THE ARTS AND SCIENCES

COLLEGE HALL

AND THE COLLEGE OF LIBERAL ARTS AND SCIENCES

College Hall

The black-and-gilt sign on the portico gives the date 1871, but College Hall first opened its doors to students on September 16, 1872.

With the enthusiasm usual to such publications, the University catalogue described the new building as "one of the most stately colleges in the country," and with equal satisfaction it commented on "the quietness, the absence of excitement, and the pure air which so greatly tend to promote industrious habits, to render study profitable, and to preserve the health, all of which objects it was impossible to secure in an equal degree while the School remained in the center of the City."

The actual building site of College Hall was a half-acre of the old Almshouse Farm. The design was Gothic, as conceived by Thomas W. Richards of the faculty. The green stone, a serpentine quarried near West Chester, was also to be used for Logan Hall, the older part of the University Hospital, and the Hare Building. In time erosion caused by sulphur in the city air, which the geologists say formed Epsom salts, made cement refacing necessary. In 1914 the Clock Tower on the west wing, in 1929 the East Tower, were taken down. The bell which for forty-two years had rung out the classes was given honored resting place in Houston Hall. Old landmarks, old customs, also passed. The Senior Fence no longer flanks the rear entrance. The Bowl Fight, which once raged in, out, and about the building, in time moved away to Museum Field and final extinction. The Hall Fight, the Flour Fight, the Corner Fight, undergraduates of today know only through commemorative tablets.
As one stands by the Boyle statue of Benjamin Franklin, erected in 1938 before the main entrance through a loan by the City of Philadelphia, the old building bulks massive, impressive in length and height even in this day, and perhaps not outmoded in dignity. Softening the gaunt lines, the ivy planted on Hey Days by successive generations clammers over and beyond the memorial plaques.

Few, save older graduates, realize what service College Hall has rendered during its sixty and more years. That once, for example, the west wing was devoted to arts, the east to science. That, in its time, it has harbored the Chapel, Gymnasium, Library, Museum; the Graduate School; the Law School; classrooms and laboratories of chemistry, physics, biology, engineering; the School of Architecture; the allied sciences now constituting the Wharton School; the School of Education. Except one or two, merged or superseded, these have found housing of their own. And until 1930, in a sub-basement, part of the old realm of "Pomp," College Hall's famous janitor, was stabled the white horse known to undergraduates as Rollo, who pulled the lawn-mower on work days, and on great occasions led parades on Franklin Field. Below even the level of the sub-basement lies a catacomb of passages extending outward to the east and west beneath the paths.

Much of the present administration of the University is still carried on in College Hall. To the left of the front entrance are the offices of the President of the University, and of the Vice-President who serves as his assistant. To the right are those of the Provost. To the left along the hall are the offices of the Dean and Associate Dean of Student Affairs. The offices of the College itself are directly ahead as one enters the building. Here are to be found the Dean of the College, the Assistant to the Dean, and the Personnel Officer of the College, who is especially concerned with the scholastic problems of the students.

In addition to these administrative offices College Hall contains the offices of eleven of the fifteen departments of the College and of many members of the faculty, and thirty-six classrooms seating 2,303 students. In the basement is the Psychological Clinic; on the second floor is the Geological Museum; on the fourth floor, a climb of 101 steps from the basement, is the office of the Department of Anthropology, itself almost a museum. Indeed, College Hall now serves partly as an art gallery, for a fine group of paintings loaned by the Academy of Fine Arts decorates the halls and stairways.
In the history of American education, it is a special distinction of the College that Provost William Smith in 1756 outlined the first liberal curriculum of higher learning in the western world. It departed from traditional, narrowly theological aims, pointing the way for other American institutions after the Revolution. The College was the first academic body of its kind to offer various practical courses such as surveying, navigation, accounting, commerce, government, international law. It established the first chair of chemistry in America in 1769, was the first to make formal inclusion of modern languages in its curriculum. A part of the College in 1765 was the faculty of the School of Medicine, the first in America.

Naturally, then, since the days of Provost Smith and his plea for a more liberal education, the curriculum has been progressively adapted to the needs of the students. In 1825 the course was lengthened from three to four years, entrance credits were made more rigorous, and students under fourteen years were denied admission. After deficiencies in the curriculum had been pointed out by Provost Stillé, an elective system was tentatively adopted in 1867 with a fixed roster in freshman and sophomore years, but for junior and senior years possible electives in modern languages in place of Greek or Latin, and various subjects in place of mathematics.

Choice of electives was further widened in 1887—too much, it was found, and the group system was adopted. Former freedom of choice was regulated, and in certain subjects electives were extended to the first two years and to the entrance requirements. The group system, modified to meet changing demands, has continued in effect to the present. In 1922 the requirement of an ancient language was eliminated from the Pre-Medical course, and in 1930 from the straight Arts and Science course. The last change of importance was the granting, in 1938, of freer choice within the group requirements and the introduction of placement examinations which make possible the more rapid advancement of capable students.

Enrolled in the College each year are over a thousand full-time students and another thousand part-time students. The latter are registered in what are known as the College Collateral Courses. These are courses given in the afternoon and evening and on Saturday morning. Established in 1894 as the College Courses for Teachers, they were given their present name in 1933, when it became clear that most of the teachers in Philadelphia and neighboring
communities were already college graduates and that the students were being drawn from many walks of life besides the teaching profession.

But the College faculty, which now numbers 271, does not teach students in the College alone, for in the undergraduate schools of the University and the Graduate School all instruction in a particular subject is given by a single department. Hence, each week the College faculty teaches some forty thousand "student hours," of which more than two-thirds are in various other undergraduate schools and the Graduate School.

DEPARTMENTS IN COLLEGE HALL

English: A college without a Department of English would seem strange today; yet, that English was taught in the Academy and later the College of Philadelphia, and not Latin and Greek alone, was largely due to Benjamin Franklin's interest in modern languages and other workaday subjects. But until 1842, when Henry Reed, the friend of Thackeray and the popularizer of Wordsworth in America, began his lectures on the English poets, little literature for its own sake was taught. And following Reed's drowning on the lost Arctic in 1854, it subsided once more, for Reed's successors devoted most of their time to history, social science, and even law rather than to English literature.

The principal purpose of the courses until late in the century was practice in composition and public speaking, and the students foraged for ideas in textbooks devoted to many branches of learning. The explanation, no doubt, lies in Franklin's statement, in his Proposals Relating to the Education of Youth in Pensilvania, that English should be taught to the students "by Grammar," and in his ensuing query, "If History should be a constant Part of their Reading, . . . may not almost all Kinds of useful Knowledge be that Way introduc'd to Advantage, and with Pleasure to the Student?"

In 1886 Felix E. Schelling, later to achieve his reputation as an Elizabethan scholar and as the academic father of professors of English widely scattered throughout the United States, joined the Department, and in 1888 he was asked by Provost Pepper to propose a plan for the reorganization of the work in English. Under the plan many new courses in English literature were instituted, and composition, philology, and literature became clear-cut divisions of the work in English. A significant aspect of the reorganization was the insistence on the importance of modern literature. As a result Dr. Schelling's course in the English novel, given in 1889—the first
course in the novel for undergraduates in America—was the first to include current novels.

With Dr. Schelling's appointment as Professor of English in 1891 and as John Welsh Centennial Professor of History and English Literature in 1893, that group of teachers and scholars for which the Department has long been known began to form. In 1891 Josiah H. Penniman was appointed, later to become Dean of the College and Provost of the University; in 1895 Arthur Hobson Quinn, pioneer historian of the American drama and the first man to give a course in the subject, but one whose writings have covered many other aspects of our native literature; in 1896 Clarence Griffin Child, teacher and scholar in the field of English philology and the earlier literature; in 1897 Cornelius Weygandt, who at once began those courses in modern literature echoes of which can be heard in his books on the English novelists and poets and the Irish playwrights, and to some degree also in his essays and sketches which preserve a passing America.

Some of these men have since retired, but other members of the Department have taken their places; and those who remain are aided by younger men, themselves specialists in their respective branches of philology and literature, whose recent books have dealt with Chaucer, the Elizabethan and Jacobean playwrights, the poets of the Romantic movement, and various periods of American literature. Included are a number of anthologies, a history of the English language, and two volumes of the *Variorum Shakespeare*, the latter undertaken at the suggestion of Horace Howard Furness, Jr., who carried on his father's work and later bequeathed his excellent Elizabethan library to the University. In 1900 thirty courses were offered by the Department; that number has now grown to 149, more than half of which represents work given in the Graduate School. And so it is hardly surprising that the staff now has more than fifty members, whose offices occupy most of the east end of the second floor of College Hall and a great deal of space on the third floor of Bennett Hall.

Indeed the English Department is one of the few departments in the College that has its own building. This is a property at 3433 Woodland Avenue, possessed of more atmosphere than elegance and popularly known as the "Journalism Building." The first floor of this building, where "Beastons," celebrated gathering place for students, once did business, houses a city-room and an experimental laboratory for broadcasting. The second floor contains the offices of the Director of the courses in journalism and publishing, which have
been a part of the work of the English department since 1901. The third floor has been fitted out as a laboratory for speech correction and is used by those members of the Department who devote their time especially to public speaking.

In addition to teaching more students than any other department of the University and producing books and articles that in variety and extent stand high in the records of the Faculty Research Committee, even when the size of the staff is considered, the English Department has had a large share in administering the affairs of the University. Since 1900 it has provided three Deans of the College, a Dean of the Graduate School, a Director of the Summer School, a Vice-President in Charge of Undergraduate Schools (an office no longer in existence), an Administrative Vice-President, and two Provosts.

History: Until 1881 history, with rare exceptions, was taught in connection with some other subject, usually English literature, of which history was often considered a part. In 1876 this relationship was emphasized by the foundation of the John Welsh Centennial Professorship of History and English Literature. Its first incumbent, Provost Stillé, was a historian and laid stress on that half of the partnership, but his successor, Robert Ellis Thompson, with his kaleidoscopic interest, taught history only alternately with English literature, political economy, and international law.

History first became a separate subject, then a distinct group of studies, after the foundation of the Wharton School in 1881. History was a necessity for a department laying stress on social studies; so John Bach McMaster, who had just published the first volume of an American history of great distinction, was called in 1883 from his instructorship in geodesy at Princeton to occupy the newly created chair of American history, then in the Wharton School, and to devote his whole time to this subject. He remained a source of distinction to the Department for thirty-seven years, until his retirement in 1920. But still more history was needed for the joint uses of the College, the Wharton School, the Scientific Departments, and the Graduate School; and in 1884 Edward P. Cheyney was engaged for one year to give half his time to teaching history. In 1886 he was given a full instructorship in history and continued to serve the Department for fifty-one years, during which time he was recognized as one of the outstanding historical scholars of America. In 1889 James Harvey Robinson was added to the staff as Assistant Professor of History. He was fresh from a German doctorate follow-
ing graduation from Harvard, and his knowledge, originality, and charm infused an attractiveness into the group that strengthened its hold on all the departments in which it gave instruction. After six years he was called to Columbia (1895), where he built up a well-known group of followers.

In 1891 a "School of American History and Institutions" was founded on the basis of a considerable library already collected, the appointment of Francis Newton Thorpe as Professor of American Constitutional History, the services of other instructors already on the ground, and the promise of a considerable endowment. This school was opened in the fall of 1892, but unfortunately the principal donor failed in the depression of 1893 and it ceased to exist at the end of that year. Its history instructors, however, remained. They had been organized as a definite department of instruction in 1892, with Professor McMaster as chairman. The following year Dana C. Munro was added as instructor in medieval history, and from that time until 1912-13 the Department was made up of five members. Of the original group of five it may be noted that four—McMaster, Cheyney, Munro, and Robinson—have been elected presidents of the American Historical Association—the highest honor that can be bestowed on an American historian. One member of the present Department, Dr. Conyers Read, is Executive Secretary of the Association, and Dr. William E. Lingelbach is chairman of the American Council of Learned Societies and Dean of the College.

Since 1912 various new members have been added to the Department, replacing those who have died, have retired, or have been called to other institutions. In addition to the earlier fivefold division of American political, American constitutional, English, modern European, and medieval history, six other special fields—ancient history, Renaissance and Reformation, Latin America, colonial history, American cultural, and European cultural history—have their place in the curriculum.

From the time of its formation, the Department has had a significant part in the development of historical instruction and research in the United States. Its members have produced widely used textbooks and many important historical works, among them McMaster's *History of the People of the United States* and Cheyney's *Industrial and Social History of England*, publications whose influence has long been felt in the emphasis given to the social and economic aspects of history. In addition the Department has trained a group of scholars who now occupy prominent positions in a score
or more of important universities and colleges throughout the country.

Mention may also be made of the Translations and Reprints from the Original Sources of European History. These publications, which began to appear in 1894, have been used in most of the colleges and many of the high schools of the United States and have done much to influence historical teaching. Since their first appearance scarcely a historical textbook published in this country has not mentioned them. In addition, the late Dr. McKinley founded and edited *The Historical Outlook*, which was for many years the only periodical devoted to the interests of history teachers in the secondary schools. This magazine, under the title *Social Studies*, is now edited by a member of the Department who also edits *Pennsylvania History*, the organ of the Pennsylvania Historical Association.

