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SWARTHMORE COLLEGE BULLETIN

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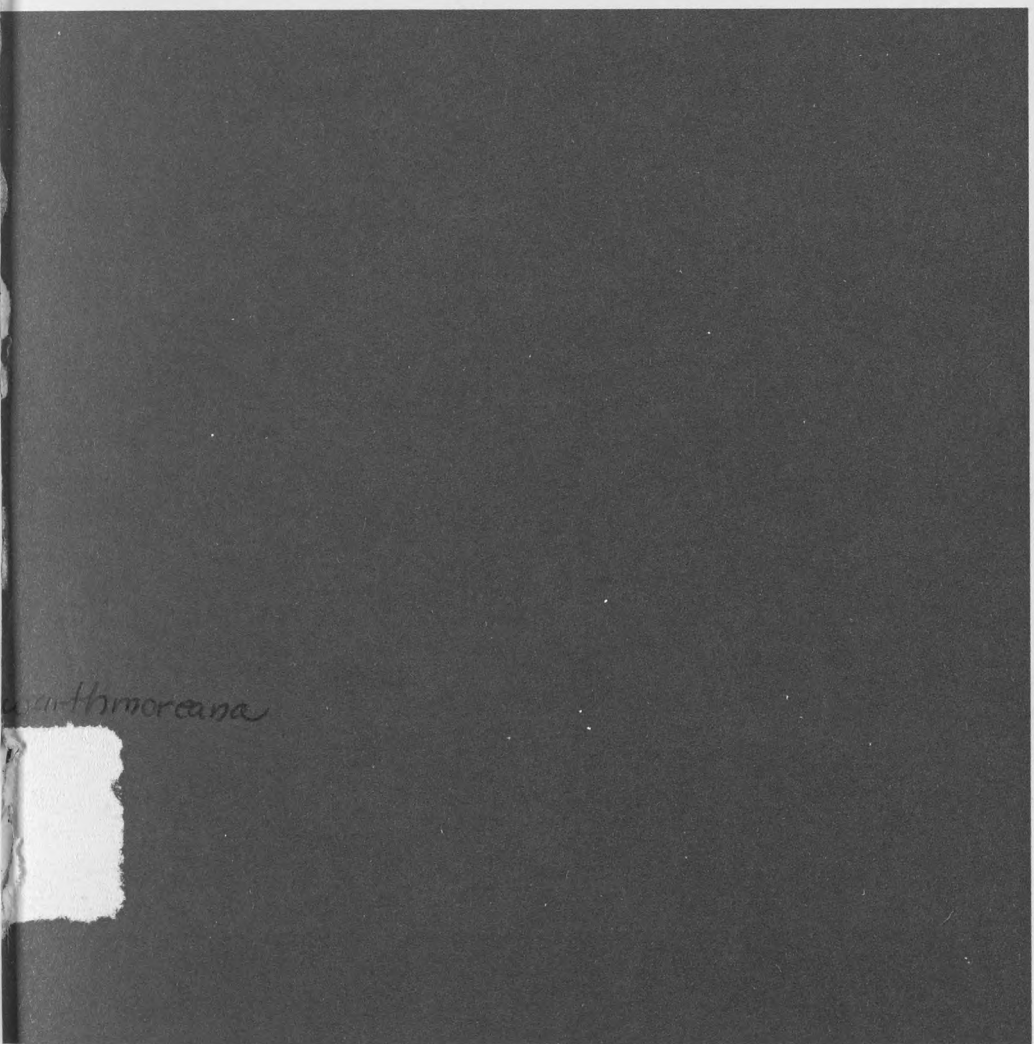

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SWARTHMORE COLLEGE BULLETIN

CATALOGUE ISSUE ■ 1970-1971

Volume LXVIII ■ Number 1 ■ September 1970

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SWARTHMORE COLLEGE, SWARTHMORE, PA. 19081

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College Calendar

1970 Fall Semester

September 15-19	Freshman placement days
September 18	Meeting of Honors students
September 19	Registration
September 21	Classes and Honors seminars begin
October 2, 3	Meeting of the Board of Managers
November 26-28	Thanksgiving recess
December 4, 5	Annual Meeting of the Board of Managers
December 11	Registration for spring semester
December 18	Christmas vacation begins, 6:00 p.m.

1971

January 4	Christmas vacation ends, 8:30 a.m.
January 4-11	Reading period for Course students (at the option of the instructor)
January 12	Classes and seminars end
January 13	Meeting of Honors students
January 18	Honors seminars begin for spring semester
January 18	Mid-year examinations begin
January 29	Mid-year examinations end

Spring Semester

February 1	Classes begin
March 5, 6	Meeting of the Board of Managers
March 19	Spring vacation begins, 6:00 p.m.
March 29	Spring vacation ends, 8:30 a.m.
April 2, 3	Meeting of the Board of Managers
April 30	Honors seminars end
May 3-14	Reading period for Course students (at the option of the instructor)
May 10	Written Honors examinations begin
May 14	Classes end
May 17	Enrollment in classes for fall semester
May 19	Course examinations begin
May 22	Written Honors examinations end
May 27-29	Oral Honors examinations
May 29	Course examinations end
May 31-June 2	Senior comprehensive examinations
June 4, 5	Meeting of the Board of Managers
June 5	Alumni Day
June 6	Baccalaureate Day
June 7	Commencement Day

College Calendar *(Tentative)*

1971 Fall Semester

September 14-18	Freshman placement days
September 17	Meeting of Honors students
September 18	Registration
September 20	Classes and Honors seminars begin
October 1, 2	Meeting of the Board of Managers
November 25-27	Thanksgiving recess
December 3, 4	Annual Meeting of the Board of Managers
December 17	Christmas vacation begins, 6:00 p.m.

1972

January 3	Christmas vacation ends, 8:30 a.m.
January 3-11	Reading period for Course students (at the option of the instructor)
January 11	Classes and seminars end
January 12	Meeting of Honors students
January 17	Honors seminars begin for spring semester
January 17	Mid-year examinations begin
January 28	Mid-year examinations end

Spring Semester

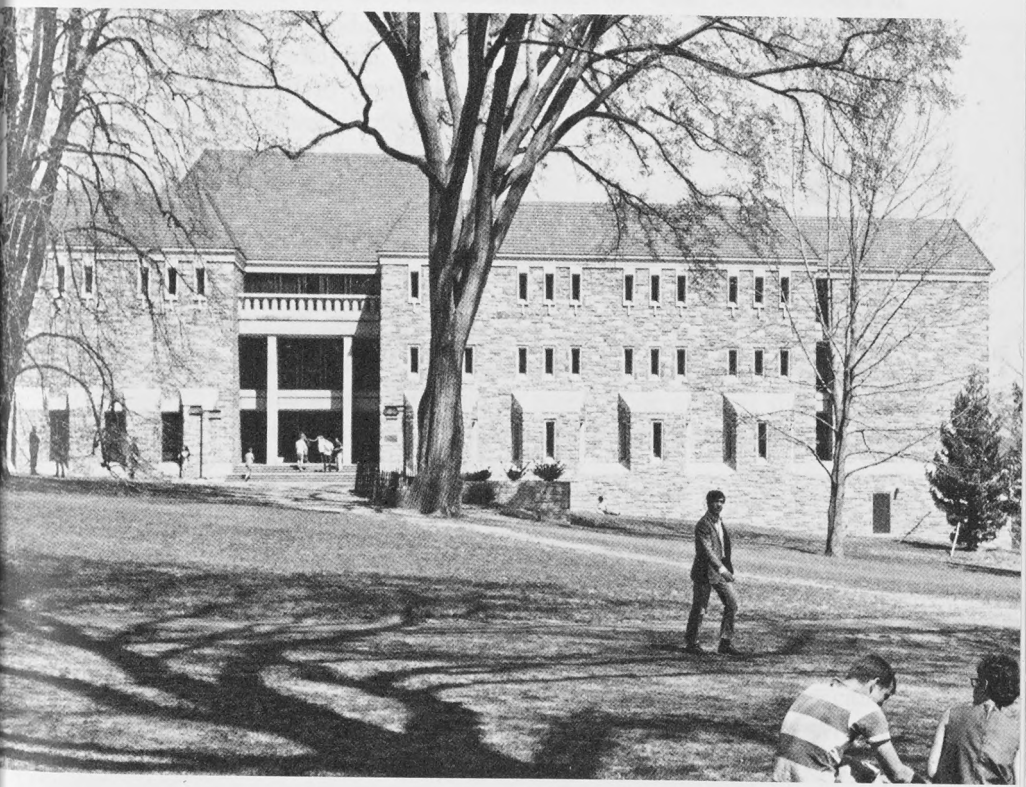
January 31	Classes begin
March 3, 4	Meeting of the Board of Managers
March 17	Spring vacation begins, 6:00 p.m.
March 27	Spring vacation ends, 8:30 a.m.
April 7, 8	Meeting of the Board of Managers
April 28	Honors seminars end
May 1-12	Reading period for Course students (at the option of the instructor)
May 8	Written Honors examinations begin
May 12	Classes end
May 15	Enrollment in classes for fall semester
May 17	Course examinations begin
May 19	Written Honors examinations end
May 25-27	Oral Honors examinations
May 27	Course examinations end
May 29-31	Senior comprehensive examinations
June 2, 3	Meeting of the Board of Managers
June 3	Alumni Day
June 4	Baccalaureate Day
June 5	Commencement Day

Note: The academic calendar is being studied by a three college committee with representatives from Bryn Mawr, Haverford, and Swarthmore. Since this committee may propose a common calendar for 1971-72, the calendar printed here should be regarded as subject to change.

I

INTRODUCTION TO SWARTHMORE COLLEGE

EDUCATIONAL RESOURCES



The McCabe Library

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 1150 students, of whom 525 are women and 625 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.

INTRODUCTION

STANDARDS OF EXCELLENCE

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

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

THE RELIGIOUS TRADITION

Swarthmore College was founded by members of the Religious Society of Friends, and it seeks to illuminate the life of its students with the spiritual principles of that Society. Although it has been non-sectarian in control since the beginning of the present century, and although the children of Friends compose a minority of the student body, the College seeks to preserve the religious traditions out of which it sprang.

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

held regarding them. That is the kind of ethical and religious character which Swarthmore seeks to develop.

TRADITION AND CHANGE

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

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

EDUCATIONAL RESOURCES

PHYSICAL FACILITIES

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 pre-medical 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 Language Laboratory in Beardsley Hall, 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 Arts Center, opened in 1961, contains the Paul M. Pearson Experimental Theater, the Florence Wilcox Lobby for art exhibitions, the Dorothy Hunt Music Room, and studios for various arts and crafts.

The Computer Center, located in Beardsley Hall, is furnished with an IBM 1130 computer and appropriate supporting equipment. It is available to students and faculty members for research and instruction, and its use by students is encouraged. Students and faculty members also have access to the facilities of the Haverford-Bryn Mawr Computer Center, including an IBM 360/44 computer, which is connected by telephone with the Swarthmore Center.

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, solid state physics, and astronomy. Through its affiliation with Thomas Jefferson University, Bartol offers a program of study leading to the Ph.D. degree.

The Thomas B. and Jeannette E. L. McCabe Library contains reading rooms, offices and the major portion of the College library collection. Total College library holdings amount to 350,000 volumes. Some 12,000 volumes are added annually. About 1,500 periodicals are received regularly. The general collection, including all but the scientific and technical books and journals, is housed in the library building, situated on the front campus. The Du Pont Science Library, new in 1960, houses some 26,100 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.

SPECIAL COLLECTIONS

In addition, the library contains certain special collections—the British Americana collection, the Wells Wordsworth and Thomson collections, the Auden collection, the Bathe collection of technological history, and a collection of the issuances of 565 private presses.

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

The Friends Historical Library, founded in 1871 by Anson Lapham, is one of the outstanding collections in the United States of manuscripts, books, pamphlets, and pictures relating to the history of the Society of Friends. The library is a depository for records of Friends Meetings belonging to Baltimore, Philadelphia, and other Yearly Meetings. More than 3,200 record books have been deposited; many of them have been reproduced on microfilm, for which four reading machines are available. The William Wade Hinshaw Index to Quaker Meeting Records indexes the material of genealogical interest in the records of 307 meetings in various parts of the United States. Notable among the other holdings are the Whittier Collection (first

editions and manuscripts of John Greenleaf Whittier, the Quaker poet), the Mott Manuscripts (over 400 autograph letters of Lucretia Mott, antislavery and women's rights leader), and the Hicks Manuscripts (more than 300 letters of Elias Hicks, a famous Quaker minister). The Library's collection of books and pamphlets by and about Friends numbers approximately 30,000 volumes. About 93 Quaker periodicals are currently received. There is also an extensive collection of photographs of meetinghouses and pictures of representative Friends, as well as a number of oil paintings, including two versions of "The Peaceable Kingdom" by Edward Hicks. It is hoped that Friends and others will consider the advantages of giving to this Library any books and family papers which may throw light on the history of the Society of Friends.

The Swarthmore College Peace Collection is of special interest to research students and others seeking the records of the Peace Movement. The personal papers of Jane Addams of Hull House, Chicago, (approximately 10,000 items) formed the original nucleus of the Collection, which now contains documentation on the history of the organized peace movement from its beginnings *circa* 1815 to the present time, as well as correspondence and writings of many workers for international peace and arbitration. The Collection includes files of some 1,200 peace periodicals published in the United States and abroad over the past 150 years; approximately 154 such periodicals in eleven languages are currently received from twenty-one countries. This collection is the official depository for the archives of leading peace organizations in the United States. A more nearly complete description of the Collection will be found in the *Guide to the Swarthmore College Peace Collection,* published by the College and available on request.

The 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 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 the McCabe Library.

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.

SPECIAL FUNDS AND LECTURESHIPS

The William J. Cooper Foundation provides a varied program of lectures and concerts which enriches the academic work of the college. The Foundation was established by William J. Cooper, a devoted friend of the college, whose wife, Emma McIlvain Cooper, served as a member of the Board of Managers from 1882 to 1923. Mr. Cooper bequeathed to the college the sum of $100,000 and provided that the income should be used "in bringing to the college from time to time eminent citizens of this and other countries who are leaders in statesmanship, education, the arts, sciences, learned professions and business, in order that the faculty, students and the college community may be broadened by a closer acquaintance with matters of world interest." Admission to all programs is without charge.

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

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

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

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

America's Recovery Program, by A. A. Berle, Jr., John Dickinson,

A. Heath Onthank . . . and others . . . London, New York, etc., Oxford University Press, 1934.

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

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

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

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

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

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

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

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

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

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

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

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

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

The Arthur Hoyt Scott Horticultural Foundation. About three hundred acres are contained in the College property, including a large tract of woodland and the valley of Crum Creek. Much of this tract has been developed as an horticultural and botanical collection of

trees, shrubs and herbaceous plants through the provisions of the Arthur Hoyt Scott Horticultural Foundation, established in 1929 by Mrs. Arthur Hoyt Scott and Owen and Margaret Moon as a memorial to Arthur Hoyt Scott of the Class of 1895. The plant collections are designed both to afford examples of the better kinds of trees, shrubs and herbaceous plants which are hardy in the climate of Eastern Pennsylvania and suitable for planting by the average gardener, and to beautify the campus. There are exceptionally fine displays of Japanese cherries, flowering crab apples, magnolias and tree peonies, and a great variety of lilacs, rhododendrons, azaleas, daffodils, irises, herbaceous peonies, and hemerocallis. Many donors have contributed generously to the collections. (For full information see *Bulletin of Swarthmore College,* Vol. xxxvii, No. 5.)

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

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

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.

II

ADMISSION
EXPENSES
FINANCIAL AID

Magill Walk and Parrish Hall

ADMISSION

Inquiries concerning admission and applications should be addressed to the Dean of Admissions, Swarthmore College, Swarthmore, Pennsylvania.

GENERAL STATEMENT

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

It is the policy of the college to have the student body represent not only different parts of the United States but many foreign countries, both public and private secondary schools, and various economic, social, religious, and racial groups. The college is also concerned to include in each class sons and daughters of alumni and of members of the Society of Friends.

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

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

All applicants are selected on the following evidence:

1. Record in secondary school.

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

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

PREPARATION

The College does not require a set plan of secondary school courses as preparation for its program. The election of specific subjects is left to the student and his school advisers. In general, preparation should include:

1. *Skills:* The following skills are essential to success in college work and should be brought to a high level by study and practice throughout the preparatory period.
   a. The use of the English language with accuracy and effectiveness in reading, writing, and speaking.
   b. The use of the principles of mathematics.
   c. The use of one, or two, foreign languages to the point of reading prose of average difficulty. The College encourages students to study at least one language for four years, if possible.
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: African, American, Asian, 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, and calculus.

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 should present the strongest possible command of at least one foreign language.

APPLICATIONS AND EXAMINATIONS

Applications must be initiated prior to January 15, and all applications must be completed by February 1. A personal information form will be sent upon request, and this form should be returned promptly, together with the non-refundable application fee of $20.00. The College then sends the remainder of the application materials. Applicants are encouraged to complete their applications to the College as early in the fall of their senior year as possible. Although Swarthmore does not have an "early decision" program, preliminary readings of completed applications are made at an early date to determine regional and national award winners.

All applicants for freshman admission are required to take the Scholastic Aptitude Test and three Achievement Tests given by the College Entrance Examination Board. English Composition is required and the other two Achievement Tests should be selected from two different fields. Applicants for Engineering must take one Achievement Test in Mathematics.

Applicants should take the Scholastic Aptitude Test in November, December, or January of the senior year. Candidates who take Achievement Tests before the senior year may submit the results to the Admissions 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. Neither the Scholastic Aptitude Test nor the Achievement Tests may be taken later than January of the senior year.

In 1970-71 these tests will be given in various centers throughout this country on November 7, December 5, January 9, March 6, April 17, and July 10. The tests will be given abroad on each of these dates except November 7. Application to take these tests should be made directly to the College Entrance Examination Board, Box 592, Princeton, New Jersey 08540. 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 94701. 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 28-39.

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 January 1. Candidates are not interviewed until the latter part of the junior year. Candidates will not be able to have campus interviews from March 1 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, 215-KI 4-7900, Ext. 445.

ADMISSION DECISIONS

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

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*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 295 South, and follow signs for Walt Whitman Bridge. After crossing Bridge follow signs for Philadelphia International Airport, Route 291. Follow Route 291 past Airport to 420. Turn right on 420 to Baltimore Pike, turn left and proceed to intersection with Route 320. Turn left and follow signs to the College. From the Pennsylvania Turnpike, take Exit 24 (Valley Forge) on to Interstate 76 (Schuylkill Expressway), take Exit 36 on to Route 320 and follow it south to the campus.

Swarthmore is on the Penn Central Railroad (Media Suburban Line). It is 21 minutes from the 30th Street Station, Philadelphia.

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 enrollment each fall. There are no mid-year admissions. For favorable consideration, applicants for transfer must have had a good scholastic record in the institution attended and must present full credentials for both college and preparatory work, including a statement of honorable dismissal. They must take the Scholastic Aptitude Test given by the College Entrance Examination Board if this test has not been taken previously.

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

EXPENSES

TUITION AND FEES

Charges for the academic year 1970-71 (two semesters):

Tuition	$2,300
General Fee	210
Board and Room	1,135
Total Resident Charges	$3,645*

While a general charge for board and room is made, this may be divided into $635 for board and $500 for room. $48 of the general fee of $210 has been designated Student Activity Fee. The balance covers library and laboratory fees, athletic fees, student health services and other items.

Payment of one-half of the total sum is due not later than the first day of classes each semester. Payments received during the first fifteen days after the beginning of classes will be subject to a one per cent late payment fee and any payments received after the fifteen-day period will be subject to a five per cent late payment fee. Bills are mailed before the opening of each 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 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 $100.00

*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.

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.

Students engaged in independent projects away from the College for which regular academic credit is anticipated are expected to register in advance in the usual way and pay normal tuition. If the student is away from the College for a full semester no charge for board, room or general fee will be made but if a student is away only for a part of a semester, board may be charged on a pro rata basis by prior arrangement.

TUITION PAYMENT PLAN

Many of the parents of students may wish to pay tuition, fees, and residence charges on a monthly basis. Details of a monthly payment plan offered by the Girard Bank of Philadelphia, Pennsylvania will be 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 and Co. of Boston, Massachusetts. Accident coverage alone costs $12.00 per year (12 months) for women, and $18.00 for men. The combined accident and sickness policy is available at an annual cost of $32.50 for women and $36.00 for men. At least accident coverage is required of all students who participate in intercollegiate athletic activities and the combined accident and sickness policy is particularly recommended. Application forms are mailed to all students during the summer.

FINANCIAL AID

The college assigns scholarships and loans 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 and loans are awarded carrying stipends varying from $100 to $4,120 annually. Approximately thirty-five per cent of the total student body are currently receiving financial aid from the College, with stipends averaging about $1,500 annually. Another ten to fifteen per cent are being assisted from sources outside the College.

All grants are based upon school or college record, and upon financial need as revealed in confidential statements to the Scholarship Committee through the agency of the College Scholarship Service. Entering students seeking financial assistance are required to submit a Parents Confidential Statement to the Service. This form may be obtained from a secondary school or from the College Scholarship Service, P.O. Box 176, Princeton, New Jersey 08540, Box 881, Evanston, Illinois 60204, or P. O. Box 1025, Berkeley, California 94701. The Scholarship Committee reviews the financial situation and academic progress of every scholarship holder at the end of each academic year before renewing the awards. In computing stipends the committee takes into account an expected family contribution from income and assets, the student's savings and earnings. These are budgeted against a normal total expense of $4,120 for the college year. This allows $475 for incidental expenses exclusive of travel and for the total college charge of $3,645, which includes tuition, board and room, and a very comprehensive college fee. This covers not only the usual student services (health, library, laboratory) but also attendance at all campus social, cultural and athletic events, and support of most club activities. The College reserves the right to adjust college stipends in the event the student receives scholarship assistance from other sources. First year transfer students are not eligible for scholarship aid.

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

For the academic year 1970-71 the college has granted approximately $725,000 in scholarships. About two-thirds of that sum was provided by special gifts and the endowed scholarships listed below. Funds from the federal government are available for needy students who are eligible for Educational Opportunity Grants, National Defense Student Loans, and the Work-Study program. Applicants are not required to apply for specific scholarships but will be considered for all scholarship opportunities either from endowed scholarships or from general college scholarship funds. *Financial need is a requirement for all scholarships listed below unless otherwise indicated.*

Swarthmore College National Scholarships

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

The amount of the annual award varies from $100 to $4,120 according to the financial need of the winner. In those cases where there is no financial need, National Scholarships will be awarded on an honorary basis and carry an annual stipend of $100.

Other Scholarships for Men and Women

The Vivian B. Allen Foundation provides scholarship aid to enable foreign students to attend Swarthmore College, as part of the Foundation's interest in the international exchange of students.

The Frank and Marie Aydelotte Scholarship is awarded biennially to a new student who shows promise of distinguished intellectual attainment based upon sound character and effective personality. The award is made in honor of Frank Aydelotte, President of the College from 1921-1940, and originator of the Honors program at Swarthmore, and of Marie Osgood Aydelotte, his wife.

The Curtis Bok Scholarship was established in the College's Centennial Year 1964 in honor of the late Philadelphia attorney, author and jurist, who was a Quaker and honorary alumnus of Swarthmore. The scholarship is assigned annually to a junior or senior whose qualities of mind and character indicate a potential for humanitarian service such as Curtis Bok himself rendered and would have wished to develop in young people. Students in any field of study, and from any part of this country or from abroad, are eligible. The scholarship is renewable until graduation.

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

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

The 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 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 Howard S. and Gertrude P. Evans Scholarship Fund provides scholarships for worthy students, preference being given to students showing highest standards in scholarship from high schools of Delaware County, Pennsylvania.

The Flack Achievement Award, presented by the Flack Foundation, one of whose founders is Hertha Eisenmenger Flack of the Class of 1938, is to be made to a deserving student who, during the first two years at Swarthmore College, has demonstrated a good record of achievements in both academic and extracurricular activities while showing leadership potential as a constructive member of the College. The donor hopes these awards will go to students of demonstrated achievement and high potential and who are dedicated to the basic principles of American democracy and of academic freedom. The awards are not related to need.

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 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 Kappa Kappa Gamma Scholarship provides an award to a member of the freshman class, renewable each year. Preference is given to a relative of members of the fraternity. In the absence of a relative it may be awarded at the discretion of the College.

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 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 E. Hibberd Lawrence Scholarship provides for a scholarship to an incoming freshman man or woman who ranks high in scholarship, character, and personality.

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

The 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 Minnesota Mining and Manufacturing Company Scholarship is awarded annually to a student selected by the Scholarship Committee.

The Howard Osborn Scholarships, established by Howard Osborn in memory of his mother and father, Viola L. Osborn and Frank Osborn, are awarded to worthy students of good character who maintain satisfactory grades and who require financial assistance.

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 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 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 Reader's Digest Foundation Endowed Scholarship Fund pro-

vides scholarships annually for students selected by the Scholarship Committee.

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

The Thomas H. and Mary Williams Shoemaker Fund provides scholarships annually for children of Friends.

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 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 ability. This gift includes a clause of preference to those students who are members of the New York Monthly Meeting of Friends.

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 Daniel Underhill Scholarship was given by Daniel Underhill '94, in memory of his grandfather, Daniel Underhill, member of the first Board of Managers.

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

The Westbury Quarterly Meeting, N.Y., Scholarship, is awarded annually by a committee of that Quarterly Meeting.

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 Edward Clarkson Wilson Scholarship has been established at

Swarthmore by friends of Edward Clarkson Wilson, '91, formerly Principal of the Baltimore Friends School. It will be awarded each year to a former student of the Baltimore Friends School, who has been approved by the faculty of the school, on the basis of high character and high standing in scholarship.

The Edward Clarkson Wilson and Elizabeth T. Wilson Scholarship provides financial aid for a deserving student.

An anonymous donor provides a renewable scholarship annually for a member of an underprivileged minority group.

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 Caroline W. Frame Scholarship Fund.
The Joseph E. Gillingham Fund.
The Thomas L. Leedom Scholarship Fund.
The Li Foundation Scholarship Fund.
The Sarah E. Lippincott Scholarship Fund.
The Mark E. Reeves Scholarship Fund.
The Frank Solomon Memorial Scholarship Fund.
The Mary Sproul Scholarship Fund.
The Helen Squier Scholarship Fund.
The Francis Holmes Strozier Memorial Scholarship Fund.
The Joseph T. Sullivan Scholarship Fund.
The Deborah F. Wharton Scholarship Fund.
The Thomas Woodnutt Scholarship Fund.

Scholarships for Men

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 Sarah Kaighn Cooper Scholarship, founded by Sallie K. John-

son 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 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.

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 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 Walter W. Krider Scholarship was established by his wife and daughter for a young man who ranks high in scholarship, character and personality.

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 Thomas B. McCabe Achievement Awards, established by Thomas B. McCabe '15, are awarded to freshman men from the Delmarva Peninsula and Northern New England (Maine, New Hampshire, or Vermont) who give promise of leadership. In making selections, the Committee will place emphasis on ability, character, personality, and service to school and community. Two awards, providing a minimum annual grant of $2,300 (tuition) or up to $4,120 depending on need, will be made to residents of Delaware or the Eastern Shore counties of Maryland or Virginia. Non-residents attending school in this area are also eligible. One award, providing

an annual grant of up to $4,120 depending on need, will be made to a resident of Maine, New Hampshire, or Vermont.

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 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 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 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 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 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.

Scholarships for Women

The Mary Lippincott Griscom Scholarship is to be given to a girl with financial need, who ranks high in character, personality and scholarship. Preference would be given to a member of the Society of Friends.

The George K. and Sallie K. Johnson Fund provides aid during the

senior year for young women who are fitted to become desirable teachers.

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 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 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 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 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 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 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 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 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 Mary Wood Fund provides a scholarship which may be awarded to a young woman who is preparing to become a teacher.

LOAN FUNDS

Swarthmore participates in the federal loan program established under the National Defense Education Act. The College also maintains special loan funds which are listed below. Repayment of college loans begins nine months after the student completes his higher education and are repayable within the next eleven years. The loans bear annual interest of 3% on the unpaid balance beginning with the date on which repayment is to begin. Amounts vary according to need, although the College believes that students should avoid heavy indebtedness which might prove detrimental to their own plans. The amount of a loan may not exceed $1,000 annually. For the year 1970-71 the College has made approximately 150 loans in amounts averaging about $300.

The Joseph W. Conard Memorial Fund, established by friends of the late Professor Conard, is available for loans to worthy students in financial difficulty.

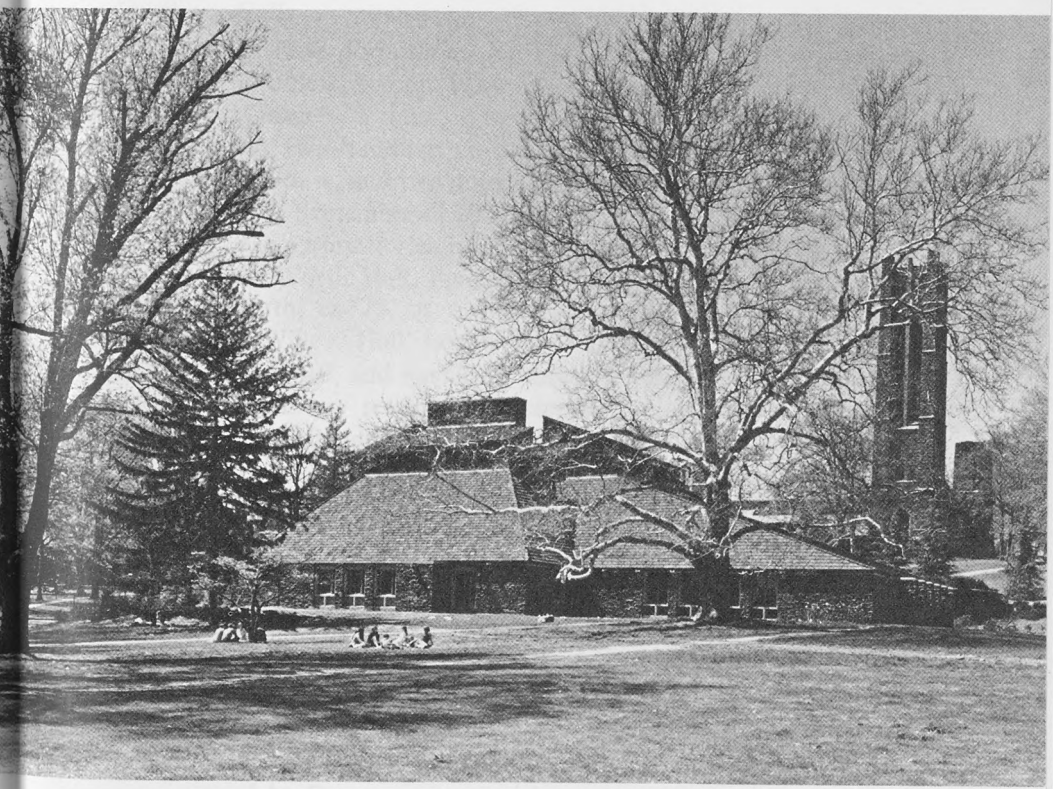
The Alphonse N. Bertrand Loan Fund.
The Class of 1916 Loan Fund.
The Class of 1920 Loan Fund.
The Class of 1936 Loan Fund.
The John A. Miller Loan Fund.
The Paul M. Pearson Loan Fund.
The Ellis D. Williams Fund.
The Swarthmore College Student Loan Fund.

STUDENT EMPLOYMENT

There are opportunities 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 $300-$400 during the college year, and some earn up to $500.

III

COLLEGE LIFE
STUDENT COMMUNITY



Sharples Dining Hall and Clothier Tower

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 nine dormitories for men: Wharton Hall, named in honor of its donor, Joseph Wharton, at one time President of the Board of Managers, Palmer, Pittenger and Roberts Halls on South Chester Road, two buildings on the former Mary Lyon School property, Ashton House, and two dormitories, Hallowell and Dana, which were opened in September of 1967.

The women's dormitories include the upper floors in the wings of Parrish Hall, Worth Hall, the gift of William P. Worth, '76, and J. Sharples Worth, ex-'73, as a memorial to their parents, Woolman House, and Willets Hall, largely made possible by a bequest from Phebe Seaman, '19, and named in honor of her mother and aunts.

Certain dormitory sections are reserved for an experimental program of coeducational housing in 1970-71.

The men's and women's dormitories may be visited by members of the opposite sex according to procedures established by the dormitory sections in consultation with the Deans.

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 from the Deans to room outside the dormitories.

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

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

Sharples Dining Hall

All students living on campus have their meals in the Philip T. Sharples Dining Hall. The dining hall is ordinarily closed during vacations.

Tarble Social Center

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

Black Cultural Center

A Black Cultural Center, located in the Caroline Hadley Robinson House, is being developed in 1970-71. It will house a library and various cultural activities of special interest to black students. The program will be planned by a committee of black students, faculty, and administration.

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. 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 Friends 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 three times during each semester in Clothier Memorial. There is regularly a

period of silence according to the Friendly tradition and a reading. Lasting about three-quarters of an hour, Collection normally includes an address; but this is varied by the occasional introduction of musical, dramatic, and other programs.

STUDENT WELFARE

Health

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

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

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

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

Each student is allowed ten days care in the Health Center per term without charge unless the services of a special nurse are required. After ten days, a charge of $5.00 per day is made. Students suffering from a communicable disease or from illness which makes it necessary for them to remain in bed must stay in the Health Center for the period of their illness. Ordinary medicines are furnished without cost, but a charge is made for special medicines, certain immunization procedures, and transportation.

The medical facilities of the college are available to students injured in athletic activities or otherwise, but the college cannot assume

additional financial responsibility for medical and surgical expenses arising from accidents. Accident insurance coverage is, therefore, required for all students participating in athletics and is recommended for all others. (For details see page 27.)

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

Student Advising

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

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

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

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

A group of upperclass women, under the direction of the Women's Dormitory Council, 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.

Career Planning and Placement

The college provides vocational information and advice to assist students in their choice of a career. Conferences 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, with the assistance of 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 COMMUNITY

Student Conduct

The influence of the Society of Friends within the College community is one of the important factors in making Swarthmore what it is. Students who choose Swarthmore as their college should understand that they are accepting social and academic standards which, while subject to periodic review, are essential to the well-being of the community. In general, the life of students should be governed by good taste and accepted practice rather than elaborate rules. Certain regulations, however, are of particular importance and are listed below.

1. The possession and use of alcoholic beverages on the campus is regulated by State law and limited to those areas of the campus which are specified by Student Council and the Deans. The observance of moderation and decorum in respect to drink is a student obligation. Disorderly conduct is regarded as a serious offense.

2. The use or possession of injurious drugs or narcotics without the specific recommendation of a physician and knowledge of the Deans subjects a student to possible suspension or expulsion. Such cases normally will be decided by the Deans.

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 Car Authorization Committee, a student-faculty group. This permission is not extended to freshmen. 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 obtained from the Office of the Deans.

5. The participation by any student in any disruption or inter-

ference with the orderly programs, functions, or conduct of College activities of any kind is a serious offense.

Penalties for violations of College regulations such as those listed above are set by judicial committees or the Deans and may involve suspension or expulsion. Standing regulations may be modified and new rules may be added at any time upon notice to the student body.

The College reserves the right to exclude at any time students whose conduct it regards as undesirable, and without assigning any further reason therefor. Neither the College nor any of its officers shall be under any liability whatsoever for such exclusion.

Student Marriages

Undergraduates who wish to marry and remain at Swarthmore must request permission to do so from the Deans. If two students are married without this permission, one of them must withdraw from the College.

