)
MARGARET CHAMBERLAIN SPRINGER (History)
JAMES OLIVER TATE, JR. (English Literature)
JANAKI NATARAJAN TSCHANNERL (English Literature)
SUSAN LEE VANDENBERG (Fine Arts)
JUDITH THERESE WALENTA (Fine Arts)
CAROL ANN WEISS (English Literature)
MARCIA JOAN YOSELSON (Spanish)
CHARLES ABRAHAM ZUCKERMAN (History)

In the Division of the Social Sciences

CARL JOHN ABBOTT (History)
FREELAND KNIGHT ABBOTT, JR. (Economics)
ELLEN HUBBS ARGUIMBAU (History)
RITA BAAB (Political Science)
PHILIP HERR BARLEY (History)
NANCY A. BEALL (Political Science)
STEPHEN HUSTON BENNETT (Economics)
LOUISE MARSHALL BINGHAM (Political Science)
WILLIAM A. BRADFORD, JR. (Political Science)
STEVEN H. BRANDT (Economics)
EDWARD THOMAS BRESLIN (History)
LUCINDA KIDDER BROWN (Psychology)
ALEXANDER MORGAN CAPRON (Economics)
ALBERT A. CHAPPELL (Political Science and History)
FRANK BLAIR COCHRAN (Political Science)
NANCY JOSEPHINE COOLEY (Political Science)
ANN LOUISE COULTER (Psychology)
NICHOLAS MICHAEL EGLESON (History)
CHARLES CALVERT ELLIS, III (Economics)
AYSE EMEL ERTURER (Political Science)
DANIEL FEIGIN (Mathematics)
JAMES MONROE FLACK, II (Economics)
DELIA ANN FORTUNE (Political Science)
JAMES YARD GARRETT (Economics)
CYNTHIA ANN GRANT (Political Science)
RICHARD IRA GREENBERG (Economics)
ROBERT EUGENE HAWKINSON (Political Science)
EMILY R. JACKENDOFF (Psychology)
ERIC BUTEN JACOBS (Psychology)
ALAIN JEHLEN (Psychology)
GARETH ALBERT JENKINS (History)
JOY KRISTINA KOLEHMAINEN (Political Science)
MAUREEN MINA KULBAITIS (Political Science)
RUTH ELLEN LANGENHEIM (Economics)
SARA MORGAN LAWRENCE (Psychology)
KLAUS E. LIEBOLD (Psychology)
LOWELL WELDEN LIVEZEY (Economics)
JEAN HELEN LYON (History)
W. HAROLD MAINS (History)
ANNE PARKER MILLS (Economics)
JOHN HOWARD MORROW, JR. (History)
ANN BISSELL MOSELY (Political Science)
JULES MOSKOWITZ (History)
MARCIA STEWART MURRAY (Psychology)
JACK HENRY NAGEL (Political Science)
LUCIA MCKIM NORTON * (History)
PETER PASSELL (Economics)
STEPHEN BEASLEY LINNARD PENROSE, III (Political Science)
DANIEL ANDREW POPE (History)
EVA MARY REISSNER (Economics)
CHARLOTTE BETH REMINGTON (Political Science)
ROXANNE B. RENSCH (Political Science)
THOMAS A. RIDDELL (Economics)
WALTER RICHARD RISTOW (Mathematics)
JOHN MARK ROBINSON (History)
DAVID E. SCULL, II (History)
ALLEN EDWARD SHOENBERGER (History)
ROY GREGORY VAN TIL (Economics)
JONATHAN VAUGHAN (Psychology)
SANDRA WARREN (History)
THOMAS RALPH WATTS (Economics)
WILLIAM ROY WHIPPLE (Psychology)
MARTHA FAITH WIGNER (Economics)
CATHLYN P. WILKERSON (Political Science)
ROBERT BRICKLEY WILLIAMS (History)
MARTIN HENRY WOLFSON (Economics)

* As of the Class of 1965.