**Philosophy:** The teaching of philosophy has been continuous in the University of Pennsylvania and its forbears since 1751, a period during which the very definition of philosophy has changed. In the earlier years the teachers were not called Professors of Philosophy, but rather of Logic, Ethics, and Metaphysics. Later there appears the title “Professor of Moral Philosophy,” as opposed to “Natural Philosophy,” which signified, of course, the physical sciences.

“Logic” and “Ethics” are terms properly applied to branches of philosophy today, but “Metaphysics,” being somewhat narrow, is no longer used as a title for courses or professorships in the University. In fact it does not properly fit even the eighteenth-century teaching of philosophy, in which theological bias and something of an anti-scientific point of view were likely to be present. And “Moral Philosophy” is but a small part of what philosophy comprises. Indeed, although the University was the first to have a distinctly secular curriculum, and some of the early teachers of philosophy taught natural philosophy as well, the present conception of philosophy as a critique of the sciences and as a systematic commentary on the history of ideas hardly appears anywhere in American education before 1870.

When in 1868 Provost Daniel Goodwin, who, like most of the Provosts before him, wore the cloth and also taught philosophy, resigned to become Dean of the Philadelphia Divinity School, another clergyman succeeded him in the chair of philosophy. This was Henry P. Krauth, whose title of Professor of Intellectual and Moral Philosophy was intended, perhaps, to indicate that ethics and theology were not the chief concern of philosophy. Though a clergy-
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man, Dr. Krauth was our first Professor of Philosophy in the modern sense, and through him the University was among the first of American educational institutions to recognize philosophy in its present rôle as a theory of knowledge. The new professor must have seemed a bit radical, for he conducted rousing seminars in Sir William Hamilton’s agnostic philosophy.

Dr. Krauth died in 1883, and his successor was George Stuart Fullerton, who for twenty years led a whole generation of students along the pleasant paths of philosophy. To others Dr. Fullerton was a distinguished man; to the present College faculty he has become a tradition. He made philosophy a living thing, and many an alumnus still alive remembers his inspiring lectures.

In 1887 the newly endowed Adam Seybert Professorship of Moral and Intellectual Philosophy was conferred on Dr. Fullerton. Its original purpose was to subsidize research in psychical phenomena and to investigate the claims of spiritualism. In 1889 William Romaine Newbold, a young instructor in Latin with a wide training in psychology, was made Lecturer in Philosophy and undertook a systematic review of spiritualism—with distinctly negative conclusions. In 1903, on Dr. Fullerton’s retirement, Dr. Newbold succeeded him and soon distinguished himself as a brilliant scholar. By 1920 he was generally recognized as an authority on Greek philosophy, and by the time of his death in 1926 his remarkable work in deciphering the Roger Bacon texts had earned him an international reputation.

During Dr. Newbold’s tenure the Department ceased to consist of but one or two men. In 1896 Edgar A. Singer, Jr., was called from Harvard, where he had been an assistant in psychology under William James, and shortly he was engaged in his widely recognized work on the history of modern thought and the philosophy of science. Others who later joined the Department were Louis William Flaccus, author of distinguished publications in ethics and aesthetics; Isaac Husik, able teacher of jurisprudence and social philosophy, who died in 1939; and Henry Bradford Smith, a nationally known authority on logic, who died in 1938.

Beginning with Dr. Fullerton, most of the men who have been named have contributed greatly to the development of the program of the present Department. This program consists of nearly forty courses covering the entire range of philosophy. It is offered by a staff of nine to undergraduate and graduate students who number considerably more than the twenty youngsters taught in 1751 by Mr. David Martin, first Rector of the Academy of Philadelphia. But
more significant than the mere increase in numbers is the Department's achieving of something of the spirit of Dr. Fullerton, who insisted that philosophy must not be regarded as a thing apart from life. Continuing to have a decent respect for history, the Department at the same time follows the tendency of the age to reestablish philosophy as mother of the sciences and as a source for the criticism of the scientist's postulates and for the correlation of his conclusions.

**Romance Languages and Literature:** One clause of the charter of the old Academy stated that "the Trustees shall, with all convenient Speed, endeavour to engage Persons capable of teaching the French, Spanish, and German Languages," a provision that was owing to Franklin's interest in modern languages. The first teacher, a Mr. Creamer, was appointed in 1754, and, according to the minutes of the Trustees, he was to teach French, Italian, and German, with perhaps some music and painting on the side. Spanish was added to the curriculum in 1766, when Mr. Paul Fook was "chosen Professor of the French and Spanish Tongues."

From that time to the beginning of the present century, there were rarely more than two teachers of modern foreign languages in the University at one time. Today, however, the Department of Romance Languages has a staff of twenty persons, who give courses in French, Spanish, Italian, Provençal, and Portuguese. Of the departments in the College, Romance Languages is third in the number of students receiving instruction. English is first by a considerable margin and History is second, being closely followed by Romance Languages. Many textbooks in French and Spanish written by members of the Department are widely used throughout the world.

The separation of French and Spanish from German in the University and, therefore, the beginning of the Department of Romance Languages, dates from the appointment of Dr. Hugo A. Rennert as Professor of Romanic Languages and Literatures in 1893. Dr. Rennert had previously taught German as well as French, having been appointed instructor in these two languages in 1885. In 1889, to prepare seriously for a career of research and teaching, he went to Germany, where he became acquainted with the new scientific methods of language and literary investigation developed earlier in the century by German scholars, receiving his doctor's degree at Freiburg in 1891. Dr. Rennert was the first American scholar to come into direct contact with these new scientific methods as applied to Spanish linguistics and literary history, and the publication of his dissertation on the Spanish pastoral romances marks the beginning of the
truly systematic investigation of Hispanic languages and literatures in the universities of the United States.

Convinced that the serious study of the early period of Spanish depended on obtaining reliable texts, Dr. Rennert soon went again to Europe to visit many of the great European libraries, and transcribed numerous documents which he later studied and published. But his fame as a Hispanist is based chiefly on two important volumes: *The Life of Lope de Vega, 1562-1635*, first published in 1904, and *The Spanish Stage in the Time of Lope de Vega*, which appeared in 1909. His library, gathered over a long period of teaching and research, is now a valuable part of the extensive Romance collections in the University Library.

Several members of the Department have been disciples of Dr. Rennert, but none was so directly influenced by him as the late J. P. Wickersham Crawford, who was Professor of Romanic Languages and Literatures from 1914 until his death in 1939. His doctoral thesis, *The Life and Works of Cristóbal Suárez de Figueroa*, was followed by numerous articles on the early lyric poetry and drama of Spain. The studies on the drama developed later into a work of major importance, *The Spanish Drama before Lope de Vega*.

In 1933, at the request of the Spanish Section of the Modern Language Association of America, Dr. Crawford founded and assumed editorship of the *Hispanic Review*, a quarterly devoted to research in the Hispanic languages and literatures. The *Review*, which is published by the University of Pennsylvania Press, has been praised by Hispanists the world over for the high standard of its scholarship.

Other successors of Dr. Rennert have carried on productive research in the field of Hispanic studies. Many contributions have been made to the study of Spanish literary history, among which might be noted an important critical edition of Baltasar Gracián's *Criticon*. In addition extensive work has been done in Portuguese, notably a historical grammar of the Portuguese language, the only systematic exposition in any language of the modern findings of Portuguese philology. The latter publication and others have given the University recognition in both Europe and American as a center for Portuguese studies. The work in French and Italian is also distinguished. It includes an edition of much of the verse of the troubadours and its accompanying music, a work that is a remarkable correlation of the fields of literature and musicology; and an extensive study of the thought of Jean-Jacques Rousseau, which is a monu-
ment of comprehensive research in eighteenth-century literature and philosophy. Contributions to the study of Italian literature have included works on the modern Italian novel and the drama of Luigi Pirandello, the latter having been prepared with the approval and advice of the great Italian himself. All of these publications have been followed by supplementary works in the form of doctoral dissertations, many of which have appeared in the Romance Language Publications Series, sponsored by the Department.

Germanic Languages and Literature: If Benjamin Franklin's interest in modern languages led to the teaching of European tongues in the Academy and College of Philadelphia, there was a further reason for the teaching of German—the presence of a large German population in the Province of Pennsylvania.

German was first taught by the same Mr. Creamer who was appointed in 1754 to teach French, Italian, and German, and perhaps music and painting. No special emphasis was given to German, but in 1780 an independent German school was established, with John Christopher Kunze as Master. The new school, in which all subjects of the curriculum were taught in German, was evidently an attempt to interest the Pennsylvania Germans in the University. Professor Kunze, it would seem, was a gentleman of wide learning, for in 1784 he resigned to become Professor of Oriental Languages at Columbia.

From 1784 to 1867 no unusual recognition was given to either German or the Pennsylvania Germans, but in the latter year, when German and other modern languages were made electives with the same status as Greek and Latin, the prominent German-American scholar Oswald Seidensticker was appointed Professor of the German Language and Literature. He was a more recent arrival in this country than the "Pennsylvania Dutch," for he was born in Göttingen in 1825; nevertheless he was a pioneer investigator into the activities of the Germans in this country. Of the twenty-two books and articles which he published, many were important contributions to the early history of Germans in America.

Dr. Seidensticker's successor was Marion Dexter Learned, who was appointed to the chair of Germanic Languages and Literature in 1895, a year after Dr. Seidensticker's death. Like his predecessor, Dr. Learned was greatly interested in German-Americans and their history. He founded the quarterly Americana-Germanica, which later became the bi-monthly German-American Annals, and was the author of numerous books and articles, notably the scholarly Life of
Francis Pastorius and a Guide to the Manuscript Sources of American History in the German State Archives, the latter written at the suggestion of the Carnegie Foundation.

But the interest in German-American history did not prevent the teaching of echt Deutsch in an increasing amount and variety. It should be noted that Dr. Learned was Professor of Germanic Languages and not of the German Language. After his appointment, the Scandinavian languages in their various periods were gradually introduced, and the graduate department in time became one of the strongest in the country.

One member of the German Department throughout the entire period of Dr. Learned's chairmanship and for long after his death in 1917 was Edward C. Wesselhoeft, the finest undergraduate teacher of German the University has had. Another was the late Daniel B. Shumway, who in 1895 returned to the University from Göttingen, where he had taken his doctorate in philology. The author of many philological articles, Dr. Shumway also wrote for many years the critical German bibliography for the Publications of the Modern Language Association, and after Dr. Learned's death he became chairman of the Department. This was just at the time when America entered the World War, and a capable administrator was needed. Student enrollment had fallen to one-third of its previous number, yet the work was never interrupted, no teacher was dismissed, and with the end of the war a prompt recovery in enrollment occurred.

Today the Department has a staff of ten, whose publications include, besides a great number of contributions to learned journals in the United States and Europe, such varied books as grammars of Old Icelandic, Swedish, Lithuanian, and Middle High German; and a Lithuanian-German dictionary. It is interesting to note also that the earlier attention to German-American matters is being renewed.

Greek: The present chairman of the Department of Greek is the sixteenth occupant of the principal chair of Greek at the University of Pennsylvania in a line which extends back to David Martin, who was appointed Rector of the Academy in 1750 at a salary of £200 with the stipulation that he was to teach Greek—as well as Latin, History, Geography, Chronology, Logic, Rhetoric, and the English Tongue!

At present, Greek does not bulk so large in the curriculum as it did in the early days, when as many as four years were devoted to it; nevertheless the number and variety of courses offered by the Depart-
ment have greatly increased. This is due partly to the expansion of the Graduate School and partly to the archaeological discoveries in Greek lands, which made it imperative that the Department give courses in Greek archaeology, as has been done for more than forty years. At present twenty-four courses in Greek are offered in the College and twenty-five in the Graduate School. This has been managed with a small faculty by organizing the courses in two- and three-year cycles.

The dropping of Greek as a required subject for undergraduates, which occurred in 1915, naturally led to a great decrease in the number of students, but this loss has been more than compensated for by the increase which has come from two courses, Greek 21 and Greek 25. The first of these is a course in the history of Greek literature in which the student is permitted to read standard translations. The other, a course in Greek civilization, is composed of lectures on Greek literature, archaeology, private life, philosophy, and oratory. Thus a single course presents much that the student would obtain only incidentally from a broad study of Greek authors. It might be added that the Catalogue for 1830-31 mentioned a course in "Roman and Greek Antiquities," one of the first of the sort to be given in any university.

The Greek Department has always had a group of excellent graduate students, and the theses they have published have been real contributions to the study of Greek language and literature. One reason for this, apart from the quality of the men, is the fact that the University Library is strong in Greek texts and in various periodicals devoted to classical studies, for which Provost C. C. Harrison was largely responsible. In recent years Dr. Charles W. Burr has made valuable additions to the Aristotle collections.

For many years the University has contributed to the support of the American School of Classical Studies at Athens. Members of the Greek faculty have at times been directors of the School, among them Dr. William N. Bates, recently retired chairman of the Greek Department and a member of the Managing Committee of the School since 1902. Dr. Bates was also Editor-in-Chief from 1926-24 of the American Journal of Archaeology.