Student Council

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

Committees of the Council include the Budget Committee, which regulates distribution of funds to student groups; the Elections Committee, which supervises procedure in campus elections; and the Social Committee, see below. In addition to these, there are several joint Faculty-Student Committees, whose student membership is appointed by a Student Committee on Committees which acts after consultation with two deans and two members of the faculty.

Judicial Bodies

Four committees have different jurisdictions. The *Women's Judiciary Committee* is a branch of the Women's Dormitory Council and is elected by the women of the student body. It sits in all cases of violations of women's 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 and acts upon cases referred or appealed from the other Committees and with any violations of rules or standards of conduct that may involve penalties of suspension or expulsion.

Women's Dormitory Councils

There are three women's dormitory councils: one each in Parrish, Willets, and the smaller upperclass women's dormitories. These councils are composed of the Senior Residents who are appointed by the Dean of Women, and the Hall Presidents who are elected by each hall. Each council elects one of its members to serve on the Coordinating Committee which meets regularly with the Dean. It is through the Coordinating Committee that certain programs of interest to students can be implemented and dormitory problems often can be resolved.

Social Committee

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

EXTRA-CURRICULAR ACTIVITIES

In addition to the foregoing organizations, Swarthmore students have an opportunity to participate in a program of extra-curricular activities wide enough to meet every kind of interest. There are more than thirty-five organized activities, not including departmental clubs or political organizations. They vary as greatly as the interests of the students vary, from the Flying Club to the Chess Club, from the Creative Writing Group to the Co-ed Dance Group. The College encourages a student to participate in whatever activity best fits his personal talents and inclinations, believing that satisfactory avocations are a necessary part of life.

The Studio Arts Program

The Artist in Residence, Harriet Shorr Baguskas, arranges for classes in studio arts and for exhibits in the Arts Center and acts as an adviser to other organizations. See under Studio Arts, page 86, for a list of credit and non-credit courses.

The Wilcox Gallery provides ten to twelve exhibitions a year,

which are a direct complement to the program. The works of nationally known painters as well as those of younger artists are exhibited in group and one man shows.

The Marjorie Heilman Visiting Artist Program

Each year a committee of students and faculty members selects an artist to be invited to spend a week at the College. The work of the invited artist is exhibited in the Wilcox Gallery, and he meets and talks with students on an informal basis.

Music

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

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

All three organizations require auditions for membership.

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

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.

Dance

The Department of Physical Education for Women sponsors performance groups in Folk Dance and Modern Dance. Both groups meet regularly each week and give performances throughout the year. In addition, Mrs. Patricia Boyer will offer this year a non-credit course in dance composition.

Drama

Professor Lee Devin is Director of Theater. He directs two major

productions and supervises the drama program, which consists of student-produced workshop productions, and a bill of student-written one-act plays. The Theater Workshop course is described on page 124.

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

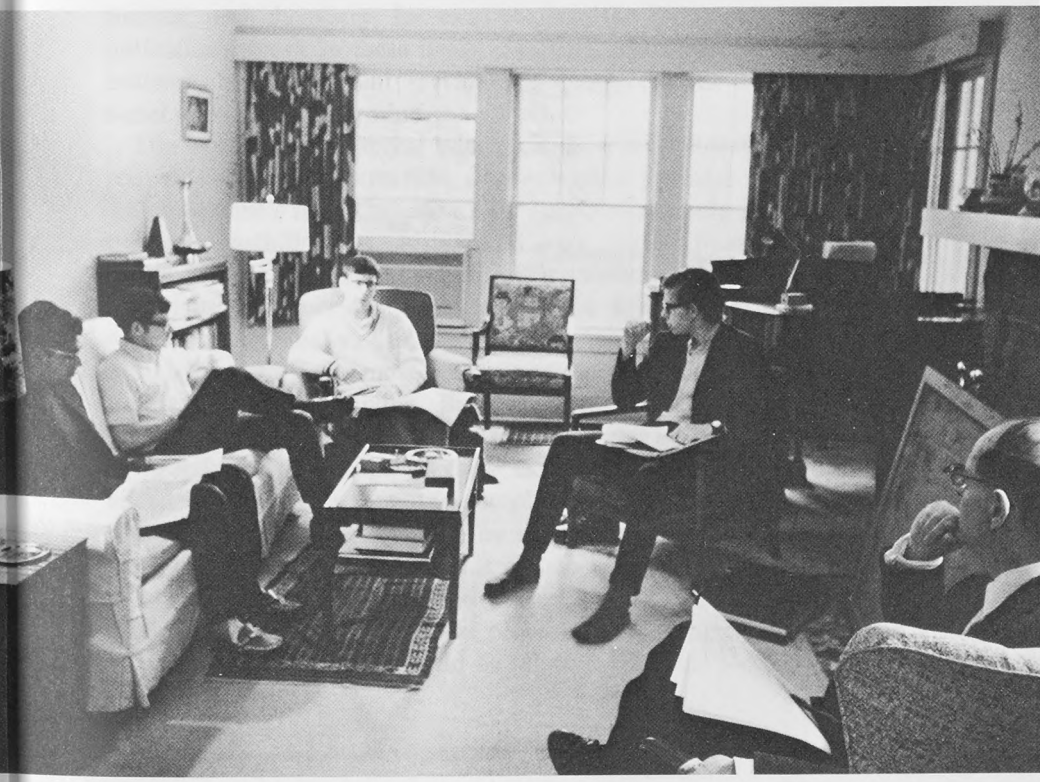
There are five fraternities at Swarthmore; Delta Upsilon and Phi Sigma Kappa are affiliated with national organizations while Kappa Sigma Pi, Tau Alpha Omicron and Phi Omicron Psi are local associations. Fraternities are adjuncts to the college social program and maintain separate lodges on the campus. 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 obtained upon request from the Office of Admissions.

IV

EDUCATIONAL PROGRAM
FACULTY REGULATIONS
DEGREE REQUIREMENTS
AWARDS AND PRIZES
FELLOWSHIPS



An Honors Seminar

EDUCATIONAL PROGRAM

General Statement

Swarthmore College offers the degree of Bachelor of Arts and the degree of Bachelor of Science. The latter is given only to students who major in Engineering; the former, to students in the Humanities, the Social Sciences, and the Natural Sciences.* Four years of resident study are normally required for a Bachelor's degree. (See page 74).

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

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

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

*For groupings of departments, see page 208.

EDUCATIONAL PROGRAM

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

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

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

The program for engineering students follows a similar basic plan, with certain variations which are explained on page 112. Courses outside the technical fields are spread over all four years.

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.

I. To meet the distribution requirements of the College, a student must take at least two courses from each of the four groups listed below and must elect work in at least six departments. Subject to the restrictions indicated here, students may receive credit toward distribution through taking any numbered course in a given department that they are eligible to take. Mathematics, though not one of the subjects included in the four groups, may be counted as one of the six departments.

1. Astronomy, Biology, Chemistry, Engineering, Physics.

2. Art History, Classics (literature courses numbered 11 or above), English Literature (except courses numbered 70-72), Modern Languages (literature courses numbered 11 or above), Music (except courses numbered 34-39).
3. Classics (courses in ancient history), History, Philosophy, Psychology, Religion.
4. Economics, Political Science, Sociology and Anthropology.

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.

It is most desirable that students include in their programs some work in a foreign language. A student who intends to major in one of the natural sciences, mathematics, or engineering should take an appropriate mathematics course in his freshman year.

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

It is expected that, after satisfying the requirements in the general program of the first two years, the student will devote the remainder of his sophomore year to preparing himself for more advanced study of those subjects which have most interested him and to other courses which will increase the range of his knowledge. He should decide, as early in his sophomore year as possible, upon two or three subjects in which he might like to major and should consult the statements of the departments concerned as to required and recommended courses and supporting subjects.

Physical education is required of all students (except veterans) in the first two years with certain provisions for exemption. The requirements are stated in full on page 72 and in the statements of the departments of Physical Education.

COURSE PROGRAM FOR JUNIORS AND SENIORS

The work of juniors and seniors in the Course program 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 at least eight courses. There is no

upper limit to the number of courses a student may take in the major field, provided that he take at least twenty courses outside 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.

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

HONORS PROGRAM FOR JUNIORS AND SENIORS

The Honors Program, initiated in 1922 by President Frank Aydelotte and modified most recently in 1968, is a distinctive part of Swarthmore's educational life. It seeks to free from the limitations of classroom routine those students whose maturity, interest, and capacity suit them for independent work. While the program is designedly flexible and responsive to new needs, it has been characterized from the beginning by three basic elements, which taken together may be said to be the essence of the system.

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

(2) Honors work frees the student from periodic examinations, since his thinking is under continual scrutiny by his classmates and instructors. By this program he undertakes to prepare himself to take examinations in six subjects at the close of his senior year. In these he is expected to demonstrate his competence in a field of knowledge rather than simply his mastery of those facts and interpre-

tations which his instructor has seen fit to present. These examinations, consisting of a three-hour paper in each field, are set by examiners from other institutions who read the papers and then come to the campus to conduct an oral examination of each student, in order to clarify and enlarge the basis of their judgment of his command of his material.

(3) Honors work is customarily carried on in seminars or small classes or in independent projects which may lead to an Honors paper or thesis. Seminars meet once a week, in many cases in the home of the instructor, for sessions lasting three hours or more. The exact technique of the seminar varies with the subject matter, but its essence is a cooperative search for truth, whether it be by papers, discussion, or laboratory experiment. Each student has an equal responsibility for the assimilation of the whole of the material and is correspondingly searching in his scrutiny of ideas presented by his fellows or by his instructor. The student is expected to devote half of his working time during a semester to each seminar or course taken in preparation for an Honors paper or examination. No student is permitted under ordinary circumstances to take more than six seminars. He may take fewer than six, since he may prepare in other ways for his Honors examinations.

In practice three avenues toward an Honors degree are open:

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

(2) Students who have a special reason to study for one or two semesters abroad or in another American institution must take the normal number of examinations. Such programs must be worked out in advance, since it may not be possible to provide visiting examiners for work offered elsewhere and since instruction in some fields of the

student's choice may not be available in the other institution. In general the student following this avenue to an Honors degree must weigh carefully the advantage of working independently or under tutorial guidance against the loss he incurs by missing both the stimulus and the criticism provided by his fellows in seminar.

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

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

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

At the end of the senior year the reading of the examinations and the decision of the degree of Honors to be awarded the candidates is

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

EXCEPTIONS TO THE FOUR YEAR PROGRAM

Although the normal period of uninterrupted work toward the Bachelor of Arts and Bachelor of Science degrees is four years, graduation in three years is freely permitted when a student can take advantage of Advanced Placement credits, perhaps combining them with extra work by special permission. When personal circumstances warrant a student may lengthen the continuous route to graduation to five years by carrying fewer courses than the norm of four during some or all of his college career: this may occasionally be appropriate for students who enter Swarthmore lacking some elements of the usual preparation for college or who, for other reasons, wish to free time for activities relating to their curricular work although not done for academic credit. Such five-year programs are possible in Music and Studio Arts for students who are taking some instruction off campus or who wish to pursue studio or instrumental work without full credit but with instruction and critical supervision; but such programs in the arts are possible only on application to and selection by the department concerned based on exceptional accomplishment or promise. In all cases where it is proposed to reduce academic credit and lengthen the period before graduation the College looks particularly to personal circumstances and to careful advising and necessarily charges the regular annual tuition. Full-time leaves of absence for a semester or a year or more are freely permitted and in some cases encouraged, subject also to careful planning and academic advising.

FORMATS OF INSTRUCTION

While classes and seminars are the normal curricular formats at Swarthmore, faculty regulations encourage other modes as well. These include various forms of individual study, student-run courses, and a limited amount of "practical" or off-campus work. The rationale and details of these methods are set out in *Critique of a College* (1967).

The principal forms of individual work are attachments, directed

reading, and tutorials. The faculty regulation on attachments provides that a student may attach to an existing course, with permission of the instructor, a project of additional reading, research, and writing. If this attachment is taken concurrently with the course it may be done for half credit. If it is taken in a later semester (preferably the semester immediately following) it may be done for either half or full credit. Actually, this kind of work can be done on either a small group or individual basis. It is not possible in all courses, but it is in most, including some introductory courses. For freshmen and sophomores it is a way of developing capacities for independent work, and for Honors students it is an alternative to seminars as a preparation for papers; but all students are encouraged to consider it. Students who decide before the middle of the semester to do a half-credit attachment may commonly, with permission, drop a regular course and carry three and a half credits in that term to be balanced by four and a half credits in another term. Students may do as many as two attachments each year.

Directed reading and tutorials are similar; but the faculty role in the former is more bibliographical than pedagogical, and, because they require somewhat less faculty time, opportunities for directed reading are more frequent in most departments than are opportunities for tutorials. In both cases substantial written work and/or written examinations are considered appropriate, and it is generally desirable that the work be more specialized or more sharply focussed than is usually the case in courses or seminars; the work may range from a course of reading to a specific research project. Such work is available primarily to juniors and seniors in accordance with their curricular interests and as faculty time permits.

The faculty regulation on student-run courses permits "a group of students to propose a topic to an instructor for half or single credit and to run their own course with a reading list approved by the instructor and a final examination or equivalent administered by him, but normally with no further involvement of faculty." In organizing such a course students obtain provisional approval and agreement to serve as course supervisor from a faculty member by December 1st (for the spring term) or May 1st (for the fall term) on the basis of an initial memorandum emphasizing the principal subject matter to be studied, the questions to be asked about it, the methods of investigation, and a preliminary bibliography. The course is then registered by its organizers with the Provost, who has administrative supervision of such work, and who may waive the foregoing deadlines to recognize prob-

lems in the organization of such courses. The supervising instructor consults his department and any other departments concerned (and the Curriculum Committee in the case of an inter-departmental course). He also reviews the course outline and bibliography and qualifications and general eligibility of students proposing to participate in the course. On departmental (or Curriculum Committee) approval the instructor's final approval is due ten days before the term begins, following which a revised reading list and class list are given to the Librarian and the course title and class list are filed with the Registrar. At the end of the course the instructor evaluates and grades the students' work or arranges for an outside-examiner to do so.

Student-run courses may vary widely in format and content. In particular, they may be provisionally proposed for half credit to run in the first half of the semester, and, at mid-term, may be either concluded or, if the participants and supervising instructor find the work profitable, be continued for the balance of the term for full credit. Alternatively, student-run courses may be started after the beginning of the semester (up to mid-semester) for half credit and then be continued, on the same basis, into the following term. Or they may be taken for half credit over a full term. The role of the supervising instructor may exceed that in planning and evaluation outlined above and extend to occasional or regular participation. The only essentials, and the purpose of the procedures, are sufficient planning and organization of the course to facilitate focus and penetration. The course planning and organization, both analytical and bibliographical, are also regarded as important ends in themselves, to be emphasized in the review of proposals before approval. Up to four of the 32 credits required for graduation may be taken in student-run courses.

Finally, as to applied or practical work, the College may under faculty regulations grant up to one course credit for practical work, which may be done off campus, when it can be shown to lend itself to intellectual analysis and is likely to contribute to a student's progress in regular course work, and subject to four conditions: (1) agreement of an instructor to supervise the project; (2) permission of the Curriculum Committee; (3) a basis for the project in some prior course work; and (4) normally, the examination of pertinent literature and production of a written report as parts of the project. This option is intended to apply to work in which direct experience of the off-campus world or responsible applications of academic learning or imaginative aspects of the practice of an art are the primary elements. Because such work is likely to bear a loose relation to organized instruction and the regular

curriculum the College limits academic credit for it while recognizing its special importance for some students' programs.

INTER-DISCIPLINARY WORK

The requirements of the departmental major typically leave room for significant flexibility in students' programs, both within and outside the major. This may be used to pursue a variety of interests and to emphasize intellectual diversity; it may also be used for the practical integration of individual programs around interests or principles supplementing the major. Except for International Relations the College does not offer inter-departmental majors or, except for Black Studies, formal inter-disciplinary programs short of the major. The programs in Education and in Linguistics have departmental status as to staff, although students do not major in them. It should be recognized that some departments are themselves rather inter-disciplinary in nature; that a number of courses are cross-listed between departments; that each year a few courses are taught jointly by members of two or more departments; that departments commonly recommend or require supporting work for their major in other departments; and that students can organize their work into ad hoc concentrations in addition to or as extensions of their majors. One such concentration is formally provided in the Black Studies program (see page 96). Many other opportunities exist informally — e.g., in Art History and Studio Arts, in Classics and Medieval History and Literature, in comparative literature, in American studies, in Religion and Sociology-Anthropology, in Engineering and Social Sciences, or in Biology and Chemistry. Students are encouraged to seek the advice of faculty members on such possibilities with respect to their particular interests. In some cases faculty members of several departments have planned and scheduled their course offerings with some consultation so as to afford a de facto concentration in addition to the major, and students may wish to know and take advantage of these cases of overlapping faculty interests. The following listings, which may be expected to change from year to year, reflect currently organized opportunities, although some other possibilities are mentioned with the listings of departmental programs later in the catalogue.

ASIAN STUDIES

Students who wish to undertake work at Swarthmore in Asian studies should be aware of the course and seminar offerings pertaining to Asia in a number of departments. The opportunity exists to develop coordinated programs of study of an interdisciplinary nature drawing

on Asian materials, in conjunction with a standard department major. Students who wish to explore these possibilities are invited to discuss the matter with either Mr. Yuan (History) or Mr. Piker (Sociology-Anthropology).

Courses and seminars dealing primarily or exclusively with Asian materials:

Department of Art History

51. Far Eastern Art (Mr. Rhys)

Department of History

9. China (Mr. Yuan)
44. Modern China (Mr. Yuan)
45. Modern Japan (Mr. Yuan)
46. Asian Nationalisms (Mr. Yuan)
144. The Modern Far East (Mr. Yuan)

Department of Political Science

19. Comparative Communist Politics
20. Politics of East Asia (Mr. Harding)
107. Comparative Communist Politics

Department of Religion

5. Introduction to Asian Religions (Mr. Swearer)
13. Theravada Buddhism (Mr. Swearer)
14. Mahayana Buddhism (Mr. Swearer)
107. The Religions of Southeast Asia (Mr. Swearer)
108. Studies in Hinduism and Buddhism (Mr. Swearer)

Department of Sociology and Anthropology

73. Japanese Society (Mr. Brandt)
64-65. Colloquium: Buddhism, A Social History (Mr. Piker)
101. Far East Peasant and Urban Cultures (Mr. Brandt)

Courses and seminars which include Asian materials:

Department of Economics

11. Economic Development (Mr. Ooms)
106. Comparative Economic Systems (Mr. Pryor)
109. Economic Development (Mr. Ooms, Mr. Pack)

Department of History

42. Expansion of Europe (Mr. Wright)

Department of Political Science

3. Comparative Politics (Mrs. Henry)
18. Politics of Developing Nations (Mr. Harding)
59. Marxism (Mr. Smith)
109. Political Development (Mr. Harding)

Department of Religion

24. Mysticism East and West (Mr. Swearer)

Department of Sociology and Anthropology

54. Anthropological Study of Complex Societies (Mrs. Ross, Mr. Brandt)
66. Independent reading on the culture and history of Theravada SE Asia is available with Mr. Piker. Prerequisite: permission.
107. Sociology of Religion

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 pre-medical consultants who, for 1970-71, will be Professor Jenkins (Biology) and Mrs. Lange, Associate Dean of Admissions. It is also the consultants' function to prepare a statement of evaluation and recommendation to each medical school to which the student may apply, basing this statement on all available information to it, including the student's record and faculty evaluations.

In conference with the student, the course adviser maps out a program based on requirements listed below, the college's general requirements, and the particular needs and interests of the student.

Beyond these considerations the need for understanding basic social problems, the cultivation of sensitiveness to cultural values, and the values of intensive work in at least one field is kept in mind in mapping an individual program.

The following courses are among the minimum requirements of most medical schools: Biology 1,2; Chemistry 1,2 or 3,4; Chemistry 28,29; Mathematics 3,4 or 5,6; Physics 1,2; English Literature, two semester courses. The foreign language requirements of medical schools are automatically met when the student has satisfied the college language requirement, which includes language course 4 or its equivalent. Advanced work in biology, chemistry and mathematics is recommended where the student's program and interests permit. Medical school requirements are changing rapidly and the student is urged to familiarize himself with the specific requirements of those medical schools in which he is interested.

The work of the junior and senior years may be done in either the Course or the Honors program. Intensive work of the major may be done in any department or the student's choice. Medical schools, however, expect that students majoring in the Divisions of the Humanities or Social Sciences will demonstrate solid competence in the scientific subjects which they take.

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.

CREATIVE ARTS

Work in the creative arts is available both in the curriculum of certain departments and on an extra-curricular basis. Interested students should consult the departmental statements in English Literature, Music, and Studio Arts. A total of not more than four courses in the creative arts may be counted toward the degree of Bachelor of Arts.

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.

Advanced students in the physical sciences and engineering may benefit from the Bartol Research Foundation, located on the campus, which offers a graduate program. (See page 12)

EDUCATION ABROAD

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

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

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

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

3. *University of Keele.* For a number of years Swarthmore College and the University of Keele, Staffordshire, England, have had a stu-

dent exchange each year. A student from Swarthmore is selected for study at Keele by a committee which interviews the applicants. The year at Keele may take the place of the junior year at Swarthmore, though it is often taken as an extra year.

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

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

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

FACULTY REGULATIONS

ATTENDANCE AT CLASSES

Registration to take a course for credit implies regular attendance at classes, unless a student specifically elects to obtain credit in a course without attending classes. The conditions for exercising this option are set forth below. With this exception, students are responsible for regular attendance. Faculty members will report to the Deans the name of any student whose repeated absence is in their opinion impairing the student's work. The number of cuts allowed in a given course is not specified, a fact which places a heavy responsibility on all students to make sure that their work is not suffering as a result of absences. Since freshmen must exercise particular care in this respect, and since the Faculty recognizes its greater responsibility toward freshmen in the matter of class attendance, it is expected that freshmen, especially, will attend *all* classes.

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

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

1) The student must signify his intent to do so at the time of registration, having obtained the instructor's approval in advance.

2) If after such registration the student wishes to change his status and attend classes normally, he must again obtain the instructor's approval.

3) The student may be required to perform such work, in addition to the final examination, as the instructor deems necessary for adequate evaluation of his performance.

4) The final grade will be recorded by the Registrar exactly as if the student had attended classes normally.

GRADES

Instructors report to the Deans' office at intervals during the year upon the work of students in courses. Informal reports during the semester take the form of comments on unsatisfactory work. At the end of each semester formal grades are given in each course under the letter system, by which *A* means excellent work, *B* good work, *C* satisfactory work, *D* passing but below the average required for graduation, and *E* failure. *W* signifies that the student has been permitted to withdraw from the course by the Committee on Academic Requirements. *X* designates a condition; this means that a student has done unsatisfactory work in the first half of a year course, but by creditable work during the second half may earn a passing grade for the full course and thereby remove his condition. *R* is used to designate an auditor or in cases when the work of a foreign student cannot be evaluated because of deficiencies in English.

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

In 1968-69 and 1969-70 the only grades recorded on students' records for courses taken during their freshman year were *P* (pass) or *E* (fail). Beginning in September 1970 this plan will be followed during the first semester of the freshman year, and students entering as freshmen in 1970 may designate four additional courses during the following three semesters to be recorded on a pass/fail basis.

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

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

REGISTRATION

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

A regular student is expected to take the prescribed number of courses in each semester. If more than five or fewer than four courses seem desirable, he should consult his course adviser and file a petition with the Committee on Academic Requirements.

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

EXAMINATIONS

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

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

SUMMER SCHOOL WORK

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

PHYSICAL EDUCATION

Physical education is required of all women and non-veteran men in the freshman and sophomore years, unless an excuse is granted by the college physician. Three periods per week are normally required, but certain provisions for exemption based on achievement are in-

cluded. 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.

ACADEMIC HONESTY

Members of an academic community have an unequivocal responsibility to present as the result of their own work only that which is truly theirs. Cheating, whether in examinations or by plagiarizing the work of others, is a most serious offense, and one which strikes at the foundations of academic life.

The responsibility of the Faculty in this area is three-fold: to explain the nature of the problem to those they teach, to minimize temptation and to report any case of cheating to the Deans for action by the College Judiciary Committee.

The College Judiciary Committee will consider the case, determine guilt, and recommend a penalty to the President. The order of magnitude of the penalty should reflect the seriousness of the transgression. It is the opinion of the Faculty that for the first offense, failure in the course, and as appropriate, suspension for a semester or deprivation of the degree in that year, is not unsuitable; for a second offense the penalty should normally be expulsion.

EXCLUSION FROM COLLEGE

The College reserves the right to exclude at any time students whose academic standing it regards as undesirable, and without assigning any further reason therefor; and neither the College nor any of its officers shall be under any liability whatsoever for such exclusion.

DEGREE REQUIREMENTS

BACHELOR OF ARTS AND BACHELOR OF SCIENCE

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

1. The candidate must have completed thirty-two courses or their equivalent.
2. He must have an average grade of *C* on the courses counted for graduation.
3. He must have complied with the distribution requirements.
4. He must have met the requirements in the major and supporting fields during the last two years.
5. He must have passed satisfactorily the comprehensive examinations in his major field or met the standards set by visiting examiners for a degree with honor.
6. He must have completed four semesters of study at Swarthmore College, two of which have been those of the senior year.
7. He must have completed the physical education requirement set forth on page 72 and in statements of the Physical Education Departments.
8. He must have paid all outstanding bills and returned all equipment and library books.

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 recommen-

dation 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.

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 $2,300 per year, and the general fee for these students is $25 per semester.

ADVANCED ENGINEERING DEGREES

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

1. The candidate must have been engaged in engineering work for five years since receiving his first degree.

2. He must have had charge of engineering work and must be in a position of responsibility and trust at the time of application.

3. He must make application and submit an outline of the thesis he expects to present, one full year before the advanced degree is to be conferred.

4. The thesis must be submitted for approval one calendar month before the time of granting the degree.

5. Every candidate shall pay a registration fee of $5 and an additional fee of $20 when the degree is conferred.

AWARDS AND PRIZES

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

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

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

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

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

The *A. Edward Newton Library Prize* of $50, endowed by A. Edward Newton, to make permanent the Library Prize first established by W. W. Thayer, is awarded annually to that undergraduate who, in the opinion of the Committee of Award, shows the best and most intelligently chosen collection of books upon any subject. Particular emphasis is laid in the award not merely upon the size of the collec-

tion but also upon the skill with which the books are selected and upon the owner's knowledge of their subject-matter.

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

Public Speaking Contests. Prizes for contests in public speaking are provided as follows: The *Ella Frances Bunting Extemporary Speaking Fund* awards prizes for the best extemporaneous short speeches. The *Owen Moon Fund* provides the Delta Upsilon Speaking Contests awards for the best prepared speeches on topics of current interest. The *William Plumer Potter Public Speaking Fund,* established in 1927, sponsors a contest in the reading of poetry as well as providing funds for other contests described below and for the collection of recorded literature described on page 51.

Three prizes for the best student-written one-act plays are provided by the *William Plumer Potter Fund.* The winning plays are usually produced during the fall semester by the Little Theater Club.

Prizes for the best student short stories are also awarded from the *William Plumer Potter Fund.*

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

The *John Russell Hayes Poetry Prizes,* of approximately $25 for a first prize and $15 for a second prize, are offered for the best original poem or for a translation from any language. Manuscripts should be ready by April 1 of each year.

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

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

FELLOWSHIPS

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

These three fellowships are:

The *Hannah A. Leedom Fellowship* of $1,100 founded by the bequest of Hannah A. Leedom.

The *Joshua Lippincott Fellowship* of $1,400, founded by Howard W. Lippincott, of the Class of 1875, in memory of his father.

The *John Lockwood Memorial Fellowship* of $1,400, founded by the bequest of Lydia A. Lockwood, New York, in memory of her brother, John Lockwood. It was the wish of the donor that the fellowship be awarded to a member of the Society of Friends.

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

The *Lucretia Mott Fellowship,* founded by the Somerville Literary Society and sustained by the contribution of its life members, yields an annual income of approximately $1,000. It is awarded each year by a committee of the faculty to a woman graduate of that year who is to pursue advanced study at some other institution approved by this committee.

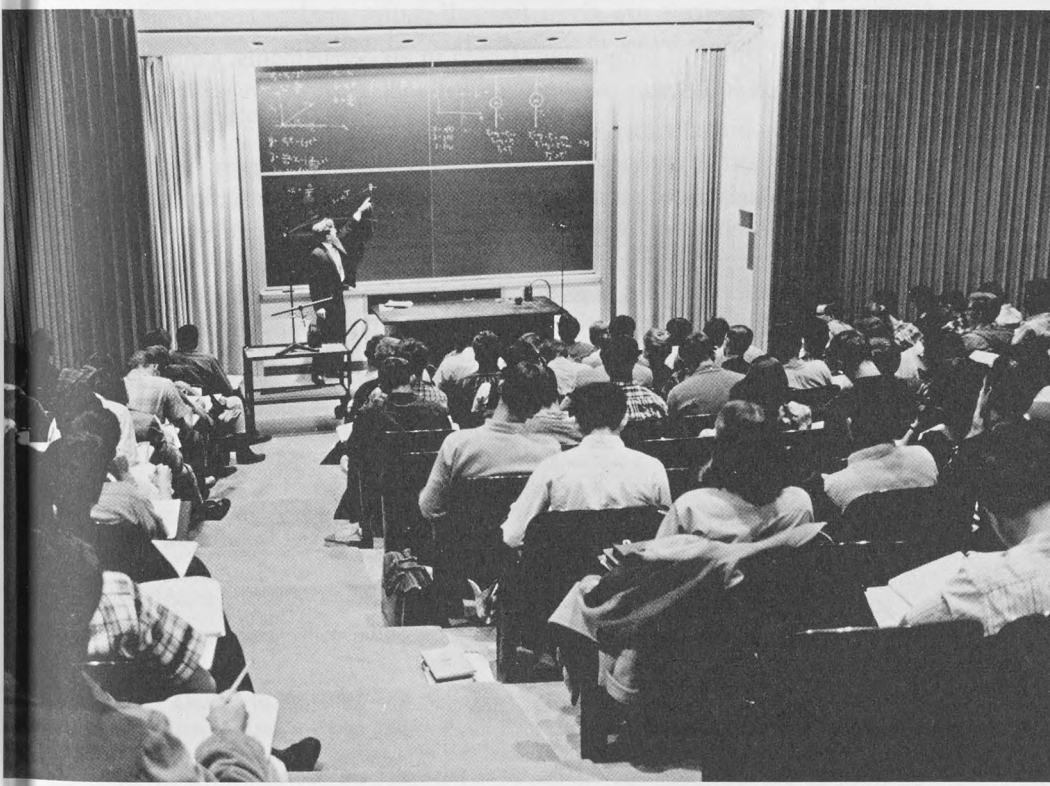
The *Martha E. Tyson Fellowship,* founded by the Somerville Literary Society in 1913, is sustained by the contributions of life members of the society and yields an income of approximately $1,000. It is awarded biennially by a committee of the faculty to a woman

graduate of that year who plans to enter elementary or secondary school work. The recipient of the award is to pursue a course of study in an institution approved by the Committee of Award.

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

V

COURSES OF INSTRUCTION



A Physics Class in the Du Pont Lecture Room

COURSES OF INSTRUCTION

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

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 primarily for Juniors and Seniors.
101 to 199—seminars for Honors students and graduate students

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

ART

Department of Art History

ROBERT M. WALKER, *Professor and Chairman*
HEDLEY H. RHYS, *Professor*
JOHN W. WILLIAMS, *Associate Professor*
TIMOTHY K. KITAO, *Associate Professor*
MOLLY FARIES, *Instructor*

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

Requirements and Recommendations

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

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

Majors and Minors in Honors: Majors in Honors may take four seminars in the department. A minor in Honors usually consists of two seminars. The seminars offered in any one semester vary according to the requirements of the students and the convenience of the department.

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

1. Introduction to Art History. A critical study of the nature of architecture, sculpture and painting in their historical context.

Each semester. Two hours of lectures and a conference meeting each week. Staff.

11. Design in Drawing and Painting. The basic elements of design and their function in drawing and painting. Types of harmony, sequence and balance such as linear, tonal and spatial. The methods of design and representation that characterize the various historical styles. Practical exercises required demand no

special technical aptitude, since the purpose of the course is to develop a critical understanding of drawing and painting and not technical skill.

Spring semester. Mr. Rhys.

13. Ancient Art. A study of the development of the forms of architecture, sculpture and painting as they express the cultural patterns of Ancient Greece from the Bronze Age through the Hellenistic Age.

Fall semester. Mr. Walker.

16. Early Medieval Art. A concentration on selected aspects of Christian Art before A.D. 1000. In the fall of 1970 the topic will be the churches and mosaics of Ravenna. Students who have taken Art History 16 are not excluded.

Fall semester. Mr. Williams.

17. Romanesque and Gothic Art. The art of Western Europe from about 1000 to about 1350 A.D.

Spring semester. Mr. Williams.

18. Italian Renaissance Art. A study of Italian Art of the 15th and 16th centuries with a consideration of certain special problems, for example, humanism in art, art as problem-solving, historicism, idea of perfection and canon in art, nature of stylistic changes, and the artist's role in the society.

Fall semester. Mr. Kitao.

20. Northern Renaissance Art. A study of the art of France, The Netherlands, and Germany from approximately 1325 to 1550. Each time the course is taught, one area will be selected for special emphasis, for example: manuscripts of the 14th century and the International Gothic style; Jan van Eyck; Hieronymus Bosch; the development of narrative; Albrecht Dürer; painting of the early 16th century in The Netherlands; Art and the Reformation.

Spring semester. Miss Faries.

21. Baroque Art. A study of European art of the 17th century with a consideration of certain special problems, among which the impact of the Catholic Reformation on art and artists, the development of scientific methods, the rise of art criticism and Academies, the question of reality and illusion, and commerce and consumption of art.

Spring semester. Mr. Kitao.

22. The Genesis of a Work of Art. An investigation of an art project in its entirety, from its first formulation to its final realization. Intervening influences and sources drawn upon during the problem-solving processes of its evolution will be considered. Monuments that are the result of a sequential effort, or a group effort such as the artist and his workshop, will be selected. The availability of pertinent information will also affect the selection. Possible examples are: the stonecutter's shop and the assemblage of Gothic facade sculpture; Giotto's fresco cycles; the conditions of an artist's contract; Raphael's Stanze in the Vatican; Baroque chapels; a Rubens altarpiece.

Fall semester. Miss Faries.

30. Modern Architecture. An introduction to the nature of architecture and the functions of the architect through a study of the developments in European and American building during the late nineteenth and twentieth centuries. The specific influence of economic, technological and social changes upon design and structure. Emphasis placed on the study of original examples in the New York

and Philadelphia areas and on the work of such men as Sullivan, Wright, Gropius, Mies van der Rohe, Saarinen and Le Corbusier.

The prerequisite of Art History 1 is waived for students in Engineering.

Spring semester. Mr. Walker

31. Modern Painting. 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.

Fall semester. Mr. Rhys.

32. American Art. 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.

Fall semester. Mr. Rhys.

51. Far Eastern Art. 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.

Spring semester. Mr. Rhys.

55. The Cinema. An introduction to the study of the cinema as art; a historical survey, examination of techniques, theories, critical methods, and special topics, varying from year to year.

Spring semester. Mr. Kitao.

56. The City. A study of visual and physical aspects of our man-made environment—our experiences and use of it, its effect on us, and the nature of its growth and design. It involves perception, analysis, and interpretation of the form, structure, imagery, and dynamics of selected historical and contemporary examples.