In the Division of the Natural Sciences

NANCY JOANNE AXELROD (Biology)
JOSEPH MARC BECKER (Zoology)
RICHARD HARVEY BONDER (Zoology)
KENNETH MELVIN BOYER (Chemistry)
JUDITH ANN BURGESS (Zoology)
STEPHEN ROBERT BURSTEIN (Biology)
PAUL DAVID CHALMER (Chemistry)
F. STUART CHAPIN, III (Biology)
LINTON REID CORRUCCINI (Physics)
JAMES LEE CRISTOL (Zoology)
GLORIA CUMMINGS (Zoology)
E. PATCHEN DELLINGER (Mathematics)
CAROLYN EBERHARD * (Zoology)
MARGARET ELIZABETH ENGEL (Biology)
MARTIN S. EWING (Physics)
JOSEPH HOWARD GATEWOOD (Chemistry)
THOMAS CHRISTMAN GRUBB, JR. (Zoology)
ALBERT KENNETH HARRIS, JR.* (Biology)
ARTHUR J. HARTZ (Chemistry)
PETER LAWRENCE DEES HENDLEY (Zoology)
RONALD W. HOLZ (Chemistry)
JOHN ALLEN HOOKE (Mathematics)
MABEL BERNICE HULTIN (Zoology)
STRATTON CHRISTOPHERSEN JAQUETTE (Mathematics)
AKIRA JINDO (Chemistry)
JANE-CAROL JOHNSON (Psychology)
KATHARINE ELISABETH KLEMPERER (Biology)
FREDERICK T. KOSTER (Biology)
MARGOT FRANCES KOSTER (Botany)
MARY ELIZABETH LEWIS (Biology)
MORGAN BURTON LEWIS (Zoology)
STEPHEN BROOK LICHTENBERG (Chemistry)
ROBERT DUNCAN MACPHERSON (Mathematics)
FRANCES ANNE MCARDLE (Biology)
JUDITH ANN MCCONNELL (Zoology)
HOWARD VICTOR MINDUS (Physics)
SANDRA MOORE (Physics)
JANET M. NORDGREN (Biology)
BRUCE RILEY PATTON (Physics)
HARSH VARDHAN PITTIE (Mathematics)
WALTER POPPER (Psychology)
ELIZABETH PROBASCO (Chemistry)
MICHAEL REICH (Mathematics)
FREDERICK MAST RHOADES (Biology)
RUTH SANDBERGH (Biology)
LINDA SARA SAXE (Biology)
MARY LAURA SCHAEFFER (Chemistry)
LINDA MARIE SIMKIN (Biology)
MICHAEL GERVASE SINCLAIR (Zoology)
PHILLIP SOLLINS (Biology)
JAMES ESTES TEAR, JR. (Chemistry)
CHRISTINE ADELE VANWEGEN (Biology)
THOMPSON WEBB, III (Botany)
JOHN FREDERICK WEHMILLER (Chemistry)
WALTER EMIL WESTMAN (Botany)
SUSAN BARBARA WOLSCHINA (Biology)
DOROTHY LOUISE WOODS (Psychology)
MARY CATHERINE YOUNG (Biology)
PAUL EDWARD YOUNG (Chemistry)
STUART JAMES YOUNGNER (Zoology)
REGINA GALE ZIEGLER (Chemistry)

BACHELOR OF SCIENCE

In the Division of Engineering

WILLIAM EMMANUEL BELANGER (Electrical Engineering)
SHIRAZ GULAMHUSSEIN BHANJI (Electrical Engineering)
DONALD EDWIN BLANKERTZ (Civil Engineering)
DAVID DANA CLARK (Electrical Engineering)
JOHN ANDREW DAUBENSPECK (Mechanical Engineering)
ALAN SCOTT DOUGLAS * (Electrical Engineering)
ROBERT CAMPBELL GWIN, III (Mechanical Engineering)
J. MICHAEL HELD (Civil Engineering)
LIN HO (Electrical Engineering)
THEODORE F. MOORE (Civil Engineering)
ROGER WILLIAM NORTH (Civil Engineering)
JOHN QUINTON PERDUE, JR. (Mechanical Engineering)
JOHN EVAN PICKETT (Civil Engineering)
FRANK WILLIAM SCHAFER (Mechanical Engineering)
LOUIS T. SCHNEIDER (Civil Engineering)
RICHARD RADUE TRUITT (Civil Engineering)
CLIFFORD AKELEY WOODBURY, III (Mechanical Engineering)
JOHN MURRAY ZELNICK (Mechanical Engineering)

* As of the Class of 1965.

HONORARY DEGREES

DOCTOR OF LAWS

COLIN WEDDERBURN BELL
RICHARD CLARKSON BOND

DOCTOR OF SCIENCE

EUGENE PAUL WIGNER

AWARDS AND DISTINCTIONS

June 6, 1966

HONORS AWARDED BY THE VISITING EXAMINERS

HONORS:

Louise Marshall Bingham, William A. Bradford, Jr., Stephen Robert Burstein, Susan Elizabeth Chady, Frank Blair Cochran, Nancy Josephine Cooley, Pamela Suzanne Corbett, Linton Reid Corruccini, Charles Calvert Ellis, III, Martin S. Ewing, Joseph Howard Gatewood, Cynthia Ann Grant, John Allen Hooke, Stratton Christophersen Jaquette, Gareth Albert Jenkins, Thomas Corbin Kennedy, L. Hunter Kevil, Jr., Margaret Klein, Joy Kristina Kolehmainen, Jean Helen Lyon, W. Harold Mains, Howard Victor Mindus, J. B. Mitchell. Christopher D. Morris, John Howard Morrow, Jr., Ann Bissell Mosely, Jules Moskowitz, William Andrew Nelson, Janet M. Nordgren, Sara Saunders Orr, Bruce Riley Patton, Stephen Beasley Linnard Penrose, III, Harsh Vardhan Pittie, Wendy Ann Prindle, Michael Reich, Richard Paul Scheinman, Allen Edward Shoenberger, Jane Wood Spavins, Margaret Louise Sprague, Thompson Webb, III, Carol Ann Weiss, Martin Henry Wolfson, Regina Gale Ziegler, Charles Abraham Zuckerman.

HIGH HONORS:

Carl John Abbott, Thomas Adams Allaway, Nancy Joanne Axelrod, John Gates Bennett, Judith Ann Burgess, Alexander Morgan Capron, Elsa Jane Dixler, Ronald W. Holz, Alain Jehlen, Maureen Mina Kulbaitis, Holly Maguigan, Elizabeth King Marsh, Judith Ann McConnell, Sandra Moore, Peter Passell, Daniel Andrew Pope, Brenda Joan Porster, Walter Richard Ristow, Jonathan Vaughan, Walter Emil Westman, William Roy Whipple.

HIGHEST HONORS:

Paul David Chalmer, Michael Kelvin Ferber, Marjorie Beth Garber, Robert Duncan MacPherson, Jack Henry Nagel.

DISTINCTION IN COURSE AWARDED BY THE FACULTY

Carol Lee Anschuetz, David Dana Clark, E. Patchen Dellinger, Margaret Elizabeth Engel, Janet Redfield Griffin, Catherine Mary Hagerty, Marilyn Patricia Hughes, Emily R. Jackendoff, Margot Frances Koster, Marcia Stewart Murray, Roger William North, Frederick Mast Rhoades, Dorothy Louise Woods, Marcia Joan Yoselson.

Elections to Honorary Societies

PHI BETA KAPPA:

Carl John Abbott, Thomas A. Allaway, John Gates Bennett, William A. Bradford, Jr., Judith Ann Burgess, Paul David Chalmer, E. Patchen Dellinger, Elsa Jane Dixler, Michael Kelvin Ferber, Marjorie Beth Garber, Joseph Howard Gatewood, Janet Redfield Griffin, Marilyn Patricia Hughes, Emily R. Jackendoff, Gareth Albert Jenkins, Thomas Corbin Kennedy, Margot Frances Koster, Maureen Mina Kulbaitis, Robert Duncan MacPherson, Elizabeth King Marsh, Judith Ann McConnell, J. B. Mitchell, Sandra Moore, Jack Henry Nagel, Peter Passell, Bruce Riley Patton, Harsh Vardhan Pittie, Daniel Andrew Pope, Brenda Joan Porster, Michael Reich, Walter Richard Ristow, Walter Emil Westman, William Roy Whipple.

SIGMA XI:

Nancy Joanne Axelrod, Stephen Robert Burstein, Paul David Chalmer, F. Stuart Chapin, III, David Dana Clark, Linton Reid Corruccini, Martin S. Ewing, Akira Jindo, Frederick T. Koster, Margot Frances Koster, Sandra Moore, Roger William North, Bruce Riley Patton, Harsh Vardhan Pittie, Michael Reich, Frederick Mast Rhoades, Walter Richard Ristow, James Estes Tear, Jr., Thompson Webb, III, Walter Emil Westman.

SIGMA TAU:

Shiraz Gulamhussein Bhanji, David Dana Clark, Robert Campbell Gwin, III, Roger William North, John Quinton Perdue, Jr., Frank William Schafer, Richard Radue Truitt, John Murray Zelnick.

Swarthmore College Fellowship Awards

The Hannah A. Leedom Fellowship to C. Elena Williams Campbell.
The Joshua Lippincott Fellowship to Walter Emil Westman.
The John Lockwood Memorial Fellowship to Margaret Hodgkin.
The Lucretia Mott Fellowship to Maureen Mina Kulbaitis.
The Phi Beta Kappa Fellowship to Elsa Jane Dixler.
The Martha E. Tyson Fellowship to Wendy Ann Prindle.