Latin: In his Proposals Relating to the Education of Youth, the matter-of-fact Benjamin Franklin declared himself in favor of a written style that was above all things clear and concise. But a little farther on in the same pamphlet, the benefits of studying the classics are described in an ornate period that has almost Ciceronian
eloquence. He added, however, that no student should be compelled to study Latin and Greek; but perhaps his own persuasiveness, if not the educational tradition of the day, was too much for his fellow incorporators, and the classics were required of all students in the College of Philadelphia and later in the University of Pennsylvania.

But whatever the merits of Latin as a required subject, it is certain that the Latin Department has given distinction to the University of Pennsylvania. Dr. John C. Rolfe, who became Professor of the Latin Language and Literature in 1902, for many years has been a trustee of the American Academy in Rome and has also served as Professor and Professor-in-Charge, being decorated Commendatore della Corona d'Italia by the Italian Government in 1930. Dr. Walton B. McDaniel, who joined the Department in 1901 and succeeded Dr. Rolfe as chairman in 1932, has also served as professor in the Academy, and both he and Dr. Rolfe have been presidents of the American Philological Association. Dr. McDaniel's successor, Dr. George DePue Hadzits, has also been a professor in the Academy and is now Editor of the Publications of the American Philological Association. Each of these men has contributed extensively to the literature of Latin scholarship. The most ambitious project of the Department was the sponsorship of a library of forty-five volumes entitled Our Debt to Greece and Rome, to which teachers of Latin at the University contributed the volumes on Cicero, Roman Private Life, Language and Philology, and Lucretius and His Influence.

Throughout the nineteenth century the teaching of Latin in the University followed the pattern that is well known to those who have studied and taught the language and literature. The poets, orators, historians, and philosophers were read and interpreted as literature and also for their revelation of Roman civilization. But with the appointment of Professors Rolfe and McDaniel the Department at Pennsylvania entered upon a new career. These two eminent scholars and teachers rapidly increased the enrollment in the undergraduate courses and established the prestige of the graduate courses. Courses have been given regularly in the public and private life of the Romans, the architectural and topographical history of Rome, in Roman religion, archaeology, epigraphy, and paleography, as well as in the authors, both classical and medieval. The graduate students have made sound contributions to scholarship and in several cases have received fellowships in the American Academy. By 1930, when Latin ceased to be a required subject in the College, the staff had increased to twelve, as compared to the one or two professors who, until the turn of the century, had usually
been responsible for all of the Latin taught in the University. Today enrollment is being maintained at a high level, and the same variety of courses is being offered by the present staff of six men, for both the Department and the University are aware of the present need for stressing the relationships between the ancient civilizations and those that have followed.

Mathematics: Those members of the Department of Mathematics who have been the authors of so many algebras, trigonometries, geometries, and other mathematical textbooks known to Pennsylvania men in the last fifty years had a precedent to follow, for the first textbook to be published by a member of the faculty was *The Uses of Globes*, by Theophilus Grew, the first master of mathematics in the Academy. A copy of the book is still in the Library. Grew was appointed on December 17, 1750, at a salary of £125 a year, and according to the minutes of the Trustees, he was to teach "Writing, Arithmetic, Merchants Accounts, Algebra, Astronomy, Navigation, and all other Branches of Mathematics."

Whether writing was really considered a branch of mathematics or not, it is certain that in those days mathematics was but one branch of the learning that a capable scholar should possess. The Rev. William Smith, first Provost of the University, had come to the Academy in 1754 to teach logic, rhetoric, and natural and moral philosophy. A capable mathematician and astronomer besides all this, he ably assisted David Rittenhouse at the transit of Venus in 1769, when the American observers moved the earth twenty percent farther from the sun. And the second Provost, John Ewing, D.D., was equally versatile. Before becoming Professor of Natural Philosophy in the College in 1762, he had been Professor of Mathematics at Princeton. In addition to his duties as teacher and Provost, he served as an engineer, surveying state boundary lines and laying out turnpikes.

Both of these men, while not officially professors of mathematics, taught the subject in the College, and the same is true of David Rittenhouse, who became Professor of Astronomy in 1779. Some of his accomplishments have been noted below, in the account of the Department of Astronomy, but Rittenhouse, who was the first member of the University's faculty to make important investigations in mathematics, is difficult to confine to one department, for in the eighteenth century nice departmental distinctions were virtually unknown.

Undoubtedly the most important mathematician in the earlier
days of the University was Robert Adrain, who became Professor of Mathematics in 1827 and who, unlike his predecessors, was a specialist. An Irish refugee who at Princeton, Columbia, and Rutgers had already won acclaim as the foremost mathematician in America, he showed great originality in descriptive geometry, calculus of variations, elliptic functions, and classical mechanics. The high-water mark of his published writings was his statement of the law of accidental error, said to be the first broad principle of pure mathematics discovered in America.

But comparatively few of the professors of mathematics during the nineteenth century were specialists like Adrain. In many cases they occupied the three chairs of mathematics, astronomy, and natural philosophy, and the Department did not achieve final independence until 1899, when Edwin S. Crawley was appointed Thomas A. Scott Professor of Mathematics. Dr. Crawley was the author of a series of textbooks on trigonometry, analytic geometry, and calculus, and was the first to receive a Ph.D. in mathematics in the University (1892). Since that time more than fifty men and women have earned the degree, most of whom are full or associate professors in twenty-five colleges and universities, while six have remained in public schools and five are in public service. There have been fourteen appointments to National Research Fellowships, besides Rosenwald and Guggenheim Fellowships and many scholarships and fellowships at Pennsylvania. Two former students have been invited for a year to the Institute for Advanced Study.

The present Department has a staff of seventeen and ranks high in the amount of instruction given in the undergraduate schools and the Graduate School. A broad field of study in both undergraduate and graduate courses maintains the two-century tradition of thorough class work and amply prepares for specialization and research, which is now chiefly in number theory, topology, and analysis.

Present members of the Department have been Vice-Presidents of the American Mathematical Society and members of the editorial staff of its Bulletin, Transactions, and Colloquium Lectures, and are associated with other scientific and educational activities both within and without the University. An important activity within the University is the Mathematical Research Club, which is frequently addressed by members of the faculty of neighboring institutions and from the Institute for Advanced Study. Professors from Bryn Mawr, Haverford, and Swarthmore are active in the Research Club and have frequently conducted courses in the Graduate School, while members of the Department of Mathematics at the University
of Pennsylvania in turn have conducted graduate courses and advanced seminars at those colleges.

Earth Sciences (Geology and Mineralogy): The Department of Geology and Mineralogy, or of Earth Sciences, as it has been known since 1938, occupies the old Chapel on the second floor of College Hall, and the only faintly surviving ecclesiastical atmosphere of the location is suggestive, perhaps, of a victory for science. In 1835, when the Department was organized, with Henry Darwin Rogers as the first professor, the establishment of a chair of geology was regarded almost as a dangerous social act and an encouragement to heresy.

At any rate, in 1930 the Department moved into the Chapel, which had long ceased to serve its original purpose, and which was transformed into a museum housing the following collections:

The F. A. Genth Collection of Minerals and Foreign Fossils, which forms the bulk of the mineral collections. The fossils, especially those of an extinct group of animals known as the Ammonoids, found mainly in Europe, are of permanent value, both scientifically and financially.

The Clay Collection of Minerals, containing some two thousand valuable specimens, many from mines no longer open.

The Cardeza Collection, formed by the late Dr. J. M. D. Cardeza and his father. The collection is rich in local minerals and rocks, many of them from quarries no longer worked.

The Bement Collection, a small but valuable collection given by the late Clarence Bement of Philadelphia.

The Koenig Collection, presented by Mrs. Elsa Koenig Nitzsche in memory of her father. This is a large collection of miscellaneous specimens, many of them from material analyzed by Dr. George A. Koenig, former Professor of Mineralogy in the University.

The James Hall Collection, purchased from the former Director of the New York State Geological Survey. It contains several thousand specimens of American fossils and a valuable series of rocks representative of the strata of the eastern United States.

In addition there are various small collections contributed by members of the staff and other donors, or acquired by purchase.

In 1938 these resources were greatly enlarged by an association with the Philadelphia Academy of Natural Sciences. At the same time a broadly planned scientific and cultural course known as the “Four-Year Course in Earth Sciences” was created. This educational arrangement is among the first to be established in American universities.
The Department has been known especially for the participation of its professors in geological surveys. Professor Rogers organized the First Geological Survey of Pennsylvania and also that of New Jersey. Following a series of annual reports, his work ultimately saw daylight in two great volumes called *The Geology of Pennsylvania*. Although he worked with no accurate base maps and in an atmosphere of popular indifference to the need for accurate surveys of the coal fields, the landscape features, the mountain structures, and other major aspects of the area, his descriptions, especially of the coal fields and the Allegheny Mountains, formed the basis of later surveys.

Among Rogers' successors were J. Peter Lesley and Ferdinand V. Hayden. Lesley, an expert topographer who saw the need for exact, painstaking detail in the mapping of the various aspects of our geological structures, organized and was Director of the Second Geological Survey of Pennsylvania. His work in the coal fields has become a classic, and his studies in the Appalachian Mountain structures are still regarded as a monument in geological literature.

Hayden organized and was Director of the first of the great American governmental scientific surveys. The "Hayden Survey," which laid the foundations for the present United States Geological Survey, is still famous for its revelation of the wonders of the West—the Badlands of Dakota, the Yellowstone geysers, the vast areas of Montana, Idaho, and Wyoming. Included in Hayden's remarkably able organization were Leidy and Cope, professors in the Medical School and famous as the founders of vertebrate paleontology in America.

**Anthropology:** On the top floor of College Hall, in a large room formerly occupied by the Zelosophic Society, is the Department of Anthropology. Here, usually, are to be found professors and students, and perhaps an American Indian (Amerindian to the anthropologists) or other racial type. The room is filled with bookcases, and hanging from the walls are ceremonial masks, hunting shirts, primitive weapons, and various other picturesque properties.

Anthropology was introduced at the University in 1886 with the appointment of Daniel Garrison Brinton as Professor of American Languages and Archaeology in the Department of Philosophy, as the Graduate School was then known. Dr. Brinton gave no courses in the College proper.

During the early years, which were dominated by Dr. Brinton, the term "anthropology" was not used, and the courses were built
about archaeology and linguistics, chiefly American, as can be guessed by the title of the chair. When, in 1893, Dr. Brinton initiated a course in primitive religion, it was necessary to give it in the Department of the History of Religion. This period was also marked by the presentation in the Department of Sociology of courses having anthropological significance.

The second era of anthropology at the University began with the introduction of courses in this subject in the College in 1904, when Dr. G. B. Gordon was appointed to the staff of both the Graduate School and the College. With his appearance, anthropology began to take the form it has today, and the last vestige of the former period disappeared in 1910, when the subject was separated from archaeology and was set up as a department in its own right in the Graduate School. This step meant a less formal association with the University Museum, which was originally known as the Department of Archaeology; nevertheless a constant interrelationship has always been maintained with the Museum.

The members of the Department and the students travel abroad as well as to the upper regions of College Hall, for the open field of general anthropology, archaeology, and ethnography has always been the laboratory, with special emphasis in recent years on American Indian cultures. The areas explored and the research completed, much of it published, have included North America, from the Eskimo of the Arctic, the Algonkian of the sub-Arctic, the northeast and eastern Woodlands, the Iroquois of the Great Lakes area, the circumpolar zone of North America and Asia, the tribes of the northern Plains, the Basin-Plateau area of the Rockies, the southern Plains and the lower Mississippi, the Gulf area, the Southwest, the Mexican Plateau, Yucatan and Central America to Panama, the Orinoco and Amazonian areas, and the West Indies. In the Old World the chosen fields have been in western Asia, eastern and southeastern Europe, the Caucasus, south-central and southeastern Africa, the Fiji Islands, Australia, Japan, China, and India.

The Psychological Laboratory and Clinic and the Department of Psychology: With one exception all of the scientific laboratories that were in College Hall in 1872 have moved out. And only one, the Psychological Laboratory, has moved in—to rooms in the east end of the first floor and basement.

But the Department of Psychology at the University of Pennsylvania is in no sense a parvenu, either at the University or in the
world, for in 1887, only eight years after the first psychological labora­tory in the world had been established in Leipzig by Wundt, James McKeen Cattell founded the Psychological Laboratory at the University of Pennsylvania, the oldest in America with a continuous existence. And one year later, in 1888, Dr. Cattell was appointed Professor of Psychology, his chair being the first in psychology in the world.

In many institutions, especially abroad, the directors of psychological laboratories still hold the title of Professor of Philosophy, but at Pennsylvania a distinction is made between philosophy and psychology. From the beginning, when the Laboratory consisted of two rooms in the present Botany building, psychology has been recognized as a science, and for the last decade it has been classed as a biological science.

From these meager beginnings of two small rooms and a staff of one, the Department has increased to a staff which includes nine professors of various ranks as well as numerous instructors, assistants, and consultants; and in addition to the space assigned to it in College Hall, it has a seminar room and eleven rooms for experimental research on the third floor of the Hare building.

The move from the Botany building occurred in 1901, when the Department of Physics was transferred to the Randal Morgan Laboratory. Without delay the psychologists moved into the physics laboratory in the basement. Only one room was available at first, but ultimately more space was assigned to psychology. At present the former chemistry lecture room on the first floor is occupied by the offices of the Department; across the hall the former physics lecture room serves for lectures and clinical demonstrations; and adjoining it is a large room used by laboratory classes. In the basement is a machine shop elaborately equipped for making research and other experimental apparatus, but most of the space is occupied by the Psychological Clinic, which, like the professorship, was also the first to be established in the world.