Fall semester. Mr. Kitao.

57. Renaissance Tradition in American Cities. A study of the elements of Renaissance and Baroque architecture and planning as they are found in their pristine form in Italy and as they persist in American cities today, especially in Philadelphia and Washington, D.C. Consideration will be given to the problems of conservation and urban development.

Spring semester. Mr. Kitao.

60. Senior Reading.

Spring semester. Staff.

61-62. Senior Thesis. With the approval of the department a thesis may be written during the senior year.

Fall and spring semester. Staff.

65-66. Colloquium. Subject to be determined.

Spring semester. Mr. Williams.

Honors Seminars

101. Ancient Art. A study of the development of the forms of art and architecture as they express the cultural patterns of Ancient Greece from the Bronze Age through the Hellenistic Age.

Fall semester. Mr. Walker.

103. Medieval Art. The development of the forms of Christian art during the Middle Ages from the fourth to the thirteenth century.

Fall semester. Mr. Williams.

104. Italian Renaissance Art. A study of Italian Art of the 15th and 16th centuries with a consideration of certain special problems, for example: humanism in art, art as problem-solving, historicism, idea of perfection and canon in art, nature of stylistic changes, and the artist's role in the society.

Spring semester. Mr. Kitao.

105. Northern Renaissance Painting. Developments in painting and the graphic arts during the fifteenth and sixteenth centuries in France, the Netherlands and Germany with intensive study of individual masters: Jan van Eyck, Roger van der Weyden, Jean Fouquet, Albrecht Dürer, Jerome Bosch and Pieter Bruegel.

Fall semester. Miss Faries.

106. Baroque Art. A study of European art of the 17th century with a consideration of certain special problems, for example: the impact of the Catholic Reformation on art and artists, the development of scientific methods, the rise of art criticism and Academies, the question of reality and illusion, and commerce and consumption of art.

Spring semester. Not offered in 1970-71. Mr. Kitao.

107. Modern Painting. 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.

Fall semester. Mr. Rhys.

108. Problems in Twentieth Century Art.

Spring semester. Mr. Rhys.

109. Master Print Makers. A consideration of certain problems in the history of the graphic arts. A study of the work of such men as Schongauer, Dürer, Rembrandt, Goya, Daumier, Toulouse-Lautrec, and Picasso for the development of expression in the media of woodcut, engraving, etching, aquatint and lithography. Students work almost exclusively with originals in the Print Room of the Philadelphia Museum and the Lessing J. Rosenwald Collection in Jenkintown.

Spring semester. Mr. Walker.

Program in Studio Arts

HARRIET SHORR BAGUSKAS, *Artist in Residence*
JOSEPH BAILEY
WILL BROWN
LORRAINE SCHECHTER
KIT YIN TIENG SNYDER

The Studio Arts program at Swarthmore, designed to develop the visual intelligence and analogic thinking, is based on a group meeting or "crit" where student work is discussed by an instructor in the program or by a visiting artist. Instructors and students in Studio Arts courses design the curriculum in re-

sponse to the needs of students and the development of their work as revealed by the crit. Visiting artists and exhibitions in the Wilcox Gallery are integral to the program.

The Visual Idea is the introductory course and is normally required of students entering the program. Courses vary depending on the needs of students and decisions of instructors concerning those needs, but offerings in painting, drawing, print-making, sculpture, pottery, and photography and film are the foundation of the program, though not all of these are offered for credit. Courses involve three consecutive hours of studio instruction and three consecutive hours of workshop. Students may receive credit for work in drawing, painting, print-making, and sculpture after a semester's work in The Visual Idea or on the basis of the presentation of a portfolio of work to the instructing staff. The portfolio may be the result of a semester's work in Studio Arts without credit. The instructors, engaged on a part-time basis, spend a full day each week available to students who are enrolled in their courses as well as to those students who wish to talk to them more generally. The program is guided by an artist-in-residence who is a full-time faculty member and maintains a studio at the College.

1. **The Visual Idea.** A three-hour studio course meeting once a week. Three problems in both two and three dimensions designed to help the student see the possibilities for form in his visual experience and to explore ways of making form.

Each semester. Mrs. Baguskas.

2. **Color.** An investigation of color. Through work with colored papers the student will explore relationships and the possibilities of creating form through color. Recommended for painting students.

Each semester. Mrs. Baguskas.

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

Each semester. Staff.

4. **An Introduction to Sculpture.** An introduction and approach to the discovery, exploration and practical use of three dimensional form. A course that will allow the student to work directly with some of the basic concepts, forms and materials used in producing sculpture through the use of models and other creative means.

Each semester. Mr. Bailey.

7. **Oil Painting.**

Fall semester. Visiting staff.

8. **Oil Painting.**

Spring semester. Visiting staff.

9. **Graphics.** An introduction to the process of silkscreening. The student will explore the possibilities of image making through the silk screen process of reproduction.

Each semester. Miss Schechter.

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

ART

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

Each semester. Mr. Brown.

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

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

Each semester. Mrs. Snyder.

ASTRONOMY

PETER VAN DE KAMP, *Professor*
Chairman and Director of Sproul Observatory
WULFF D. HEINTZ, *Associate Professor*
JOHN L. HERSHEY, *Research Associate and Lecturer*
SARAH LEE LIPPINCOTT, *Research Associate and Lecturer*
KYONGAE CHANG, *Research Assistant*

Astronomy deals with the nature of the universe about us and the methods employed to discover the laws underlying the observed phenomena. The elementary courses present the problems in broad outlines and trace the growth of our knowledge of the facts and development of theories. The advanced courses consider some of these problems in detail. The seminars deal primarily with the techniques, methods and problems of the Sproul Observatory research program.

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

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

Requirements and Recommendations

Prerequisites for an Astronomy major, in course, are Astronomy 1-2, 1-12, 11-2, or 11, 12, 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, 1-12, 11-2, or 11, 12, Physics 1-2, and a reading knowledge of French, German or Russian.

1-2. Descriptive Astronomy. These courses provide an introduction to the methods and results of astronomy. Fundamental notions of physics are studied

as they are needed to provide an adequate scientific basis for the course. Three class periods each week, practical work to be arranged.
Year course. Staff.

11. Intermediate Astronomy (Astromechanics; Descriptive). Celestial sphere, celestial navigation. Motions of stars, planets and satellites. Kepler's laws. Newton's law of gravitation.

The two-body problem, introduction to the three-body problem and perturbations. Orbits.

Survey of solar system. Atoms and radiation. Architecture, composition and radiation of the sun.

Prerequisites: Mathematics 3,4 or equivalent; Physics 1,2, or equivalent, may be taken concurrently with consent of instructor.

Fall semester. Mr. Heintz.

12. Intermediate Astronomy (Astrophysics; Galactic Structure). Observational data; spectrum-luminosity relation. Double stars; mass-luminosity relation. Unstable stars. Stellar clusters. Interstellar material. Galaxies.

Structure of Milky Way system. Expanding universe; origin, age and evolution of stars and galaxies.

Prerequisites: Mathematics 3,4, or equivalent; Physics 1,2, or equivalent, may be taken concurrently with consent of instructor.

Spring semester. Mr. Heintz and Mr. van de Kamp.

51. Celestial Mechanics. The two-body and three-body problems. Theory of orbits and perturbations. Satellite motions.

Fall semester. Mr. Heintz.

52. History of Astronomy. Development from early times through Greek and Medieval science to modern concepts of the universe.

Spring semester. Mr. Heintz.

Honors Seminars

101. Astrometry. 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, methods of least squares.

Spring semester. Mr. van de Kamp.

104. Astrophysics. Review of observational material. Atomic spectra. The gaseous state. Radiation. Continuous spectra of stars. Formation of absorption lines. Stellar interiors.

Fall semester. Mr. Hershey.

110. Research Project.
Staff.

Graduate Work

In conformity with the general regulations for work leading to the Master's degree (see page 74), 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.

The opportunity exists for pursuing advanced work at the Bartol Research Foundation, which conducts doctoral programs in astronomy and physics. (See p. 12).

BIOLOGY

LAUNCE J. FLEMISTER, *Professor*
LUZERNE G. LIVINGSTON, *Professor*
NORMAN A. MEINKOTH, *Professor and Chairman*
NEAL A. WEBER, *Professor*
KENNETH S. RAWSON, *Associate Professor*
JAMES C. HICKMAN, *Assistant Professor*
JOHN B. JENKINS, JR., *Assistant Professor*
ROBERT E. SAVAGE, *Assistant Professor*
BARBARA Y. STEWART, *Assistant*
JEAN D. TOMEZSKO, *Assistant*

The student may be introduced to the study of biology by taking Biology 1 and Biology 2. Either course may be taken first. Together they offer an overview of the field of biology. Biology 1 considers those principles and phenomena fundamental to all living systems, emphasizing cellular aspects. Biology 2 stresses the organism. Advanced courses are listed under three categories: those dealing specifically with plant biology (Botany), or animal biology (Zoology), and those whose subject matter deals with phenomena common to all living organisms (Biology).

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

Requirements and Recommendations

A student may elect to major in biology, botany or zoology. Students in Course should include the following supporting subjects in addition to the eight courses in their major subject: chemistry, including at least one semester in organic chemistry, two courses in physics and two in mathematics. These courses are required for majors in botany or zoology, and should be completed by the end of the junior year. The program for biology majors may be modified in respect to outside requirements when the department considers cause for such modification to be sufficient.

Honors Work

Requirements for admission to Honors with major work in the department include: Biology 1 and 2, another course in the department, chemistry through organic chemistry, physics, and first year mathematics. It should be noted that

certain subjects likely to be chosen as minors in other departments require a second year of mathematics.

Honors students in this department may designate a major in biology, botany or zoology according to their preferences. Offerings listed under Biology may be included in a major in botany or zoology, but a botany major may not include papers listed as Zoology nor the zoology major include those listed under Botany. A major in biology will by definition include papers selected from among the total departmental Honors offerings. Any Honors program in the biological sciences must include at least two papers outside the department.

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

Biology

1. Principles of Biology. An introduction to the study of phenomena fundamental to living systems. The emphasis will be at the cellular level and will include the consideration of cell structure and function, genetics, cell differentiation, and organic evolution.

Three lectures and one three-hour laboratory per week.

Fall semester. Staff.

2. Organismal Biology. An introduction to the study of whole organisms, chiefly the higher plants and animals. While basic taxonomy will be included stress will be placed on adaptive aspects of the morphology and physiology of organisms, their development, behavior, ecology and evolution.

Three lectures and one three-hour laboratory per week.

Spring semester. Staff.

20. Biology of the Gene. The course will deal with three basic areas: The discovery, structure, and replication of the genetic material; the transmission of the genetic material; and the mode of action of the genetic material, including a consideration of developmental genetics. Some time will be devoted to the historical development of genetic concepts. Areas of genetics not covered in this course (i.e. population genetics, quantitative inheritance, etc.) will be treated in Biology 22.

Three lectures per week and a laboratory or library project.

Prerequisites: Biology 1 and 2, or consent of the instructor.

Recommended: Organic chemistry.

Fall semester. Mr. Jenkins.

21. Cell Biology. A study of the ultrastructure and function of cell components, including cell division and development, biosynthesis of macro-molecules, and intermediary metabolism. Laboratory exercises are designed to illustrate the variety or approaches to findings in cell biology.

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

Spring semester. Mr. Savage.

22. Organic Evolution. The course will concern itself with three major areas: A history of evolutionary thought: an analysis of evolutionary mechanisms, including discussions of genetic drift, genetic recombination, and mutation; and a consideration of selected evolutionary pathways and the evidence which supports them.

Three lectures per week.

Prerequisites: Biology 1 and 2, or consent of the instructor.

Spring semester. Mr. Jenkins.

40. Man and Environment. The study of patterns of energy flow and material cycling in the world ecosystem with particular reference to human population. Consideration will be given to the methodology of ecological analysis and its application to the study of the causes and consequences of the growth of technology and human populations, especially in relation to the question of environmental deterioration. Freshmen admitted by permission of the instructors. (Also listed as Sociology-Anthropology 40.)

Prerequisite: Biology 2 or Sociology-Anthropology 1.

Spring semester. Mr. Hickman and Mr. Mitchell.

59. Cytology. A consideration of the nucleus in regard to its structure and activities and to its interaction with cytoplasm, including investigations of nuclear ultrastructure, replication of chromosomal constituents, cell division, biosynthesis of nucleic acids and proteins, the role of the nucleus and chromosomes in cell development. Laboratory experiments are designed to illustrate the variety of approaches to findings in cytology.

Three lectures and one laboratory per week.

Prerequisites: Biology 1 and organic chemistry.

Fall semester. Not offered in 1970-71. Mr. Savage.

65. Directed Reading. With the permission of a staff member who is willing to supervise it a qualified student may undertake a program of directed reading in an area of biology not included in the curriculum, or as an extension of one of his courses.

Fall or spring semester. Staff.

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

Three lectures and one laboratory period per week.

Prerequisites: Biology 1 and organic chemistry.

Spring semester. Mr. Livingston.

Honors Seminars

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

Fall semester. Mr. Savage.

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

Spring semester. Mr. Jenkins.

Botany

15. Taxonomy of Seed Plants. An introduction to the classification of flowering plants and gymnosperms and its underlying theory and methods. Emphasis is upon biologically, culturally, and economically important aspects of the world flora, with special reference to native spring plants. Recent advances in biosystematics, plant speciation, biochemical and numerical taxonomy, phylogeny, 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 per week.

Prerequisite: Biology 2 or consent of instructor.

Spring semester. Mr. Hickman.

16. Developmental Plant Anatomy. 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.

Alternate years, fall semester. Mr. Livingston.

18. Biology of Lower Plants. An introduction to the algae, fungi, mosses, and ferns, including aspects of their classification, phylogeny, structure, physiology, and ecology. The laboratories are in part exploratory and experimental. Their content depends in part upon the current interests of staff and students.

Three lectures and one field trip and/or laboratory period per week.

Prerequisite: Biology 1,2.

Alternate years, fall semester. Not offered in 1970-71. Mr. Livingston.

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

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

Prerequisites: Biology 1,2 and organic chemistry.

Alternate years, spring semester. Not offered in 1970-71. Mr. Livingston.

70. Plant Ecology. A study of the response of plant individuals and communities to environmental factors and the influence of plants upon their own environments and those of selected other organisms. The physical nature of the ecosystem is developed, with reference to the role of plants in energy flow, material cycles, and soil formation. Divergent concepts of niche, community, and biotic diversity are discussed, as are world patterns of vegetation and productivity. Laboratory work emphasizes the collection, analysis, and interpretation of field data.

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

Prerequisites: Biology 2 and permission of the instructor.

Recommended: Botany 15.

Fall semester. Mr. Hickman.

71-72. Special Topics. With the permission of the department, qualified students may elect to pursue a research program not included in the regular Course program.

Staff.

Honors Seminars

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

Prerequisites: Biology 1,2 and organic chemistry.

Alternate years, spring semester. Not offered in 1970-71. Mr. Livingston.

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

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

Alternate years, fall semester. Mr. Livingston.

118. Plant Ecology. 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 habitants. 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 habitants.

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

Alternate years, fall semester. Not offered in 1970-71. Mr. Hickman.

120. Special Topics. With the permission of the department, qualified students may elect to pursue a research problem not included in the regular offerings in Honors.

Staff.

Zoology

12. Vertebrate Physiology. 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. Two lectures and one conference per week.

Prerequisite: Biology 2 recommended.

Spring semester. Mr. Flemister.

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

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

Prerequisite: Biology 2.

Fall semester. Mr. Weber.

25. Field Zoology. 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.

Prerequisites: Biology 2, Zoology 14 desirable.

Spring semester. Mr. Weber.

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

Prerequisites: Biology 1,2, Zoology 14.

Fall semester. Not offered in 1970-71.

53. Biology of Arthropods. The study of insects and their relatives, their morphological and physiological adaptations and their effects 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.
Fall semester. Not offered in 1970-71. Mr. Weber.

54. Biology of Parasitism. 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.
Alternate years, spring semester. Mr. Meinkoth.

56. Invertebrate Zoology. 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.
Fall semester. Mr. Meinkoth.

57. Comparative Physiology. A course of lectures and laboratory experiments treating functional processes from the standpoint of adaptation of the animal to its environment. These processes in representative animals are compared in order to follow their elaboration from the more general to the more specialized.
Two lectures and one laboratory period per week.
Prerequisites: Zoology 14, organic chemistry and physics.
Fall semester. Mr. Flemister.

58. Physiological Ecology. A course of lectures, discussions and experiments concerning the physiological adaptations of representative animals to environmental stress. Requirements and availability of optimum conditions of temperature, oxygen, food-stuffs and the maintenance of ionic independence are appraised.
Two lectures and two laboratory periods per week.
Prerequisite: Zoology 57.
Spring semester. Mr. Flemister.

60. Biology of Animal Communities. The study of animals at the emergent level of populations. Problems of animal behavior as related to the growth and maintenance of populations will be considered with particular reference to communication and social interaction within animal groups. Both field and laboratory study techniques will be used.
Two lectures per week and the equivalent of one laboratory meeting per week.
Prerequisite: Biology 2.
Fall semester. Mr. Rawson.

63, 64. Special Topics. With the permission of the department, a qualified student may elect a program of independent research for either one or two semester course credits.
Fall and spring semesters. Staff.

Honors Seminars

103. Embryology. An analysis of reproduction and development. The laboratory work includes individual projects by the students, a study of developmental anatomy of the chick, pig and frog, and the observation of living material under normal and experimental conditions.
Prerequisite: Zoology 14.
Spring semester. Not offered in 1970-71.

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

Prerequisites: Zoology 14, organic chemistry and physics.

Fall semester. Mr. Flemister.

106. Biology of Arthropods. 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.

Alternate years, fall semester. Not offered in 1970-71. Mr. Weber.

107. Invertebrate Zoology. 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.

Alternate years, fall semester. Not offered in 1970-71. Mr. Meinkoth.

108. Sensory Physiology. 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.

Alternate years, spring semester. Not offered in 1970-71. Mr. Rawson.

109. Biology of Animal Communities. 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.

Fall semester. Mr. Rawson.

110. Special Topics. With the permission of the department, a qualified student may include a program of independent research as part of his Honors program.

Fall or spring semester. Staff.

BLACK STUDIES

CLEMENT COTTINGHAM, JR., *Director*

The Black Studies concentration offers students the opportunity to develop a deeper and broader understanding of the experiences, cultures, and goals of black people, especially those in Africa and in the Americas. Because of the unique nature of this area of study, the program offered will differ in some respects from those of more institutionalized disciplines, and considerable flexibility will be required. Therefore, students in the concentration will need to work very closely both with the chairman of their department and the director of the Black Studies program in working out their programs for each semester.

Program Features and Requirements

Students majoring in any subject bearing on Black Studies will be permitted to concentrate in this area as an aspect of the work in their major. The subjects normally falling in this category are Art History, Economics, English, History, Music, Political Science, Religion, and Sociology-Anthropology. However, other combinations are possible: for example, students seeking careers in urban planning through an Engineering major or in health planning through a Biology major may wish to concentrate in Black Studies.

To concentrate in this area a student must take at least five semester courses in the program, as well as fulfill the requirements of his major. Courses selected must include a course in black history or in black consciousness and a course involving work off-campus directly concerned with black problems. Other courses may be taken according to individual preference. The work of students concentrating in Black Studies will be reviewed and evaluated when completed by whatever means, such as a comprehensive or a thesis, considered appropriate by the director of the program.

Course Offerings

As already noted, courses in Black Studies will vary in particular semesters but the principal offerings which will be generally available are listed below (for descriptions of courses, see department statements in the catalogue).

Economics

The Black Worker in American Society. Mr. Anderson. *Spring semester*

English

Black Literature. *Spring semester*

French

Littérature et Négritude. Mr. Barré.

History

Africa. Mr. Wright. *Fall semester*

Topics in African History. Mr. Wright. Not offered in 1970-71.

Afro-American History.

Topics in Afro-American History.

Philosophy

Black Philosophical Thought. Mr. Bennett. *Spring semester*

Political Science

Politics of Africa. Mr. Cottingham. *Fall semester*

Problems in Community Government. Mr. Cottingham.

Religion

African Religion and American Culture. Mr. Barrett. *Spring semester*

Sociology-Anthropology

African Modernization. Mr. Mitchell. Not offered in 1970-71.

Caribbean Society. Mr. Bramson. *Spring semester*

Race and Ethnic Relations in the United States Mr. Van Til. Not offered in 1970-71.

CHEMISTRY

EDWARD A. FEHNEL, *Professor*
WALTER B. KEIGHTON, JR., *Professor and Chairman*
JAMES H. HAMMONS, *Associate Professor*
PETER T. THOMPSON, *Associate Professor*
JAMES R. HUTCHISON, *Assistant Professor*

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

The minimum requirement for a major in Chemistry is eight courses in the department. Majors are strongly advised to include in their programs Chemistry 28,29 and 61,62 (or 101), as well as a second year of mathematics.

Students are advised that sound preparation for professional work in chemistry includes: Chemistry 1,2 (or 3,4); 28,29; 61,62 (or 101); and at least four additional semesters of chemistry; Physics 1,2 and two years of mathematics; proficiency in reading scientific German, Russian, or French (preferably German).

Majors who wish to meet the minimum standards for professional training of chemists set by the American Chemical Society should consult with their advisers as to what additional work is required.

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

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

One laboratory period weekly.
Fall and spring semester. Mr. Keighton.

3, 4. General Chemistry. The subject matter of this course parallels that of Chemistry 1,2 but at a more advanced and mathematically oriented level. The course is intended for students with a strong interest in chemistry, whose high school preparation has been extensive, and who are prepared to work independently.

Admission to this course is based on consultation with the staff and a placement examination. Prior or concurrent enrollment in Physics 1,2 is highly desirable. One laboratory period weekly.
Fall and spring semester. Mr. Thompson and Mr. Hutchison.

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

One laboratory period weekly.

Prerequisite: Chemistry 1,2 or its equivalent.

Fall and spring semester. Mr. Fehnel.

56. Organic Structure Determination. Classroom and laboratory study of the principles and techniques involved in the elucidation of the structures of organic compounds. Emphasis is placed on the correlation of structure and properties of organic molecules and on the theoretical principles underlying various chemical and spectroscopic methods of identification and structure determination.

Prerequisite: Chemistry 29.

One laboratory period weekly.

Fall semester. Mr. Hammons.

57. Analytical Chemistry. Many of the principles and techniques of analytical chemistry are taught within the context of other courses listed in this section of the catalogue. Course 57 is intended to provide further, and more advanced, experience with the theories, techniques and instruments used in analysis.

Prerequisite: Physical Chemistry.

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

Prerequisite: Chemistry 29.

Fall semester. Mr. Hammons.

61, 62. Physical Chemistry. 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, elementary quantum theory and statistical mechanics.

Prerequisites: Chemistry 1,2 or its equivalent, a year of mathematics including differential and integral calculus, Physics 1,2. Engineering students may enter 62 without previously taking 61, provided they have satisfied the other prerequisites.

One laboratory period weekly.

Fall and spring semesters. Mr. Hutchison.

63. Quantum Chemistry. 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.

Fall semester. Mr. Hutchison.

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

Prerequisite: Chemistry 62. Chemistry 63 is highly desirable.

67. Physical Organic Chemistry. Selected topics in organic chemistry, including resonance and molecular orbital concepts, physical properties of organic compounds, stereochemistry, mechanisms of ionic reactions, free radicals, electrocyclic reactions, photochemistry, and other topics of current interest. A

familiarity with physical chemistry is desirable.

Prerequisite: Chemistry 29.

Spring semester. Mr. Hammons.

68. Advanced Laboratory. Individual projects of the investigative or research type in which the student has primary responsibility for the design of the experiment and the solution of the problem. Normally two or three projects in different areas will be assigned in each semester. This laboratory work is intended to give the student practical experience in the solution of a research problem, to develop facility in the use of the chemical literature and in the interpretation and communication of experimental results, and to stimulate interest in current developments in chemical research.

A prerequisite to this course is normally the completion of seven semester courses in chemistry.

Both semesters. Staff.

69. Special Topics. The course provides an opportunity for qualified advanced students to undertake original investigations or to make detailed literature studies of selected topics in the fields of inorganic, organic, analytical, or physical chemistry. Students who propose to take this course should consult with the appropriate instructor during the early part of the semester preceding that in which the work is to be done.

Approximately ten hours of laboratory and/or library work weekly.

Fall and spring semester. Staff.

Honors Seminars

Before admission to Honors work the chemistry major should complete Chemistry 1,2 or 3,4 and 28,29, two years of mathematics including a year of differential and integral calculus, and Physics 1,2. An Honors program in chemistry should include Chemistry 56 and 57.

101. Physical Chemistry. The gaseous, liquid, and solid states, solutions, elementary thermodynamics, chemical equilibria, electrochemistry, the kinetics of chemical reactions, elementary quantum theory and statistical mechanics.

Prerequisites: Second year mathematics and general physics.

One seminar and laboratory weekly.

Spring semester. Mr. Thompson.

106. Physical Organic Chemistry. An intensive study of essentially the same material covered in course 67. A familiarity with physical chemistry is desirable.

Prerequisites: Chemistry 28,29.

108. Valence and Molecular Structure. Quantum theory is developed and applied throughout to a variety of topics including: atomic structure, molecular and atomic spectroscopy, theories of chemical bonding, and molecular structure determination. Symmetry and group theoretical arguments are developed and applied extensively.

Prerequisite: Chemistry 101.

Fall semester. Mr. Thompson.

109. Thesis. Honors candidates may write a thesis as preparation for one of their papers. The thesis topic must be chosen in consultation with some member of the staff and approved early in the semester preceding the one in which the work is to be done.

CLASSICS

HELEN F. NORTH, *Professor and Chairman*
MARTIN OSTWALD, *Professor*‡
RUSSELL MEIGGS, *Cornell Visiting Professor*
JULIA HAIG GAISSER, *Assistant Professor*
THOMAS N. MITCHELL, *Assistant Professor*
GILBERT P. ROSE, *Assistant Professor*‡

The Department of Classics offers instruction in the various fields which constitute the study of Greek and Roman culture. Courses numbered from 1 to 20 are devoted to the Greek and Latin languages and literatures. Courses numbered from 31 onwards presuppose no knowledge of the Greek or Latin languages and are open (except for 42 and 44) without prerequisite to all students; they deal with the history, mythology, religion, archaeology, and other aspects of the ancient world and include the study of classical literature in translation.

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

Requirements and Recommendations

Greek, Latin, or Ancient History may be offered as a major subject either in Course or in Honors, and as a minor subject in Honors.

A major in Greek or Latin in Honors or in Course should complete during the first two years either Intermediate Greek or Intermediate Latin.

In Honors, a major in Greek is also expected to study Latin through the intermediate level and a major in Latin is expected to study Greek through the intermediate level before graduation.

Minor students in Honors should complete during the first two years either Intermediate Greek or Intermediate Latin.

Majors in both Honors and Course are strongly advised to take for at least one semester a course in prose composition (Greek 9,10 or Latin 9,10).

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

A major in Ancient History will consist of (1) Classics 42, with attachments, (2) Classics 44, with attachments, and (3) either or both of the following: Greek 113, Latin 102. The prerequisites for Classics 42 and 44 are Classics 31 and 32. For Greek 113 the prerequisite is one year of Intermediate Greek, for Latin 102, one year of Intermediate Latin.

A minor in Ancient History will consist of (1) and (2) above, with the specified prerequisites.

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‡Absent on leave, 1970-71.

Majors in Latin in Course or Honors are eligible for certification as secondary school teachers in Pennsylvania, provided that they include in their programs a course in Roman history and either Classics 35 or Classics 36.

Greek

1-2. Elementary Greek. The essentials of Greek grammar are covered and selections from masterpieces of Greek literature are read.

Year course. Miss North.

9, 10. Greek Prose Composition. Course meets one hour a week. This course is recommended in conjunction with courses at the intermediate level or above, to provide the student with grammatical and stylistic exercise.

Half course, each semester. Staff.

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

Mr. Mitchell.

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

Miss North.

15, 16. Greek Poets. The works read are determined by the interests and needs of the members of the class. Credit is given for each semester. The course is offered only when required.

Mrs. Gaisser.

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

Staff.

19. Comparative Grammar of Greek and Latin. A study of the morphology, phonology, and inflection of Greek and Latin words derived from Indo-European. Students are expected to have the equivalent of at least two college years of one language and one college year of the other. No prior experience in linguistics is assumed.

Fall semester. Not offered in 1970-71. Mr. Rose.

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

Staff.

Latin

1-2. Elementary Latin. An intensive course in the essentials of Latin grammar aiming to provide sufficient knowledge of the language to make possible the study and appreciation of Latin literature.

Study of the language is combined with a weekly meeting in which students are introduced to a wide range of topics related to the study of Latin. These include such subjects as Roman art, archaeology, palaeography, religion, and (in translation) masterpieces of Latin literature. These meetings will normally be conducted by specialists from the Swarthmore faculty and from neighboring colleges.

The course will have four one-hour meetings each week, for the study of the language, and one two-hour meeting each week for lecture and discussion. It carries one and one-half course credits each semester.

Year course. Mr. Mitchell.

3. Intermediate Latin: Catullus. A study of the lyric, elegiac, and hexameter poetry of Catullus. This course follows Latin 2 and is open to those with two or three years of high school Latin.

Fall semester. Mrs. Gaisser.

4. Intermediate Latin: Cicero. An Oration and Selected Letters. This course is designed to introduce students to a great historical and literary figure of the Roman Republic. It combines a study of his major political and literary achievements with a careful analysis of his prose style.

Spring semester. Mr. Mitchell.

9, 10. Latin Prose Composition. The development of Latin prose style is studied, with an analysis of Latin texts and extensive translation of English into Latin. A requirement for majors, it is recommended in conjunction with Latin 3 and Latin 4. The course meets one hour a week.

Half course, each semester. Staff.

11. Introduction to Latin Literature. A study of Roman Comedy. This course is normally open to students who have had four or more years of high school Latin. Students admitted with fewer than four years of Latin are required to take Latin 9 in conjunction with this course.

Fall semester. Mrs. Gaisser.

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

Spring semester. Miss North.

13. Ovid and Latin Elegy. A study of Ovid and the Roman elegists, Propertius and Tibullus.

Fall semester. Not offered in 1970-71. Staff.

14. Mediaeval Latin. Works chosen from the principal types of mediaeval Latin literature (including religious and secular poetry, history and chronicles, saints' lives, satire, philosophy, and romances) are studied in this course.

Spring semester. Miss North.

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

Staff.

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

Staff.

Ancient History and Civilization

31. History of Greece. 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. Classics 31 meets the distribution requirement for Group 3; it counts towards a major in History.

Fall semester. Mr. Meiggs.

32. The Roman Republic. A study of the Roman world in the period 300-44 B.C. Four major subjects will be dealt with in detail: (1) The evolution of the Republican constitution, (2) Rome's wars of expansion and the acquistion of her empire, (3) The Roman Revolution, and (4) The cultural background.
Students will be required to read the pertinent original sources in translation, as well as a selection of modern viewpoints. Students' reports and discussion will accompany the lectures. There is no prerequisite. Classics 32 meets the distribution requirement for Group 3; it counts towards a major in History.

Spring semester. Mr. Meiggs.

33. Greek Literature in Translation. 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. The course is given in alternate years.

Fall semester. Miss North.

34. Colloquium on the Ancient Theatre. All extant examples of Greek and Roman drama (both tragedy and comedy) will be read in translation, and there will be a study of ancient dramatic production and the physical remains of Greek and Roman theatres. There is no prerequisite, but preference will be given to students who have had some previous acquaintance with dramatic literature, or have taken Classics 33 or 35.

Spring semester. Not offered in 1970-71. Miss North.

35. Latin Literature in Translation—Classical and Mediaeval. The works studied in this course range in time from the age of the Roman Republic to the twelfth century after Christ. They include the major authors of the classical period, St. Jerome and St. Augustine from the Latin Fathers, and from the Middle Ages Boethius, Prudentius, the chief figures of the Carolingian Renaissance, and the writers of Mediaeval Latin hymns and secular poetry.
The course is given in alternate years.

Fall semester. Not offered in 1970-71. Miss North.

36. Classical Mythology in Literature and Art. The course is designed to give familiarity with those myths and legends that have served as material for writers and artists from ancient times to the present. The principal works studied are Homer's *Odyssey,* Hesiod's *Theogony,* selected Greek tragedies, Virgil's *Aeneid,* the *Metamorphoses* of Ovid, and Dante's *Commedia.* A study is made of the way in which mythological themes have been handled in painting and sculpture at various periods, and topics for papers provide an opportunity for the study of the treatment of mythology by writers from the Renaissance to modern times.

The course is normally given in alternate years.

Spring semester. Miss North.

42. Greece in the Fifth Century B.C. An intensive study, chiefly on the basis of primary sources, of Athens and the Greek world from the reforms of Cleisthenes to the end of the Peloponnesian War. Special emphasis is placed on the political, social, and economic institutions of the Athenian democracy and on

the problems of the Delian League, both internal and in its relation to the Greek and non-Greek world. Classics 42 counts towards a major in History.

The course is normally given in alternate years.

Prerequisite: Classics 31 or its equivalent.

Fall semester. Mr. Meiggs.

44. The Roman Empire. This course treats in detail the political, economic, social, and cultural history of the Roman world from the death of Julius Caesar to the death of Marcus Aurelius in A.D. 180. Special attention is given to Octavian's rise to power, the transformation of the republican constitution into an autocracy, and the impact of this change on the administration of the empire, on the structure of Roman society, and on literary and artistic movements. Classics 44 counts towards a major in History.

The course is normally given in alternate years.

Prerequisite: Classics 32 or its equivalent.

Spring semester. Mr. Meiggs.

Honors Seminars

102. Roman Historians. This seminar combines a survey of Latin historical writing to the end of the Silver Age with intensive study of selected books of Livy and Tacitus, both as examples of Roman historiography and as sources for Roman history.

Spring semester. Mr. Meiggs.

103. Latin Epic. This seminar traces the development of Roman epic poetry, with particular emphasis on the *De Rerum Natura* of Lucretius and the *Aeneid* of Virgil. Some attention is also given to early Roman epic, as represented by the *Annales* of Ennius, and to the later epic, typified by Lucan's *Pharsalia.*

Spring semester.

104. Roman Satire. A study of the *Satires* and *Epistles* of Horace and of the *Satires* of Juvenal is supplemented by a general survey of the development of Roman satire.

Fall semester. Mr. Mitchell.

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

Fall semester. Mr. Mitchell.

111. Greek Philosophers. 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.

Fall semester.

112. Greek Epic. The study of Homer's *Iliad* or *Odyssey* constitutes the chief work of this seminar. Some attention is also paid to Hesiod's *Theogony* and to the *Argonautica* of Apollonius of Rhodes.

Spring semester. Miss North.

113. Greek Historians. This seminar is devoted to a study of Herodotus and Thucydides, both as examples of Greek historiography and as sources of Greek history.

Fall semester. Mr. Meiggs.

114. Greek Drama. 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.

Spring semester. Miss North.