Special Awards *

The Ivy Award to Lowell Welden Livezey.
The Oak Leaf Award to Judith Ann Burgess.
The McCabe Engineering Award to David Dana Clark.
The John W. Nason Award to Clair Wilcox.
The Brand Blanshard Prize to Geoffrey S. Joseph.
The Sarah Kaighn Cooper Scholarship to William Hauser.
The John Russell Hayes Poetry Prizes: for an original poem, Joel Schultz; *for a verse translation,* Joel Schultz.
The Lois Morrell Poetry Awards: William Nelson and James O. Tate.
The William Plumer Potter Public Speaking Fund Awards:
The Potter One-Act Play Contest: prizes awarded to Lawrence Arnstein, Paul Chalmer and Jeffrey Jones.
The Potter Short Story Contest: first prize, Carl Abbott, second prize, Paul Leavin.
The A. Edward Newton Library Prize to Thomas Wolf.
The May E. Parry Award to Dulany Ogden.
The Phi Beta Kappa Prize to Geoffrey S. Joseph.
The Scott Award to Daniel Eubank.
The Katherine B. Sicard Prize to Nancy Bekavac.

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

Enrollment of Students by Classes—1965-66

	Men	*Women*	*Total*
Seniors	120	99	219
Juniors	135	112	247
Sophomores	144	119	263
Freshmen	151	138	289
Total undergraduates	550	468	1,018
Special students	2	4	6
Graduate Students	1	1	2
Totals	553	473	1,026

Geographical Distribution—1965-66

New York	205
Pennsylvania	186
New Jersey	87
Massachusetts	59
Maryland	49
California	44
Connecticut	40
Virginia	32
Ohio	30
Delaware	22
Illinois	21
Michigan	20
North Carolina	18
District of Columbia	17
Florida	14
Wisconsin	11
Texas	10
Tennessee	9
Colorado	8
Georgia	8
Indiana	8
Maine	8
Missouri	8
Minnesota	7
Vermont	7
New Hampshire	6
Iowa	5
Washington	5
West Virginia	5
Arizona	4
Kentucky	4
Nebraska	4
Rhode Island	4
Alabama	3
Hawaii	3
New Mexico	3
South Carolina	3
Kansas	2
Louisiana	2
Oregon	2
Puerto Rico	2
Alaska	1
Idaho	1
Oklahoma	1
Wyoming	1
Canal Zone	1
Virgin Islands	1
Total United States	991
Greece	4
Colombia	3
Italy	3
Mexico	3
England	2
Canada	2
Japan	2
Panama	2
Switzerland	2
Taiwan	2
Turkey	2
Brazil	1
Germany	1
Ghana	1
India	1
Liberia	1
Malawi	1
Peru	1
Tanzania	1
Total from abroad	35
Grand Total	1,026

Index

Index

Plan of the Grounds of Swarthmore College

Map of College and Key

1 *Parrish Hall*
1A *Parrish Hall Annex*
2 *Hall Gymnasium*
3 *Sharples Pool*
4 *Martin Building*
5 *Pierre S. duPont Science Building*
6 *Beardsley Hall*
7 *Trotter Hall*
8 *Arts Center*
9 *Hicks Hall*
10 *Bartol Foundation*
11 *Friends Meeting House*
12 *Whittier House*
13 *Professors' Residences*
14 *Woolman House*
15 *President's House*
16 *Robinson House*
17 *Cunningham House*
18 *McCabe Library*
19 *Willets Dormitory*
20 *Worth Dormitory*
21 *Bond Memorial and Class Lodges*
22 *Benjamin West House*
23 *College Library and Friends Historical Library*
24 *Tennis Courts*
25 *Cunningham Field*
26 *Pennsylvania Railroad Station*
27 *Palmer Hall*
28 *Pittenger Hall*
29 *Roberts Hall*
30 *Storage*
31 *Mary Lyon Dormitories*
32 *Hydraulic Laboratory*
33 *Clothier Fields*
34 *Lamb-Miller Field House*
35 *Heating Plant*
36 *Employees' Houses*
37 *Phi Omicron Psi Fraternity Lodge*
38 *Delta Upsilon Fraternity Lodge*
39 *Phi Sigma Kappa Fraternity Lodge*
40 *Tau Alpha Omicron Fraternity Lodge*
41 *Kappa Sigma Pi Fraternity Lodge*
42 *Wharton Hall*
43 *Sproul Observatory*
44 *Clothier Memorial*
45 *Scott Outdoor Auditorium*
46 *Scott Foundation Building*
47 *Ashton House*
48 *Service Building*
49 *Philip T. Sharples Dining Hall*
50 *Worth Health Center*
51 *Site of Dana and Hallowell Dormitories*

Plan of the Grounds of Swarthmore College