The Clinic was founded in 1896 by Dr. Lightner Witmer, who had succeeded Dr. Cattell as Director of the Psychological Laboratory in 1892. It was organized on a plan that provided for (1) a psychological clinic supplemented by a training school for the treatment of retarded children; (2) the training of psychological experts who would examine and treat retarded children, in connection with either the school system or the medical profession; (3) research and teaching by clinical methods. No training school, how-
ever, has ever been established at the University, but in 1907, in which year Dr. Witmer also founded a journal of orthogenics, *The Psychological Clinic*, he had under his professional care a number of children needing prolonged educational treatment. To provide for them he established a boarding and day school, independent of the Clinic but working, as it still does, in association with it.

Although the work of the Clinic has been expanded and diversified, the original purposes for which it was founded still guide its policy. On one hand it serves the public by making examinations and offering advice and guidance regarding all types of psychological problems; on the other it continues to be a laboratory for teaching and research within the Department of Psychology.

So greatly has the work expanded that the Clinic now has five sections: the General Mental Clinic, which is concerned with the educational problems and the problems of neglect and conduct of all mental types from infancy to early maturity; the Speech Clinic, which treats speech defects of all kinds, cooperating in cases of malformation with the orthodontists and oral surgeons of the Dental School; the Vocational Guidance Clinic, which studies the vocational and educational problems of persons over the age of thirteen; the Personnel Clinic, which works especially with prospective college students and students at the University, advising them concerning their fitness for college work and for professional education. Although for many years the work of the Clinic was mainly with retarded and defective children, normal children and adults now form the majority of the cases examined.

When Dr. Witmer's interest turned to clinical psychology, Dr. Edwin B. Twitmyer became responsible for much of the experimental research and especially for the development of new forms of research apparatus. Dr. Twitmyer, whose experiments on the knee jerk demonstrated the establishment of a conditioned reflex in man ten years before Pavlov's results were published, continued the tradition that psychology, like other sciences, must be taught by laboratory methods. As a result the experimental method is maintained throughout most of the undergraduate courses and almost exclusively in the graduate courses.

Naturally equipment is important in such a program, and in addition to a wide variety of standard apparatus for undergraduate and graduate instruction the laboratory is equipped for research on problems of sensation and perception, memory and learning, imagination and thinking, emotional reaction, reflexes, choice and habit, and the physiology of these processes.
The Randal Morgan Laboratory of Physics, which is on the east side of Thirty-fourth Street below Walnut, is not one building but two. The brick structures were designed in an Italian Renaissance style—not for the University, however, but for a short-lived school for girls. In 1901 they were remodeled by the Physics Department with the expenditure of part of a fund given to the Department by Randal Morgan, a Trustee of the University. After the necessary renovation had taken place, the Department moved over from the west end of College Hall to what must have seemed very roomy quarters, for the staff then numbered but four (compared to eighteen at present), and naturally the equipment was less extensive and elaborate than today.

Fortunately the largest piece of the Department’s present equipment is not kept indoors. This is a huge steel cylinder, forty-six feet high, which was constructed in 1939 at the rear of the smaller building to the north. Physicists recognize it as a Van de Graaf generator; to the laity it is an “atom smasher.” In effect, it is a huge Leyden jar which will receive its charge (up to five million volts) from a motor-driven rubber belt controlled in a research laboratory in the basement, where members of the Department conducting research in nuclear physics will be able to study flying fragments of atoms broken off from larger nuclei by streams of ions accelerated to a speed of twenty thousand miles a second by the Van de Graaf generator.

The less spectacular but equally important equipment of the laboratory is largely in the main building to the south. Here are the large student laboratories with apparatus needed in the courses on mechanics, heat, light, sound, electricity, and x-rays; in the theory and application of thermionic vacuum tubes and gas discharges, atomic and molecular theory, and the various other aspects of physics studied by the undergraduates. In both buildings are research laboratories in which the members of the staff are carrying on important investigations in radio activity, luminescence, the optical properties of metallic surfaces, electron diffraction, the theory of solids, and the phenomena of low temperatures, as well as in nuclear physics. Extremely important work in the development of the electron microscope is being carried on under a physicist asso-
associated with the R.C.A. Victor Company. Much of the necessary apparatus is designed by the staff and is constructed in the Department's completely equipped workshop.

Tucked away in odd corners in the Laboratory is apparatus considerably older than that used today, dating in fact to 1754, when the Trustees appropriated the round sum of £150 for "apparatus for exhibiting experiments in natural philosophy," and to 1757, when they sponsored a lottery to provide, among other things, for a "compleat apparatus for experiments." Many of the surviving pieces of those early purchases, however, are now exhibited in the Franklin Museum, for space in the Laboratory is needed for the four hundred undergraduate and graduate students studying physics each year at the University of Pennsylvania.

Physics: The study of physics at the University has come a long way, yet it owes much to those early beginnings, for Benjamin Franklin and his fellow experimenters in electricity—Ebenezer Kinnersley, Thomas Hopkinson, and Philip Syng—gave Philadelphians a bent towards science that was felt for generations. It was not by accident that Franklin's Proposals of 1749 put so much stress on natural philosophy, for in 1748 he had retired from business, intending to devote his life to his experiments. The impetus thus given lasted not merely through the administrations of the first two Provosts, William Smith and John Ewing, who were Professors of Natural Philosophy, but far into the next century, when such men as the two Robert Pattersons, Alexander Dallas Bache, John Fries Frazer, and Persifor Frazer occupied the chair. In the Department's excellent library is a copy of Cajori's History of Physics, which mentions twenty-seven American physicists of note, from the earliest days up to 1876, and seven of these were associated with the College or University as trustees, teachers, or students.

More recent histories include Dr. George F. Barker, the first to hold the title of Professor of Physics in the University. Dr. Barker, who was appointed in 1872, maintained the earlier tradition. In addition to being a prolific author, an editor, a brilliant lecturer, and president of various learned societies, he was in constant demand as a consultant in technical problems, one of his clients being Thomas A. Edison. He was widely acquainted at home and abroad, and a close friend was Lord Kelvin, a visitor to the laboratories in College Hall.

Dr. Barker's record rests also on his students. Some of these were Dr. William Duane, biophysicist; Dr. Paul R. Heyl, authority on
COLLEGE HALL

MORGAN LABORATORY OF PHYSICS
HARRISON LABORATORY OF CHEMISTRY

ZOOLOGICAL LABORATORY
gravitation; Dr. George F. Stradling, known for his analysis of the "human equation," a term so frequently misused by the layman; Dr. Arthur W. Goodspeed, who did pioneer work with roentgen rays and who became Director of the new Morgan Laboratory in 1901; and Dr. Horace C. Richards, who was Director of the Laboratory from 1931 to 1938.

Among the men who studied under Dr. Goodspeed and Dr. Richards were H. E. Ives, known for his work in photo-electricity and television; H. C. Snook, developer of x-ray equipment; and a group of prominent geophysicists which includes W. P. Haseman, E. A. Eckhardt, J. C. Karcher, B. B. Weatherby, and C. B. Bazzoni. The last named, who was Professor of Experimental Physics at the University until 1938, was cited by General Pershing and decorated by the French and British governments for his distinguished service in sound-ranging on the American Front.

The Flower Observatory

The offices of the members of the Department of Astronomy are in the remodeled residence at 3438 Walnut Street, but the real center of the Department's activities is the Flower Observatory, completed in 1895, which is on the "Flower Farm" about one mile west of Sixty-ninth Street on the West Chester Pike.

Here are the large equatorial buildings, a meridian building, and the residence of the Director, who is also Flower Professor of Astronomy. The Observatory and the chair are named for Reese Wall Flower, who willed all his property to the University for an observatory and a chair of astronomy.

The principal instrument of the Observatory is an excellent 18-inch refracting telescope, and only the climatic conditions prevent magnifying powers of the theoretical limit being used. It is equipped with a filar micrometer and a wedge photometer that are in constant use. Smaller instruments are a 4½-inch zenith telescope, a 3-inch prism transit instrument, and two refractors of 4- and 4½-inch apertures. In 1937, through the generosity of Dr. Gustavus W. Cook, a Trustee of the University, a splendid Ross photographic telescope was acquired. This has a 4-inch lens and a focal ratio of one to seven, the field being large and the images excellent over an area twelve degrees in diameter. The Observatory is open to the public every Thursday evening that is not a University holiday, and visitors in considerable numbers come there, even on winter nights, when the unheated building is not exactly comfortable.
Astronomy: The history of the Department begins in the earliest years of the Academy, when Theophilus Grew taught astronomy as the only form of mathematics required of members of the senior class. Astronomy was also taught in connection with natural philosophy, Provosts William Smith and John Ewing, the first holders of that chair, being capable astronomers.

The first Professor of Astronomy, however, was David Rittenhouse, F.R.S., a man whose versatility almost challenges that of the many-sided Franklin. Although receiving little formal education, he was not only an exquisite mechanic and a famous clockmaker, but a mathematician of note, a great astronomer, and a modern physicist. He made a "Fraunhofer grating" for the study of the dark lines of the spectrum before Fraunhofer was born; he anticipated "Ewing's Principle" by striking a soft ramrod in the magnetic field of a compass; he amused himself by explaining optical illusions by psychological methods; he devised a method of directly computing logarithms, and independently discovered Wallis's Formula for integrating powers of trigonometric functions. And he was a statesman, engineer, translator, and a Trustee of the University.

Throughout the nineteenth century, one man was usually professor of mathematics, astronomy, and even of natural philosophy; and astronomy did not achieve final independent status until 1899, four years after the appointment of Dr. Charles L. Doolittle as Professor of Mathematics and Flower Professor of Astronomy. In 1912 Professor Doolittle, who did pioneer work in the variation of latitude, was succeeded by his son, Eric Doolittle, who had been associated with his father since the opening of the Observatory. Eric Doolittle's work with double stars had already brought him a high reputation, for in 1913 S. W. Burnham, of the Yerkes Observatory, selected him to carry out the extension of his famous General Catalogue of double stars.

Following the younger Doolittle's death in 1920, the chair remained vacant until 1928, when Dr. Charles P. Olivier was called from the University of Virginia. In the meantime Dr. S. G. Barton devoted his time to the measurement of double stars and the search of the catalogues of the Carte de Ciel, in which he has detected up to the present about 2,500 new double stars. This work has appeared in numerous articles in scientific journals, and usually has been issued later in reprints of the Flower Observatory, as well as in Vol. V., Part 1, of the Astronomical Series of the Publications of the University of Pennsylvania. The latter, which appeared in 1932,
contained 1,414 measures of 1,033 double stars, made by the five members of the staff; and Vol. V., Part 2, published in 1940, contained 2,117 additional measures.

In photometry, work in which was begun by Dr. Olivier on his arrival and which he, aided by the assistants, has carried on since, about eighty variable stars, most of them recently discovered, have been studied. One star, EZ Aquilae, has proved to be of surpassing interest as a transition type. Magnitudes of comparison stars for several score of regions have been derived with the photometer, and several thousand observations of the variables themselves have been made. Fully half of the time of the 18-inch refractor is used for this work, and all of the time of the photographic telescope.

Dr. Olivier, who founded the American Meteor Society in 1911, also devotes much of his time to meteors and fireballs. Since 1928 several hundred thousand observations, made all over America and in other continents, have been sent to the Observatory for discussion and observation, the results appearing in numerous articles and in many of the reprints of the Flower Observatory.

THE DEPARTMENTS OF BOTANY AND ZOOLOGY

Macfarlane Hall of Botany

The study of botany at the University of Pennsylvania is conducted primarily in a three-story, red brick building on Hamilton Walk west of Thirty-sixth Street and facing the considerably more ornate dormitories. Not the most attractive structure on the Campus, it was built in 1884 to house a newly organized School of Biology. The original cost was defrayed largely by a gift from Dr. Horace Jayne, a member of the faculty. In 1887 a third story was added to accommodate the increasing numbers of students, and pillars on the lower floors are reminders of the fact that the city authorities once demanded that the top floor be strengthened. Its present name is in honor of Dr. John M. Macfarlane, Professor of Botany from 1893 to 1920.

Although Macfarlane Hall once housed the Departments of Botany, Zoology, and Psychology (it was here that J. McKeen Cattell established the oldest psychological laboratory in the United States and Eadweard Muybridge made his celebrated pictures of a galloping horse), the Department of Botany does not find the vacated space too extensive for its needs, for more than four hundred students each year make use of the laboratories and other facilities in
the building. These consist of a large laboratory for plant physiology and two classroom laboratories on the first floor; a laboratory of plant pathology and a laboratory of plant cytology on the second floor; three classroom laboratories, a chart room containing an especially excellent collection of charts, a dark room, and a room for the preparation of fossil sections, on the third floor. The basement contains a bacteriology laboratory, a laboratory of forest pathology, used by the United States Forest Service, and a mounting room. A small annex at the rear is devoted to instruction and research in protoplasm. Scattered through the building are the offices of the members of the staff and small research laboratories. The excellent departmental library and the herbarium are housed for greater safety in the fireproof Zoology Laboratory to the west.