ECONOMICS

EDWARD K. CRATSLEY, *Professor*
FRANK C. PIERSON, *Professor and Chairman*‡
VAN DOORN OOMS, *Associate Professor and Acting Chairman*
HOWARD PACK, *Associate Professor*
FREDERIC L. PRYOR, *Associate Professor*
BERNARD SAFFRAN, *Associate Professor*
LEWIS R. GATY, *Lecturer*
HELEN M. HUNTER, *Lecturer*
ANITA A. SUMMERS, *Lecturer*
BERNARD E. ANDERSON, *Visiting Lecturer****
ROBINSON J. HOLLISTER, JR., *Visiting Lecturer***

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

Course 1-2A is prerequisite to all other work in the department except courses 3 and 4. Students intending to major in economics are advised to take Political Science 1 (Elements of Politics) and Economics 4 (Statistics). While not essential, college-level mathematics would also be helpful. Students intending to do graduate work in economics should also take Mathematics 5,6,11, and, if possible, 22. Majors in Course are required to take courses 50 and 51 in the junior year, and course 59 in the senior year. Majors in Honors are advised to take seminars 103 and either 101 or 102. Students intending advanced work in business finance, money and banking, public finance, or public regulation, and those intending to go to law school or business school, will find accounting helpful.

1-2A. Introduction to Economics. This course, which is 1½ semesters in length, is designed both to afford the general student a comprehensive survey and to provide students doing further work with a foundation on which to build. It describes the organization of the economic system and analyzes the allocation of resources, the distribution of income, the maintenance of economic stability, and international economic relations. On completing the course, students will have the option of joining seminars for one half course credit held during the last seven weeks of the semester.

Staff.

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‡Absent on leave, 1970-71.
**Fall semester, 1970-71.
***Spring semester, 1970-71.

3. Accounting. 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.

Spring semester. Mr. Cratsley.

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

Fall semester. Mrs. Hunter.

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

Spring semester. Mr. Ooms.

50. Economic Theory. Determination of prices in theory and in practice. Distribution of income. Economic welfare aspects of various market structures.

Fall semester. Mr. Gaty.

51. Money and Banking. Organization and operation of commercial banking in the United States. Central banking; the Federal Reserve system. Macroeconomic and monetary theory. Monetary policy.

Spring semester. Mrs. Hunter.

52. Public Finance. Social goals and fiscal institutions, Federal, state, and local, including analysis of public expenditures, taxation, the national debt, fiscal federalism, and current fiscal policy.

Fall semester. Mr. Pack.

53. Econometrics. A six-week survey of the theory of multiple regression and the problems encountered in using multiple regression in economic analysis. This will be followed by individual empirical research projects on economic topics selected by students. Admission by permission of the instructor.

Spring semester. Mrs. Hunter.

54. Business Finance. Analysis of private financial instruments, markets, and institutions, and public regulation of financial practices.

Fall semester. Not offered in 1970-71. Mr. Gaty.

55. Labor Problems. The structure and functions of labor unions. Employer approaches to labor relations. Analysis of wage policies. Governmental control of labor relations.

Fall semester. Not offered in 1970-71. Mr. Pierson.

56. Social Economics. The extent, consequences, and causes of poverty and economic insecurity; an appraisal of reforms in social insurance, medical care, public housing, and rural development; the economics of discrimination and urban ghettos.

Fall semester. Not offered in 1970-71.

57. Managerial Economics. 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.

Fall semester. Not offered in 1970-71.

58. Public Control of Business. 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.

Spring semester. Not offered in 1970-71. Mr. Gaty.

59. Economic Stability. National income theory. Analysis of business fluctuations and long-term economic change. Public policies for stabilization and growth.

Spring semester. Mr. Pack.

60. International Economics. Theory and practice of international trade. Balance of payments, foreign exchange, national commercial policies, international investment, and foreign aid.

Fall semester. Not offered in 1970-71. Mr. Ooms.

61. Comparative Economic Systems. Analysis of methods by which economic systems can be compared; case studies of the Soviet Union, Yugoslavia, and several West European nations.

Spring semester. Mr. Pryor.

65. Political Economy of Multinational Enterprises. This course will examine the political and economic significance of multinational enterprises, which have recently become increasingly important in the international economy. Problems discussed will include those of efficiency of resource allocation, economic and political concentration, distributive equity in the use of and payment for resources, and political relationships between host and investing countries. The concept of political and economic "imperialism" will be examined within a framework of modern economic and political analysis.

Students enrolling in this course should have some knowledge of economic analysis and international politics, such as is provided in Economics 1-2A and Political Science 4. Students without this background should consult the instructors before enrolling.

Fall semester. Mr. Keohane and Mr. Ooms.

70. Economic Anthropology. Examination of the economic institutions of primitive and peasant societies. Theoretical issues such as the meaning of "economic" and the nature of surplus will be considered, in addition to such substantive issues as the origins and kinds of money, property, labor, trade and markets.

Fall semester. Mr. Novick and Mr. Pryor.

75. The Black Worker in American Society. This course will trace the economic status of black workers in this country from the period of slavery to the present. The relative income position and career patterns of black workers will be examined in terms of geographical, industrial and occupational changes, and in terms of the economic, political and institutional influences which have brought about these changes. Relevant policies of union, management and government will also be reviewed. One major feature of the course will be independent investigation and research of contemporary employment problems of black workers.

Enrollment will be limited. Prerequisite: Economics 1.

Spring semester. Mr. Anderson.

Honors Seminars

101. Finance. Social goals and fiscal institutions, Federal, State, and local, including analysis of public expenditures, taxation, the national debt, fiscal fed-

eralism, and current fiscal policy. Analysis of private financial instruments, markets, and institutions, and public regulation of financial practices.

Fall semester. Mr. Pack.

102. Economic Stability and Growth. The theory of cyclical fluctuations and secular growth. Money and banking. Monetary and fiscal policy. Wage-price pressures and the control of inflation.

Spring semester. Mr. Pack.

103. Economic Theory. Contemporary theory: price determination, the functional distribution of income, the level of employment. Evaluation of theory in the light of simplifying assumptions and empirical evidence. The relevance of theory to socio-economic problems.

Each semester. Mr. Saffran.

104. Public Control of Business. The maintenance of competition in American industry. The moderation of competition in agriculture, the extractive industries, and the distributive trades. The regulation of public utilities, transport, and communications. Public ownership and operation of industry.

Spring semester. Not offered in 1970-71. Mr. Gaty.

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

Spring semester. Mr. Ooms.

106. Comparative Economic Systems. Analysis of methods by which economic systems can be compared; study of resource allocation and growth in socialist, capitalist, and mixed economies; case studies of the U.S.S.R., Yugoslavia, China, France, and other nations; examination of special problems in economic planning.

Spring semester. Mr. Pryor.

107. Labor and Social Economics. The organization of labor. Analysis of wage policies. Government control of labor relations. Problems stemming from income inequality and insecurity. Methods of income maintenance. Economic aspects of education, medical care, public housing. Special topics in urban economics.

Fall semester. Mr. Hollister and Mr. Pryor.

108. Econometrics. Econometric theory and empirical studies. An empirical research paper is required.

Prerequisites: Mathematics 11 and Economics 103.

Spring semester. Mr. Saffran.

109. Economic Development. An examination of the problems of economic development and growth in low-income countries, with attention to both historical experience and current issues of development policy. Techniques of economic planning and instruments of policy will be studied. Emphasis will be placed upon case studies of individual countries, and each student will prepare at least one research paper of considerable depth.

Fall semester. Mr. Ooms and Mr. Pack.

EDUCATION

JOSEPH B. SHANE, *Professor*
ALICE K. BRODHEAD, *Lecturer & Director of Student Teaching*
BARBARA Z. PRESSEISEN, *Lecturer*

There is no major in Education, but Swarthmore students may offer the following program of courses in conjunction with a major or a concentration of courses stipulated by the departments in the following fields for the Instructional I Certificate for secondary schools teachers in Pennsylvania: Biology, Chemistry, Comprehensive English, Comprehensive Social Studies, Economics, French, German, History, Latin, Mathematics, Physics, Physics and Mathematics, Russian, Sociology, and Spanish. Students are referred to the pertinent department, to Mrs. Brodhead, or to the Registrar for further information about teacher certification. Courses in Education may also be taken by students who are not seeking certification.

Psychology 3. Introduction to Psychology.

Psychology 11. Educational Psychology.

Either Education 14. Introduction to Teaching
or Education 12. Principles & Methods of Secondary Education.

Either Education 15. History of Education.
or Education 17. Problems in Urban Education.

Education 16. Student Teaching.

11. Educational Psychology. Problems and issues in contemporary education viewed in a psychological context. Specific content of seminar discussion and reading to be determined by the class. Possible topics include: curriculum development, learning theory, epistemology, socialization, morality, discipline, motivation, testing and measurement, language and communication, and the theories of Piaget, Skinner, and Bruner. Open only to students previously or currently enrolled in Introduction to Teaching except by permission of the instructor.

Fall semester. Mr. Bernheim.

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

Spring semester. Mr. Shane.

14. Introduction to Teaching. An exploratory course designed to help students determine their own interest in preparing to teach, as well as to furnish them with opportunities for learning about elementary and secondary schools in order to operate as informed parents and citizens. Current educational theory will be discussed and compared with contemporary practice.

Each semester. Mrs. Brodhead and Mrs. Presseisen.

15. History of Education. Educational thought in our western culture from the Greeks to the present day, with emphasis upon the development of the public schools in the U.S. Weekly seminar in which members of the Classics, History, Philosophy, and Religion departments participate.

Mrs. Brodhead.

16. Student Teaching. Practice teaching with appropriate guidance in subject methods is available to juniors and seniors who seek teacher certification at the secondary level. Education 14, Introduction to Teaching, or Education 12, Principles and Methods of Secondary Education, and Psychology 11, Educational Psychology, are required.

Each semester. Mrs. Presseisen.

17. Problems in Urban Education. This course considers the problems of schools in big cities, related to topics such as financial support, community relations, professional staff, curricular innovation, pupil personnel. A weekly seminar, individual study, and field investigation in the city of Philadelphia.
Fall semester. Mrs. Brodhead.

Linguistics 38. Reading and Writing. This course is designed primarily for students involved in reading tutorial programs, and for those intending to teach. At issue is the problem of reading in both its conceptual and social aspects. Students will tutor or assist in teaching reading as part of the course work. Weekly meetings with the instructor will concern theoretical issues in phonology, reading, and writing; methods of teaching; and discussion of the ongoing tutorial programs.
Spring semester. Mrs. Gleitman.

Philosophy 30. The Philosophy of Education. The idea of education in philosophy, and the implications of philosophical and psychological theories for educational practice. Readings may include: Plato, Rousseau, Kant, Tolstoy, Dewey, James, Whitehead, Montessori, Skinner, Piaget, Neill, Laing, and McLuhan.
Fall semester. Mr. Bennett and Mr. Bernheim.

ENGINEERING

SAMUEL T. CARPENTER, *Professor and Chairman*
JOHN D. McCRUMM, *Professor*
BERNARD MORRILL, *Professor*
CARL BARUS, *Associate Professor*
DAVID L. BOWLER, *Associate Professor*†
RAYMOND DOBY, *Associate Professor*
M. JOSEPH WILLIS, *Associate Professor*
G. STUART PATTERSON, JR., *Assistant Professor*‡
VICTOR K. SCHUTZ, *Assistant Professor*†

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 overall plan leading to a degree of Bachelor of Science with the major in Engineering is accredited by the Engineers' Council for Professional Development.

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.

†Absent on leave, spring semester, 1970-71.
‡Absent on leave, 1970-71.

ENGINEERING

Courses in the Department of Engineering are open to all students who have the interest and the prerequisite background. Special inquiries may be made through the chairman of the department. Courses E1, E2, E7, E8 and E56 may be especially relevant to some student programs.

The use of the College's computer facilities is central to an engineering education at Swarthmore. The Department has developed a number of courses dealing with computers which would be of interest to students in all departments of the College. These include an introductory course in Digital Computers, a course in Special Computer Topics, and a course in Special Topics—Numerical Analysis for Computers. Additional courses will be offered if the demand warrants.

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

(1) Four year course programs with the major in Engineering, with elected concentrations of study in the professional branches of engineering such as Civil, Electrical, and Mechanical Engineering, and in related engineering areas. (See suggested Elective Plans).

(2) Four year course programs with the major in Engineering, with elected combinations of study in Biology, Chemistry, Economics, Mathematics, Political Science, etc.

(3) Reading for Honors in Engineering.

(4) Special combinations to meet unusual needs or interests:
   (a) A four year program relating Engineering with other College areas of study, or
   (b) A five year program leading to both a B.S. degree with a major in Engineering, and a B.A. degree.

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

Course Program

The prerequisites leading to a major in Engineering are Engineering 1 and Engineering 2 in the first year and Engineering 11 and Engineering 12 in the second year. Prospective Engineering majors are strongly urged to enroll in appropriate courses in Chemistry, Physics, and Mathematics. In special cases, students with preparation comparable to, but differing from, the above may apply to major in Engineering after consultation with the department chairman.

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

Course Advising

Students are advised to make their educational goals known to their advisers at the earliest possible time. In this way the student can best benefit from the

flexibility provided for course election and provide for a curricular program specifically oriented to his future educational goals. The plan for upperclass study in Engineering should be formulated during the second semester of the sophomore year when the student applies for a major in Engineering.

Reading for Honors in Engineering

Students who wish to become candidates for a Bachelor of Science degree in Engineering with Honors should follow the application procedure given on pages 58-60.

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

Elective Plans in the Course Program

The following suggested plans of study for the last two years are listed to indicate the flexibility of choice open to the student. Other plans may also be arranged beyond those suggested. At least four elected and approved advanced courses in Engineering must be included in the program of the junior and senior years. Electives in the humanities, social sciences and life sciences can also contribute, in many cases, to the central educational aims. A course in Special Topics or a Thesis is available for meeting special interests or needs.

Suggested Elective Plans

BIO-ENGINEERING

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

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

CIVIL ENGINEERING AND RELATED AREAS

General Civil Engineering
Structures
Urban and Regional Planning
Water Resources

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

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

ELECTRICAL ENGINEERING AND RELATED AREAS

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

Students who plan to do work in electrical engineering will normally include the following courses in their programs: Circuit Theory, Electromagnetic Theory, Electronic Circuit Theory I (73).

The program should be filled out with additional courses selected partly from those numbered 55 and 74 to 80, inclusive, according to individual interest. The full program may emphasize an area of study such as those listed at the left.

ENERGY CONVERSION

Electromechanical Energy Conversion
Thermodynamics and Heat Transfer

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

ENGINEERING SCIENCES

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

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

ENGINEERING COMBINED WITH STUDY IN OTHER COLLEGE AREAS

Biology
Chemistry
Economics
Mathematics
Political Science
Psychology
Physics

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

Mechanical Engineering and Related Areas

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

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

1. Introduction to Engineering. An introduction to engineering analysis evolving solution to engineering problems through the use of simple mathematical models. The body of mathematics necessary for structuring these models is fully developed within the course. The use of the digital computer is introduced and several engineering problems are assigned for computer solution. During the last four or five weeks of the course, the class is broken up into small seminar groups directed by the engineering faculty and covering various current engineering topics. The laboratory work introduces graphical concepts and some shop practice.

Three class periods and a laboratory each week.

Fall semester.

2. Mechanics I. Special areas in the field of mechanics are discussed. Elementary beam theory and theory of torsion constitute the material discussed in the first half of the course. The latter half concerns itself with problems in dynamics which are approached from a Lagrangian point of view.

Three class periods and a laboratory each week.

Spring semester.

7, 8. Principles and Problems of Modern Technology. This course is designed to meet the needs of non-science majors and fulfills the group I distribution requirement. (See p. 56.) In the first semester, the logic and programming of the digital computer will be introduced, elementary decision theory will be developed, and the engineering concepts of optimization, feedback, and information discussed. Newton's laws of motion and the laws of thermodynamics will be introduced to illustrate the use of science in technology. In the second semester, 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. Past topics have been: world communications, environmental engineering, and bio-engineering.

Three class periods and a laboratory every other week.

11. Electrical Engineering Science. The subjects to be considered in this course are the following: the analysis and design of electric circuits; force and energy in electromagnetic fields; problems involving static electric and magnetic fields such as, for example, magnetic circuits and dielectric materials. Students registering for this course are assumed to be familiar with the basic concepts of electricity and magnetism.

Three class periods weekly and a laboratory every other week.

Prerequisite: To be preceded or accompanied by Integral Calculus.

Fall semester.

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

Three class periods and a laboratory every other week.

Prerequisite: Engr. 11, or equivalent.

Spring semester.

23. Digital Computers. An introductory course on general aspects of information processors. Topics covered include machine and system organization, languages (including both assembly language and a problem oriented language), applications including Monte Carlo methods, non-numeric data processing, and data banks. There will be extensive use of the College's computer facilities.

Three class periods each week.

No prerequisites.

Fall semester.

24. Special Computer Topics. Topics covered may include systems programming, compiler construction, or more advanced treatment of topics covered in Engr. 23.

Three class periods each week.

Prerequisite: A knowledge of "ASSEMBLER" language.

Spring semester.

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

Three class periods and a laboratory each week.

Prerequisite: Engr. 12, or equivalent.

Fall semester.

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

Three class periods and a laboratory each week.

Fall semester.

55. Systems Theory. Mathematical analysis of an assemblage of interacting elements comprising a generalized system. Fourier methods and the Laplace transform. Linear graphing and operators. Root locus theory. State variables, the system state transition matrix and canonical forms. Linear vector spaces. Digital data systems and the Z transform. Response to random inputs. Correlation func-

tions and spectral distribution. Some aspects of socio-economic and urban systems. The role of the digital computer in systems analysis.
Three class periods each week; conference or laboratory every other week.
Prerequisite: Engr. 12, or equivalent.

56. 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.
Normally for junior and senior students.
Spring semester.

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 a laboratory each week.
Prerequisite: Mechanics I, or equivalent.
Fall semester.

61. Structure and Properties of Materials. The physical nature of matter in the solid state. Electrical, mechanical, optical, and thermal properties. Macroscopic, phenomenological characteristics in terms of microscopic fundamentals. Design of material structures for meeting engineering specifications.
Three class periods each week.
Prerequisite: Theoretical Chemistry.
Fall semester.

62. Structural Mechanics I. Principles of structural systems and advanced mechanics of deformable bodies pertaining to deflection and stability. Structural mechanics of space and plane framed structures including stress analysis, influence lines, and matrix solutions.
Three class periods and a laboratory each week.
Prerequisite: Engr. 59.
Spring semester.

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 a laboratory each week.
Prerequisite: Structural Mechanics I.
Fall semester.

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 a laboratory each week.
Spring semester.

65. Civil Engineering Design. An introduction to the design of engineering structures with emphasis on structural components and structural materials; de-

sign projects involving planning, analysis and synthesis, structural models, and optimization criteria.

Three class periods and a laboratory each week.

Fall semester.

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 a laboratory each week.

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

Spring semester.

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

Three class periods and a laboratory each week.

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

Three class periods and a laboratory each week.

Prerequisite: Engr. 64.

71. Circuit Theory. Transient and steady-state analysis of electric circuits and networks with emphasis on state variable as well as classical methods and s-plane interpretation. Network topology, equilibrium equations, theorems, network functions and their properties. Energy in electric networks. Matrix formulation for the systematic representation of generalized networks for computer analysis. Linear, nonlinear, time varying and time-invariant cases.

Three class periods and a laboratory each week.

Prerequisites: Engr. 12, or Physics 12.

Fall semester.

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

Three class periods and a laboratory each week.

Prerequisite: Engr. 51, or equivalent.

Spring semester.

73, 74. Electronic Circuit Theory. The principal emphasis of the course is on the use of transistors as active circuit elements. The Ebers-Moll, charge control and hybrid-pi models are introduced and used, together with appropriate analytical techniques, in such applications as biasing circuits, low-pass amplifiers, tuned amplifiers, power amplifiers, feedback circuits and switching circuits. The bulk of the laboratory work is oriented toward circuit design. Students are encouraged to become familiar with and use the IBM Electronic Circuit Analysis Program which is available in the Computer Center.

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

Three class periods and a laboratory each week.

Prerequisite: Engr. 12, or equivalent.

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

Three class periods and a laboratory each week.

Prerequisite: Engr. 12, or equivalent.

77. Topics in Information Transmission. Selected topics relating to the transmission and processing of information and information-bearing signals. Application to communication and information-processing systems.

Three class periods and a laboratory each week.

Prerequisite: Engr. 12, or equivalent.

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

Three class periods and a laboratory each week.

Prerequisite: Engr. 12 (and preferably Engr. 55).

80. Physical Electronics. The course begins with a study of the properties of semiconductors based on the quantum mechanical point of view. This background is then used in a detailed consideration of the operation of semiconductor devices. The connection between material properties and the characterization of devices as circuit elements is stressed.

Three class periods and a laboratory each week.

Prerequisite: Engr. 61.

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

Four class periods each week.

Prerequisite: Ordinary differential equations and multivariate calculus.

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

Four class periods each week.

Prerequisite: Engr. 82.

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

Four class periods each week.

Prerequisite: Engr. 53.

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

Four class periods each week.

Prerequisite: Ordinary differential equations.

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

Four class periods each week.

Prerequisite: Engr. 51.

89. Machine Design. The study of the analysis and synthesis of the elements of machines.

Three class periods and a laboratory each week.

Prerequisite: Engr. 59.

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

Three class periods and a laboratory each week.

Prerequisite: Senior Engineering standing.

91. Special Topics. Subject matter dependent on a group need or individual interest. Normally restricted to senior students and offered only when staff interests and availability make it practicable to do so.

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

Honors Seminars

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

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

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

111. Circuit Theory. Classical and modern treatments of electric circuits and networks. Time-domain and frequency-domain analysis of linear circuits. Analytic properties of network functions and introduction to synthesis. Application of linear graph theory. State variable analysis and computer applications including nonlinear and time-varying cases.

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

ENGLISH LITERATURE

DAVID COWDEN, *Professor*‡
HAROLD E. PAGLIARO, *Professor and Chairman*
DEREK TRAVERSI, *Professor*
THOMAS H. BLACKBURN, *Associate Professor*
LEE DEVIN, *Associate Professor and Director of Theatre*
SUSAN B. SNYDER, *Associate Professor*
JOHN S. SHACKFORD, *Assistant Professor*‡
JANE HEDLEY, *Instructor*
PHILIP M. KEITH, *Instructor*
THOMAS L. SHERMAN, *Instructor*
CAROLYN G. HEILBRUN, *Visiting Lecturer*
VICKI W. KRAMER, *Lecturer*
ROBERT TEITELBAUM, *Technical Director of Theatre*

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

Requirements and Recommendations

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

Major in Course: The work of a major in Course consists of a minimum of eight semester-courses in the department, including Shakespeare and Problems of Literary Study and at least two other courses in literature written before 1800.

‡Absent on leave, 1970-71.

Major in Honors: Majors in Honors must take three or four seminars in the department, two of which should be from Group I.

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

1. Studies in Poetry and Prose. Emphasis on sensitive reading and analysis: exploration of lyrics, longer poetic forms, and imaginative prose works from various periods.
Each semester. Staff.

5, 6. English for Foreign Students. Individual and group work on an advanced level for students with non-English backgrounds.
Each semester.

10. Advanced Composition. Analysis, organization, and effective presentation of complex subject matter. The course will be conducted for the most part on a tutorial basis.
Spring semester. Staff.

21. Poetics. Consideration of the essential aspects of poetry. Readings will include poetry in English from all periods, as well as some of the major documents of poetics.
Fall semester. Not offered in 1970-71.

22. Satire. Examination of satire as a literary genre.
Spring semester. Mr. Blackburn.

23. Main Currents of Nineteenth-Century Literature. The major movements of romanticism, realism-naturalism, and symbolism in European literature.
Fall semester. Not offered in 1970-71.

24. Main Currents of Twentieth-Century Literature. Emphasis on the European novel. The creation of new forms of literary experience by such figures as Proust, Gide, Camus, Kafka, Mann, Joyce, and Nabokov.
Spring semester. Not offered in 1970-71.

25. Shakespeare (for non-majors). Study of representative plays. Not open to majors in the department.
Spring semester. Staff.

29. Black Literature. Afro-American writers, or on occasion comparative Black writers. The form and content of the course will vary with the instructor.
Spring semester.

31. Chaucer. Reading in Middle English of most of Chaucer's poems, with special emphasis on *The Canterbury Tales.* The course attempts to place the poetry in the context of medieval culture.
Fall semester. Not offered in 1970-71.

32. Medieval Literature. Study of the literature of England from *Beowulf* to Malory. From time to time the course will focus on more specialized topics, such as the Germanic epic or the emergence of romance from Celtic narrative and mythology.
Spring semester. Not offered in 1970-71.

33. Renaissance Poetry. Lyric and narrative poetry of the Elizabethan age and the early seventeenth century.
Fall semester. Miss Snyder.

34. Renaissance Comparative Literature. Selected major writers of the Continental Renaissance will be studied in translation.
Spring semester. Miss Snyder.

35. Tudor-Stuart Drama. Development of the English drama in the sixteenth and seventeenth centuries.
Fall semester. Mr. Blackburn.

36. Milton. Study of the main body of Milton's poetry with particular emphasis on *Paradise Lost.*
Spring semester. Mr. Blackburn.

37. Eighteenth-Century Literature. The eighteenth-century literary scene, examined through the principal works of Dryden, Swift, Pope, Johnson, and a few others. The context for this study will include biographies of the four major authors, and essays on the political, religious, and aesthetic preconceptions of the age.
Fall semester. Mr. Pagliaro.

38. Romantic Poetry. The major English romantic poets, with attention given to the ideas as well as to form and structure.
Spring semester. Mr. Pagliaro.

39. The English Novel. Study of the beginnings of the novel concentrating on eighteenth-century, romantic, and Victorian novels.
Fall semester. Mrs. Kramer.

41. Nineteenth-Century American Literature. Selected major writers: Hawthorne, Melville, Thoreau, Whitman, Dickinson, Twain, James.
Fall semester. Mr. Keith.

43. Victorian Literature. Study of representative figures of the period.
Spring semester. Not offered in 1970-71.

44. Twentieth-Century American Fiction. Selected major writers: Fitzgerald, Hemingway, Faulkner, Nabokov. A study of experimentation with the form of the novel.
Spring semester.

45. Modern Poetry (British). A variety of critical approaches to major British poets of the last hundred years. Additional readings may include criticism, autobiography, social documents, and the work of minor poets.
Each semester. Mr. Sherman.

46. Modern Poetry (American). Selected major poets: Frost, Stevens, Williams, Pound.
Spring semester. Not offered in 1970-71.

48. Modern Drama. Examination of the range of dramatic literature since Ibsen.
Each semester. Mr. Devin.

50. The Modern Novel. Study of the development of the modern novel beginning with James and continuing to the present.
Spring semester. Mrs. Kramer.

51-52. Colloquium.
Staff.

53. Special Topics. From time to time intensive courses will be offered in fields not covered by the regular program.
Staff.

54. Independent Study. Students who plan independent study must submit a prospectus to the appropriate instructor and receive general approval for the project before the beginning of the semester during which such study is actually done.

61-62. Shakespeare. Study of the complete works of Shakespeare, tracing the development of his craftsmanship and ideas. Required of majors in the department, who meet weekly in small groups during the first semester of the senior year. Students should read through the plays before beginning the course.
Fall semester. Staff.

63-64. Problems of Literary Study. Group meetings of departmental majors in the second semester of the senior year. About half the semester is devoted to writing a research paper of magnitude.
Spring semester. Staff.

65-66. Thesis. Majors may elect to substitute a thesis for Problems of Literary Study. Application must be made by May 15 of the junior year.
Spring semester.

70. Fiction Writers' Workshop.* Projects in imaginative writing. Meetings will be devoted primarily to the analysis of stories submitted by students; secondarily to the discussion of readings in the theory of fiction, the craft of fiction, and the work of contemporary authors.
Each semester.

71. Poetry Workshop.* A seminar in which students will write, read, and talk about poetry. Limited to twelve. Students should submit three poems or the equivalent for admission to the course. The class will meet once a week together, and in individual conferences.
Each semester.

72. Theater Workshop.* A course open to all students interested in acting, directing, and play production. Lectures, demonstrations and laboratory. Each semester a different element is stressed. Fall will stress production and spring acting and directing.
Each semester. Mr. Devin.

*Students interested in receiving credit for their first semester's work in any creative workshop should see the instructor of the workshop or the department chairman.

Honors Seminars

Group I

101. Shakespeare. 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.
Each semester. Staff.

103. Chaucer. Reading of Chaucer's poems in the original Middle English, with particular attention to *Troilus and Criseyde* and *The Canterbury Tales.*
Fall semester. Not offered in 1970-71.

104. Milton. Study of Milton's works with special emphasis on *Paradise Lost.*
Spring semester. Mr. Blackburn.

105. Tudor-Stuart Drama. The development of English drama from the medieval morality plays to Restoration tragedy and comedy.
Fall semester.

108. Renaissance Poetry. Poetic modes and preoccupations of the English Renaissance, with emphasis on Sidney, Shakespeare, Spenser, Donne, Herbert, and Marvell.
Spring semester. Miss Snyder.

109. Eighteenth-Century Literature. An examination of the literary forms and critical values of the age, with special attention given to the works of Dryden, Swift, Pope, and Johnson, and to a few representative playwrights.
Fall semester. Mr. Pagliaro.

110. The Romantic Poets. An examination of the poetry of Blake, Wordsworth, Coleridge, Byron, Shelley, and Keats.
Fall semester. Mr. Pagliaro.

Group II

113. The Novel. Studies in four novelists: James, Conrad, Joyce, and Woolf.
Each semester. Not offered in 1970-71.

115. Modern Comparative Literature. Consideration of some of the major themes and philosophic attitudes embodied in recent literature.
Each semester.

116. American Literature. Three novelists and three poets from the nineteenth and twentieth centuries, representative of the themes, forms, and character of American literature. The authors for 1969 are Hawthorne, Twain, Faulkner, Whitman, Dickinson, Stevens.
Fall semester. Not offered in 1970-71. Mr. Shackford.

118. Modern Poetry. 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.
Spring semester. Mr. Sherman.

119. Special Topics in Literature. Occasional seminars will be given in special fields not part of the regular program.
Staff.

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.

125. Independent Study. Students may prepare for an Honors examination in a field or major figure comparable in literary significance to those offered in the regular seminars. Independent study projects must be approved by the department and supervised by a department member.
Staff.

HISTORY

PAUL H. BEIK, *Professor*
JAMES A. FIELD, JR., *Professor*
HARRISON M. WRIGHT, *Professor and Chairman*†
ROBERT C. BANNISTER, *Associate Professor*‡
BERNARD S. SMITH, *Associate Professor*‡
GEORGE E. McCULLY, *Assistant Professor*
JEROME H. WOOD, JR., *Assistant Professor*
MARGARET A. YARVIN, *Assistant Professor*
TSING YUAN, *Assistant Professor**
ROBERT D. CROSS, *President*
JAMES F. GOVAN, *Librarian*

The Department of History attempts to give students a sense of the past, an acquaintance with the cultural and institutional developments which have produced the world of today, and an understanding of the nature of history as a discipline. The courses of the department emphasize less the accumulation of data than the investigation, from various points of view, of those ideas and institutions—political, religious, social, economic—by which man has endeavored to order his world.

Requirements and Recommendations

Prerequisites: Any one of the introductory history courses (those numbered 1 through 9), or its equivalent by Advanced Placement, is the prerequisite for advanced history courses open to students of all classes (those numbered 11 through 49). In the sophomore and junior years, with the consent of the instructor and of the department chairman, an advanced course may be taken concurrently with an introductory course. In the senior year advanced courses may, with the consent of the instructor, be taken without prerequisite. The prerequisite for admission to the department as a major in Course or Honors or as a minor in Honors is at least two history courses taken at Swarthmore and a satisfactory standard of work in all courses.

Advanced Placement: The department will grant one semester's credit for incoming students who have achieved a score of 4 or 5 in Advanced Placement history tests. This credit may be counted toward the number of courses required for graduation. It may be used in partial fulfillment of the college distribution requirements. It may serve as the prerequisite for advanced courses in history.

Major in Course: The work of the major in Course consists of at least eight semester courses in the department, one of which is History 68. The choice of courses is made so as to prepare for a comprehensive examination, in the spring of the senior year, on three of the four following fields: (1) Ancient, Medieval and Early Modern Europe; (2) Modern Europe; (3) the United States; (4) Africa, Asia, and Latin America. Students are expected to take at least two courses (introductory or advanced) in each of the three fields on which they intend to be examined.

Major and minor in Honors: Students entering the Honors program may elect history as a major or a minor in the Division of the Humanities, in the Division of the Social Sciences, or in cross-divisional programs. Majors in Honors may take either three or four seminars in the department. Minors in Honors are ordinarily expected to take at least two seminars.

†Absent on leave, spring semester, 1970-71.
‡Absent on leave, 1970-71.
*Absent on leave, fall semester, 1970-71.

General: Students seriously considering a major in history should try to take more than two history courses during their freshman and sophomore years. Those who intend to continue their studies after graduation should bear in mind that a reading knowledge of one or two foreign languages (particularly French and German) is now generally assumed for admission to graduate school.

COURSES

1. Early Europe. Europe from the fall of the Roman Empire to the Enlightenment. This course will provide a theoretical and technical introduction to the study of history, stressing the uses of primary sources in literature, religion, philosophy, science, politics, and the arts.

Fall semester. Mr. McCully.

2. Modern Europe. Europe from the Enlightenment to the mid-twentieth century.

Each semester. Mrs. Yarvin.

5. The United States to 1877. The colonial experience; independence, a new society and a new government; transcontinental expansion and the struggle between North and South.

Fall semester. Mr. Wood.

6. The United States Since 1877. Industrialism and its consequences; the United States as a great power; the problems of a shrinking world.

Spring semester. Mr. Field.

8. Africa. African history and civilization, with an emphasis on tropical Africa in modern times.

Fall semester. Mr. Wright.

9. China. The formation and maturing of Chinese civilization.

Spring semester. Mr. Yuan.

10. Freshman-Sophomore Seminar. Collaborative small group investigation of subjects within the particular fields of interest of members of the department. The seminar this year will be *Ethnic Groups In American History.* The study of the arrival, development, and interrelationship of ethnic groups in American history. The presupposition of this course is that the most important determinants of ethnicity in America have been religion, national origin, and color. Limited enrollment. There is no prerequisite for this course. It counts for one course credit.

Fall semester. Mr. Cross.

11. Early Medieval Europe. The history of western Europe from the accession of Diocletian to the last Carolingians.

Not offered in 1970-71. Mr. Smith.

12. Later Medieval Europe. The history of western Europe from the tenth to the fifteenth century, with emphasis on the role of the Papacy.

Not offered in 1970-71. Mr. Smith.

13. England to 1485. The political, cultural, and religious history of England from the Roman occupation to the accession of the Tudors.

Not offered in 1970-71. Mr. Smith.

14. Medieval European Intellectual History. The history of ideas in western Europe from the fifth to the fourteenth century, with roughly equal attention

being paid to the development of political theory, theology, philosophy, education and science.

Not offered in 1970-71. Mr. Smith.

16. The Renaissance. The birth of modern western civilization considered in terms of intellectual and artistic developments and their relation to economic, social, and political conditions.

Not offered in 1970-71. Mr. McCully.

17. The Reformation and the Seventeenth Century. The attempt to reform religion, its failure, and the subsequent secularization of culture and society.

Not offered in 1970-71. Mr. McCully.

18. Tudor and Stuart England. The English Renaissance and Reformation, constitutional developments and the origins of radical politics, the Civil War, the Restoration and the Glorious Revolution.

Spring semester. Mr. McCully.

19. The Scientific Revolution, 1500-1800. The history of the sciences, from the Renaissance through the Enlightenment, and especially of their interactions with technology, commerce, politics, societies, and the arts.

Spring semester. Mr. McCully.

Classics 31. History of Greece. (See listing under Department of Classics.)

Classics 32. The Roman Republic. (See listing under Department of Classics.)