Of obvious importance in instruction and research are the six greenhouses adjoining Macfarlane Hall at the rear. These contain more than five thousand specimens of plants from the tropical, subtropical and temperate regions of the world. A great number of the specimens have been in the greenhouses for many years and were acquired by purchase or gift, but most of the newer specimens are propagated by the Department's expert from seeds and cuttings distributed without cost to botanical gardens throughout the world by the Botanical Garden Exchange. The largest greenhouse contains palms and other large tropical plants; another serves for experimental purposes only; others contain the collections of flowering plants, desert plants, aquatic plants, ferns, hardwoods, and orchids. Every type of plant is available to the students, from algae, liverworts, and mosses up to the orchidaceae.

The Botanical Gardens

The Botanical Gardens behind Macfarlane Hall are a distinctly ornamental feature of the Campus. Established by Dr. Macfarlane in 1894 and consisting then of four acres, they have now been reduced to three acres as a result of the subsequent construction of the Medical Laboratories and the Zoological Laboratory. Beautifully landscaped and containing thousands of specimens of hardy plants, they attract many visitors. The lily pond in the center, usually called the “frog pond,” once served as a place to duck freshmen, but happily the practice has been ended to prevent damage—to the flora, not the fauna. The gardens are not merely ornamental, however, for they provide the Department with great quantities of plant material for instruction and research.
The Morris Arboretum

Somewhat more remote from Macfarlane Hall is the most recent addition to the facilities for the study of botany in the University. This is the Morris Arboretum, which is on a tract of 170 acres fourteen miles away in Chestnut Hill, on the northern boundary of Philadelphia. Once the property of Miss Lydia T. Morris and her brother, John T. Morris, the land and the large stone residence on it were bequeathed to the University in 1932, along with a large fund for the maintenance and extension of the rich collections of plant life on the tract and for research in botany. Under the terms of the bequest, the Arboretum serves as a Graduate School of Botany affiliated with the University through the Department of Botany. Undergraduate classes, however, are frequently held there, and a regular bus service carries students and staff to the Arboretum.

During their lifetime Mr. Morris and his sister had developed eighty acres of the Morris home by landscaping the tract with profuse plantings of shrubs and trees from all over the world, a large proportion being from Asia. The maintenance of the collections has been no mean task, especially because of the unusually severe winters of 1933-34-35, which damaged or destroyed many important specimens. Virtually all of these have now been replaced by specimens propagated at the Arboretum. For replacing and extending the plantings, two nurseries are maintained, one for deciduous plants and one for conifers, the latter containing the widest variety of specimens in the United States. The greenhouses at the Arboretum also serve for propagation and for experimental purposes.

The original plantings were made with appearance almost solely in mind, but as these die they are being replaced in groupings of closely related specimens that will also preserve the landscaping. In this way the Arboretum serves for the study of ecology and taxonomy combined with modern landscape art.

The large stone residence at the Arboretum has been converted to the uses of the staff. It contains a laboratory especially devoted to forest pathology, an herbarium, offices, and a lecture room in which monthly public lectures are given. The public is also admitted to the grounds on Wednesday, Thursday, Saturday, and Sunday afternoons.

The Zoölogical Laboratory

The Zoölogical Laboratory is just west of Macfarlane Hall and close to the western entrance of Hamilton Walk. The impressive
three-story building, which was first occupied in the fall of 1911, was the last to be arranged for during the administration of Provost C. C. Harrison. The architectural design is an English collegiate style of the mid-seventeenth century, similar to that of the dormitories and harmonizing with the Medical Laboratories. The building is T-shaped, the longer section extending 204 feet along Hamilton Walk. The shorter section extends south and is connected with the "Vivarium" by an animal breeding house. The plans for the building were mainly the work of Dr. Thomas H. Montgomery, chairman of the Department of Zoölogy at the time, who died in April 1912.

Dr. Montgomery's plans anticipated a greatly increased number of undergraduate and graduate students, and included unusual facilities for a broad program of research. To provide for experimentation, the plans included breeding rooms, constant temperature rooms with a wide range of temperatures, dark rooms for controlled spectral and ultra-violet light, rooms for physiological and embryological experimentation, chemical rooms, microtome rooms, a balance room, and a machine shop. In addition there is an excellent departmental library at the west end of the first floor, and an auditorium seating three hundred, which is on the first floor of the rear wing. There are also research museums containing among others the osteological collection bequeathed to the Department by Dr. Edward Drinker Cope, the noted paleontologist who was a member of the faculty of the School of Biology until his death in 1897. A part of Dr. Cope's bequest was the famous Hyrtyl collection of fish skeletons.

The Vivarium

The Vivarium is a substantial one-story brick building at the rear of the Zoölogical Laboratory. Constructed in 1899, it was the first of its kind connected with any university in this country and, with the exception of one at Amsterdam, probably in the world. The building provides facilities for maintaining in a healthy condition a variety of small terrestrial, fresh-water, and marine animals. Its suitability is shown by the large number of species that have become established and breed. The salt-water aquaria have a capacity of two thousand gallons, the fresh-water aquaria contain eight thousand gallons. Thirteen of the aquaria have glass fronts on a dark underground corridor, so that their inmates may be observed from below.
The San Francisco Mountain Zoological Station

Certain of the activities of the Department of Zoology are carried on at a location extremely remote from the Campus. This is the San Francisco Mountain Zoological Station, near Flagstaff, Arizona. It was established in 1929 by a member of the Department who since 1926 had been carrying on research at that location while on leave of absence. The laboratory of the station provides opportunity for graduate study and research in mountain and desert fauna under especially favorable circumstances.

BIOLOGY AT THE UNIVERSITY OF PENNSYLVANIA

There is no Department of Biology at the University of Pennsylvania, but rather separate Departments of Botany and Zoology. Naturally the development of the two is closely related, and for long both were closely associated with the faculty of medicine.

The first Professor of Botany in the University (appointed in 1768) was Adam Kuhn, a pupil of Linnaeus. Zoology was introduced in 1789, when Kuhn's successor, Benjamin Smith Barton, pioneer investigator of American flora, was appointed Professor of Botany and Natural History. Both of these men were M.D.'s, and for many years of their service to the University they also taught materia medica. In 1813 the chairs of botany and natural history were separated from the Medical Faculty and were made a part of the Faculty of Natural Science. Nevertheless the medical point of view continued to dominate until close to the beginning of the present century, for most of the teachers were M.D.'s. It was for this reason, perhaps, that the teaching of botany and zoology for their own sake was not very extensive in the University until 1884, when a School of Biology was established by Provost Pepper.

The founding of the School was the result partly of the need for more effective teaching of biology in the University and partly of a demand for the education of women. At first only a two-year course preparatory to medicine was offered, but shortly a four-year course in natural history, leading to the degree of B.S. in Biology, was offered to both men and women. Thus for the first time it was possible at the University for women to secure an undergraduate degree (except in music), a privilege, however, that was not finally approved by the Trustees until 1892. That the School quickly achieved prominence is not surprising, for the faculty contained names of extremely important biologists. Joseph Leidy was Director; Joseph Rothrock (later Commissioner of Forestry of the Common-
wealth of Pennsylvania) and William P. Wilson (later Director of the Commercial Museum) were Professors of Botany; John A. Ryder was Professor of Histology and Embryology; and Edward D. Cope was Lecturer on Geology and Vertebrate Paleontology. Leidy, Cope, and Ryder were a combination probably never equaled in this country.

The Department of Botany: Older alumni of the University, both in biology and medicine, recall Professors Rothrock and Wilson; a far larger group know Dr. John Muirhead MacFarlane. Appointed Professor of Botany in 1893, he became head of the Department in 1910, when botany and zoology separated. This distinguished botanist, who, like the first Professor of Botany, Kuhn, was a graduate of the University of Edinburgh, was responsible for the establishment of the Botanical Gardens, and through his association with the Botanical Society of Pennsylvania, which was founded in 1897 under the auspices of the Department, did much to extend the recognition of the importance of botany, both within and without the University. An effective teacher and administrator, he was also an authority on insectivorous plants and the author of *Evolution and Distribution of Flowering Plants*, a work representing fifty years of investigation. Associated with Dr. MacFarlane for many years were Dr. Rodney H. True, whose work in economic botany, carried on for the U.S. Department of Agriculture, resulted in the establishment of many new crops and the improvement of others; and Dr. John W. Harshberger, author of nearly three hundred scientific papers devoted mainly to plant distribution and the factors determining it.

Throughout much of the nineteenth century, botany was regarded to a considerable extent as a science that was important primarily because it provided drugs to the doctor, raw products to industry, and better and healthier plants to the farmer. If studied for its own sake, it was of interest to the dilettante, and study was directed mainly toward description and classification. Today, while taxonomy continues to be a part of the fundamental equipment of the botanist, the anatomy, physiology, and pathology of plants are the objects of most of the investigative effort at the University. This changed point of view, however, has by no means divorced botany from associated fields of knowledge. If anything it has brought botany closer to the other biological sciences, for it is now studied for the light it can shed on the structure and functions of cells and groups of cells, on microorganisms, genetics, and the life process in general.
The Department of Zoology: Like botany, zoology was long dominated by the medical point of view. Notwithstanding the great eminence of Dr. Leidy and his colleagues, as zoologists they were essentially self-made, nearly all of them were M.D.'s, and the zoological interests of two of the most prominent, Dr. Leidy and Dr. Cope, lay largely in paleontology. Indeed these two men are acknowledged as the fathers of American vertebrate paleontology.

The first Professor of Zoology at the University who was professionally trained for the position was Dr. E. G. Conklin, who in 1896 succeeded Dr. Ryder as Professor of Histology and Embryology and after Dr. Cope's death in 1897 became Professor of Zoology. During the period of his service, which ended in 1908, the requirements for the Ph.D. were strengthened, many new courses were added, and zoology came to be regarded as an independent, basic science.

In 1910 Dr. Thomas H. Montgomery became head of the Department, and in 1911 the new laboratory made possible real progress in an extensive program of undergraduate and graduate study and research. This program, which was planned by Dr. Montgomery, was not to be realized by him, for he died in 1912, but by his successor, Dr. C. E. McClung, a zoologist known as the discoverer, in 1901, of the sex chromosome.

With the new laboratory, the more advantageous curriculum, and the skillful management of the new chairman, the Department progressed steadily, until today the four hundred undergraduate students who use the Zoological Laboratory each year test its facilities, especially those parts devoted to the more advanced courses and research. A half-century of growth has produced other changes. The teaching staff has increased to more than twenty, conditions of work have improved, technical methods have become more exact and searching, courses have multiplied and have become more technical, and the emphasis has shifted from morphology and observation to physiology and experiment. The advanced courses now deal with the analysis of cell mechanisms and functions, such as general physiology, genetics, cytology, and protozoology; and experimentation plays an increasing part in all branches of comparative anatomy, embryology, bionomics, and even taxonomy.
LOGAN HALL, THE HARE BUILDING
AND THE WHARTON SCHOOL

Logan Hall

Just west of College Hall and facing on Thirty-sixth Street is Logan Hall, the home of the Wharton School since 1904, when what is now an extremely large division of the University moved over from College Hall with 226 students. The building, until then known as Medical Hall, had just been vacated by the Medical School, for which it was constructed in 1874. It was renamed in honor of James Logan, secretary to William Penn and one of the founders of the University. Like College Hall, it was designed by Thomas Richards and is built of serpentine stone.

Logan Hall now houses ten of the eleven teaching departments of the Wharton School and, on the fourth floor, the Lippincott Library. On the second floor is Alumni Hall, a large, handsomely furnished room used for faculty and committee meetings and for interviews between representatives of business organizations and seniors when graduation is approaching. The offices of the Dean and other administrators are on the first floor, to the right and left of the main entrance on Thirty-sixth Street. These include the offices of the Wharton Evening School of Accounts and Finance, of the Extension Courses, and of the Graduate Course in Business Administration.

The exterior of Logan Hall is virtually the same as in 1874, but the interior has been greatly changed, especially since the fire that burned out the north end on October 31, 1919. An earlier fire in 1888 had done considerable damage, but resulted in no great alteration. After the fire of 1919 it was decided that a complete rebuilding of the interior would be more economical than the erection of a new home for the Wharton School on the vacant ground on the north side of Woodland Avenue which had long been reserved for that purpose but is now used for parking faculty automobiles. And so the old medical amphitheatres, each seating three hundred, were ripped out, concrete floors replaced what was left of the old wooden ones, and a passageway that also provided additional office space permitted the Wharton School to expand into the Hare Building.

The Hare Building

The Hare Building (once called the Hare Laboratory) is also built of serpentine, and it is an easy guess that its designer was
Thomas W. Richards. The building was opened in 1878, the year that the Dental School of the University was founded, and it provided the necessary additional space, part of the work in dentistry being carried on in Medical Hall and part in the Hare Laboratory. Because most of the building was used for chemistry, it was named for Robert Hare, the great Professor of Chemistry in the Medical School, who, interested in industrial chemistry as well as the chemistry of medicine, invented the oxyhydrogen blowtorch.

At present all of the original departments in the Hare Building have moved out. On the fourth floor is the organic chemistry laboratory of the Department of Chemistry in the Towne Scientific School. On the third floor is a laboratory for experimental psychology and some offices, mainly for Wharton School professors. The second floor contains the offices of the Department of Political Science and classrooms, used primarily by the Wharton School.

The Department of Admissions, which serves the seven undergraduate divisions of the University, is also in the Hare Building. After having been moved from College Hall, where it began functioning in 1912, to the Fine Arts Building, to Blanchard Hall, it now seems permanently lodged in what was once the dental clinic. In addition to its principal duties, it also conducts a guide service which introduces visitors, especially prospective students, to the Campus and its various buildings.

THE WHARTON SCHOOL

Students and visitors waiting in Room 102, Logan Hall, to see the Dean of the Wharton School may gaze at the portrait of Joseph Wharton, who, on March 21, 1881, submitted to the Trustees of the University his “Project for a School of Finance and Economy.” Joseph Wharton was a successful businessman and accustomed to seeing his enterprises prosper, but it is probable that he would be astonished today by the subsequent growth of the institution he founded, the first collegiate school of business.

The idea apparently was slow in taking hold. Starting with one full-time professor of political economy and a part-time instructor in accounting, the Wharton School in its early years was a small part of a small college. In 1881 the enrollment in the Department of Arts was 183, in the Wharton School 13; in 1884 the respective enrollments were 128 and 21. In 1893 the Wharton School had only seventy-one students, but the establishment of a full four-year course the following year raised the enrollment to 113. It took ten years
more, however, to double that figure. The classical course was still dominant, and although many University of Pennsylvania "firsts" were quickly imitated elsewhere, it was not until 1898 that the Universities of Chicago and California set up the second and third business schools of collegiate rank to be established in the world.

Though small, the faculty in those early years was distinguished. Robert Ellis Thompson, the first Professor of Political Economy, was an important figure in education. Even more so was Edmund J. James, who was chairman of the Wharton group in the College Council until 1896, when he left the University of Pennsylvania and shortly became president first of Northwestern University and then of the University of Illinois. Others were John Bach McMaster, later a noted member of the History Department, and Simon Patten, internationally known as a pioneer in consumption economics.

By 1894 political science, economics, and sociology were being taught, and already a start had been made toward the development of technical courses in finance, accounting, transportation, insurance, and the rest of the subjects represented in the present instructional departments. Since most of the teaching in these courses was pioneer work, the necessary textbooks had to be provided, and it is not surprising that a predominant number of the standard publications in the various fields have been written by members of the Wharton School faculty.

The remarkable numerical growth, both in faculty and enrollment, dates from 1912, when the Wharton School was separated from the College and was given its own Dean. The present enrollment, 2,100, which includes over 100 full-time students working for their M.B.A. in the two-year Graduate Course in Business Administration established in 1921 under Dean Emory R. Johnson, is lower than the peak of nearly 2,700 reached in 1926, partly because of the depression, but also because in 1926 the authorities determined that a better job could be done with a smaller group of students. The figures above, however, do not include nearly 4,000 in the Wharton Evening School, founded in 1904, and in the Extension Courses, founded in 1913. The latter division, it might be added, administers courses in Arts and Sciences and Education, as well as Wharton School courses, given to nearly a thousand additional students.

Dr. Johnson, who became Dean in 1919, was confronted by a formidable task. On one hand the student body had increased almost twofold, and on the other the faculty had been greatly diminished, either through enlistment or by participation in government service. In his first year the number of teachers was increased by fifty per cent, and to make the work of the larger faculty more effective, the
number of departments was increased and their chairmen were given added responsibility. And because the greater enrollment presented problems of guidance and counsel that could no longer be cared for by individual faculty members, an “Industrial Service Department” was created in 1920, renamed in 1926 the “Department of Student Personnel,” to aid the undergraduates in scholastic and personal matters and to assist them in starting their life’s work. When Dr. Johnson retired as Dean in 1933, after forty years of service in the Wharton School, the organization and curriculum were virtually what they are today.

From the beginning of the academic year 1933-34 until February 1939, when he became Director of the Department of Social Sciences of the Rockefeller Foundation, Dr. Joseph H. Willits was Dean of the Wharton School. His marked ability enabled the Wharton School to develop its educational work despite the adverse economic conditions of recent years. The maintenance and, indeed, the elevation of faculty standards has been due largely to the creation in 1933 of the Faculty Personnel Committee, which considers all appointments to the staff. Other important events during his administration were the establishment in 1937 of the Institute of Local Government and of the Howard Crawley Memorial Lectures, which are given to the Wharton students by men of national and international prominence.

The Lippincott Library

The Lippincott Library, which was founded in 1927, is a reference library devoted to the social sciences, public affairs, and business. The only library of its kind in Philadelphia, it serves all of the departments of the Wharton School and many business and research organizations. Financed partly by a gift from Mrs. J. Bertram Lippincott, a daughter of Joseph Wharton, the library is in a large room occupying nearly a quarter of the fourth floor of Logan Hall. Here some 18,000 volumes and 58,000 pamphlets, and the 1,100 periodicals that the library receives are arranged and classified with reference to the curriculum. A trained staff of nine is in charge. In the hall outside the well-lighted room are shelves holding bound volumes of the last twelve years of the New York Times. As might be expected, the library is a busy place. It receives more than fifty thousand visits a year.

DEPARTMENTS IN THE WHARTON SCHOOL

Economics: Economics, or political economy as it was formerly designated, is a relatively modern science, and the University of Penn-
sylvania was one of the first to give it formal recognition. The early development of the subject matter was, in the nature of the case, in connection with other subjects—philosophy, history, law—and its emergence as a separate course was gradual.

In 1749 Benjamin Franklin urged the inclusion in the curriculum of the Academy of Philadelphia of information on the “History of Commerce, of the Invention of Arts, Rise of Manufactures, Progress of Trade, Change of its Seats, with the Reasons, Causes &c.” It is not surprising, therefore, that the University of Pennsylvania was one of the first half-dozen institutions to recognize political economy as a distinct field of instruction.

Although origins are somewhat obscure, it is clear that the first formal instruction in the subject at the University was given as early as 1855, by Dr. Henry Vethake, Professor of Mental and Moral Philosophy. The present Department of Economics, however, traces its origin to Robert Ellis Thompson, later President of the Philadelphia Central High School, who is credited with giving the first formal instruction in “social science” in the United States. In a world given to specialization, it may seem odd that Dr. Thompson, who was a Presbyterian minister, was instructor in mathematics in the College, and that his lectures in social science were a part of the English requirement of the senior year. That was in 1869-70, and in 1874 Dr. Thompson was appointed to the newly created Professorship of Social Science, but his course, which embraced all of the social sciences, continued to be a senior requirement in English until 1878, when it was given independent status.

Interested like Thompson in the entire field of group activity and human welfare was Simon Nelson Patten, who was appointed Professor of Economics in 1888, the first to hold that title in the University and one of the best known of American economists. His complete mastery of the entire range of social science made him one of the most stimulating of teachers, and his provocative writings anticipated in a remarkable manner much that is now accepted by economists and by scholars in other fields. Especially noteworthy were his emphasis on dynamic economics and his insistence that improvements in consumption as well as in production may contribute to progress.

In its earlier days, the Department of Economics included all instruction in the broad field covered by its title, but its connection with the Wharton School has very naturally led to the splitting off of many topics of instruction, such as finance, insurance, industry,
and marketing, which are now taught by departments with these special names, leaving to the original Department courses chiefly devoted to what may be called economic theory. In these courses, however, economic theory is tempered by a close and objective observation of the data of the economic system.

This approach can be found in the widely used textbooks and other works published by members of the Department and in their research activities. The latter have resulted in the publication of a variety of important studies for such organizations as the National Bureau of Economic Research, the National Industrial Conference Board, and the United States Department of Commerce.

In recent years two members have participated in the Consumer Installment Financing Project, under the Financial Research Program of the National Bureau of Economic Research, one of them serving as director of the program, which is supported by grants from the Association of Reserve City Bankers and the Rockefeller Foundation. Others have served various agencies of the Federal and Commonwealth governments as experts. One member is now Deputy Secretary of the Department of Public Assistance of the Commonwealth of Pennsylvania, and since 1930 another has been President of the American Academy of Political and Social Science.

The American Academy of Political and Social Science: Closely related to the University and especially to its work in economics, sociology, and political science, is the American Academy of Political and Social Science, which, after having had such varied habitations as Logan Hall, the Zoology building, and the Veterinary building, is now located at 3457 Walnut Street.

The Academy is widely known, having a membership of about nine thousand. It publishes a bi-monthly journal, the Annals, and a series of monographs and a series of pamphlets; it holds, also, many meetings for the discussion of public questions. Although the Academy is separately incorporated, it is everywhere identified with the University, and throughout its fifty years of life each of its presidents and most of its other officers have been members of the Wharton School faculty.

Finance: From 1881 until 1902 the Wharton School was known as the Wharton School of Finance and Economy. In the latter year, possibly because a redundancy was detected in the earlier name, it was changed to the Wharton School of Finance and Commerce. That there was a redundancy neither the Department of Economics nor
the Department of Finance would deny; in fact both would insist that finance is a major division of economics.

The teaching of the Finance Department is concerned not only with the technicalities of corporation finance, banking, real estate, and the management of trust funds, but with business cycles, the forces underlying the rise of modern American industry, gold and other monetary problems, and the importance of credit in the world of commerce. A course entitled "Investments" might be supposed to deal with technical market conditions affecting current prices of securities, but instead it is devoted mainly to the underlying forces which influence corporate income, national income, and budgetary stability.

The publications of members of the Department also show an interest in both the fundamentals of economics and the technical aspects of finance. On one hand there are such works as Interpretation of Accounts, Financing and Production and Distribution of Cotton, Railroad Consolidation, Banking Theory and Practice, Real Estate, Trust Finance, The Careful Investor, and Cost of Obtaining Money to Public Utilities in the United States. On the other hand there are The Economics of Money, Credit, and Banking; England Today; The Meaning of Money; and the Story of Gold. These, which are but a few items from the extensive bibliography of the Department, represent standard textbooks used at the University and in many other institutions, solid pieces of research, and in some cases books of interest to the general public. In recent years members of the Department have also served the public as Secretary of Banking of the Commonwealth of Pennsylvania, as Treasurer of the City of Philadelphia, and as Deputy Treasurer.

With "Finance" so prominent in the name of the Wharton School, it is to be expected that the subject would be taught from the beginning. No course with that specific title was given immediately upon the founding of the School, but topics that were clearly the forerunners of the present courses in finance were prominent in the courses offered by Robert Ellis Thompson, the only professor on the Wharton School faculty from 1881 to 1883. Indeed, except for accounting and business law, Dr. Thompson's all-inclusive lectures contained at least the germ of virtually everything now taught in the Wharton School.

Today the Department offers in the Wharton School fourteen courses on the various aspects of finance besides a great number in other divisions of the University, and instead of utilizing only part of the services of one professor, it has a staff of seventeen.
Insurance: Insurance is one of the fundamental divisions of economics. That it has a vital bearing on business, the management of individual estates, and social welfare has been recognized at the University at least since 1904, when S. S. Huebner was appointed Instructor in Insurance and Commerce in the Wharton School, the first such post in any college or university. In that year approximately $12,500,000,000 worth of life insurance was in force; in 1939 the figure was in the neighborhood of $100,000,000,000.

In this phenomenal increase the Wharton School's Department of Insurance has played a part. Today there is hardly a sizable city in the United States where one or more underwriters cannot be found who have received their instruction in insurance at the University of Pennsylvania, and many of these hold the post of president, vice-president, or actuary in some of the most important insurance companies of this country. Moreover, the Department was primarily responsible for the establishment of the American College of Life Underwriters, of which two members of the Department have been President and Dean for many years; and former members are in charge of the instruction in insurance at four important American universities.

Life insurance, however, is but part of the work of the Department, which is concerned with the whole subject of risk and risk bearing. Naturally property insurance (fire, title, and marine) has been important from the beginning, and since 1913, when the present Department was established, the first department of its kind apparently in the world, courses dealing with compensation insurance, casualty insurance, transportation insurance, actuarial science, loss prevention activities, fidelity and surety bonding, as well as courses on such special aspects of life insurance as life insurance salesmanship and a course in preparation for the chartered life underwriter examinations have been added. These, along with courses on security and commodity markets and brokerage, which are also a part of the work of the Department, are now given by a staff of thirteen full-time teachers to nearly 1,600 students each year in five divisions of the University, including the Graduate Course in Business Administration and the Graduate School.

Both here and abroad the Department is recognized as a pioneer in insurance education, and it continues to be generally regarded as a leader, for it is widely known, not only through the many students it has trained but through its publications, its activities in connection with scientific societies, and its services to the public through agencies of the federal, state, and municipal government.
Its teaching staff has prepared eight outstanding textbooks, nearly all of which were pioneer works and are widely used throughout the world. In addition to numerous articles prepared for scientific journals, twenty-two volumes have been written by the staff and sixteen other volumes have been prepared editorially.

Only a slight indication of the public and semi-public services of members of the Department can be given. A list of such activities would include services as experts and consultants to various congressional committees, the United States Shipping Board, the Federal Social Security Board, and many other agencies of the federal or state government. The list would also include services as members or chairmen of nationally recognized committees concerned with insurance and insurance education, social security, and labor legislation.