Classics 42. Greece in the Fifth Century B.C. (See listing under Department of Classics.)

Classics 44. The Roman Empire. (See listing under Department of Classics.)

21. The French Revolution and Napoleon. The place of the French Revolution and Napoleon in the development of European political institutions and social theories.

Not offered in 1970-71. Mr. Beik.

22. French Regimes Since Napoleon. The succession of political shocks and readjustments from 1814 to the present, studied in the context of social changes and popular aspirations.

Fall semester. Mr. Beik.

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

Fall semester. Mr. Govan.

25. Modern Russia. The course begins with the reign of Peter and gives half its time to the twentieth century.

Spring semester. Mr. Beik.

26. Modern Europe. Modern Germany 1815-1950. Germany's transformation from a people in search of a national state to a national state in search of world power.

Spring semester. Mrs. Yarvin.

28. Europe of the Dictators, 1914-1945. The assault of radical politics, left and right, on the social and political fabric of Europe; the interaction of domestic and international conflict; nationalism, racism, militarism in their historical context; the first effective experiments in the use of ideology, tech-

nology, and terror as means of social control; the political responses to the crises of modernization and industrial capitalism.

Fall semester. Mrs. Yarvin.

30. American Diplomatic History. Official United States foreign policy considered as a part of the larger problem of American participation in world affairs.

Fall semester. Mr. Field.

31. American Intellectual History to 1865. 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.

Fall semester. Mr. Wood.

32. American Intellectual History Since 1865. 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 1970-71. Mr. Bannister.

33. The American Colonies. The transit of civilization to British North America, and the modification of Old World ideas and institutions in a New World environment, 1607-1763.

Fall semester. Mr. Wood.

34. The American Revolution. The conflict between intensive self-government in the colonies and English ideas and projects for empire; the revolt against colonial status and the elaboration of a "republican" ethos and "republican" institutions, 1763-1789.

Spring semester. Mr. Wood.

35. Afro-American History. A general survey from the era of the slave trade to the present.

36. Topics in Afro-American History. A course of limited enrollment which seeks to illuminate important aspects of Afro-American History.

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

Not offered in 1970-71. Mr. Wood.

38. America in the Progressive Era, 1896-1920. The attack on political privilege and the movement for the control of industry; urban poverty, the new immigration, race relations, women's rights, temperance, and conservation; the emergence of America as a world power.

Not offered in 1970-71. Mr. Bannister.

39. Topics in American History. Intensive study of particular problems. Offered as opportunity permits.

Not offered in 1970-71.

Religion 38. Quakerism. (See listing under Department of Religion.)

40. Topics in African History. Special problems in African history. Offered as opportunity permits. Limited enrollment.

Not offered in 1970-71. Mr. Wright.

42. The Expansion of Europe. A survey of European overseas expansion since 1415, and of its impact on non-European societies. The emphasis is on South and Southeast Asia.

Not offered in 1970-71. Mr. Wright.

44. Modern China. The search for a modern Chinese identity since 1840. This course will concentrate on such themes as the impact of the West on the traditional Confucian society, reform and revolution, the failure of democratic liberalism, and the adaptation of Marxism to China.

Not offered in 1970-71. Mr. Yuan.

45. Modern Japan. The transformation of Tokugawa Japan into a modern nation, with emphasis on westernization, imperialism, and the search for national identity.

Spring semester. Mr. Yuan.

46. Asian Nationalisms. A comparative study of middle eastern and far eastern Asian nationalisms, with emphasis on the Turkish, Arab, Chinese, and Japanese forms.

Spring semester. Mr. Yuan.

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

Not offered in 1970-71.

51-2. Colloquium. A double-credit course of restricted enrollment which seeks, through intensive investigation of a limited topic, to illuminate an important historical field. Open to majors in Course in any department. In 1970-71 the subject will be *Thomas Jefferson: The Man and the Meaning.* Intensive analysis of the interplay between Jeffersonian ideas and other modes of thought in American politics, social theory, literature, religion, and architecture.

Spring semester. Mr. Wood.

53. Directed Reading. Individual or group study in fields of special interest to the student not dealt with in the regular course offerings. The consent of the chairman and of the instructor is required. History 53 may be taken for one-half credit as History 53A.

Members of the department.

54. The Nature and Meaning of History. A systematic description of a philosophy of history, supplemented by reading and discussion of such topics as order and violence, institutions and revolutions, the relations between natural and human history, the moral content of history, the historic functions of art, science, religion, and politics, and the relations between the study of history and other academic disciplines.

Fall semester. Mr. McCully.

67. Thesis. With the consent of the chairman and of the supervising member of the department a thesis may be substituted for a course in the fall semester of the senior year.

Members of the department.

68. Special Topics. 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, on the relationship of the historian to his time, and on historical method and its problems.

Honors Seminars

The following seminars are offered by the department to juniors and seniors who are preparing to be examined for a degree with Honors. They may be taken in any combination and without regard to chronological order. Some preliminary

reading or other preparation may be required for seminars on subjects in which no work has previously been done.

Those who wish to specialize in international relations with a major in history (see page 132), should include in their programs at least three of the following seminars: 128, 134, 140, 144.

111. Medieval Europe. The course of European civilization from the conversion of Constantine to the foundation of the western kingdoms.

Prerequisite: History 11 or the permission of the instructor.

Spring semester. Not offered in 1970-71. Mr. Smith.

116. The Renaissance and Reformation. The birth of Modern Europe as seen in such developments as the recovery of classical culture, the crisis of religion and the Church, the establishment of centralized polities, and the origins of modern science.

Fall semester. Mr. McCully.

118. Tudor and Stuart England. The English Renaissance and Reformation, constitutional developments, the Civil War and the Restoration.

Spring semester. Not offered in 1970-71. Mr. McCully.

122. Europe 1760 to 1870. The disintegration of the old regime and the rise of liberalism.

Fall semester. Mr. Beik.

123. Europe 1870 to 1945. Political and social changes in Europe through the Second World War.

Spring semester. Mrs. Yarvin.

124. England Since 1785. The rise of the first modern industrial state. Its social, political, and economic problems.

Fall semester. Not offered in 1970-71. Mr. Govan.

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

Spring semester. Mr. Beik.

130. Early American History. Political, economic, social, and cultural aspects of the period from the explorations to the early National period.

Spring semester. Mr. Wood.

132. Problems in American History. Selected topics in the history of the United States.

Each semester. Mr. Field.

134. Problems in American History: Foreign. A study of the evolution since 1776 of American relations with the outer world with emphasis on ideological, economic, and strategic developments.

Spring semester. Mr. Field.

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

Fall semester. Mr. Wright.

144. The Modern Far East. Political, social, and intellectual movements in China and Japan since about 1840.

Spring semester. Mr. Yuan.

167. Thesis. With the permission of the department Honors students may write a thesis for either single or double course credit. Double-credit theses will normally be written in the fall semester of the senior year for submission as papers to the visiting examiners. Honors students wishing to write a thesis for single credit should elect History 67.

INTERNATIONAL RELATIONS

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

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

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

Group I

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

Group II

History 8. *Africa*
History 25. *Modern Russia*
History 30. *American Diplomatic History*
History 42. *The Expansion of Europe*
History 44. *Modern China*
History 45. *Modern Japan*
History 46. *Asian Nationalisms*
History 48. *Latin America*

Group III

Economics 11. *Economic Development*
Economics 61. *Comparative Economic Systems*
Political Science 3. *Comparative Politics*
Political Science 18. *Politics of Developing Nations*
Political Science 19. *Comparative Communist Politics*
Political Science 20. *Politics of East Asia*
Political Science 21. *Politics of Africa*
Political Science 55. *Modern Political Theory*
Political Science 64. *Topics in International Relations*
Economics 65. *Political Economy of Multinational Enterprises*

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.

LINGUISTICS

LILA R. GLEITMAN, *Associate Professor*

Linguistics is the study of human language. The discovery and description of universal features characterizing all languages is the primary theoretical goal. Specifically, *synchronic linguistics* is the study of the syntactic, phonological, and semantic structure of language; *diachronic linguistics* approaches these issues through the study of genetic language relationships. Linguistic studies are closely linked with broad issues in the social sciences. Possible connections between language typology and culture have made language a central concern of anthropologists and sociologists. Psychologists have recognized that language studies bear on fundamental issues in human cognitive organization. The resulting collaboration between linguists and psychologists *(Psycholinguistics)* is among the more hopeful current directions in the study of cognition. Students of individual languages and students of philosophy and mathematics may also find linguistics relevant to their academic concerns.

The linguistics program of studies (which is not a major) can usefully be supplemented with courses in a number of related areas. Of particular interest to students of language are *Cognitive Development* (Psychology), *Language, Culture and Society* (Anthropology), and *The Philosophy of Language* (Philosophy). Students of linguistics will also find their background enhanced by comparative studies of various languages (particularly the nonIndoEuropean languages), and by some acquaintance with concepts of logic and modern algebra.

1. Introduction to Linguistics. Languages of the world; language change; dialect; human and animal languages; concepts in synchronic linguistics: syntax, semantics, and phonology; transformational and structural grammars; reading and writing.

Fall semester. Mrs. Gleitman.

2. The Psychology of Language. Developmental linguistics (acquisition of a first language); the origins of language; the perception and use of language; bilingualism; linguistic abnormalities (aphasia, deafness, anarthria); dialect and the social context; linguistic determinism; machine translation and information retrieval; issues in cognitive psychology.

Prerequisite: Psychology 1 or Linguistics 1.

Spring semester. Mrs. Gleitman.

38. Reading and Writing. This course is designed primarily for students involved in reading tutorial programs, and for those intending to teach. At issue is the problem of reading in both its conceptual and social aspects. Students will tutor or assist in teaching reading as part of the course work. Weekly meetings with the instructor will concern theoretical issues in phonology, reading, and writing; methods of teaching; and discussion of the ongoing tutorial programs.

Spring semester. Mrs. Gleitman.

52. Diachronic Linguistics. Not offered 1970/71.

53. Recreational Linguistics. An approach to questions of language organization through a survey of language games: crypts, ciphers, puns, and anagrams; bridge bidding and other special-purpose languages; machine languages; signs, creoles, and pidgins.

Prerequisite: Linguistics 1 or 2. Not offered 1970-71.

68. Directed Reading or Research. Students may conduct a reading or research program in consultation with the instructor (permission of the instructor required).

Either semester. Mrs. Gleitman.

106b. Cognitive Development. (*see* Psychology 106b).
Fall semester. Mr. Feldman, Mrs. Gleitman.

107. Language and Thought. Philosophical, psychological, and linguistic approaches to the problem of meaning.
Prerequisite: Linguistics 1 and 2 or permission of the instructor.
Fall semester. Mrs. Gleitman, Mr. Feldman.

108. Transformational Grammar. Not offered 1970/71.

MATHEMATICS

DAVID ROSEN, *Professor and Chairman*
JAMES W. ENGLAND, *Associate Professor*
STEVENS HECKSCHER, *Associate Professor*
EUGENE A. KLOTZ, *Associate Professor*
ROLAND B. DI FRANCO, *Assistant Professor*
THOMAS W. HAWKINS, *Assistant Professor*
J. EDWARD SKEATH, *Assistant Professor*

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 5, 6, 11, 22 forms the normal preparation for further work in mathematics as well as for work in physics, other sciences, and engineering. Courses 7, 8 are Honors courses and can be taken in place of Courses 5, 6 by properly qualified students. Those students who have obtained a grade of 3 or better on the Advanced Placement AB examination normally take Course 6 while those who similarly qualify in the BC examination normally take Course 11.

A student who wishes to major in mathematics in Course must complete six courses in addition to the normal sequence of four courses listed above. It is expected that a Course major in mathematics will take some advanced courses from the three major areas, namely analysis, algebra, topology-geometry. Physics 1, 2 is highly recommended and a reading knowledge of French, German, or Russian is desirable for all mathematics majors.

In order to be admitted to the Honors program with work in mathematics a student must have completed Course 22. An Honors student with a major in mathematics will normally take in his junior year seminars 101 (Real Analysis), and 102 (Modern Algebra). In his senior year he will normally take seminars 103 (Complex Analysis), and 104 (Topology); or 105 (Probability and Statistics).

An Honors student minoring in mathematics will normally offer two papers in mathematics. A student may use Courses 51, 52 as partial preparation for an Honors paper in mathematics.

Mathematics majors in Course or Honors automatically meet the mathematics requirements for being certified to teach mathematics in secondary school. Minimum requirements for certification in mathematics are: (a) 5 and 6; (b) one course from 24, 41, 42, 102; (c) one course from 23, 53, 104; (d) two additional courses that may be taken from 11, 14, 22, 30, 51, 52, 101, 103, 105. Certification to teach mathematics in secondary school requires departmental recommendation.

1. Elementary Statistics. This is a non-calculus statistics course available to students in all disciplines. It does not satisfy any mathematics prerequisite nor can it be counted toward a major or minor in the department. The course begins with an introduction to discrete probability, and then shifts to methods and techniques of statistical inference such as assembling and handling data, estimation of parameters, hypothesis testing, correlation and regression analysis. Other topics will be considered as desired by the class.

Fall semester.

3,4. Probability and Calculus for the Biological and Social Sciences. This course is intended to introduce biology and social science majors to the concepts and techniques of probability and calculus. Topics to be included are the main concepts of discrete probability and one variable calculus, sequences and series, and an introduction to continuous probability. Statistical techniques are discussed as appropriate.

Students wishing to continue with mathematics should take Math 6 and/or 11. One year of mathematics required by many medical schools may be satisfied by this course.

5. Differentiation and Integration. This is an introductory calculus course which presupposes such normal high school mathematics as algebra, analytic geometry, and elementary trigonometry. Derivatives and integrals of functions of one variable are studied in detail. Applications of the methods of calculus are given, when possible.

Fall semester.

6. Topics in Calculus. Topics to be included are infinite series, techniques of integration, transcendental functions, improper integrals and an introduction to differential equations.

Prerequisite: Math 5 or its equivalent, or a grade of 3 or better on AB Advanced Placement.

Both semesters.

7,8. Functions on the Real Numbers. This course, which is an alternative for 5,6, studies functions defined on the real numbers from a mathematician's perspective. It begins with a study of the topological structure of the real numbers and then develops the derivative and the integral as tools which provide information about the structure of these functions. Permission to enroll in this course must be obtained from the instructor.

11. Linear Algebra. This course is the normal sequel to Math 6 or 8. It introduces the student to vector spaces, matrices, and linear transformations, with applications to the solutions of systems of linear equations, determinants and the eigenvalue problem.

Prerequisite: Math 4, 6, or 8. Freshmen who score a grade of 3 or better on BC Advanced Placement examination may begin with this course.

Both semesters.

12H. Analytic Geometry. This half course presents applications of linear algebra to the geometry of n-space with special emphasis on n = 2, and 3. It will include such topics as lines, planes, and their higher dimensional analogs; euclidean spaces, orthogonality, least squares, rigid motions, symmetric matrices, quadratic forms, classification of surfaces corresponding to second degree equations.

Prerequisite: Math 11.

Spring semester.

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

Prerequisite: Course 5 or Course 7.

Spring semester.

17. Set Theory. Set theory will be presented in an axiomatic framework. The course will include: operations on sets, well ordering and well founded relations, transfinite induction, ordinal numbers, axiom of choice and its equivalents, cardinal numbers and their arithmetic, and construction of the real numbers.

Prerequisite: permission of the instructor.

Fall semester.

18. Metamathematical Methods in Mathematics. Topics will be selected depending on the interests of the class. Among the topics that will be considered are: first order theories with equality, Godel Incompleteness Theorem, models of set theory, consistency of the axiom of choice and the continuum hypotheses, model theory in algebra.

Prerequisite: Logic 12 (Phil. Dept.) and Math 17, or permission of the instructor.

Spring semester.

22. Several Variable Calculus. This course considers differentiation and integration of functions of several variables with special emphasis on two and three dimensions. It is the normal sequel to Math 11 and is a prerequisite for several other mathematics courses.

Prerequisite: Math 11.

Both semesters.

23. Higher Geometry. This course considers an assortment of specialized topics in geometry that are important in the present stream of mathematics. The material consists of parts of euclidean geometry, convexity, and transformation theory which will also relate to other courses in mathematics. The emphasis will be on the theory of convex sets and the theory of congruence and similarity in euclidean two space and three space.

Prerequisite: Math 11.

Fall semester.

24. Introduction to Modern Algebra. This course, which is offered in alternate years, is especially designed to accommodate those people who desire to be certified to teach mathematics in secondary school or who desire a brief introduction to modern algebra. The course will be a survey of some of the important topics of modern algebra, such as groups, integral domains, rings, and fields.

Prerequisite: Math 11 or permission of the instructor.

Spring semester. 1970-1971.

30. Differential Equations. An introduction to differential equations that will include such topics as: first order equations, linear differential equations, approximative methods, some partial differential equations.

Prerequisite: Math 11.

Spring semester.

34. Numerical Methods. This course will deal with the numerical solution of various mathematical problems, pure and applied. A laboratory period will be included, and a knowledge of computer programming will be useful.

Prerequisite: Math 11.

Spring semester.

35. Mathematics for the Social Sciences. This course will deal with various topics in mathematics that have arisen from the social sciences. Topics include such areas as Markov chain models, simulation, linear programming, game theory, utility theory, and graph theory with applications to organization theory, integer programming and optimal assignment problems. Examples will be drawn from economics, political science, psychology and sociology-anthropology. Some computer programming may be included.

Prerequisite: Math 11.

Spring semester. Not offered 1970-1971.

41. Groups and Representations. An introduction to the theory of abstract groups with applications to such areas as symmetry groups, followed by the elements of representation theory.

Prerequisite: Math 11.

Spring semester.

42. Applied Modern Algebra. Topics will be selected from such areas as Boolean algebras, finite state machines, programming languages, optimization and computer design, and coding theory.

Prerequisite: Math 11 or permission of the instructor.

Fall semester.

51. Applied Real Analysis. Among the topics to be covered are normed vector spaces, Fourier series, the Fourier integral, and such important theorems as those of Gauss, Green and Stokes.

Prerequisite: Math 22, or permission of the instructor.

Fall semester.

52. Applied Complex Analysis. An introductory course in the theory of functions of a complex variable, including the theory and application of conformal mappings.

Prerequisite: Math 51, or permission of the instructor.

Spring semester.

53. Topology. This course 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 will be selected from those topics in seminar 104.

Spring semester.

Honors Seminars

101. Real Analysis. This seminar concentrates on the careful study of the principles underlying the calculus of real valued functions of real variables.

Fall semester.

102. 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.

Spring semester.

103. Complex Analysis. A brief study of the geometry of complex numbers is followed by a detailed treatment of the Cauchy theory of analytic 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 also discussed.

Prerequisite: Seminar 101 or Math 51.

Fall semester.

104. Topology. The subject matter of this semester will include such topics as point set topology with some applications, piecewise linear topology, homology and homotopy theory.

Spring semester.

105. 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 may 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.

Spring semester.

In recent years several additional seminars and courses have been offered and are available when there is sufficient interest. These include:

Functional Analysis

Theory of Numbers

Foundations and Philosophy of Mathematics

Applied Mathematics

Group Representations

Differential Geometry

Set Theory (Course 17)

Metamathematical Methods in Mathematics (Course 18)

MODERN LANGUAGES AND LITERATURES

HILDE D. COHN (German), *Professor*
FRANZ H. MAUTNER (German), *Professor*
FRANCIS P. TAFOYA (French), *Professor and Chairman*
ELISA ASENSIO (Spanish), *Associate Professor*
GEORGE C. AVERY (German), *Associate Professor*
JEAN ASHMEAD PERKINS (French), *Associate Professor*†
GEORGE KRUGOVOY (Russian), *Associate Professor*
PHILIP METZIDAKIS (Spanish), *Associate Professor*
JEAN-CLAUDE BARRÉ (French), *Assistant Professor*
THOMPSON BRADLEY (Russian), *Assistant Professor*
ROBERT ROZA (French), *Assistant Professor*
SIMONE VOISIN SMITH (French), *Assistant Professor*
RICHARD TERDIMAN (French), *Assistant Professor*‡
OLGA FERNANDEZ CONNOR (Spanish), *Visiting Lecturer*
ANNE MENARD (French), *Visiting Lecturer.*
ELKE PLAXTON (German), *Visiting Lecturer*
HELEN P. SHATAGIN (Russian), *Visiting Lecturer*
URBAIN J. DE WINTER (Spanish), *Assistant*

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

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

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

Students who want to continue a language begun elsewhere will be placed at the course level where they will profit best according to the rating of the College Entrance Examination or placement tests administered by the department. Students who place in courses numbered 1 through 4 must in addition take the Modern Language Aptitude Test during freshman orientation. Students beginning their study of a foreign language at Swarthmore are also required to take the Modern Language Aptitude Test.

Swarthmore College does not offer courses in Italian but arrangements have

†Absent on leave, spring semester, 1970-71.
‡Absent on leave, 1970-71.

been made at neighboring institutions which will permit students to study Italian if they so desire. PMC, in Chester, offers courses in first-year and second-year Italian, each meeting three times a week. Students interested in registering for these courses should consult the Chairman of the department.

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

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

Students wishing to receive teaching certificates in French, German, Russian or Spanish should plan on taking the regular program of language and literature courses required for the major or show proof of the equivalent. In addition, they should take Linguistics 1 and courses in the foreign history and culture to prepare them for the MLA Foreign Language Test for Teachers and Advanced Students. This examination consists of seven sections: the four basic skills (listening, speaking, reading and writing), Applied Linguistics, Culture, and Professional Education. In order to be certified, students must pass this examination at the level of "good." Prospective teachers of a foreign language are urged to include in their program at least a summer and a semester abroad.

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

Continental European Literature

(Courses conducted in English)

Students acquainted with a particular foreign language would do best to elect the appropriate literature course taught in the original language and not the corresponding CEL 12 or CEL 50, though they might well take one in another literature. These courses cannot be substituted for the 11 or 12 level courses in the original languages to satisfy the departmental prerequisites for a major or minor. The CEL 50s may in some cases form an appropriate part of the upper-level work in the major in one of the foreign literatures or serve as the basis of preparation for an Honors paper. Students planning programs where such considerations would apply must consult with the department.

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

1970-71

Fall	*Spring*
CEL 12 French	CEL 12 German
CEL 50 Spanish	CEL 50 Russian

1971-72

Fall	*Spring*
CEL 12 Spanish	CEL 12 Russian
CEL 50 French	CEL 50 German

12F. Man and Society in French Literature. An examination of the double-tradition of introspective individualism and deep social concern—and the

inevitable conflict between these impulses—in the works of such writers as Montaigne, Corneille, Molière, Diderot, Stendhal, Balzac and Zola.
Fall semester, 1970. Mr. Barré.

12G. The Quest for a Tradition in German Literature. A selection of representative works written in German-speaking countries from the Middle Ages to the end of the nineteenth century. Emphasis on the emergence of characteristically German themes and forms as a response to the influences of historical and cultural forces and of the European literary tradition. Authors will include Gottfried, Grimmelshausen, Lessing, Schiller, Goethe, Keller, Fontane, and Wedekind.
Spring semester, 1971. Mr. Avery.

12R. Russian Thought and Literature in the Quest for Truth. The development of Russian intellectual tradition as reflected in Russian philosophy and literature from the eighteenth century to the present day. Brief consideration of Russian medieval literature and thought. Historical and cultural consequences of the introduction of Christianity into Russia from Byzantium. Eighteenth century: secularization of culture. Nineteenth and twentieth centuries: philosophical and literary polemics within framework of current secular ideologies and religious thought. Russian and the West and the dream of Perfect World.
Spring semester, 1972.

12S. The Development of Spanish Literature. A study of works representative of the most significant currents in Hispanic literature from the Renaissance through the nineteenth century. Special emphasis on Spain's unique contribution to world literature: the figure of the *pícaro, la Celestina, Don Juan* and *Don Quixote.* Includes selective prose works of the Realistic and Naturalistic periods.
Fall semester, 1971.

13. Medieval Comparative Literature. The tension between ideals and their realization as reflected in the literature of the Middle Ages, especially the epic (*Roland, Cid, Nibelungen*) and the romance (*Tristan, Yvain, The Grail.*)
Fall semester, 1970. Mrs. Perkins.

17. The Age of Enlightenment. The intellectual history of the late seventeenth and the eighteenth century in Europe as illustrated in selected works exemplifying such important themes as the rise of rationalism and its eventual decline, the opposing forces of optimism and pessimism, and new views of the nature of man and his place in society.

34. Renaissance Comparative Literature. See English 34.

48. Modern Drama. See English 48.

50F. Intellectual Trends in 20th Century French Literature. Principal doctrines (Bergsonism, Surrealism, Marxism, Existentialism, Structuralism) as reflected in, or related to, the major literary or critical works and essays of Proust, Gide, André Breton, Louis Aragon, Malraux, Sartre, Camus, de Beauvoir, Roland Barthes, and Claude Lévi-Strauss.
Fall semester, 1971.

50G. German Literature Since 1900. The reflection in German literature of the political and cultural crises that have dominated the century. Works by Rilke, Thomas Mann, Hesse, Kafka, Musil, Broch, Döblin, Brecht, and contemporary authors.
Spring semester, 1972.

50R. Russian Literature and Revolutionary Thought. A study of continuity and change: the relationship between the major political and social movements

and the writers before and after 1917. Special attention will be given to the post-revolutionary literary and political struggle in the 1920's and the literary revival of the 1960's with emphasis on Herzen, Bakunin, Chernyshevsky, Trotsky, Babel, Olesha, Mayakovsky, Tertz and Solzhenitsyn.

Spring semester, 1971. Mr. Bradley.

50S. Spanish Thought and Literature of the 20th Century. The struggle between traditionalism and liberalism, its background and manifestations in Spanish thought and letters from the turn of the century through the Civil War to the present day. Emphasis on Unamuno, Ortega y Gasset, Federico García Lorca, José Camilo Cela, Carmen Laforet and Juan Goytisolo.

Fall semester, 1970. Mrs. Connor.

EXPLANATORY NOTE ON LANGUAGE COURSES NUMBERED 1 THROUGH 4

French, German, Russian and Spanish language courses numbered 1 through 4 are taught in sections with different orientations. The work load for courses numbered 1 through 4 without a postscript capital and those numbered 1A through 4A is similar except that students in *A* sections prepare a greater proportion of their daily assignments under the supervision of a specialist who speaks the target language natively. Courses numbered 1B through 3B are more intensive than those numbered with or without the postscript capital A and carry extra credit.

a. Courses numbered 1 through 4 without a postscript capital combine the presentation or review of grammar essentials with extensive reading and translation of texts of literary, cultural or general interest. These courses meet three times per week with additional sessions in the language laboratory as assigned. These courses do not normally prepare students for the intermediate or advanced courses in literature taught in the original language. Admission contingent upon departmental testing.

b. Courses numbered 1A through 4A are designed to impart an active command of the language and combine the study or review of grammar essentials and readings of literary texts with intensive practice to develop the ability to speak the language. This orientation is recommended for those interested in acquiring a thorough command of the language or in preparing for intermediate or advanced courses in literature taught in the original language. These courses (a) meet as one section for grammar presentation and in small groups for oral practice with a special instructor (b) require periodic work in the language laboratory. Admission contingent upon departmental testing.

c. Courses numbered 1B through 3B are similar in orientation to those designated with a capital A but meet more frequently for extra credit. Three semesters in this sequence 1B-2B, 3B are the equivalent of two years of work at the college level. Recommended for students who want to progress rapidly and especially for those with no previous knowledge of the language who are considering majoring in that literature.

French

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

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

Recommended supporting subjects: see the introductory departmental statement.

Majors in Course and Honors, as well as minors in Honors, are expected to be sufficiently proficient in spoken and written French to do all of their work in French, i.e., discussions and papers in courses and seminars, and all oral and written examinations, including comprehensive and Honors examinations.

COURSES

NOTE: Not all advanced courses are offered every year. Those announced for 1970-71 and 1971-72 guarantee adequate coverage for majors but do not preclude additional offerings or special arrangements to satisfy manifest interest. Students wishing to major or minor in French should plan their program in consultation with the department.

1-2. First-Year French. For students who begin French in college. This is a terminal course which is primarily designed for those students who want a reading knowledge of French.

Year course.

1B-2B, 3B. Intensive French. For students who begin French in college. Designed to impart an active command of the language. Combines the study of grammar with intensive oral practice and readings in literary and expository prose. Class and drill sessions meet seven and one-half hours per week. Periodic language laboratory attendance required. Each semester carries one and one-half credits; three semesters of work satisfy the prerequisites for intermediate courses in literature taught in French. Recommended for students who want to progress rapidly and especially for those with no previous knowledge of French who are considering majoring in French literature. Admission contingent upon satisfactory scores in the Modern Language Aptitude Test or special permission. Normally followed by 6, 11, or 12.

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

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

11. Readings in French Literature. The transition from language learning to literary study is facilitated through intensive readings in modern French literature (works by authors such as Beckett, Butor, Camus, Genet, Gide, Sartre or others). Frequent oral exposés and written compositions as well as extensive readings are assigned to improve fluency and accuracy in French.
Prerequisite: French 3B, the equivalent, or special permission.

Each semester.

12. Introduction to Literary Studies. A comparative study of representative works by classical and modern authors: poetry (DuBellay-Rimbaud), drama (Racine-Beckett), novel (Prévost-Proust), essay (Pascal-Camus).

Prerequisite: French 11, the equivalent or special permission.

Each semester.

13. Freshman Seminar. For freshmen only. Limited enrollment.
Prerequisite: a score of 675 or above in French, and special permission of the instructor. The topic for fall semester, 1970 is: *Littérateurs Engagés.* An examination of ideas of commitment as exemplified in selected literary works and essays by Malraux, Sartre, Camus, de Beauvoir, Merleau-Ponty or others.
Fall semester, 1970. Mr. Tafoya.

14. L'Humanisme de la Renaissance. The evolution of French thought from the optimism of Rabelais to the skepticism of Montaigne as reflected primarily in the prose works of the Renaissance.
Mrs. Smith.

15. Le Théâtre Classique. The development of dramatic techniques in French drama from the sixteenth century through the age of Classicism. Emphasis on Corneille, Racine and Molière.
Mrs. Smith.

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.
Fall semester, 1970. Mrs. Smith.

17. L'Esprit Critique du 18e Siècle. Development of the critical approach in the works of Montesquieu, Voltaire, Diderot and Rousseau.
Mrs. Perkins.

19. Roman du 19e Siècle. A study of innovations in technique and form as well as the examination of moral problems arising from socio-political changes in 19th century France. Based primarily on the novels of Balzac, Stendhal, Flaubert and Zola.
Mr. Terdiman.

20. Roman du 20e Siècle. A study of aesthetic innovations and of principal themes in their ideological and sociological context. Readings to be chosen from the works of authors such as Beckett, Breton, Butor, Camus, Céline, Gide, Malraux, Queneau, Robbe-Grillet, Sarraute, Sartre or others.
Spring semester, 1971. Mr. Tafoya.

21. Théâtre Moderne. Major trends in 20th Century drama with special emphasis on the works of Giraudoux, Anouilh, Sartre, Camus, and the Theatre of the Absurd.
Fall semester, 1970. Mr. Roza.

22. Littérature du Moyen-Age. The genesis of the French novel in its relation to the epic model and its successor. The function of Love and Adventure in the courtly romance. Emphasis on the *Chanson de Roland,* the romances of Chrétien de Troyes and *La Quête du Graal.*
Mrs. Perkins.

23. Poésie Symboliste. The evolution of symbolist aesthetics from Baudelaire through Apollinaire. Includes Rimbaud, Mallarmé, Verlaine, LaForgue and Valéry.
Spring semester, 1971. Mr. Roza.

25. Poésie Contemporaine. Major poets after Apollinaire: includes the Surrealists (Breton, Reverdy, Eluard, Aragon and Char) as well as Saint-John Perse, Supervielle and representative poets since World War II (Guillevic and Bonnefoy).

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

40. Littérature et Négritude. This course is designed to provide interested students with an introduction to the works of French-speaking African and West Indian writers. Some emphasis will be placed on the relationship of

African authors to the French literary milieu, on the link between their socio-political and aesthetic concerns, and finally on their efforts to adjust themes and forms typical of African vernacular literatures to the tenets of French cultural tradition. The two major figures to be discussed are Léopold Senghor and Aimé Césaire.
Mr. Barré.

50, 51. Colloquium. Offered for single or double credit and devoted to the intensive investigation of subjects or topics not covered by the regular program. Enrollment is limited and subject to departmental approval. The subject for the spring semester of 1970-71 is: *"Littérature et troubles sociaux."* The course will consist of an investigation into works dealing with social disorders (riots, civil war, revolution); a great deal of attention will be paid to the ways in which various writers (mostly novelists) perceive and appraise social events, describe the development of their characters in the midst of those events, and, in some instances, propose solutions to existing social problems. The authors dealt with are: Madame de la Fayette, Victor Hugo, Stendhal, Balzac, Flaubert, Rimbaud, Zola, Malraux, Sartre, Vercors and Camus.
Spring semester, 1971. Mr. Barré.

52. Special Topics (for senior majors). Study of individual authors, selected themes or critical problems.
Spring semester, 1971.

53. Thesis.

54. Directed Reading.

HONORS SEMINARS

100. Littérature du Moyen-Age. Old French readings in lyric poetry, theatre and romance.
Mrs. Perkins.

101. La Renaissance. Prose works of Rabelais, Marguerite de Navarre, and Montaigne. Poetic innovations from Marot through the Pléïade.
Mrs. Smith.

102. Le Théâtre Classique. Corneille, Racine, Molière.
Mrs. Smith.

103. L'Age des Lumières. The "Philosophes," the theater and the novel of the eighteenth century.
Mrs. Perkins.

104. Stendhal et Flaubert.
Spring semester, 1971. Mr. Roza.

105. Proust.
Mr. Terdiman.

106. Poésie Moderne. Baudelaire, Rimbaud, Verlaine, Mallarmé, Claudel, Valéry.
Fall semester, 1970. Mr. Roza.

108. Le Roman du 20e Siècle.
Mr. Roza.

110. Special Topics. Study of individual authors, selected themes or critical problems not included in the regular program to satisfy the interest of students and instructors.
Each semester.

112. Thesis.

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

German

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

Required: German 11 or 12, or equivalent work.

Recommended supporting subjects: see the introductory departmental statement.

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

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

COURSES

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

1-2. First-Year German. For students who begin German in college. Equivalent to two years of German in secondary school. Normally followed by German 3, 4, but exceptionally qualified students may request permission to continue in German 3A, 4A. Emphasis on fundamentals of grammar; readings in literary and expository prose.

Year course.

1B-2B, 3B. Intensive German. For students who begin German in college. Designed to impart an active command of the language. Combines the study of grammar with intensive oral practice and readings in literary and expository prose. Class and drill sessions meet seven and one-half hours per week. Periodic language laboratory attendance required. Each semester carries one and one-half credits; three semesters of work satisfy the prerequisites for intermediate courses in literature taught in German. Recommended for students who want to progress rapidly and especially for those with no previous knowledge of German who are considering majoring in German literature. Admission contingent upon satisfactory scores in the Modern Language Aptitude Test or special permission. Normally followed by 6, 11, or 12.

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

3A, 4A. Second-Year German. For students who have completed German 1A-2A or its equivalent as determined by departmental testing. Completion of

German 4A fulfills the prerequisites for German 6, 11 or 12. German 3A is offered only in the fall semester and 4A only in the spring semester. Grammar and readings similar to German 3, 4 but with emphasis on development of speaking and writing ability.

6. Writing and Speaking German. Oral discussions and writing practice based on general and literary topics of contemporary interest. For students who want to consolidate their skills of expression. Usually offered each semester.