Commerce, Transportation, and Public Utilities: The Commerce, Transportation, and Public Utilities Department began its educational work without precedents to follow or literature to use. The courses that have developed reflect in part the intellectual interests of the men who have been connected with the Department and in part the evolution of trade, transportation, and public utility services, their agencies and facilities.

The teaching of transportation in the Wharton School was begun by Emory R. Johnson in 1894 with a course scheduled for one hour a week. But sixteen students were enrolled. A specialized course in railway and corporation finance was also given by Joseph French Johnson, and a course in the geography and history of commerce had previously been introduced and was being taught by Roland P. Falkner.

Out of these early beginnings the Department of today gradually developed, largely under the guidance of Dr. Johnson. In 1912, when the Wharton School became autonomous, the various courses then being offered were listed as a separate group, and the teaching staff, headed by Dr. Johnson, became known as the Commerce and Transportation Department. In 1935 its name was changed to Commerce, Transportation, and Public Utilities Department. At present the eight members of the Department give twenty-six courses in the Wharton School and other undergraduate schools, the Wharton Evening School, the Graduate Course in Business Administration, and the Graduate School.

Members of the Department have written many textbooks which have contributed much to the effectiveness of their courses and to
the introduction of business education in other colleges and universities. They have also written books for the use of readers other than college students, and numerous reports for departments and agencies of the United States government. Some of the publications were the first in their particular fields. The list includes the first treatise on water transportation in the United States, the first comprehensive treatment of railroad freight and passenger traffic, the first textbook on the marketing of farm products, the first comprehensive history of American commerce, and the first books to treat ocean traffic management, motor traffic management, and coordinated motor-rail-steamship transportation.

Experts in a highly technical field, members of the Department have held many positions with governmental agencies. Dr. Johnson was a member of the Isthmian Canal Commission from 1899 to 1902, in 1911 he was requested to recommend tolls and vessel-measurement rules for the Panama Canal, and in 1936 he served as chairman of a special board to recommend revision of Panama tolls and measurement rules. He served as an expert for many other agencies of the Federal government and has been a member of the Public Service Commission of Pennsylvania. Other members of the Department have performed special services for such agencies as the Isthmian Canal Commission, the War Trade Board, the Federal Trade Commission, the Tariff Commission, the Maritime Commission, the Federal Communications Commission, the Interstate Commerce Commission, the Federal Coördinator of Railroads, and the Foreign Trade Zones Board.

**Geography and Industry:** The departments of the Wharton School can be divided roughly into two groups: those devoted to the social sciences, and those devoted to technical business subjects. The Department of Geography and Industry, which came into existence in 1912, stands midway between the two, as is evidenced by such courses as Economic Geography (required of all freshmen), Geographical Environment, and Economic and Political Geography of Europe.

Obviously the Department has wider interests than the mere amount and availability of natural resources, and this viewpoint can be traced to the first course in geography given in the Wharton School (in 1893), in what was then known as the Economics and Social Science Group. The courses in industry are more technical, particularly those which deal with industrial management and manufacturing, subjects which include much of what is known as industrial engineering; but a strong sociological bent is to be found in
such a course as the one entitled "Industrial Relations and Personnel Administration," in which an analysis is made of workers' attitudes, the rise of labor unions, strikes, labor turnover, absenteeism, and the restriction of output.

That the teaching of the Department, which now has a staff of twenty-four, is not merely theoretical and academic is the result of the long-standing policy of taking advantage of the highly industrialized area near at hand. Philadelphia proper offers an array of industrial establishments including such industries as radio and electrical appliances, textiles, clothing, sugar refining, publishing, paper, petroleum refining, shipbuilding, and iron and steel. Bordering Philadelphia are others: canning and glass manufacture in the southeast, silk and ceramics in the northeast, steel and cement in the northwest.

The Department benefits from these resources in two ways. Students are taken through the plants, which serve as laboratories for the study of manufacturing processes, operating procedures, and management methods. These visits are an integral part of the course in manufacturing industries and comprise entirely the course known as Field Work in Industry. The Department also takes advantage of the industrial area by inviting to the classroom prominent business executives. Students engage in group discussion with these men and are individually required to submit written solutions to actual current business problems. Field work in geography courses consists of summer tours conducted to foreign countries by members of the Department. Students are thus enabled to obtain course credits by the ideal combination of study and travel under professional guidance. That the work of the Department is considered important by the undergraduates is shown by the fact that each year some 1,300 students enroll in the elective courses alone.

Various members of the staff are frequently engaged by industrial organizations as consultants in such technical matters as budgeting, plant layout, and analysis of wage-payment plans. As a result of the upsurge of the labor movement, both labor unions and business men have repeatedly called upon members of the Department to arbitrate disputes arising in employment relations. This has occurred in the confectionery, carpet, textile, and shipbuilding industries. And as is so frequently the case with the Wharton School faculty, various members of the Department have held important governmental posts. Besides serving in the cabinets of governors of Pennsylvania of both parties, they have been associated at various times with the
United States Shipping Board, the NRA, and the Automobile Labor Board.

Marketing: According to available records, the University of Pennsylvania offered the first course in marketing in the United States. This was in 1904, when “Marketing of Products” was the name of a course given by W. E. Kreusi to some twenty-five students.

The course, listed as Economics 102 in those early days when Economics embraced virtually everything in the Wharton School, was thus described in the catalog:

The methods now practiced in the organization and conduct of the selling branch of industrial and merchandising business. The principal subjects in the field are publicity, agency, advertising, forms and correspondence, credit and collections, and terms of sale.

Mr. Kreusi emphasized advertising and selling, and this emphasis was continued under later instructors. In 1910 the name was changed to Advertising. With the increase in enrollment in the Wharton School and the greater attention being paid to advertising, new courses were added from time to time until, in 1921, a Department of Merchandising, composed of six members, was established.

In the meantime a number of courses in marketing had developed in the Department of Commerce and Transportation, which since the nineties had paid attention to the historical and geographical aspects of the distribution of goods. No clear line divided the work of the two departments, but in general the merchandising courses tended to stress advertising and sales management; the commerce courses, the description and analysis of marketing as an economic institution. Finally, in 1936, the two related groups of courses were merged in a new Department of Marketing. Evidently the combination appeals to the Wharton undergraduates, for more than 125 members of the graduating class of 1939 wrote their senior theses in marketing.

The location of the Wharton School in one of the most important commercial centers of the United States contributes materially to the work of the Department. The students make frequent visits to important industrial plants, department stores, and advertising agencies; and, in turn, experts in marketing and merchandising technique from these organizations act as visiting lecturers and also provide data and material used by the students in solving problems in marketing.
As has been indicated, the courses fall into two groups: those relating to advertising and selling and those relating to the analysis of the conditions affecting the successful distribution of manufactured goods, without which no intelligent sales effort is possible. The work, therefore, is primarily technical, but like other departments of the Wharton School which trace their origin to the early courses in social science, the Department of Marketing recognizes the importance of the broader social and economic aspects of the distribution of goods, such as the ethics of advertising, fair prices, monopolistic practices, and the flattening of the peaks and valleys of production. This point of view is to be found not only in the teaching and publications of members of the Department but also in their activities in cooperation with the major foundations of the country, trade and professional organizations, government agencies, and other educational institutions, and as consultants for individual business enterprises.

Economic and Social Statistics: Although instruction in statistical methods has been offered in the Wharton School since 1888, a department of statistics was not organized until 1930. During the early period, the courses in statistics were taught by various members of the faculty of the Wharton School and were listed from time to time in the curricula of different departments, but most frequently in the Department of Economics.

Since its formation, the Department of Economic and Social Statistics has consistently maintained the point of view that statistical methods are an essential tool of research. All of the courses stress the practical uses of statistics in the solution of social and economic problems, with very limited emphasis on the body of mathematical disciplines which underlie many of the methods. The principal goal has been to train the students to analyze and interpret numerical data correctly.

Important in the work of the Department is the statistical laboratory maintained in Room 411, Logan Hall, which is equipped with a variety of calculating machines. Although intended primarily for students registered in the various courses in statistics, this laboratory has come to be an important workroom for undergraduates, graduates, and members of the faculty throughout the entire Wharton School. A statistical study applied by the Department to its own services during the year 1938-39, indicated that from fifty to seventy-five students use the room daily, of whom about one-third are not registered in any of its own courses. A laboratory assistant is in
charge of the room at all times and is prepared to give instruction in the use of the machines and render general assistance to the student.

Enrollment in the various statistics courses shows considerable variation from year to year, but recently there have been about 150 undergraduates and 100 graduate students enrolled each year. The trend is upward, and with the growing interest in research the expansion of the Department may be expected to continue.

The Department of Statistics since its formation has coöperated regularly with other departments of the University, with research agencies, and the Federal government. A member of the Department who has been on leave of absence for a number of years is serving as chairman of the Central Statistical Board, the agency which coördinates the statistical work of the Federal government. Another is affiliated with the National Bureau of Economic Research, for which organization he has supervised extensive research programs dealing with the study of business cycles, national income, capital formation, seasonal variations in industry and trade, etc. Another has conducted a retail trade study for the United States Bureau of the Census and has served as statistical coördinator for the Pennsylvania State Department of Labor and Industry. Another has carried on various research activities, especially in coöperation with the University of Pennsylvania School of Medicine and also with the Pennsylvania State Department of Labor and Industry. Other members have served the United States Bureau of the Census and the Pennsylvania State Department of Labor and Industry.

**Sociology:** Like the Department of Economics, the Department of Sociology traces its descent from Robert Ellis Thompson. And it likewise claims at least spiritual descent from Simon Patten, who, although officially Professor of Economics, was frequently referred to as a sociologist.

In 1891 Frederick W. Moore was appointed Instructor in Sociology and gave a course on the Elements of Sociology, the first in the University to bear that name. He was followed in 1893 by Samuel McCune Lindsay, one of Patten's first students. Dr. Lindsay's work, which began in 1894 and followed that of Moore after a gap of two years, marks the beginning of the continuous history of the Department of Sociology. Sociology, however, did not become a full-fledged department until 1907, when Dr. Carl Kelsey became chairman. Today a staff of fourteen has taken the place of the one instructor appointed in 1891, and courses are given to more than
Three factors have been dominant in determining the activities and the point of view of the Department. The first of these is the fact that sociology has always been a part of the work of the Wharton School, and the Department therefore has been able to affect the training of future business executives, both through its own courses and through its influence on the content of other courses. Second is the fact that throughout its history the Department has enjoyed consistently friendly relations with the allied social sciences and with the Departments of Psychology and History. Third is the fact that the Department has never adopted any single conceptual framework in which all social data are arranged. Opposed to speculative or "arm-chair" sociology, the Department prefers an eclectic approach to the scientific study of group structures and relationships.

This point of view can be readily observed in the teaching of the Department, in recent standard works on social change, divorce, and America's racial problems, which bear the names of members of the staff, and in its service to the public. In recent years members of the Department have served variously as chairman of the Central Statistical Board, Washington, on the Social Science Research Council, New York, as director of a study of the social consequences of public housing projects, and in many similar activities.

The William T. Carter Foundation of Child Helping: The Carter Foundation, which has headquarters at 3440 Walnut Street, was established at the University in 1924, having been endowed by Mrs. William T. Carter in memory of her husband. Although not a part of the Department of Sociology, it is closely associated with that Department because of the nature of its work. For many years Dr. James H. S. Bossard, who became Director of the Foundation in 1938, had been primarily concerned with the social problems of childhood. Under his direction, the resources of the Foundation are being devoted to research in this field.

The Pennsylvania School of Social Work: No courses in the training of social workers are offered by the Department of Sociology. Such training is given by the Pennsylvania School of Social Work, a graduate professional school located at 311 South Juniper Street that has been affiliated with the University of Pennsylvania since 1935. Although the School is an independent corporation, its students, after completing a two-year course, are granted the degree of Master of Social Work by the University.
Political Science: Government has become a partner in every human enterprise, and with every extension of government activity the work of a department of political science grows in importance. The modern university's inescapable rôle is to discover by patient research the principles that underlie wise political action, to publish the results of these inquiries, and to teach them in its classrooms.

For more than a hundred years of the University's history such topics as Natural and Political Law, Political Philosophy (based on the American Constitution), and International Law were included in those composite courses usually given the label "English" in the catalogue. It was not until 1888 that work in political science was organized on a more formal basis.

In the meantime Joseph Wharton had given his views on the subject of political science and had implemented them with a handsome endowment. When in 1881 he set forth in printed form his Project for a School of Finance and Economy to form a new Department of the University, he emphatically stated his desire that the new school should train young men for public as well as private life. This was not to be merely for the advantage of the student, but to make him a more useful member of society.

Fortunate in its personnel from the earliest days of the Wharton School, the Department had as its first chairman Dr. Edmund J. James, who was also the organizer and chief executive of the School. John Bach McMaster, the historian, and the widely known Robert Ellis Thompson likewise took part in the Department's early work. Dr. John Quincy Adams succeeded Dr. James, and after him Dr. Leo S. Rowe served as chairman before becoming chief of the Latin-American Division of the United States Department of State and later Director-General of the Pan-American Union. Dr. Rowe's successors have been Dr. James T. Young, Director of the Wharton School from 1904 until 1912, when the office of Dean was re-established; and the late Clyde T. King, former Secretary of the Commonwealth of Pennsylvania, Secretary of Revenue, and Chairman of the Public Service Commission.