Prerequisite: German 3A, 4A or its equivalent. Eligibility as it applies to students from German 4 is explained under German 3, 4 above.

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.

Year course.

11. Introduction to German Literature (19th and 20th Centuries). A study of representative prose fiction, poetry, and drama from the German Romantics to Kafka. Discussion, papers. Not a survey course.

Prerequisite: German 4A or its equivalent. Eligibility as it applies to students from German 4 is explained under German 3,4 above.

12. Introduction to German Literature (Goethe and his Age). A study of works by Lessing, Goethe, and Schiller. Discussion, papers. Not a survey course. Prerequisite: German 4A or its equivalent. Eligibility as it applies to students from German 4 is explained under German 3,4 above.

14. Goethes Faust, Erster und Zweiter Teil. An intensive study of *Faust, I and II.* Also for students who only know *Faust, Part One.*

Mr. Mautner.

15. Die Deutsche Romantik. Also taught as a seminar. See German 105 below.

Mr. Avery.

16. Die Deutsche Novelle seit Goethe. Also taught as a seminar. See German 110 below.

Miss Cohn.

17. Moderne Deutsche Literatur. A study of leading German writers of the twentieth century, including Hauptmann, Thomas Mann, Rilke, Hofmannsthal, Kafka.

Mr. Avery or Miss Cohn.

18. Studies in German Poetry. Also taught as a seminar. See German 111 below.

Mr. Mautner.

20. Die Deutsche Komödie. Also taught as a seminar. See German 109 below.

Fall semester, 1970. Mr. Mautner.

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

Spring semester, 1971. Mr. Avery.

30. Herman Hesse. A study of the central themes and the development of narrative technique in Hesse's novels. Works to be examined will include:

Knulp, Demian, Siddhartha, Der Steppenwolf, and *Die Morgenlandfahrt.*
Prerequisite: German 11 or 12, or SAT score of 650. Primarily for freshmen and sophomores; meets 1½ class hours per week.
Half-course. Mr. Avery.

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

52. Special Topics (For senior majors). Study of individual authors, selected themes or critical problems.

Honors Seminars

103. Deutsches Barock und Aufklaerung. A study of German literature in the seventeenth and early eighteenth centuries. The lyric poetry of the period, the mysticism of Angelus Silesius and Jakob Böhme, the plays of Gryphius, and the prose of Grimmelshausen; a study of Lessing.

104. Goethe. Goethe's most significant works and his role in German intellectual history will be studied.
Mr. Mautner.

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.
Spring semester, 1972. Mr. Avery.

106. Von Romantik zu Realismus. Studies in the works of Mörike, Stifter, Keller, Meyer, Storm, and Fontane.

107. Moderne Prosa. The development of German prose fiction since 1900 as reflected in works by Schnitzler, Hofmannsthal, Rilke, Mann, Kafka, Döblin and Grass.
Fall semester, 1970. Mr. Avery.

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.
Spring semester, 1971. Miss Cohn.

111. Studies in German Poetry. A study of selected examples of German poetry from the Baroque period to the present time. The interrelation of *Aussage, Gehalt und Gestalt.*

112. Modernes Drama und Lyrik des XX. Jahrhunderts. The emergence of modern trends as reflected primarily in the poetic and dramatic works of Hauptmann, George, Hofmannsthal, Rilke, Trakl, Sternheim, Benn and Brecht.
Miss Cohn.

Russian

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

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

Recommended supporting subjects: see the introductory departmental statement.

COURSES

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

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

1-2. First-Year Russian. For students who begin Russian in college. Equivalent to two years of Russian in secondary school. Normally followed by Russian 3,4; emphasis on fundamentals of grammar; readings in literary and expository prose.

Year course.

1B-2B, 3B. Intensive Russian. For students who begin Russian in college. Designed to impart an active command of the language. Combines the study of grammar with intensive oral practice and readings in literary and expository prose. Classes and drill sessions meet seven and one-half hours per week. Periodic language laboratory attendance required. Each semester carries one and one-half credits; three semesters of work satisfy prerequisites for intermediate and advanced courses in literature taught in Russian. Recommended for students who want to progress rapidly and especially for those with no previous knowledge of Russian who are considering majoring in Russian. Admission contingent upon satisfactory scores in the Modern Language Aptitude test or special permission. Normally followed by Russian 6 and 12.

3, 4. Second-Year Russian. For students who have completed Russian 1-2 or the equivalent as determined by departmental testing. See Section *a* of the explanatory note on language courses in the introductory departmental statement. Normally a terminal course but exceptionally qualified students may, with permission, take an appropriate sequential course. Students who completed Russian 4 during the academic year 1969-70 may freely elect to continue in sections of 11 or 12.

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

11. Introduction to Literature. A survey of the development of Russian literature from the eleventh century through the Golden Age of Russian Poetry in the nineteenth century. Classics of Russian medieval literature. Baroque poetry. Classicism of the eighteenth century. Romanticism of the first third of the nineteenth century. Pushkin and Lermontov. Readings and class discussions in Russian.

12. Introduction to Literature. A survey of Russian literature of the nineteenth and twentieth centuries to 1918. Age of Realism and literary tendencies in the first two decades of the twentieth century. Works of Gogol, Turgenev, Dostoevsky, Tolstoy, Leskov, Chekhov, Gorky and Bely will be read and discussed in Russian.

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

52. Special Topics. (For senior majors). Study of individual authors, selected themes or critical problems.

Honors Seminars

101. Tolstoy.

102. Russian Short Story.

103. Pushkin and Lermontov.

104. Dostoevsky.

105. Literature of the Soviet Period.

Spanish

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

Required: Spanish 11 and 12, or equivalent work.

Recommended supporting subjects: see the introductory departmental statement.

Majors are expected to speak Spanish with sufficient fluency to take part in discussion in courses and seminars in the language and to pass all oral comprehensive or oral Honors examinations in Spanish.

NOTE: Not all advanced courses are offered every year. Those announced for 1970-71 and 1971-72, guarantee adequate coverage for majors but do not preclude additional offerings or special arrangements to satisfy manifest interest. Students wishing to major or minor in Spanish should plan their program in consultation with the department.

Courses

1B-2B, 3B. Intensive Spanish. For students who begin Spanish in college. Designed to impart an active command of the language. Combines the study of grammar with intensive oral practice and readings in literary and expository prose. Class and drill sessions meet seven and one-half hours per week. Periodic language laboratory attendance required. Each semester carries one and one-half credits; three semesters of work satisfy the prerequisites for intermediate courses in literature taught in Spanish. Recommended for students who want to progress rapidly and especially for those with no previous knowledge of Spanish who are considering majoring in Spanish literature. Admission contingent upon satisfactory scores in the Modern Language Aptitude Test or special permission. Normally followed by 6, 11, or 12.

3A, 4A. Second-Year Spanish. For students who have completed Spanish 1A-2A or the equivalent as determined by departmental testing. See Section *b* of the Explanatory Note on language courses in the introductory departmental statement. Completion of 4A satisfies the prerequisites for intermediate courses in Spanish. Normally followed by Spanish 11.

5, 6. Composition and Diction. For majors and others who wish advanced courses 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. Introduction to Spanish Literature. A study of representative prose fiction, poetry and drama of the nineteenth and twentieth centuries (works by

authors such as Espronceda, Zorrilla, Bécquer, Pérez Galdós, Unamuno, Baroja, Lorca, etc.). Discussion, papers.

Prerequisite: Spanish 4A, the equivalent, or special permission.

12. Introduction to Spanish Literature. A study of representative prose fiction, poetry and drama from the late Middle Ages through the Golden Century (authors to be read include: Jorge Manrique, *Romances,* Cervantes, Lope de Vega, Calderón, Quevedo, etc.). Discussion, papers.

Prerequisite: Spanish 4A, the equivalent, or special permission.

NOTE: Spanish 11 and 12, the equivalent, or consent of instructor, are prerequisite for the courses in literature that follow.

20. La Literatura Medieval. From the *Poema del Cid* to *La Celestina.* Also included are works by Gonzalo de Berceo, Don Juan Manuel, el Arcipreste de Hita, and Jorge Manrique.

21. El Teatro del Renacimiento y del Siglo de Oro. Special emphasis will be placed on the outstanding dramatists of the Golden Century (Lope de Vega, Tirso de Molina, Ruiz de Alarcón, Calderón, etc.).

23. La Poesía del Renacimiento y del Siglo de Oro. From the *Romancero* through the Baroque. Special emphasis on Garcilaso de la Vega, Herrera, Fray Luis de León, San Juan de la Cruz, Lope de Vega, Quevedo and Góngora.

Spring semester, 1971. Mr. Metzidakis.

24. Cervantes. The works of Cervantes with special emphasis on the *Quijote.*

26. La Novela en el Siglo XIX. Realism and Naturalism in nineteenth century prose fiction. Works by Alarcón, Valera, Pérez Galdós, Pardo Bazán, Clarín, Blasco Ibáñez and others.

Fall semester, 1970. Mrs. Asensio.

27. La Generación del 98. Studies in the works of Valle-Inclán, Azorín, Baroja, Unamuno, Benavente and Antonio Machado.

28. Literatura Española Contemporanea. Major figures of the twentieth century not covered in Spanish 27: Juan Ramón Jiménez, García Lorca, Alberti, Salinas, Guillén, Hernández, Hierro and Aleixandre among the poets; novels by Cela and Goytisolo; the theater of Casona and Sastre.

29. Literatura Hispanoamericana. The nineteenth-century realistic novel, modernism and the post-modernist novel. Representative works of authors such as Rubén Darío, Silva, Rodó, Lugones, Chocano, Rivera, Gallegos, Azuela, or others.

30. La Poesía Hispanoamericana en el Siglo XX. A study of the poetry of Mistral, Agustini, Ibarbourou, Storni, Vallejo, Huidobro, Gorostiza, Paz, Nicolás Guillén, Neruda, Borges, and others.

Spring semester, 1971. Mrs. Connor.

31. La Novela Hispanoamericana en el Siglo XX. Works by Mallea, Sábato, Lynch, Carpentier, Asturias, Rojas, Vargas Llosa, Rulfo, Fuentes, García Márquez and others.

50-51. Colloquium. Offered for double credit and devoted to the intensive investigation of subjects or topics not covered by the regular program. Enrollment is limited and subject to departmental approval.

52. Special Topics (for senior majors). Study of individual authors, selected themes or critical problems.

HONORS SEMINARS

108. Las Obras de Cervantes.

109. La Generación del 98: Valle-Iuclán, Azorín, Baroja, Unamuno, Maeztu, Benavente, Antonio Machado.
Fall semester, 1970. Mr. Metzidakis.

110. Literatura Española Contemporanea.

111. La Poesía Hispanoamericana en el Siglo XX.

112. La Novela Hispanoamericana en el Siglo XX.

113. El Teatro del Renacimiento y del Siglo de Oro.

114. La Poesía del Renacimiento y del Siglo de Oro.

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

MUSIC

PETER GRAM SWING, *Professor and Chairman*‡
JAMES D. FREEMAN, *Assistant Professor and Acting Chairman*
DAVID H. STEINBROOK, *Instructor*
JANE A. COPPOCK, *Lecturer*
CAROLINE M. CUNNINGHAM, *Lecturer***
GILBERT KALISH, *Associate in Performance*
MICHAEL KORN, *Associate in Performance*
ROBERT M. SMART, *Associate in Performance*
PAUL ZUKOFSKY, *Associate in Performance*

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. The department encourages students to develop performing skills through private study and through participation in the orchestra, chorus and chamber music coaching program which it staffs and administers. Scholarships are available to assist music majors who are talented instrumentalists or singers finance the cost of private instruction.

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 provost, elect a five-year plan of study, thus reducing the normal number of courses to be taken per semester.

‡Absent on leave, 1970-71.
**Fall semester, 1970-71.

Requirements and Recommendations

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

Major in Honors: A student intending to major in Honors will generally stand for four papers in music. The department strongly recommends that one paper be a thesis or research project. Music 61-62, required of all majors, may be used as the basis of a paper. Papers in history can be prepared by tutorial, by seminar or by taking a history course with a concurrent or subsequent attached unit of additional research.

Minors in Honors: A student intending to minor in Honors will generally stand for two papers in music. Two semester courses in theory and one semester course in history are prerequisite for a minor. Music 1 may, with permission of the department, be substituted for the theory prerequisite.

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

Proficiency on an instrument: All majors in music will be expected to play a keyboard instrument well enough to perform at sight a two-part invention of J. S. Bach and a first movement of an easy late 18th or early 19th century sonata. By the end of the junior year they should be able to read chamber music scores, also vocal music in four clefs, and realize figured basses. The department recommends that majors take one or two semesters of Music 39 to develop these skills. Students with exceptional proficiency in an instrument other than the piano, or in singing, will not be expected to meet the performing standards of pianists.

The basic piano program: This program is designed to develop keyboard proficiency to a point where a student can effectively use the piano as a tool for study, also to help students meet the keyboard requirements outlined above. It is open to freshmen and sophomores planning to major in music. No academic credit is given for basic piano.

Credit for Performance

A student who has taken Music 1, Music 11-12, or Music 13-14 (or who has equivalent prior training) has the option to receive credit for study of an instrument or voice, participation in the department's chamber music coaching program, participation in the Swarthmore College Orchestra, and participation in the Swarthmore College Chorus. The amount of credit received will normally be a half-course in any one semester, and will usually be granted only to students participating for a full year in a particular activity. Students applying for credit will be given an audition at the beginning of the semester and will fulfill requirements established for each activity, i.e. regular attendance at rehearsals and performances and participation in any supplementary classes held in connection with the activity. Students will be graded on a pass-fail basis.

A student applying for credit for study of an instrument or voice will first demonstrate to the department his ability to undertake such study at least at an intermediate level. He will arrange to work with a teacher of his choice, subject to approval of the department. The department will then supervise the course of study in any semester for which credit is to be given. The teacher will submit

a written report of the student's work at the close of the semester to be used by the department in making its evaluation. The department may use public performance or a final audition as additional evidence for evaluating work. The College does not undertake to pay for instruction; the student is expected to make his own financial arrangements directly with the teacher.

Courses and Seminars

NOTE: All seminars are open to qualified Course students.

1. Introduction to Music. A course combining study of the materials of music (including fundamentals) with training in listening and analysis. Students will work with a selected repertory of compositions from different eras. The course assumes no prior training in music.
Open to all students without prerequisite.

Fall semester. Mr. Freeman.

Spring semester. Mr. Steinbrook.

Theory and Composition

11-12. First Year Theory. A course in elementary tonal theory offering basic training in harmony and counterpoint. Emphasis will be placed on written exercises along with ear-training, dictation and keyboard harmony. Frequent reference will be made to a variety of keyboard and chamber compositions which will be carefully analyzed.

Year course. Miss Coppock.

13-14. Second Year Theory. A continuation of Music 11-12.

Year course. Mr. Steinbrook.

41. Composition. Open to qualified students with permission of the instructor.

Fall semester. Mr. Steinbrook.

61-62. Third Year Theory. A continuation of Music 13-14 covering specialized areas of harmony, counterpoint and analysis.

Year course. Mr. Steinbrook.

Honors Seminars

141. Composition.

Fall semester. Mr. Steinbrook.

163. Advanced Theory.

Not offered in 1970-71.

History of Music

15. Introduction to the History of Music (I). Topics in music of the Middle Ages and the Renaissance, with emphasis given to the analysis and performance of selected compositions. This course is concerned with studying the relationship of music to the art and thought of the times, and the function of music in the Roman Catholic liturgy.

Prerequisite: Music 1 (or the equivalent).

Not offered in 1970-71. Mr. Swing.

16. Introduction to the History of Music (II). Topics in music of the 17th, 18th and 19th centuries.

Not offered in 1970-71. Mr. Freeman.

22. Contemporary Music.

Not offered in 1970-71.

26. Instrumental Music of the 16th and 17th centuries. Development of the fantasy, canzona, ricercare, suite, trio sonata and concerto grosso with particular emphasis on performance and the preparation of editions from original sources.

Open to students with permission of the instructor.

The performance workshop held in connection with this course may be taken for chamber music (Music 34) credit. Music 26 may be substituted for Music 15 or 16 in the major program.

Fall semester. Mrs. Cunningham.

27. J. S. Bach. 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.

Open to students with permission of the instructor.

Not offered in 1970-71. Mr. Swing.

32. History of the String Quartet. This course traces the development of the string quartet from the middle of the 18th century to the present through study and (whenever possible) performance of selected works.

Open to students with permission of the instructor.

Not offered in 1970-71. Mr. Swing.

40. Analysis, Research, Performance. An examination of the relevances of analytical and historical research to intelligent performance through study of selected compositions. Ability to perform instrumentally or vocally is required, though it need not have reached an exceptionally skilled level.

Not offered in 1970-71. Mr. Freeman.

42. Lieder. A study, through performance and analysis, of various solutions by various composers to the problems of relating text and music. Students should be moderately proficient either as singers or as pianists. A knowledge of German is required.

Not offered in 1970-71. Mr. Freeman.

70. Senior Reading and Research.

Staff.

71-72. Senior Thesis.

Fall and spring semesters. Staff.

HONORS SEMINARS

101. The Sixteenth Century Parody Mass. An investigation of parody as a concept and as a technique of composition, giving particular attention to Masses by different composers on the same model.

Offered in 1971-72. Mr. Swing.

103. Early Nineteenth Century Romanticism. A study of the origins and rationale of musical Romanticism in the first half of the nineteenth century. A reading knowledge of French or German will be very helpful.

Spring semester. Mr. Freeman.

171. Senior Thesis.
Fall and spring semesters. Staff.

191. Tutorial.
Staff.

PERFORMANCE

NOTE: All performance courses are for half-course credit per semester. See p. 62 and p. 153 for general provisions governing work in performance under the provisions for Creative Arts.

34. Performance (chamber music).
Both semesters. Mr. Kalish, Mr. Zukofsky and staff.

35. Performance (orchestra).
Both semesters. Mr. Freeman.

36. Performance (chorus).
Both semesters. Mr. Korn.

37. Individual Instruction.
Both semesters.

39. Figured Bass and Score Reading.
Both semesters. Mr. Smart.

PHILOSOPHY

JOHN M. MOORE, *Professor*
DANIEL BENNETT, *Associate Professor*
HANS OBERDIEK, *Assistant Professor*
CHARLES RAFF, *Assistant Professor*
RICHARD SCHULDENFREI, *Assistant Professor*‡
RICHARD SHARVY, *Assistant Professor*
UWE HENKE, *Instructor*
JOHN DOLAN, *Visiting Lecturer*
GILMORE STOTT, *Lecturer*

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

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

1. Introduction to Philosophy. Methods of philosophical investigation are introduced through discussion of typical philosophical problems, such as: the problem of freedom, the arguments for the existence of God, the nature of logic and mathematics, the sources and limits of human knowledge, the justification of moral judgments. Readings include classical and current sources.
Introduction to Philosophy is a prerequisite for all other philosophy courses except Logic.

Each semester. The staff.

‡Absent on leave, 1970-71.

1A. Freshman Seminar. A seminar open only to freshmen, an alternative to Philosophy 1. Limited enrollment. For description see Philosophy 1.

Spring semester. Mr. Stott.

10. The Nature and Methods of Inquiry. From the perspectives of their fields the instructors in this course will explain and critically examine the methodological foundations of the various disciplines they represent. At the same time an attempt will be made to compare and relate methodology and substantive problems of different disciplines with the goal of arriving at a coherent view of scientific inquiry. The emphasis given to different disciplines will vary depending on the composition of the staff. The course is given for half credit.

Each semester. Interdepartmental staff.

11. Ethics. 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.

Each semester. Mr. Oberdiek or Mr. Stott.

12. Logic. An introduction to the principles of deductive logic with equal emphasis on the syntactic and semantic aspects of logical systems. Topics include the notions of logical truth, logical consequence, and proof. Some attention is given to the development of axiomatic theories and selected topics in the philosophy of logic.

Fall semester. Mr. Dolan.

13. Selected Modern Philosophers. A history of modern philosophy is presented through the metaphysical and epistemological problems common to Descartes, Leibniz, Spinoza, Locke, Berkeley, Hume and Kant. One or more of these philosophers may be selected for separate, detailed examination.

Spring semester.

14. Ancient Philosophy. The analysis of selected topics in Plato and Aristotle. Primary attention is given to problems in epistemology and metaphysics.

Spring semester. Mr. Sharvy.

15. Philosophy of Science. The focus of the course is on recent systematic attempts to solve certain major and related problems concerning science. Among these problems are distinguishing scientific from non-scientific bases for the acceptance or rejection of claims, determining the proper field for scientific inquiry, and determining the foundation of scientific knowledge.

16. Philosophy of Religion. The nature of religion; the psychology and interpretation of religious experience; the problem of religious knowledge; the validity and difficulties of Christian theology and ethics. (Also listed as Religion 16.)

Spring semester. Mr. Bennett.

17. Aesthetics. 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. Philosophical problems that arise in the application of scientific methods to human behavior; i.e., problems concern-

ing concepts, laws, theories, values, explanation and prediction in the social sciences and history; and the differences and similarities between social and natural science.

Spring semester.

19. Medieval Philosophy. See Religion 19.

Fall semester. Mr. Urban.

20. Existentialism and Religious Belief. See Religion 20.

Fall semester. Mr. Urban.

21. Social and Political Philosophy. 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.

Fall semester. Mr. Bennett.

22. Philosophy in America. A critical examination of thinkers representative of the major philosophic traditions in America, with special emphasis on Peirce, James, and Dewey. The primary aim is to understand and evaluate the philosophic worth of their views; some attention is also given to their relation to American culture.

23. Contemporary Philosophy. A study of current attempts to resolve fundamental philosophical issues. Readings include articles and books by major 20th century philosophers, such as G. E. Moore, Bertrand Russell, and Ludwig Wittgenstein.

Fall semester. Mr. Raff.

24. Theory of Knowledge. Current epistemological issues and some metaphysical issues which underlie them are treated in detail. Readings include classical and current sources.

25. Advanced Logic. Topics include selected problems in deductive logic, detailed development of principles of inductive logic and the logic of decision.

26. Philosophy of Language. Topics include the role of investigation of natural and artificial languages in the solution of philosophical problems; investigation into the conceptual framework necessary to any adequate theory of ordinary language; relationships between natural and formal languages; recent attempts to found linguistics on a scientific basis.

Spring semester.

27. Metaphysics. This course will examine such topics as Universal and Particular, Abstract and Concrete, Essence and Accident, Physical Object and Event, Space, Time and Causation, etc.; and their relations to topics in the theory of knowledge and theory of language.

Philosophy 12 recommended.

Fall semester. Mr. Bennett.

28. Marxist Philosophy. An introduction to the philosophy of Marx, Engels and Lenin. Based on the major writings of these philosophers, the course will begin with a systematic exposition of the fundamental concepts of Marxist social, economic and political theory. Then, in keeping with Marx's conception of the intimate connection between social analysis and social philosophy, an attempt will be made to deepen the understanding of certain theoretical concepts (alienation, consciousness, etc.) by applying them in the analysis of selected contemporary social problems.

Fall semester. Mr. Henke.

29. Philosophy of Mind. Concepts of mind will be explored with special attention given to the mind-body problem and the nature of motive, intention, and human action.
Fall semester. Mr. Oberdiek.

30. The Philosophy of Education. The idea of education in philosophy, and the implications of philosophical and psychological theories for educational practice. Readings may include: Plato, Rousseau, Kant, Tolstoy, Dewey, James, Whitehead, Montessori, Skinner, Piaget, Neill, Laing, and McLuhan.
Fall semester. Mr. Bennett and Mr. Bernheim.

31. Religion and Ethics. (See Religion 31.)

50. Directed Reading.
Each semester. The staff.

51. Thesis.
Each semester. The staff.

52. Senior Conference.
Spring semester.

Honors Seminars

101. Moral Philosophy. 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.
Fall semester. Mr. Oberdiek.

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.

103. Modern Philosophy. Metaphysical and epistemological problems about the nature of minds and bodies, the varieties of knowledge and freedom, are approached through the philosophical systems of Descartes, Spinoza, Leibniz, Locke, Berkeley, Hume, Reid, Kant.
Fall semester. Mr. Raff.

104. Contemporary Philosophy. Some current philosophical problems are investigated in light of the work of Bradley, Moore, Wittgenstein, and the most recent contributions.
Spring semester.

105. Philosophy of Science. 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. 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. Philosophical problems that arise in the application of scientific methods to human behavior (see Course 18). The discussion will focus on the nature of human action.

108A. Symbolic Logic. An examination of symbolic logic as (1) the theory of inference, (2) a tool of analysis, and (3) a foundation for mathematics. Emphasis will be placed on the fundamental concepts (e.g., the axiomatic method, consistency, decidability), major theorems (completeness and incompleteness), and problems of the foundation of logic.
(Note: Students who have taken 108B may not take this seminar.)

Fall semester. Mr. Henke.

108B. Foundations and Philosophy of Mathematics. This seminar will begin with a brief survey of the major results in foundations of mathematics: axiomatic development of symbolic logic and set theory, Gödel incompleteness theorem, consistency and independence of the axiom of choice and the continuum hypothesis. This will be followed by a comparison of the logicist, formalist and intuitionist views of the foundations of mathematics.

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

Prerequisites: one course in philosophy and Mathematics 24 or equivalent work with axiomatic mathematics.

Mr. Henke and Mr. di Franco.

109. Metaphysics. The logical analysis of problems and theories about time, change, form, matter, essence, substance, identity and universals. Readings from such philosophers as Aristotle, Leibniz, McTaggart, Russell and Quine.

Fall semester. Mr. Sharvy.

110. Medieval Philosophy. See Religion 110.

Fall semester. Not offered in 1970-71. Mr. Urban.

111. Philosophy of Religion. Current techniques of philosophical analysis are brought to bear on the philosophical issues raised by religious belief and experience.

Spring semester. Mr. Bennett.

112. Philosophy of Mind. The nature and variety of experience is examined with an end to discovering what is peculiar to human experience and to the objects of human experience, the nature of judgment and of persons, the relations between minds and bodies.

113. Epistemology. The seminar will concern itself primarily with the problem of the sources of knowledge and the problem of justifying belief.

114. Hegel.

Mr. Bennett.

120. Thesis. A thesis may be submitted by majors in the department in place of one Honors paper, upon application by the student and at the discretion of the department.

PHYSICAL EDUCATION FOR MEN

WILLIS J. STETSON, *Professor of Physical Education for Men and Director of Athletics*
LEWIS H. ELVERSON, *Associate Professor*
ERNEST J. PRUDENTE, *Associate Professor*
WILLIAM C. B. CULLEN, *Assistant Professor*
GOMER DAVIES, *Assistant Professor*
DOUGLAS M. WEISS, *Instructor*
BROOKE P. COTTMAN, *Assistant*
JACK HOUTZ, *Assistant*
JAMES J. McADOO, *Assistant*
ROBERT McCOACH, *Assistant*
JAMES W. NOYES, *Assistant*
C. J. STEFANOWICZ, *Assistant*
EDWARD TOWNSLEY, *Assistant*
JOHN P. UDOVICH, *Assistant*
ANDREW J. ZACHORCHEMNY, *Assistant*
DR. MORRIS A. BOWIE, *College Physician*
DR. HAROLD C. ROXBY, *Team Physician*

The course in Men's Physical Education is designed to promote an awareness of one's physical well being through a regular exercise program. In addition, the learning of new sports skills and the improvement of previously learned ones is achieved by planned instructional opportunities. Emphasis is placed on the individual, or so-called "carry-over" sports, as well as those involving a team effort.

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. By meeting certain minimum objectives, one may be exempted from the program after satisfactorily completing one year's work. During participation in the program men students must participate in their assigned activity a minimum of three hours per week.

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

Fall Activities

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

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

WINTER I AND II ACTIVITIES

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

SPRING ACTIVITIES

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

PHYSICAL EDUCATION FOR WOMEN

ELEANOR K. HESS, *Chairman and Associate Professor*
IRENE MOLL, *Associate Professor*
MARY ANN YOUNG, *Assistant Professor*
PATRICIA BOYER, *Lecturer*
JANICE FELLMAN, *Lecturer*
DR. MORRIS A. BOWIE, *College Physician*

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 for a maximum of one semester if they fail to pass the swimming test. In the sophomore year, the department encourages the students to develop greater initiative in planning their own programs of physical activity by granting greater freedom in the fulfillment of the requirement through a variety of programs worked out by the student and the department. After a minimum period of instruction, a student may apply for exemption from the required program and may be exempted if she successfully passes a series of tests administered by the department.

In addition to the departmental requirements, the faculty regulations state the following: "If any semester's work of the first two years is failed, it shall be repeated in the junior year. No student shall be permitted to enter her senior year with a deficiency in physical education."

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

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

ACTIVITIES

Archery.*
Fall and Spring. Class and Varsity.

Badminton.
Winter. Class and Varsity.

Basketball.
Winter. Class and Varsity.

Bowling.
Winter. Class.

Conditioning Exercises.
Fall, Winter and Spring.

Fencing.
Winter.

Folk and Square Dancing.*
Fall, Winter and Spring. Class and Performance Group.

Golf.*
Fall and Spring. Class.

Hockey.
Fall. Class and Varsity.

Jogging.

Lacrosse.
Spring. Class and Varsity.

Modern Dance.*
Fall, Winter and Spring. Class and Performance Group. Dance Composition.

Self-Defense.

Soccer.
Winter. Class.

Softball.
Spring. Class and Varsity.

Squash.

Swimming. 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.)
Fall, Winter and Spring.

Tennis.
Fall, Winter and Spring. Class and Varsity.

Volleyball.*
Fall and Winter. Class and Varsity.

Water Ballet.*
Fall. Class and Performance Group.

* Co-ed classes.

PHYSICS

OLEXA-MYRON BILANIUK, *Professor*
WILLIAM C. ELMORE, *Professor*
MARK A. HEALD, *Professor and Chairman*
PAUL C. MANGELSDORF, JR., *Professor*
ALBURT M. ROSENBERG, *Associate Professor*
JOHN R. BOCCIO, *Assistant Professor*‡
CYRUS D. CANTRELL, *Assistant Professor*‡

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 experimental work must submit their laboratory notebooks to the visiting examiners for their inspection.

In addition to curricular work, students are encouraged to pursue research projects in consultation with members of the faculty. Good shop facilities, a wide range of electronic instrumentation, and the Computer Center are available in support of independent work. The Department holds research colloquia jointly with the Bartol Research Foundation, which is located on the Swarthmore campus and which offers a Ph.D. program in physics through an affiliation with Thomas Jefferson University (see p. 68). In special cases Swarthmore students may take graduate courses at Bartol or at the University of Pennsylvania.

Requirements and Recommendations

Students who intend to major in physics normally take Physics 1, 2 and Chemistry 3, 4 in the freshman year and Physics 11, 12 in the sophomore year. In addition they should complete Mathematics 12 by the end of their sophomore year. In view of graduate school requirements and of the extensive literature of physics in French, German and Russian, it is strongly recommended that the student fulfill his language requirement in one of these languages. Satisfactory work in Physics 1, 2 or its equivalent is prerequisite for all further work in the department, and Chemistry 2 or 4 is a prerequisite for Physics 112 and 114.

Honors students majoring in physics normally take Physics 102, 106, 112, in that order, and Mathematics 51, 52, and 104. Physics 114 or a second mathematics seminar is encouraged but not required. Other seminars and courses in the program may be chosen to meet the interests of the student. Normally a student will present four papers in physics and two in mathematics to the visiting examiners. Such a program is a particularly satisfactory way of preparing for graduate or other professional work in physics or mathematics. However, it constitutes in itself an effective educational program, since the aim throughout is to achieve an understanding of fundamental ideas and concepts, as distinct from the mastery of information, skills, and techniques in a limited segment of science. Honors students minoring in physics may prepare for examinations by taking Physics 11, 12, as well as by one or more seminars.

Course students majoring in physics normally complete the following courses in their junior and senior years: Mathematics 51, 52; Chemistry 61, 62; and

‡Absent on leave, 1970-71.

Physics 51, 52, 54, 71, 72. It is recommended that Physics 60 or additional work in engineering or chemistry be included in the program of Course students who intend to do graduate work in physics. This program provides a well-rounded study of physics, and by requiring less intensive concentration than an Honors program offers 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 French or Russian, or German if neither of these is available.

1, 2. General Physics. 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. The introductory course can be supplemented by directed reading in current topics. Entering freshmen who may be qualified for advanced placement should see the department chairman.

Prerequisite: First year mathematics taken concurrently, or adequate preparation in mathematics.
Mr. Bilaniuk, Mr. Heald, and Staff.

6. Principles of the Earth Sciences. An analysis of the forces shaping our physical environment, drawing on the fields of geology, geophysics, meteorology and oceanography. Recent developments in these fields are emphasized with readings and discussion based on current literature. The underlying physical and chemical principles are stressed. One or more field trips. No special scientific background required.
Fall semester. Mr. Mangelsdorf.

7, 8. Concepts and Theories in Physical Science. 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.
Mr. Rosenberg.

10. Topics in Biophysics. Applications of physical tools and analysis to living systems. Emphasis is 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.
Spring semester. Mr. Rosenberg.

11, 12. Mechanics and Wave Motion. Particle and rigid body mechanics with an introduction to advanced dynamics. Elastic waves and wave motion. Inter-

ference and diffraction phenomena. Considerable emphasis is placed on laboratory work, both to illuminate and extend the subject matter, and to foster the students' ability to work independently. Three lectures and a laboratory period weekly. This course may be taken by Honors students with a minor in physics in preparation for an Honors examination.

Prerequisite: Second-year mathematics taken concurrently.

Mr. Elmore and Mr. Mangelsdorf.

51. Modern Physics I. A selection of topics including the special theory of relativity, and atomic, nuclear, and particle physics. Three lectures and one laboratory period weekly. Open to seniors only.

Prerequisite: Second-year mathematics and consent of the instructor.

Not offered in 1970-71.

52. Modern Physics II. Quantum mechanics and solid-state physics.

Three lectures and one laboratory period weekly.

Prerequisite: Physics 51 and/or Engineering 61.

Not offered in 1970-71.

54. Thermal Physics. 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.

Prerequisite: Second-year mathematics.

Not offered in 1970-71. Mr. Mangelsdorf.

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

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

Staff.

62. Introduction to Oceanography. The theory and practice of modern marine sciences. Topics to be covered include physical oceanography and measurement techniques, the dynamics of rotating stratified fluids, air-sea interaction, coastal and estuarine processes, the ocean as a biological habitat, and the energy, mass, and chemical budgets of the oceans. This course is intended to enable the student to follow current literature in marine sciences. Exercises on the computer and a field trip.

Prerequisite: Mathematics 51 or consent of the instructor.

Not offered in 1970-71. Mr. Mangelsdorf.

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 a laboratory each week.

Prerequisite: Physics 12.

Not offered in 1970-71.

72. Electromagnetic Theory. Application of Maxwell's equations. Macroscopic field treatment of magnetic, dielectric and conducting bodies. Forces,

motion and energy storage. Field basis of circuit theory. Electromagnetic waves; wave-guides, transmission lines and antennas.
Three class periods and a laboratory each week.
Prerequisite: Physics 12.
Not offered in 1970-71.

HONORS SEMINARS

102. Electricity and Magnetism. 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.
Fall semester. Mr. Heald.

106. Atomic and Nuclear Physics. 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 interactions. The accompanying laboratory includes basic experiments in atomic and nuclear physics.
Prerequisite: Physics 102, or equivalent preparation in the Honors program in Engineering Sciences.
Spring semester. Mr. Elmore.

112. Radiation and Statistical Physics. 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 experimental projects.
Prerequisites: Chemistry 2 or 4, and Physics 106.
Fall semester. Mr. Mangelsdorf.

114. Quantum Mechanics. 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. Accompanying laboratory emphasizes theoretical interpretation of the data.
Prerequisite: Physics 112.
Spring semester. Mr. Bilaniuk.

POLITICAL SCIENCE

CHARLES E. GILBERT, *Professor*
J. ROLAND PENNOCK, *Professor*†
DAVID G. SMITH, *Professor and Chairman*
CLEMENT COTTINGHAM, JR., *Assistant Professor*
RAYMOND F. HOPKINS, *Assistant Professor*‡
ROBERT O. KEOHANE, *Assistant Professor*
HARRY HARDING, JR., *Instructor*
PAUL LUTZKER, *Instructor*
NANNERL O. HENRY, *Lecturer*

Courses and seminars offered by the Political Science Department deal with the place of politics in society and contribute to an understanding of the pur-

†Absent on leave, spring semester, 1970-71.
‡Absent on leave, 1970-71.

poses, organization, and operation of political institutions, domestic and international. For the beginning student, the department offers courses dealing generally with the basic concepts of political science and the processes of politics as illustrated by case studies, by theoretical analysis, and by more extended study of the elements of politics in various institutional settings. In appropriate places throughout the curriculum, attention is focused on problems of change (evolutionary and revolutionary), freedom and authority, war and peace—and on the development of political institutions that are responsive to the needs of our day. Courses are provided that give special attention to political theory, comparative political systems, political development, politics and government in the United States, and international relations.

Requirements and Recommendations

Students planning to study political science are strongly advised to start with Elements of Politics (Political Science 1), and to continue with one or more of the other introductory level courses, Policy-Making in America (Political Science 2), Comparative Politics (Political Science 3), International Politics (Political Science 4). Any one of these courses may be taken without prerequisite and as a terminal course. Normally any two of these courses, preferably including Political Science 1, constitute the prerequisite for further work in the department. Students who intend to major in political science should begin their work in the freshman year if possible. Political Theory, either in seminar for Honors students, or in course (Political Science 54) for Course students, is required of all majors. Course majors must take Political Science 60.

Program in International Relations

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

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

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

Group I

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

Group II

History 8—Africa
History 25—Modern Russia
History 30—American Diplomatic History
History 42—The Expansion of Europe
History 44—Modern China
History 45—Modern Japan
History 46—Asian Nationalisms
History 48—Latin America

Group III

Economics 11—Economic Development
Economics 61—Comparative Economic Systems
Political Science 3—Comparative Politics
Political Science 18—Politics of Developing Nations
Political Science 19—Comparative Communist Politics
Political Science 20—Politics of East Asia
Political Science 21—Politics of Africa
Political Science 55—Modern Political Theory
Political Science 64—Topics in International Relations
Economics 65—Political Economy of Multinational Enterprises

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.

1. **Elements of Politics.** Using materials particularly from the United States and the Soviet Union, but drawing also on experiences of other societies, this course asks: Who governs? How? Under what constraints? It therefore involves a study of the basic institutions, concepts and moving forces of politics. Through the use of readings from contemporary political scientists, it also presents an introduction to the analytical tools and methods of the discipline. Normative problems of freedom and authority, equality and inequality, obligation and protest, are considered in conjunction with the study of political forces and institutions.

Fall semester. Staff.

2. **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.

Spring semester. Mr. Lutzker.

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

Spring semester. Mrs. Henry.

4. **International Politics.** An introduction to the analysis of the contemporary international system and its evolution since 1945. The course will consider the foreign policies of major powers and their interaction, contemporary forces in-

fluencing the nature of international relations, and the role of ideologies. Various approaches to world order, such as diplomacy, collective security, disarmament and world government will be considered.

Spring semester. Staff.

11. Problems in Community Government. 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.

Spring semester. Mr. Cottingham.

13. International Law and Organization. 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.

Alternate years, spring semester. Mr. Keohane.

14. American Foreign Policy. 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 American policies in crucial areas of the world.

Alternate years, fall semester. Not offered in 1970-71. Mr. Keohane.

15. Legislative Behavior. An analysis of the various forces that shape the results of the legislative process and the behavior of individual legislators. The influence of personality, constituency, party leadership, ideology, rules and procedures, the committee system, the Executive Branch. The main focus will be on the Congress, with some illustrative material from other legislative bodies.

Fall semester. Not offered in 1970-71. Mr. Lutzker.

18. Politics of Developing Nations. An examination of the concept of "political modernization," based on analyses of Turkey, Thailand, Nigeria, Mexico, and the United States. The course will discuss the creation of a national identity, problems of building political institutions, increasing participation in the political process, patterns of allocation of political goods, leadership strategies, and revolution.

Fall semester. Mr. Harding.

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

Spring semester. Not offered in 1970-71.

20. Politics of East Asia. A comparative analysis of politics in China and Japan. Special emphasis will be placed on China: the Chinese Revolution, ideology, policy-making, local politics, and the Cultural Revolution.

Spring semester. Mr. Harding.

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

Fall semester. Mr. Cottingham.

51. Public Administration. 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 arrangements.

Fall semester, alternate years. Mr. Smith.

52. American Constitutional Law. 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.

Spring semester. Mr. Smith.

53. American Party Politics. 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.

Alternate years, fall semester. Mr. Lutzker.

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

Open to sophomores planning to take the "Modern and Analytical" version of the Political Theory honors seminar; otherwise to juniors and seniors only, except by special arrangement.

Fall semester. Mrs. Henry.

55. Modern Political Theory. A study of the development of liberalism, socialism, democratic theory, and sociological theories of politics. The course includes intensive reading of a few works by Rousseau and Marx plus discussion of other such authors as Burke, Tocqueville, Mill, Lenin, and Weber. In a concluding section, several contemporary democratic theories will be considered.

Spring semester. Mrs. Henry or Mr. Smith.

56. Jurisprudence. A study of the sources and nature of law; historical, sociological and philosophical approach to legal theory; the nature of the judicial process; key problems of jurisprudence illustrated by case study in selected areas of American constitutional law.

Open to juniors and seniors only, except by special arrangement.

Spring semester. Not offered in 1970-71. Mr. Pennock.

57. Problems of Democratic Theory. Individualistic, pluralistic, and "holistic" approaches will be studied, including contemporary attacks upon liberalism and pluralism. Democracy will be considered from the point of view of justification theory, theories of requisites, and both normative and descriptive operative theory.

Fall semester. Mr. Pennock.

59. Marxism. A study of Marxist political theory and philosophy. Primary emphasis is placed on the works of Marx, Lenin, and Mao Tse-tung. In addition,

some attention is devoted to the background of Marxist thought as well as to influential derivatives of Marxism other than Communism. Selected examples of contemporary Marxist theory are also considered.

Half course, fall semester. Not offered in 1970-71. Mr. Smith.

60. Special Topics in Political Science. 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.

Spring semester. Mr. Lutzker.

62. Political Sociology. 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.

Spring semester. Mr. Mueller.

63. Advanced International Politics. A theoretical approach to the abiding and changing patterns of relations among states and the various factors that affect them, drawing both on classical and contemporary writings. The contemporary international system will be subjected to a detailed analysis.

Prerequisite: Course 4 or the equivalent.

Alternate years, fall semester. Not offered in 1970-71. Mr. Keohane.

64. Topics in International Relations. An analysis of certain problems of international relations chosen by the instructor. Possibilities include: comparative foreign policy, war, international relations of developing nations, regionalism.
Prerequisite: Course 4 or the equivalent and Course 63.

Alternate years, spring semester. Not offered in 1970-71. Mr. Keohane.

65. Political Economy of Multinational Enterprises. This course will examine the political and economic significance of multinational enterprises, which have recently become increasingly important in the international economy. Problems discussed will include those of efficiency of resource allocation, economic and political concentration, distributive equity in the use of and payment for resources, and political relationships between host and investing countries. The concepts of political and economic "imperialism" will be examined within a framework of modern economic and political analysis.

Students enrolling in this course should have some knowledge of economic analysis and international politics, such as is provided in Economics 1-2A and Political Science 4. Students without this background should consult the instructors before enrolling.

Fall semester. Mr. Keohane and Mr. Ooms.

69. Directed Readings in Political Science. Available on an individual or group basis, subject to the approval of the chairman and the instructor.

70-71. Colloquium. Staff.

72. Thesis. With the permission of the chairman and a supervising instructor, any major in Course may substitute a thesis for one course, normally during either semester of the senior year.

Honors Seminars

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

101. (a) and (b) Political Theory. 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 Hobbes and organized in more topical fashion. Considerable attention is given to modern democratic theory. It is desirable but not required for students planning to take 101b to take Political Science 54 during their sophomore year.

Each semester. Mr. Pennock or Mr. Smith.

102. Politics and Legislation. 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.

Spring semester. Mr. Gilbert or Mr. Lutzker.

103. Problems in Government and Administration. Problems of administrative organization, policy-making and responsibility, with primary reference to the United States and to selected fields of policy.

Fall semester. Mr. Smith.

104. International Politics. An inquiry into the principles and problems of international politics, this seminar will consider theories of international stability and disorder, the relationship between foreign policies and the international system, and approaches to international order such as diplomacy, international law, and collective security. Basic to the analysis will be the question: what are the causes of war and the conditions of peace?

Prerequisite: Course 4 or the equivalent.

Fall semester. Mr. Keohane.

105. American Foreign Policy. 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.

Spring semester. Mr. Keohane.

106. Public Law and Jurisprudence. Sources and nature of law; historical, sociological, philosophic, "realistic," and behavioral approaches to law; key problems of jurisprudence illustrated by the study of court cases, especially, but not solely, from selected areas of public law.

Spring semester. Not offered in 1970-71. Mr. Pennock.

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

Fall semester. Not offered in 1970-71.

108. Comparative Government. Advanced study of comparative government; governmental structures and political processes largely as exemplified by selected governments of Western and Eastern Europe; inquiries into common problems, such as planning, defense, nationalization, and transnational political movements.

Fall semester. Mrs. Henry.

109. Political Development. A comparative study of the politics of societies undergoing change and modernization. Various theories, approaches, and meth-

ods of explanation are examined and considered in the context of states in Asia, Africa, the Middle East and Latin America.

Spring semester. Mr. Harding.

110. Urban Sociology and Politics. The impact of urbanization on contemporary politics and social structure, from the perspectives of political science and sociology. Emphasis will be placed on empirical study of selected problems such as physical planning, social welfare, and political organization.
Fall semester. Mr. Gilbert and Mr. Van Til.

129. Thesis. Approval must be secured early in the student's junior year.
All members of the department.

PSYCHOLOGY

DAVID ROSENHAN, *Professor*‡
HANS WALLACH, *Professor*‡
A. GORDON HAMMER, *Visiting Professor***
SHEL FELDMAN, *Associate Professor*
KENNETH J. GERGEN, *Associate Professor and Chairman*
DEAN PEABODY, *Associate Professor*
JEFFREY TRAVERS, *Assistant Professor*
JOSEPH W. BERNHEIM, *Instructor*
MARY K. GERGEN, *Research Associate*

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

Requirements and Recommendations

The course Introduction to Psychology is normally required before advanced work may be taken. However, students whose grades are generally in the honors range and who have had significant background in either the natural or social sciences may apply to individual instructors for entrance to courses beyond the elementary level.

Majors should include advanced work in two areas of psychology: (a) basic processes underlying human and animal behavior, such as perception, learning and physiological psychology; (b) human behavior in its social context, such as personality, child psychology, social psychology. Majors in Course should take at least two courses and majors in Honors, at least one seminar from each area. It is highly desirable for all majors to take at least one course providing them with experience in basic research (e.g. Psychology 54 or 69). In addition, all majors in Course are encouraged to enroll in Psychology 64 during the spring semester of their senior year. This course is especially suited for preparation for the comprehensive examinations.

‡Absent on leave, 1970-71.
**Fall semester, 1970-71.

3. Introduction to Psychology. An introduction to the study of the behavior and experience of the individual. The broader significance of psychology will be emphasized.

Two lectures, plus conference hours to be arranged.

Fall semester. Staff.

11. Educational Psychology. Problems and issues in contemporary education viewed in psychological context. Topics may include: curriculum development, learning theory, discipline, motivation, testing and measurement, and socialization. Permission of instructor required.

Fall semester. Mr. Bernheim.

13. Statistics for Psychologists. See Math 1.

Fall semester.

14. Learning and Behavior Theory. 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 are evaluated. The laboratory is designed to acquaint students with the major processes considered.

Spring semester. Mr. Bernheim.

15. Child Psychology. Cognitive development, the socialization process, and the influence of childrearing practices will be emphasized.

Spring semester. Mr. Travers.

36. Primate Social Behavior.

38. Abnormal Psychology. Several views of abnormality are considered, including those that allow conceptions of normality. Biological and learned bases of positive and negative abnormality are considered, along with various methods of behavior modification and psychotherapy.

Fall semester. Mr. Hammer.

41. Comparative Psychology.

42. Physiological Psychology.

43. The Psychology of Communication. A study of the modes, processes, and effects of inter-individual communication and of the problems of measuring semantic meaning, the psychological aspects of language structure, and the learning thereof.

45. Group Dynamics. The course will deal with the psychological aspects of behavior in groups. Issues such as intimacy, solidarity, group problem solving, leadership development, splinter-group formation, and phases of group development will all receive attention. Classroom sessions will focus on the ongoing behavior within the group itself. Outside reading and papers will be used to illuminate processes within the group and to raise significant theoretical problems.

(By application only.)

Fall semester. Mr. Gergen.

46. Cognitive Processes. Centers on those processes the individual uses to understand the world. Emphasizes those processes used in dealing with people, and their relation to those dealing with impersonal objects.

Fall semester. Mr. Peabody.

48. Intergroup Relations. An examination of factors that create strife and conflict among persons, and conditions enhancing interpersonal tolerance and

acceptance. Particular attention will be given to minority groups, race relations, and communication between individuals of diverse backgrounds.

Fall semester. Mr. Peabody.

49. The Psychology of Language. See Linguistics 2.

Spring semester. Mrs. Gleitman.

50. Perception. 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.

54. Methods of Psychological Research. Discussion will focus on the relationships between given theories and the methods used in the supporting research. The comparative advantages and disadvantages of participatory observation and analysis, "objective" naturalistic observation, interviewing, content analysis, and experimentation will be examined. Particular attention will be given to problems in sampling, measurement and scaling, reliability and validity, and controls against artifacts and alternative explanations. Direct research experience will complement classroom discussion.

Spring semester. Mr. Feldman.

56. Social Psychology. An examination of theory and research relevant to the understanding of social interaction from a psychological viewpoint. Special emphasis will be placed on social perception and its distortion, attitude development and change, conformity, the relationship of personality to social interaction, and social motivation.

Spring semester. Mr. Travers, Mr. Peabody.

58. Personality. An examination of contrasting theories of the human personality. Theories of Freud, Jung, Lewin, Rogers and others will be discussed, and special attention will be given to current empirical work.

Spring semester. Mr. Gergen.

61. Psychological Anthropology. See Sociology 63.

64. History and Systems of Psychology. Reading and discussion on a tutorial basis intended to provide integration of different fields of psychology and to help majors prepare for comprehensives. Historical treatment will concentrate on the major systematic points of view. Special consideration will be given to problems overlapping several areas of psychology.

Spring semester. Staff.

67. Social Psychology of Social Issues. A course in seminar format. Students consider the scientific approach to issues of social significance. Areas such as race relations, international conflict, poverty, urbanism, drugs, and revolution may all be discussed. (Enrollment limited.)

68. Tutorial. Any student may, with the consent of a member of the Department, work under a tutorial arrangement for a single semester. The student is thus allowed to select a topic of particular interest to him, and in consultation with a faculty member, prepare a reading list and work plan. Tutorial work may include field experience outside Swarthmore.

Each semester. Staff.

69. Independent Research. Students conduct independent research projects. They typically study problems with which they are already familiar from their

course work. Students must submit a written report of their work. Registration for Independent Research requires the sponsorship of a faculty member who agrees to supervise the work.

Each semester. Staff.

NOTE: Under special circumstances, courses from other departments may be counted toward a major in psychology, especially when such courses take a distinct psychological orientation to the subject matter. Permission required.

HONORS SEMINARS

101. Perception. 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, visual motion, visual and auditory localization, recognition, adaptation of perceptual functions. Scheduled laboratories are devoted to demonstrations.

102. Learning and Behavior Theory. 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.

Spring semester. Mr. Bernheim.

103. Abnormal Psychology. Two conceptions of abnormal behavior, the psychoanalytic and the social psychological, are examined, mainly from a developmental point of view. Problems of state and trait, and of cognitive, affective, and behavioral change are considered.

Fall semester. Mr. Hammer.

104. Individual in Society. 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.

Spring semester. Mr. Peabody.

105. Personality. A scrutiny of attempts to build an objective basis for "understanding the person as a whole." Contrasting theoretical orientations, techniques of observation, and specific problems will be examined. Theoretical orientations: psychoanalysis, factor analysis, learning theory, phenomenology. Observation techniques: interviews, questionnaires, fantasy material. Problems: aggression, need achievement, prediction, psychotherapy, and psychological maturity.

Spring semester. Mr. Gergen.

106. Child Development. The development of complex psychological processes in the individual will be studied. Problems of intellectual, linguistic, and social development will be stressed.

Fall semester. Mr. Travers.

106b. Cognitive Development. Problems in child development with special emphasis on modes of thinking, language, and memory.

Fall semester. Mr. Feldman, Mrs. Gleitman, Mr. Travers.

107. Psycholinguistics and Communication. An intensive study of certain communication processes and of the psychological aspects of human language. Specific topics include: words as motivational signs, the meaning of compounds, non-verbal signs and style as a determinant of perceptual and logical processes. Some individual experimental research is anticipated.

108. Language and Thought. See Linguistics 107.

Spring semester. Mrs. Gleitman.

109. Comparative and Physiological Psychology. The genetic, developmental, and physiological determinants of animal behavior. The seminar will explore in detail experimental and field studies of behavior in a few selected animal species. Generalizations derived from the study of animal behavior will be brought to bear on problems in human behavior and behavior pathology.

110. Group Dynamics. A combination of Psychology 45 (Fall) and a subsequent semester of empirical research.

Fall and spring semester. Mr. Gergen.

120. Thesis. May be presented as a substitute for one seminar, provided the student is doing major work in psychology with three seminars, and provided some member of the department is available to undertake the direction of the thesis.

All members of the department.

Master's Degree

A limited number of students may be accepted for graduate study toward the Master's degree in psychology (see pp. 74-75). 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.

RELIGION

JOHN M. MOORE, *Professor*
P. LINWOOD URBAN, JR., *Professor and Chairman*
DONALD SWEARER, *Associate Professor*
PATRICK HENRY, *Assistant Professor*‡
LEONARD BARRETT, *Visiting Lecturer*
SAMUEL T. LACHS, *Visiting Lecturer*

The academic discipline of religion consists of several methodologies applied to a broad subject matter. Understanding of religion is achieved by philosophical, historical, literary, and sociological analysis of religious experience, thought, texts, rites and ceremonies, institutions. Department offerings are designed to

‡Absent on leave, 1970-71.

provide illustrations of the various ways in which religion can be studied in an academic setting.

Any course numbered 3 through 6 may be taken as an introduction to the field, and successful completion of one of these will normally be required for admission to courses numbered 11 and above. The normal prerequisite for religion as a Course major, or an Honors major or minor, will be completion of two courses. For advanced work in some areas of religion, foreign language facility will be very useful, especially French and German. For advanced work in biblical studies and early Christian history, knowledge of one of the ancient languages—Greek, Latin, Hebrew (given at Bryn Mawr)—would also be useful.

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

3. Introduction to the Old Testament. The literature and history of the people of Israel. Early traditions, the law and the prophets, the emergence of Judaism. Primary emphasis will be on developing familiarity with the text.

Fall semester. Mr. Lachs.

4. Introduction to the New Testament. The literature and history of early Christianity. The formation of the gospels, the life and teachings of Jesus, the Christian movement in the apostolic age, with special attention to the theology of Paul. Primary emphasis will be on developing familiarity with the text.

Spring semester.

5. Introduction to Asian Religions. An introduction to the study of religion through an examination of selected phenomena from the religious traditions of India and China. Attention will focus on Hinduism and Islam in India and Confucianism and Taoism in China.

Fall semester. Mr. Swearer.

6. Problems of Religious Thought. The purpose of this course is to study various answers to the chief religious problems of the 20th century. Problems include: the nature of religious experience, the existence of God, religion and morality, science and religion and the problem of evil. Answers include those given by Karl Barth, Martin Buber, Rudolph Bultmann, Reinhold Niebuhr, Paul Tillich and others. The student is encouraged to find his own answers and to work out his own religious beliefs.

Each semester. Mr. Urban.

11. Early Christianity.

Fall semester. Not offered in 1970-71. Mr. Henry.

12. Christianity Since the Reformation.

Spring semester. Not offered in 1970-71. Mr. Henry.

13. Theravada Buddhism. A critical study of selected aspects of the literary, doctrinal, cultural and historical development of Theravada Buddhism in India, Ceylon and Southeast Asia. Attention will be given to Buddhism's relationship to Hinduism and folk traditions.

Spring semester. Mr. Swearer.

14. Mahayana Buddhism. A study of selected aspects of Mahayana and Tantrayana Buddhism. While the focus of the course will be on Buddhism in Japan, the development of particular Buddhist traditions within the contexts of Tibet and China will also be studied.
Fall semester. Not offered in 1970-71. Mr. Swearer.

15. African Religion and American Culture. The evolution of Afro-American religion.
Spring semester. Mr. Barrett.

16. Philosophy of Religion. See Philosophy 16.
Spring semester. Mr. Bennett.

18. The Reformation. A study of the rise and development of the Protestant Reformation during the 16th century; its history and thought with special attention to the work and thought of Luther and Calvin.
Spring semester. Not offered in 1970-71. Mr. Urban.

19. Medieval Philosophy. Philosophical thought from Augustine to the 15th century. Attention will be paid both to specific problems such as universals, analogy, and epistemology and to outstanding thinkers such as Anselm, Aquinas, and Ockham. Although the primary emphasis will be historical, attention will be given to the contemporary relevance of medieval thought. (Also listed as Philosophy 19.)
Fall semester. Mr. Urban.

20. Existentialism and Religious Belief. A study of one of the most influential, philosophical movements of the 20th century and its impact on religious thought. Among philosophers attention will be given to the writings of Edmund Husserl, Martin Heidegger, Karl Jaspers, and Jean-Paul Sartre. Among religious thinkers the writings of Rudolph Bultmann, John Macquarrie, Gabriel Marcel, and Paul Tillich will be read. Lectures, discussions, and reports. (Also listed as Philosophy 20.)
Fall semester. Mr. Urban.

21. Studies in Old Testament. An advanced course in some special topic in Old Testament, which may vary from year to year.
Not offered in 1970-71. Mr. Henry.

22. Studies in New Testament. An advanced course in some special subject in New Testament, which may vary from year to year.
Spring semester. Not offered in 1970-71. Mr. Henry.

23. Studies in History of Christianity. An advanced course in some special topic in history of Christianity, which may vary from year to year.
Spring semester. Not offered in 1970-71. Mr. Henry.

24. Mysticism East and West. Mysticism will be studied within the contexts of various religious traditions including Christianity, Judaism, Islam, Hinduism, Buddhism and Taoism. Philosophical and psychological analyses of mysticism will be considered in addition to a study of its nature and role as a type of religious phenomenon.
Fall semester. Mr. Swearer.

25. Religious Classics. An advanced course in the study of one or two great religious thinkers.
Fall semester. Not offered in 1970-71. Mr. Urban.

31. Religion and Ethics. The perennial problems of ethics and their relation-

ship to religious perspectives. Attention will be given to such problems as: the analysis of moral and religious language, Freudian and Marxist critiques of religious ethics, freedom and order, love and justice, just-war theory and personal responsibility in the use of power, as well as the nature of the good life and the ideal society. Among classical and contemporary authors studied will be Plato, St. Thomas, Joseph Butler, Ludwig Feuerbach, Martin Buber, John Dewey, A. C. Garnett, Eric Fromm, and Bernard Häring. Students as well as instructors will be responsible for the presentation of issues. (Also listed as Philosophy 31.)
Prerequisite: Philosophy 1, or one of the courses numbered Religion 3-6.
Spring semester. Messrs. Oberdiek and Urban.

37. American Religious Thought. See History 37.

38. Quakerism. 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.
Spring semester. Not offered in 1970-71.

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

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

53. Directed Reading.

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

HONORS SEMINARS

101. The Old Testament. A general introduction to major issues in Old Testament interpretation, followed by detailed investigations of particular subjects, chosen as far as possible on the basis of an individual student's interests, and leading to the production of a substantial research paper. Discussions are designed to familiarize the entire seminar with each student's special project.
Spring semester. Not offered in 1970-71. Mr. Henry.

102. The New Testament. The New Testament dealt with according to the format outlined for the Old Testament in Religion 101.
Spring semester. Not offered in 1970-71. Mr. Henry.

103. Early Christianity. A study of the development of Christian thought and institutions from the end of the first century to the Council of Chalcedon (A.D. 451). Specific subjects covered will depend on the students' interests. Among topics which might be considered are church and empire, missionary expansion, episcopacy, sacraments and liturgy, councils, doctrinal development and dogmatic definition, heresy, beginnings of monasticism. Greek and/or Latin, as well as French and German, while not required, can be employed extensively.
Fall semester. Not offered in 1970-71. Mr. Henry.

104. Christian Divisions East and West. This seminar is part of a large project, which is a study of the doctrinal, cultural, political, and ecclesiastical factors that caused divergence between Greek and Latin Christianity, and led to eventual schism. The specific subject matter will vary from year to year.
Fall semester. Not offered in 1970-71. Mr. Henry.

105. The Idea of God in Western Thought. 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.

Spring semester. Mr. Urban.

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

Fall semester. Not offered in 1970-71. Mr. Urban.

107. The Religions of Southeast Asia. A study of Theravada Buddhism within the historical and cultural matrix of Southeast Asia. Attention will be devoted to both textual and doctrinal problems as well as issues of a sociological and anthropological nature.

Fall semester. Not offered in 1970-71. Mr. Swearer.

108. Studies in Hinduism and Buddhism. A seminar designed to treat special topics in Hinduism and Buddhism depending on the interest and needs of students in the field of the History of Religions. Possible subjects of interest might include idealistic thought in Hinduism and Buddhism, facets of Buddhism in China and Japan, or the historical and cultural interactions of Hinduism and Buddhism in South Asia.

Spring semester. Mr. Swearer.

110. Medieval Philosophy. Philosophical thought from Augustine to the 15th century. Attention will be paid both to specific problems such as universals, analogy, and epistemology and to outstanding thinkers such as Anselm, Aquinas, Scotus and Ockham. Although primary emphasis will be historical, attention will be paid to the contemporary relevance of medieval thought. (Also listed as Philosophy 110.)

Fall semester. Not offered in 1970-71. Mr. Urban.

111. Philosophy of Religion. (See Philosophy 111.)

Spring semester. Mr. Bennett.

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

SOCIOLOGY AND ANTHROPOLOGY

LEON BRAMSON, *Associate Professor and Chairman*
STEVEN PIKER, *Associate Professor*
VINCENT BRANDT, *Assistant Professor*†
ROBERT C. MITCHELL, *Assistant Professor*
HANS-EBERHARD MUELLER, *Assistant Professor*
JENNIE-KEITH ROSS, *Assistant Professor*
JON VAN TIL, *Assistant Professor*†
VICTOR NOVICK, *Instructor*†

Although Sociology and Anthropology arose initially out of divergent historical traditions, they are engaged in a common task. Studies in the department are

†Absent on leave, spring semester, 1970-71.

directed toward the discovery of the general principles which help to explain the order, meaning, and coherence of human social and cultural life. To that end, work in the department will emphasize the comparative analysis of societies and social institutions; the structure and functioning of human communities; the principles of social organization and disorganization; and the conditions which tend to foster continuity and change, consensus and conflict. Emphasis will also be laid on the relevance of Sociology and Anthropology to social problems in the modern age, particularly to the question of the nature, conditions and limits of human freedom.

Requirements and Recommendations

Course 1 is prerequisite to all other work in the department. Applicants for a major or minor are required to have taken one additional course. Course majors will customarily write a thesis in their senior year. Course majors will take a minimum of eight courses in the department, including the introductory course and Course 98-99 (thesis). In general, students who take a course may not take the corresponding seminar.

1. Introduction to Sociology and Anthropology. An exploration of human societies and cultures: the origin of culture, its acquisition by the individual, and the diversification of societal types. Topics to be studied comparatively will include: human evolution, urbanism, ethnic and cultural pluralism, and social change.

Fall semester. Members of the Department.

20. Methods of Social Research. An introduction to the empirical study of societies. Topics for study include: the philosophical basis of social inquiry, the design of social research, problems of sampling, measurement, statistical analysis, data collection and interpretation. The major portion of class work consists of lab assignments. To fulfill lab requirements the student may choose either a) to undertake and complete an empirical research project on a topic of his choice or, b) to complete the weekly lab assignments. The last involves survey research, cross cultural research, participant observation, and the use of the computer in social research. This course presupposes no particular mathematical background, and is especially recommended to sophomores or juniors who plan to undertake empirical research for their theses.

Spring semester. Mr. Mitchell.

21. African Modernization. A survey of modernization theory and the modernization process in Africa south of the Sahara, including indigenously induced pre-colonial change, the impact of the West on African traditional societies, the changes associated with nationalism and independence, and the impact of urbanization and industrialization. Attention will be given to the uniquely African aspects of modernization with special reference to modern African culture. Selected countries will be examined intensively.

Not offered in 1970-71. Mr. Mitchell.

22. Race and Ethnic Relations in the United States. Ethnic and minority relations in America, their structure and patterns of change. Particular emphasis will be placed on the American Negro: the development of subcultures, effects of racial discrimination on the individual, and social movements arising out of the acculturation process. The experience of other ethnic groups, the melting-pot thesis, and the persistence of religious subcultures will also be studied.

Not offered in 1970-71. Mr. Van Til.

23. Comparative Social Organization. Examination of the social, economic, and political systems of primitive hunting-gathering and simple agricultural societies. Effects of environment on demography and complexity of organization. Comparison with primate societies.
Not offered in 1970-71. Mr. Novick.

25. Community Studies: Latin America. An examination of ethnographic accounts of rural and urban communities in Latin America, with emphasis on theoretical issues associated with the definition of types of communities. Detailed study of social, economic, and political organization of these communities. Topics will include interpretation of local community organization in a national and international context; social stratification; and the process of change.
Not offered in 1970-71. Mr. Novick.

26. Language, Society and Culture. The relationship of language to culture and society will be investigated through study of language acquisition, the influence of social and cultural context on language use, and the distribution of linguistic, social and cultural borders in speech communities. Major linguistic theories and methods will be discussed in terms of their usefulness to students of anthropology and sociology. Specific topics will include multi-lingualism, ethnoscience, linguistic relativity, codes and slang, Creoles and pidgins, translation and formal kinship analysis.
Spring semester. Mrs. Ross.

29. Sociology of Religion. Examination of the relationship between religion and society. Sociological theories of religion, religious organization and behavior, religion and social change, processes of institutionalization and secularization.
To be offered in 1971-72. Mr. Mitchell.

30. Special topics. Student initiated courses in which members of the staff participate or other irregular course offerings. The department lists the following courses under Special Topics:

30B. Applied Anthropology and Community Development. This course will examine theories of community development in the context of the application of anthropological knowledge to practical problems. Ample use will be made of case studies in directed change. Contrasts will be indicated where possible between the theory and practice of community development in capitalist and socialist countries.
Not offered in 1970-71. Mr. Novick.

40. Man and Environment. The study of patterns of energy flow and material cycling in the world ecosystem with particular reference to human population. Consideration will be given to the methodology of ecological analysis and its application to the study of the causes and consequences of the growth of technology and human populations, especially in relation to the question of environmental deterioration. Freshmen admitted by permission of the instructors. (Also listed as Biology 40.)
Prerequisite: Biology 2 or Sociology-Anthropology 1.
Spring semester. Mr. Hickman and Mr. Mitchell.

44. Special Project. As stated in C.E.P. Recommendation No. 4, the College will grant up to one unit of course credit "for practical work, which might be done off-campus, when it can be shown to lend itself to intellectual analysis, and is likely to contribute to a student's progress in regular course work, and subject to four conditions: (1) agreement of an instructor to supervise the project; (2) permission of the Curriculum Committee; (3) a basis for the project in

some prior course work; and (4) normally, the examination of pertinent literature and production of a written report as parts of the project."

Members of the Department.

50. Modern Social Theory. The social and intellectual background of the rise of social science, with consideration of selected social theorists and emphasis on the relation of ideology to theory and research. Among the topics discussed are individualism, progress, elitism, racism, collectivism, and war.

Not offered in 1970-71. Mr. Bramson.

51-52. Colloquium: Caribbean Society. An attempt to develop generalizations about the structure of Caribbean society. Each student will be responsible for the analysis of a particular island or segment of that society and its relationship to the larger whole, utilizing the results of existing sociological, anthropological, or other studies.

Spring semester. Mr. Bramson.

55. Anthropological Study of Complex Societies. The rapid disappearance of isolated primitive communities has focused anthropologists' attention on societies with literate traditions, as well as urbanization in developing countries. This course treats theoretical and methodological problems associated with this shift in anthropological perspective. Ethnographic materials from Asia, Africa, and South America will be used.

Fall semester. Mr. Brandt, Mrs. Ross.

57-8. Colloquium: Social Borders. This course will try to define the processes by which basic social characteristics such as age, sex, or ethnicity become identified and maintained as social borders which define groups, roles, and conflicts in both traditional and industrial societies.

Spring semester. Mrs. Ross.

59. Urban Sociology. The historical growth of cities, the social structure of urban areas, impact of urbanization on social relations, and the emergent ideologies of city life considered from the main perspectives of urban sociology. Topics of special interest include the structure and process of metropolitan life, the consequences of urbanization for rural life and small towns, the prospects for urban planning, and the contemporary crisis of the cities.

Fall semester. Mr. Van Til.

60. Cultural Ecology. An examination of cultural systems viewed as adaptations to the physical, social, and political environment. Consideration will be given to theoretical issues of cause and explanation in ecological studies; social and cultural adjustments to factors such as nutritional needs, population size and density, and natural resources. Case material will be drawn from the anthropological literature on primary bands, tribal societies, and pastoral nomads.

Fall semester. Mr. Novick.

61. Social Stratification. An examination of theoretical perspectives and empirical studies on the structure of social inequality. Special emphasis will be placed upon stratification in contemporary society. Topics will include: social mobility, class subcultures, the social organization of the poor, deviance and delinquency, and ethnic stratification.

Spring semester. Mr. Mueller.

62. Political Sociology. The relation of politics to basic social structures, processes and traditions. Study of problems, concepts and theories about politics viewed as human behavior. The specific topics will vary from year to year.

Spring semester. Mr. Mueller.

63. Psychological Anthropology. A study of cultural differences from the standpoint of the socialization process. A comparative analysis of the ways in which patterns of behavior are transmitted through the family and related institutions. An assessment of the significance of this approach for fields of social and cultural anthropology.

Spring semester. Mr. Piker.

64-65. Colloquium: Buddhism, a Social History. An exploration of the social and historical conditions under which Buddhism developed in the 6th century B.C., and the conditions under which it became established in India and subsequently in Ceylon and S.E. Asia. Primary focus will be upon the Theravada School. Some familiarity with doctrinal Buddhism will be developed, but the main emphasis will be upon the history of Buddhism seen as a number of instances of religion and social change. Special attention will be given to sectarian developments within the Theravada School within the past 150 years.

Prerequisite: permission of the instructor.

Spring semester. Mr. Piker.

66. Directed Reading. Individual or group study in fields of special interest to the students not dealt with in the regular course offerings. Consent of the Chairman and of the instructor is required.

Members of the Department.

67-8. Colloquium: Human Resources. A research colloquium emphasizing the study of the intersection of the educational system and the occupational structure. Specific problems will include improvement of the educational system, military manpower policy, the human career, and professionalization. Each member of the colloquium will do a project.

Fall semester. Mr. Bramson.

70. Economic Anthropology. Examination of the economic institutions of primitive and peasant societies. Theoretical issues such as the meaning of "economic" and the nature of surplus will be considered, as will such substantive issues as the origins and kinds of money, property, labor, trade and markets.

Fall semester. Mr. Pryor and Mr. Novick.

71-2. Colloquium: The Sociology of Intellectual Life. An examination of the main approaches to the sociological study of culture and intellectual life. Particular attention will be given to the role of intellectuals in modern society. The colloquium will provide an opportunity for research on the sociology of science, literature, art, and music.

Spring semester. Mr. Mueller.

73. Japanese Society. After tracing the development of a distinctive Japanese civilization within the East Asian cultural tradition, attention will be focused on post war society. To what extent is industrial Japan "converging" with other advanced nations in terms of ideology and social organization? Comparisons will be introduced with China and Korea, as well as with the West.

Fall semester. Mr. Brandt.

98-99. Thesis. Theses will be required of all Course majors. Seniors will normally take two consecutive semesters of thesis tutorial (Course 98-99) during their senior year. Students are urged to have their thesis proposals approved as early as possible during the junior year.

Honors Seminars

101. Far East Peasant and Urban Cultures. The relationship between systems of thought and social institutions will provide the main integrating frame for a discussion of kinship systems, the state bureaucracy, religion, and forms of economic organization in China, Japan, and Korea. The influence of modernizing ideology on traditional forms will be stressed in an attempt to describe and understand some of the sharp contrasts of the development process in these countries.
Not offered in 1970-71. Mr. Brandt.

102. Comparative Social Organization. The nature of human social organization. Case materials will be drawn from a variety of culture types and areas. Special emphasis will be given to non-Western social structure and to recent theoretical developments in the analysis of social organization.
Spring semester. Mrs. Ross.

103. Race and Culture. 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.
Not offered in 1970-71. Mr. Van Til.

104. Psychological Anthropology. 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.
Spring semester. Mr. Piker.

105. Modern Social Theory. The social and intellectual background of the rise of social science, with consideration of selected social theorists and emphasis on the relation of ideology to theory and research in sociology.
Spring semester. Mr. Bramson.

106. Cultural Ecology. An examination of cultural systems viewed as adaptations to the physical, social, and political environment. Consideration will be given to theoretical issues of cause and explanation in ecological studies; social and cultural adjustments to factors such as nutritional needs, population size and density, and natural resources. Case material will be drawn from the anthropological literature on primary bands, tribal societies, and pastoral nomads.
Fall semester. Mr. Novick.

107. Sociology of Religion. An exploration of the relationship between religion and society. Special emphasis will be given to the social and historical determinants of changes in religious institutions, and to the adaptive qualities of religious institutions in periods of social upheaval. Case materials will be drawn largely from societies and religions of South and Southeast Asia, principally Hinduism and Buddhism. Work in the seminar will include a research project.
To be offered in 1971-72.

108. Social Stratification. An examination of theoretical perspectives and empirical studies on the structuring of social inequality. Special emphasis will be placed upon the study of social problems in contemporary society associated with patterns of stratification. Units of study will include the following topics: social mobility, class subcultures, the social organization of the poor, deviance and delinquency, and ethnic stratification.
Fall semester. Mr. Mueller.

109. Social and Cultural Change. Classical and modern theories of change. Case studies of long term and short term aspects of change including the industrial revolution, the modernization process, collective behavior and aspects of contemporary and future American society.

Spring semester. Mr. Mitchell.

110. Urban Sociology and Politics. The impact of urbanization on contemporary politics and social structure, from the perspective of political science and sociology. Emphasis will be placed on empirical study of selected problems, such as physical planning, social welfare, and political organization.

Fall semester. Mr. Gilbert and Mr. Van Til.

112. Sociolinguistics. The relationship of language to culture and society will be investigated through a study of language acquisition, the influence of social and cultural context on language use, and the distribution of linguistic, social and cultural borders in speech communities. Major linguistic theories and methods will be discussed in terms of their usefulness to students of anthropology and sociology. Specific topics will include multi-lingualism, ethnoscience, linguistic relativity, codes and slang, Creoles and pidgins, translation and formal kinship analysis.

Fall semester. To be offered in 1971-72. Mrs. Ross.

114. Political Sociology. The relation of politics to basic social structures, processes, and traditions. Study of problems, concepts, and theories about politics viewed as human behavior.

Fall semester. To be offered in 1971-72.

120. Thesis. Honors students who choose to do so will customarily write theses during the senior year. Students are urged to have thesis proposals approved as early as possible during the junior year.

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HEALTH SERVICE

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

Harold C. Roxby, B.S., Pennsylvania State University; M.D., Temple University, Associate College Physician.

Erwin R. Schmidt, Jr., B.S., Yale University; M.D., University of Wisconsin, Consulting Orthopedic Surgeon.

Consulting Psychiatrists:

Leon J. Saul, B.A. and M.A., Columbia University; M.D., Harvard University.

J. W. Lyons, B.A., University of Scranton; MD., University of Pennsylvania.

Donald V. Stevenson, B.A. and M.D., Universidad de Cartagena.

Silas L. Warner, B.A., Princeton University; M.D., Northwestern University.

Nurses:

Elizabeth Cozine, R.N., **E. Elizabeth McGeary,** R.N., **Helen R. Martin,** R.N., **Joan Morton,** R.N., **Ida Moore Thomas,** R.N.

Janet B. Hazzard, R.N., Secretary.

DEPARTMENTAL SECRETARIES, ASSISTANTS AND TECHNICIANS

Art History: **Karen Lindesmith,** B.A., Indiana University.

Astronomy: **Mary MacD. Jackson,** B.A., Swarthmore College; **Nan Jones; Elizabeth H. Kuhlman,** B.A., Mount Holyoke College; **Louise H. Mitchell,** B.S., West Chester State College; **Michael D. Worth,** A.A., Keystone Junior College.

Biology: **Lloyd Merritts; Gloria Rosen,** M.A., Mt. Holyoke College.

Chemistry: **Ursula M. Davis,** B.S., MT (ASCP) Colby Junior College; **Jacqueline Bray; Edward C. Kehl.**

Economics: **Eleanor Greitzer; Mary E. Renneisen.**

Electronics Technician: **John J. Dougherty.**

Engineering: **Frances Shero,** B.A., Swarthmore College; **Theodore T. Bartholomew; Josephine Booth; T. F. Hockman.**

English Literature and Humanities Division: **Thelma M. Miller.**

History: **Eleanor W. Bennett.**

Mathematics: **Dorothy D. Blythe.**

Modern Languages: **Martha Dieffenbach; Natalie Kruczaj.**

Music: **Mary G. Gatens.**

Philosophy: **Alta K. Schmidt.**

Physical Education for Men: **Elizabeth Bassett.**

Physical Education for Women: **Esther R. Gosser.**

Physics: **John R. Andrews; Anna V. DeRose.**

Political Science: **Eleanor Greitzer; Mary E. Renneisen.**

Psychology: **Virginia S. Greer; Otto Hebel.**

Religion: **Alta K. Schmidt.**

Sociology and Anthropology: **Pauline B. Federman; Marie C. Perkins.**

Studio Arts: **Wallace C. Ayres,** B.A., Swarthmore College, M.Ed., Harvard University.

VII

VISITING EXAMINERS
DEGREES CONFERRED
AWARDS AND DISTINCTIONS
ENROLLMENT STATISTICS
PLAN OF COLLEGE GROUNDS

Commencement in the Scott Auditorium

VISITING EXAMINERS 1970

ART HISTORY: Professor John W. McCoubrey, *University of Pennsylvania;* Professor Charles Mitchell, *Bryn Mawr College;* Professor James Snyder, *Bryn Mawr College.*

BIOLOGY: Professor William T. Battin, *State University of New York at Binghamton;* Dr. A. Duncan Chiquoine, *Hamilton College;* Professor Melvin J. Cohen, *Yale University;* Professor Dietrich Kessler, *Haverford College.*

CHEMISTRY: Professor Carl von Frankenberg, *University of Delaware;* Professor Frank B. Mallory, *Bryn Mawr College;* Professor Wallace H. McCurdy, Jr., *University of Delaware.*

CLASSICS: Professor Anne Burnett, *University of Chicago;* Professor Robert E. A. Palmer, *University of Pennsylvania.*

ECONOMICS: Professor David F. Bradford, *Princeton University;* Professor Richard N. Cooper, *Yale University;* Professor Peter A. Diamond, *Massachusetts Institute of Technology;* Professor Holland Hunter, *Haverford College;* Mrs. Alice M. Rivlin, *The Brookings Institution;* Professor Robert Summers, *University of Pennsylvania.*

ENGINEERING: Professor Ralph C. Walker, *Bucknell University.*

ENGLISH LITERATURE: Professor Michael Bell, *Princeton University;* Professor Joseph Kramer, *Bryn Mawr College;* Professor Lowry Nelson, *Yale University;* Professor Edward Tayler, *Columbia University;* Professor Helen Vendler, *Boston University.*

HISTORY: Professor Herman Ausubel, *Columbia University;* Professor Elizabeth Brown, *Brooklyn College;* Professor F. Hilary Conroy, *University of Pennsylvania;* Professor Allen F. Davis, *Temple University;* Professor Alfred J. Rieber, *University of Pennsylvania;* Professor Alain Silvera, *Bryn Mawr College;* Professor Maynard W. Swanson, *Yale University;* Professor Edward M. Peters, *University of Pennsylvania.*

MATHEMATICS: Professor Willard E. Baxter, *University of Delaware;* Professor Richard Clelland, *University of Pennsylvania;* Professor Adam Kleppner, *University of Maryland;* Professor John Thorpe, *State University of New York at Stony Brook.*

MODERN LANGUAGES

FRENCH: Professor Howard Garey, *Yale University;* Professor Mario Maurin, *Bryn Mawr College.*

GERMAN: Professor Adolf Klarmann, *University of Pennsylvania.*

RUSSIAN: Professor Herman Ermolæv, *Princeton University;* Professor Elliott Mossman, *University of Pennsylvania.*

SPANISH: Professor Ciriaco Moron-Arroyo, *University of Pennsylvania.*

MUSIC: Professor Robert P. Morgan, *Temple University.*

PHILOSOPHY: Professor Richard J. Bernstein, *Haverford College;* Professor Ann Brentlinger, *University of Massachusetts;* Professor William A. Christian, *Yale University;* Professor James W. Cornman, *University of Pennsylvania;* Professor John Dolan, *The Rockefeller University;* Professor William Pohle, *Herbert H. Lehman College, City University of New York;* Professor Anthony D. Woozley, *University of Virginia;* Professor Saul Kripke, *The Rockefeller University.*

PHYSICS: Professor Donald N. Langenberg, *University of Pennsylvania;* Professor John R. Olson, *Bryn Mawr College;* Professor Robert E. Warner, *Oberlin College.*

POLITICAL SCIENCE: Professor Henry Bienen, *Princeton University;* Professor Milton C. Cummings, Jr., *The Johns Hopkins University;* Professor J. Woodford Howard, Jr., *The Johns Hopkins University;* Professor Holland Hunter, *Haverford College;* Professor John D. Lewis, *Oberlin College;* Professor Kenneth N. Waltz, *Brandeis University.*

PSYCHOLOGY: Professor James Bryan, *Northwestern University;* Professor Henry Gleitman, *University of Pennsylvania;* Professor Edward E. Jones, *Duke University;* Dr. Jane Piliavin, *University of Pennsylvania;* Professor Robert Rescorla, *Yale University;* Dr. Sheldon White, *Harvard University;* Professor David Winter, *Wesleyan University;* Dr. Sarah Winter, *Wesleyan University;* Professor Carl Zuckerman, *Brooklyn College.*

RELIGION: Professor William A. Christian, *Yale University;* Professor Howard C. Kee, *Bryn Mawr College;* Professor Jaroslav Pelikan, *Yale University.*

SOCIOLOGY AND ANTHROPOLOGY: Professor E. Digby Baltzell, *University of Pennsylvania;* Professor Leonard Blumberg, *Temple University;* Professor A. Thomas Kirsch, *Princeton University;* Professor Robert A. LeVine, *University of Chicago;* Professor Dean McCannell, *Temple University;* Professor Nan Pendrell, *Chatham College;* Professor Gilbert Rozman, *Princeton University;* Professor Eugene Schneider, *Bryn Mawr College.*

DEGREES CONFERRED

June 8, 1970

BACHELOR OF ARTS

Michael Sherman Aldrich, *Psychology*
Margaret Dale Allen, *Zoology*
Janet R. Allison, *Psychology*
Kristen Anderson, *History*
Stephen K. Arbuthnot, *English Literature*
Janice Kay Archer, *Art History*
Javier A. Arrastia, *Philosophy*
Douglas Arnold Bacon, *Biology*
Sarah Bancroft, *Greek*
Frank Barch, *Biology*
William Hale Barton, *Psychology*
Anita Louisa Beck, *Religion*
Brigitte Schmidt Bell, *Religion*
Russell Alan Benghiat, *English Literature*
John C. W. Bennett, *Economics*
Marvin Berg, *Sociology-Anthropology*
Lauren Nash Bernstein, *Psychology*
Paula Bernstein, *Psychology*
John William Black, *History*
Douglas H. Blair, *Economics*
Arthur Ray Block, *Political Science*
Gabriella M. Boden, *History*
Walter Cammack Bond, *Mathematics*
Michael Allen Boni, *Mathematics*
Susan Jane Bonthron, *Art History*
Paula Anne Braveman, *Philosophy*
John Worth Braxton, *Botany*
Barbara P. Briggs, *Zoology*
John Edward Briggs, *History*
Alan Douglas Brooks, *History*
Prudence Elizabeth Brown, *Sociology-Anthropology*
Michael Alan Brownlee, *Zoology*
Lauren Eugene Brubaker, *Sociology-Anthropology*
Raymond Paul Bub, *Sociology-Anthropology*
Harold Buchanan*‡, *Mathematics*
Frank Duffryn Burns, Jr., *Biology*
Theodore Burton, IV, *Economics*
Bruce Monroe Bush, *Sociology-Anthropology*
John Alexander Byers, *Zoology*
David L. Camp, *Economics*
Deborah Joan Carey, *English Literature*
Stephen Hughes Carr, *Zoology*
John William Chaffee, *History*
Claudia Chanlett, *Psychology*
George Bernard Clairmont, *History*
Beverly Lyon Clark, *English Literature*
Roger D. Clark, *Sociology-Anthropology*
Stephanie Lucy Cooley, *English Literature*
John Michael Cooper, *Political Science*
Mary Anne Cornish, *English Literature*
Sarah Louise Sproul Cotterill, *English Literature*
James G. Cuthbertson, *Biology*
Mark Howard Daniel, *History*
Martha Rose Davidson, *Art History*
John Charles Dean, *History*
Elizabeth DeLaHunt, *English Literature*
Deborah DeMott, *History*
Beatrice Diebold, *History*
Robert Scott DiPrete, *Philosophy*
Jean Adrianne Dirks, *Psychology*
Peter Dodge, *English Literature*
Jannette Domingo*‡ *Political Science-International Relations*

*As of the Class of 1969
‡With concentration in Black Studies

Christine Marie Doty, *Political Science*
Frank Easterbrook, *Political Science*
Jonathan Ellis*, *Economics*
Israela Ettenberg, *Philosophy*
Eileen Ruth Farrell, *Sociology-Anthropology*
John Richard Fields, *Physics*
Sharon Gail Finley, *Greek*
Jennifer Will Fleischaker, *Russian*
David R. Foster, *Economics*
Mary Catherine Fowler, *Zoology*
Carolyn Ellis Frick, *English Literature*
Timothy Pishon Gardner, *Political Science*
Byron Fritts Golden, *Biology*
Mary Josephine Good, *Religion*
Bartlett Lee Grahl, *English Literature*
Christine Behrens Grahl, *French*
Jacob Lee Graves, *English Literature*
Wilbert Joseph Greenhouse, Jr., *Economics*
Michael Paul Greenwald, *Sociology-Anthropology*
Sarah Gregory, *Biology*
William Evans Greiner, *History*
Gary Edward Gross, *History*
Eliot Lee Grossman, *Philosophy*
Carl Eric Gulotta, *Chemistry*
Dean Francis Hanley, *Chemistry*
Jeanne Elsie Harrison, *Mathematics*
Laura Jean Hassler, *Sociology-Anthropology*
Ida Hay, *Botany*
Dahrl Louise Hill, *Biology*
Alan S. Hollister, *Chemistry*
Duncan Twiford Hollomon, *Political Science*
William James Holt, *Zoology*
Elizabeth Kathryn Hood, *Philosophy*
Joseph Irving Horowitz, *History*
Mary Louise Hough, *English Literature*
John Douglas Howard, *Music*
Meredith Hunt, *Religion*
Ronald David Hurt, *Political Science*
Anne Elizabeth Jones, *History*
Noble Sidney Jones, *Chemistry*
Fania Davis Jordan*, *French*
Kathleen Karkut, *Art History*
Raymond Allen Kelly, *English Literature*
Vinit Khosla, *Economics*
James B. Kimmel, *Economics*
Deborah Kirk, *Latin*
Benjamin Kuipers, *Mathematics*
William Eliot Ladd, *History*
Nancy Monroe Leiser, *English Literature*
Bradley N. Lemke, *Zoology*
Lucinda M. Lewis, *Economics*
Martha S. Lewis*, *English Literature*
Karen Kristine Lind, *Art History*
Bruce Edward Lohman, *Chemistry and Music*
Janice Margaret Lohr, *Sociology-Anthropology*
Robert Allen Lohr, *Economics and Political Science-International Relations*
John William Loven, *Psychology*
Victoria McK. Lundquist, *Zoology*
Joanne Luoto*, *Zoology*
Mary Diane Lusk, *Psychology*
Robert Stewart Lykens, *English Literature*
Beth Ann Maier, *Zoology*
Stephen Robert Marion, *Economics*
Janet Eileen Mather, *Sociology-Anthropology*
Guy Scott McLean, *English Literature*
Ruth Netta McNeill, *Sociology-Anthropology*
Robert Elliott Mellman, *Economics*
Barbara Diane Merrill, *Economics*
Harvey S. Miller, *Psychology*
Louis R. Miller, *English Literature*
Terry Ann Miller, *Spanish*
Seymour Moscovitz†, *English Literature*

*As of the Class of 1969

Gary Lawrence Moss, *Economics*
Michael Namiki, *English Literature*
Susan Nayfield, *Chemistry*
Anne Linda Newman, *Biology*
Margaret Ellen Nordstrom, *Political Science-International Relations*
Kevin Lee Northrup, *Mathematics*
Karen Kristina Nygaard, *German*
Chloe Mary O'Gara, *Psychology*
Joyce Margaret Olum, *German*
R. Michael O'Neal, *History*
Patricia Lynn O'Regan, *Sociology-Anthropology*
Lawrence Gilbert Palmer, *Physics*
Ann Jameson Peet, *Russian*
Paul Edward Prusiner, *Chemistry*
Elizabeth Raleigh, *English Literature*
Jeffrey Brian Remmel, *Mathematics*
Christopher C. Richter, *Economics*
Doris Ring, *French*
Lance Jeffrey Rips, *Psychology*
Grant Alden Ritter, *Mathematics*
Alan Joel Robin, *Psychology*
James Adams Robinson, *Economics*
Dean Howard Roemmich, *Physics*
Diana Roose, *Psychology*
Myra Elizabeth Rose, *Chemistry and Biology*
David William Rosenbaum, *Philosophy*
Caroline Robinson Sanders, *English Literature*
Andrew Schaefer, *German*
Elizabeth Schairer, *History*
Jessica Gross Schairer, *Sociology-Anthropology*
William B. Schendel, *History*
Aaron Schwartz, *English Literature*
Michael Henry Seligmann, *Psychology*
Roy James Shanker, *Physics*
Kathryn Louise Sharp, *Sociology-Anthropology*
Freda Foh Shen, *Political Science*
Roland W. Sherman, *Sociology-Anthropology*
Allen Mark Shlaifer, *Latin*
William Ivan Shorter, *Mathematics*
Irene Marsha Silverblatt, *Sociology-Anthropology*
Ruth Stein Singleton, *Art History*
Boyd Justin Slomoff, *Psychology*
Ann Benedict Smith, *Psychology*
Charles B. Spadoni, *Economics*
John Hannum Stevens, *Economics*
Alexandra Stevenson, *English Literature*
Richard Jerome Stone, *Religion*
Artley Swift*, *Religion*
Akiko Takahashi, *Art History*
Avery Taylor, *English Literature*
G. Carol Teets, *English Literature*
Tin Swe Thant, *Political Science*
Anne Mee Thompson, *Chemistry*
Ellen Rosalie Thompson, *Mathematics*
Stephen B. Trippel, *Psychology*
Seth Tyler, *Biology*
Virginia Branch van der Bogert, *Sociology-Anthropology*
Bridget Van Gronigen, *Biology*
Howard L. Vickery, II, *Sociology-Anthropology*
Susan Vivell, *History*
Thomas White Warrington, *Psychology*
Phillips Cromwell Watson, *English Literature*
Helene Silverblatt Weber, *Sociology-Anthropology*
Linda Janine Wells, *Psychology*
Richard Ellery Welsh, *Psychology*
Wendell Walter Willard, *Sociology-Anthropology*
John Clark Willett, *Physics*
Carol Mae Williams, *French*
Gary Philip Williams, *Psychology*
Michael Charles Wing, *English Literature*

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†As of the Class of 1968
*As of the Class of 1969

Morton Emanuel Winston, *Psychology*
Consuelo Staisey Woodhead, *English Literature*
Anand Alan Yang, *History*
Tuggelin Biccard Yourgrau, *Philosophy*
Arlene Zarembka, *Economics*
Barbara Marie Zaveruha, *Sociology-Anthropology*
Paul William Zelnick, *Biology*

BACHELOR OF SCIENCE

Terrence L. Burch, *Engineering*
Manuel J. Casanova, *Engineering*
James Monroe Foltz, *Engineering*
Mark Steven Goldman, *Engineering*
John Julius Gorlich, *Engineering*
Bruce Hamilton, *Engineering*
Bentley P. Jenkins, *Engineering*
Michael C. Liu, *Engineering*
Stuart William Olson*, *Electrical Engineering*
André Clement Pool, *Engineering*
Paul Lum Taylor, *Engineering*
Ferdinand M. Warren, *Electrical Engineering*
Roy E. Wilber, *Civil Engineering*
Burt M. Zurer, *Engineering*

MASTER OF ARTS

Katherine Anne Bode, *Psychology*

HONORARY DEGREES

DOCTOR OF HUMANE LETTERS
Avram Noam Chomsky

DOCTOR OF SCIENCE
John Wainwright Evans, Jr.

DOCTOR OF LAWS
Clarence Russel Moll

DOCTOR OF LAWS
R. Stewart Rauch, Jr.

DOCTOR OF HUMANE LETTERS
Barbara Weisberger

†As of the Class of 1968
*As of the Class of 1969

AWARDS AND DISTINCTIONS

HONORS AWARDED BY THE VISITING EXAMINERS

HIGHEST HONORS:

Timothy P. Gardner, Joseph I. Horowitz.

HIGH HONORS:

Brigitte S. Bell, John C. W. Bennett, Arthur R. Block, John W. Chaffee, John C. Dean, Frank H. Easterbrook, John R. Fields, Benjamin J. Kuipers, Robert E. Mellman, Ann J. Peet, Roland W. Sherman, Michael C. Wing.

HONORS:

A. Louisa Beck, John E. Briggs, Sarah L. Cotterill, Deborah A. DeMott, Jean A. Dirks, David R. Foster, Mary J. Good, Duncan T. Hollomon, Deborah Kirk, Nancy M. Leiser, Lucinda M. Lewis, Patricia L. O'Regan, Lawrence G. Palmer, Jeffrey Brian Remmel, Grant A. Ritter, James A. Robinson, Jessica G. Schairer, Freda Foh Shen, Charles B. Spadoni, G. Carol Teets, Anne M. Thompson, Stephen B. Trippel, Howard L. Vickery, John C. Willett, Gary P. Williams, Arlene Zarembka, Paul W. Zelnick.

DISTINCTION IN COURSE AWARDED BY FACULTY

Sarah Bancroft, Lauren N. Bernstein, Alan D. Brooks, Michael A. Brownlee, John M. Cooper, James G. Cuthbertson, Eileen R. Farrell, Jennifer W. Fleischaker, Bartlett L. Grahl, Mary L. Hough, Victoria McK. Lundquist, Mary Diane Lusk, Margaret E. Nordstrom, Elizabeth Raleigh, Lance J. Rips, Diana Roose, Seth Tyler, Richard E. Welsh, Morton E. Winston.

ELECTIONS TO HONORARY SOCIETIES

PHI BETA KAPPA:

Sarah Bancroft, Lauren N. Bernstein, Arthur R. Block, Alan D. Brooks, John W. Chaffee, Beverly L. Clark, John M. Cooper, Frank Easterbrook, Eileen R. Farrell, John R. Fields, Sharon G. Finley, Jennifer W. Fleischaker, Timothy P. Gardner, Duncan T. Hollomon, Joseph I. Horowitz, Benjamin Kuipers, Lucinda M. Lewis, Mary Diane Lusk, Robert E. Mellman, Lawrence G. Palmer, Ann J. Peet, Elizabeth Raleigh, Jeffrey B. Remmel, Lance J. Rips, Grant A. Ritter, Diana Roose, Roland W. Sherman, Charles B. Spadoni, Anne M. Thompson, Seth Tyler, John C. Willett, Morton E. Winston, Arlene Zarembka.

SIGMA XI:

Douglas A. Bacon, Terrence L. Burch, John R. Fields, Bruce Hamilton, Richard R. Kaiser, Benjamin J. Kuipers, Lawrence G. Palmer, André C. Pool, Jeffrey B. Remmel, Grant A. Ritter, Anne M. Thompson, Seth Tyler, John C. Willett.

SIGMA TAU:

Terrence L. Burch, Bruce Hamilton, André C. Pool, Roy E. Wilber.

SWARTHMORE COLLEGE FELLOWSHIP AWARDS

The Hannah A. Leedom Fellowship to John Charles Dean.

The Joshua Lippincott Fellowship to John William Chaffee.

The Lucretia Mott Fellowship to Sarah Bancroft.

The Martha Tyson Fellowship to Beverly Lyon Clark, Janet Mather, Ellen Thompson.

SPECIAL AWARDS

The Ivy Award to Arthur R. Block.

The Oak Leaf Award to Susan Vivell.

The McCabe Engineering Award to James M. Foltz.

The Sarah Kaighn Cooper Scholarship to Paul L. Shechtman.

The Phi Beta Kappa Prize to David J. Scheidlinger.

The Brand Blanshard Prize to Robert E. Heinaman.

The A. Edward Newton Library Prize to Francis L. Randolph.

The Ella Frances Bunting Poetry Reading Contest: first prize, Don A. Mizell; second prize, Dennis A. Small; third prizes, M. Denise Dennis and Bertrand R. Yourgrau.

The William Plumer Potter Public Speaking Fund Awards:

The Potter One-Act Play Contest: prize awarded to John Loven.

The Potter Fiction Contest: first prize, Richard Chandler; second prize, Bertrand R. Yourgrau; third prize, Jonathan P. Levin.

The Lois Morrell Poetry Award to Richard Chandler.

The John Russell Hayes Poetry Prizes: first prize, Arthur P. Johnson; second prize, Christine Grahl.

The Academy of American Poets Award to Alan B. Brooks.

The May E. Parry Memorial Award to Elizabeth Schairer.

The Scott Award to Giles K. Kemp.

ENROLLMENT OF STUDENTS BY CLASSES 1969-70

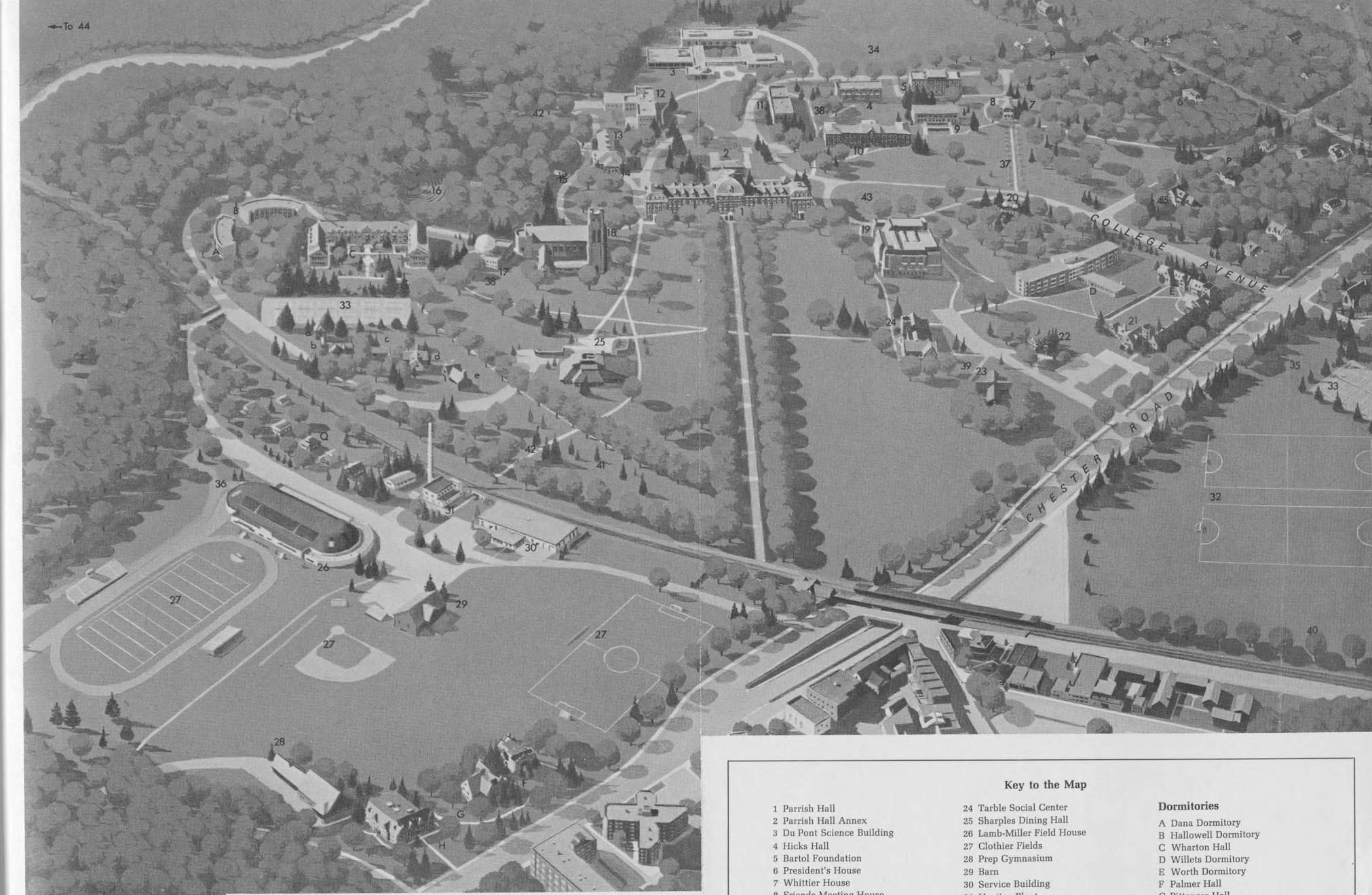
	Men	*Women*	*Total*
Seniors	138	92	230
Juniors	118	101	219
Sophomores	179	141	320
Freshmen	180	150	330
Total Undergraduates	615	484	1,099
Special Students	5	7	12
Graduate Students	0	3	3
Totals	620	494	1,114

GEOGRAPHICAL DISTRIBUTION 1969-70

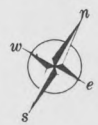
Pennsylvania	225
New York	169
New Jersey	82
Maryland	59
California	57
Connecticut	53
Ohio	48
Massachusetts	46
Delaware	29
Virginia	29
Illinois	28
North Carolina	16
District of Columbia	15
Florida	15
Indiana	15
Michigan	13
Minnesota	12
Texas	12
Washington	12
Missouri	9
Wisconsin	9
Colorado	8
Hawaii	8
Tennessee	8
New Hampshire	7
Oregon	7
Vermont	7
Georgia	6
Iowa	6
New Mexico	6
Alabama	5
Rhode Island	5
Maine	4
Mississippi	4
South Carolina	4
Oklahoma	3
Virgin Islands	3
Arkansas	2
Canal Zone	2
Kentucky	2
Louisiana	2
Nebraska	2
North Dakota	2
Arizona	1
West Virginia	1
Wyoming	1
Total U.S.A.	1,059
Canada	11
England	3
Hong Kong	3
Japan	3
Mexico	3
Thailand	3
India	2
Italy	2
Lebanon	2
Nigeria	2
Bermuda	1
Brazil	1
Chile	1
Colombia	1
France	1
Germany	1
Greece	1
Guatemala	1
Indonesia	1
Jamaica	1
Libya	1
Morocco	1
Nicaragua	1
Peru	1
Portugal	1
Saudi Arabia	1
Seychelles	1
Spain	1
Turkey	1
Uruguay	1
Venezuela	1
Total from abroad	55
Grand Total	1,114

INDEX

INDEX



Swarthmore College Campus



Key to the Map

1 Parrish Hall
2 Parrish Hall Annex
3 Du Pont Science Building
4 Hicks Hall
5 Bartol Foundation
6 President's House
7 Whittier House
8 Friends Meeting House
9 Arts Center
Pearson Theatre
Wilcox Gallery
10 Trotter Hall
11 Beardsley Hall
12 Martin Biological Laboratory and Animal Laboratory
13 Sharples Swimming Pool
14 Hall Gymnasium
15 Scott Foundation Building
16 Scott Outdoor Auditorium
17 Sproul Observatory
18 Clothier Memorial
19 McCabe Library
20 Cunningham House
21 Bond Memorial and Lodges
22 Benjamin West House
23 Worth Health Center
24 Tarble Social Center
25 Sharples Dining Hall
26 Lamb-Miller Field House
27 Clothier Fields
28 Prep Gymnasium
29 Barn
30 Service Building
31 Heating Plant
32 Hockey Fields
33 Tennis Courts
34 Proposed site of music and studio arts building
35 Proposed site of women's athletic facilities
36 Site of squash courts
37 Lilac Collection
38 Tree Peonies
39 Magnolias
40 Crabapples
41 Pinetum
42 Rhododendrons and azaleas
43 Dean Bond Rose Garden
44 Scott Foundation Nursery and test plots
45 Black Cultural Center

Dormitories

A Dana Dormitory
B Hallowell Dormitory
C Wharton Hall
D Willets Dormitory
E Worth Dormitory
F Palmer Hall
G Pittenger Hall
H Roberts Hall
J Ashton House
K Woolman House
M Mary Lyon Buildings
P Professors' Residences
Q Employees' Houses

Fraternity Lodges

a Kappa Sigma Pi
b Tau Alpha Omicron
c Phi Sigma Kappa
d Delta Upsilon
e Phi Omicron Psi