Besides those named, the staff, past and present, has also included members of the Foreign Service, a justice of the Supreme Court of Pennsylvania, a budget secretary of the Commonwealth, and an attorney-general, not to mention holders of important municipal posts. In the educational and scientific field there are several trustees of universities, the heads and important members of political science departments in other institutions, and the directors of research
bureaus. A member of the present staff is the Hon. Roland S. Morris, distinguished as a diplomat and as a leader in civic life.

Currently the outside activities are broad and diverse. These include many assignments in federal, state, and local administration, consultation services for state legislative committees and industrial groups, civic organizations such as the Pennsylvania Economy League and the City Charter Committee. Members of the Department have also added greatly to the literature of political science. In research and writing they have covered such broad fields as city government, rural government; state, federal, and comparative government; public finance, international law and relations, citizenship, Latin-American affairs, and public administration.

Once a subject receiving part of the attention of a single professor, political science at the University is now taught by a staff of nineteen, whose offices alone occupy most of the space on the second floor of the Hare Building. Eleven undergraduate and seventeen graduate courses are given to more than a thousand students registered in the Wharton School, the Wharton Evening School and Extension Classes, the Graduate Course in Business Administration, the College, the College for Women, and the Graduate School. Beginning with introductory work in American government and constitutional law, these courses run through all fields of present public interest, including local government (city and rural), state, federal, and comparative government, political theory, public administration, Latin-American relations, international affairs, taxation, and public finance.

So extensive are these activities that it might seem as if a school of public affairs were in existence in the University. Such is not the case, but the Department has visions of realizing to a degree not heretofore possible the aims of training citizens, public servants, leaders in public life, future lawmakers, and prospective members of the bench and bar. Equipped with research facilities in all the fields that touch on government activities and staffed by a personnel possessing both broad experience and specialized knowledge, it hopes to train not only citizens whose usefulness lies somewhat in the future but men in all walks of life, including those already engaged in public service.

The Institute of Local and State Government: A significant start toward a school of public affairs has already been made at the University. In 1937, through the generosity of Mr. Samuel Fels, an Institute of Local and State Government was established to further
the training of men for service to Pennsylvania communities and the State. The Institute's courses are given in cooperation with the Department of Political Science. Under the auspices of the Institute, which has offices in Blanchard Hall, eight graduate apprentices are now pursuing advanced work, which includes employment in branches of Pennsylvania local government. The Institute also carries on an active program of research.

Accounting: The original deed of trust of the Wharton School stipulated that the instruction should inculcate "the necessity of system and accuracy in accounts, of thoroughness in whatever is undertaken, and of strict fidelity in trusts." It stated further that there was to be...

... one Professor or Instructor of Accounting or Bookkeeping, to teach the simplest and most practical forms of bookkeeping for housekeepers, for private individuals, for commercial and banking firms, for manufacturing establishments, and for banks; also, the modes of keeping accounts by executors, trustees, and assignees, by the officials of towns and cities, as well as by the several departments of a State or National Government; also the routine of business between a bank and a customer.

But the work of the lone instructor who was appointed was far from what is indicated by such modern accounting expressions as accounting principles, budgeting, cost accounting, auditing, analysis and interpretation, consolidated statements, accounting systems, governmental accounting, income tax accounting, C.P.A. problems, and fiduciary accounting, all of which represent aspects of accounting included in the courses now offered in the Wharton School.

Progress in developing sound accounting courses was slow in the early years of the School. There were few students in the Wharton School itself, there was a decided lack of personnel trained to teach accounting, and the relative simplicity of business gave no compelling reason for future business men to study the subject. At first it was taught by a part-time instructor from a downtown business office, and it is a legend of that early period that a faculty member always accompanied him to class, to maintain order.

It was not until 1904 that a member of the teaching staff became sufficiently interested in accounting to make it his life's work. In that year Edward P. Moxey, Jr., who had just graduated from the College, was made an assistant in accounting, later becoming the first Professor of Accounting and the first chairman of the Department. Dr. Moxey served as its administrator for eighteen years and built a smoothly functioning organization which now offers twenty-seven courses in eight divisions of the University.
All freshmen in the Wharton School are required to take an introductory course designed to benefit any student of business, and each year more than three hundred students usually elect the second-year course in order to obtain the excellent cross-section of business which a sound knowledge of accounting provides. In addition some sixty or seventy a year elect highly technical advanced courses which provide a training for professional practice as certified public accountants and for careers in private enterprise or with governmental agencies. Accounting is also of great importance in the Wharton Evening School and the Extension Courses.

With this increase in the extent of its teaching the Department has grown in numbers until it now has a staff of twenty-five. Twelve of these men give full time to their University work; the other thirteen, with two exceptions, are practising accountants and controllers who are associated mostly with the instruction in evening classes.

But the influence of the staff spreads beyond the confines of the classroom. The books by department members, many of them pioneer texts prepared when little accounting literature existed, have been used widely. In addition the Department is represented in the various national and local professional and academic accounting societies, and members have served as officers and consultants to governmental departments, as well as to business organizations.

Business Law: In 1790, when the Trustees of the College of Philadelphia authorized James Wilson's lectures on law, they stated that "The obvious Design of such a Plan is to furnish a rational and useful Entertainment to gentlemen of all professions, but particularly to assist in forming the Legislator, the Magistrate and the Lawyer." Throughout much of the nineteenth century the Department of English offered quaint courses such as the one described thus in the catalogue of 1829: "Evidences of Natural and Revealed Religion. Metaphysics. Natural and Political Law. English Composition. Forensic Discussions." It was the purpose of such instruction not to train prospective lawyers but to give the citizen a conception of his relation to society and the state, and to dispel the fog which to the layman seems to encompass law and legal processes.

When the Wharton School was established in 1881, it was natural to include a course in law in its curriculum with the same purposes in mind. In 1889 "Business Law and Practice" becomes the title, not only for the course in law, but for a series of courses in accounting, panics, corporations, stock and produce exchanges, prices, rail-
way finance, and the like. When the Wharton School was separated from the College in 1912, Business Law was organized on a departmental basis and has remained one of the principal departments of instruction since that time, now giving courses in all of the divisions of the Wharton School and also in the College, in one of the Engineering Schools, the College for Women, the School of Education, and the Graduate School.

The paramount aim of these courses is to inculcate habits of orderly and discriminating thought, and thus to contribute to the general cultural training of the student. At the same time the teaching of business law in the Wharton School must be closely related to the particular needs of students in a school of finance and commerce. These needs are reflected in the numerous publications of members of the Department—standard works which bear such names as *Pennsylvania Business Law, American Business Law, American Corporations, American Courts, Selected Cases on Agency, Selected Cases on Contracts, Legal Solutions of Business Problems, Cases on the Law of Business Associations,* and *Cases and Materials on Business Associations.*

Many research publications by members of the Department have also appeared both in book form and as contributions to periodical legal literature, a number of them undertaken for governmental agencies.

**Industrial Research:** The headquarters of the Department of Industrial Research are in a remodeled building at 3440 Walnut Street. The Department was established in 1921 as a research organization which would have the benefits of a university background and of industrial experience with which to study the local labor market. A group of representative firms interested in unbiased research stood ready to provide data for analysis, and the Carnegie Corporation and the University were willing to help provide salaries for the staff and the complex tabulating and computing equipment which was needed. Contributions from the Rockefeller and Rosenwald Foundations and interested individuals made the later work possible.

The staff of the Department now numbers eighteen full-time members. Its record of achievement can be measured by its bookshelf of thirty-one volumes, published by the University Press, and its list of informal reports and releases; by the length and extent of its contacts and work in certain industries; by its coöperation with government agencies and industrial, trade, and labor organi-
zations; and by its training of students and assistants, many of whom now hold important posts in government bureaus. Various phases of employee earnings, industrial relations, production, equipment, labor market problems, and commodity prices are represented in the investigations, which have analyzed data from bituminous coal mines, retail stores, iron and steel foundries, employment office files, from individuals in many walks of life, and from mills in every branch of the textile industry.

Originally the Department approached outside groups for the purpose of securing data for analysis—analysis which, the staff believed, would clarify some problem in economic relationships as well as aid the organizations supplying the information. As the work of the Department became known, there was more opportunity to select sources of data. Always the underlying principle adhered to was that the studies should be defined in areas in which the materials of research could be added to or improved either by the research staff or by cooperative work with other research agencies. In addition to the studies originating in the Department, there have been requests from community, government, and industrial groups for inquiries into special situations, for staff members to act as arbitrators in particular cases or in whole industries, for others to serve as consultants and advisers to community and governmental agencies.

THE ENGINEERING BUILDING AND THE TOWNE SCIENTIFIC SCHOOL

The Engineering Building

When the Engineering Building, which would be at Thirty-third and Locust streets if Locust Street were there, was dedicated in 1906, nearly three years after ground had been broken, the University was genuinely proud of the new structure, and still is for that matter. The architects had prepared designs in a fairly simple Georgian style in keeping with both the University setting and the solidly scientific engineering courses, and it was the largest instructional building on the Campus until a new wing was added to the Medical Laboratories in 1928.

The building is a hollow rectangle of brick and limestone three stories high, with two impressive entrances on the south side. The offices of the Dean of the Towne Scientific School, who is also Director of the Department of Mechanical Engineering, are at the west
entrance; those of the Director of the Department of Civil Engineer­
ing are at the east entrance.

The laboratories are at the rear of the building on the ground
level and occupy approximately 32,000 square feet of floor space. A
laboratory for fuel technology is at the west end, the materials
and hydraulic laboratories are at the east end, and stretching be­
tween are a laboratory for chemical engineering, a heat-power
laboratory for mechanical engineering, a machine shop, pattern
shop, and foundry.

The Engineering Building also houses smaller laboratories for
physical chemistry, fuel calorimetry, metallography, heat treatment,
photo-elasticity, and vibration analysis. The building has numerous
offices, classrooms and drawing rooms, a large library, an assembly
room seating approximately four hundred, and a large room made
available for student activities. In the basement is an electrical sub­
station for regulating the power to the building; there are also
locker rooms and a lavatory equipped with a battery of shower­
baths that are of great benefit to the engineering students at the
close of a long afternoon in the laboratories.

THE TOWNE SCIENTIFIC SCHOOL

The Towne Scientific School has three departments: Chemistry
and Chemical Engineering, Civil Engineering, and Mechanical En­
gineering. Until 1920, when the School of Fine Arts was organized
under its own dean, architecture was a division of the Towne
Scientific School, as was electrical engineering until 1923, when the
Moore School of Electrical Engineering was established.

Engineering at the University of Pennsylvania, which up to the
present has developed into these three schools, can be traced to the
earliest years of the College of Philadelphia, when surveying was
a part of the work in mathematics. But it is generally looked on
as having begun in 1850, when the Trustees adopted a resolution
providing for a school of Arts. The school had but one chair, a
professorship of “Chemistry as applied to the Arts,” and according
to the catalogue of 1851-52, “Familiar lectures are given by the
professor, to students exclusively, upon the following subjects: Min­
eralogy, Geology, Theoretic and Applied Chemistry.”

In 1875, after a number of changes of title and a considerable
increase in staff had taken place, the school became the Towne
Scientific School, named in honor of John Henry Towne, a Trustee,
who had left his large residuary estate to the University. At once it was made a separate division of the University under its own dean, but in 1883 it again became a part of the College, where it remained until 1912, when both the Towne Scientific School and the Wharton School were given autonomy under their own deans.

Civil Engineering: The Department of Civil Engineering occupies the east end of the Engineering Building. On the first floor are the offices of the Director, and the members of the staff are assigned offices and classrooms at the east end of the building. Here also, with the entrance on the first floor, are the materials laboratory and the hydraulic laboratory, the principal laboratories of the Department.

The materials laboratory has the biggest pieces of apparatus to be found in the University. Of the thirteen testing machines of various capacities, the largest is an Olsen four-screw vertical machine, capable of taking a column twenty-four feet high. It can exert a load of six hundred thousand pounds and will test a thirty-inch I-beam, the largest that has yet been rolled. In addition there is equipment for the testing of cement, sand, plain and reinforced concrete, and road materials.

The equipment of the hydraulic laboratory consists of stand-pipes, concrete reservoirs, pumps, turbines, and water wheels, and a venturi flume thirty-four feet long. Two of the pumps have each a capacity of 450 gallons a minute against a head of 165 feet, and another can lift 2,100 gallons a minute to a height of fifty feet, the total maximum rate of discharge of the entire laboratory being eleven million gallons a day, enough water to supply a city of thirty thousand inhabitants if they have normal thirst and habits of cleanliness. For certain work the laboratory is looked on as one of the best equipped in the country, and many users of hydraulic construction specify that their apparatus must be tested in it before being accepted.

Equipment for civil engineering in 1852, when the first Professor of Civil Engineering, J. H. Alexander, was appointed, consisted of transits and levels, and not many of them, for the enrollment in the School of Arts was limited at first to ten students. Professor Alexander, who resigned in 1855, was succeeded by Fairman Rogers, later an important figure in the scientific life of Philadelphia and a Trustee of the University. Professor Rogers' course consisted in 1856-57 of fifty lectures on 'Civil Engineering and surveying, on triangulation and compass; linear, mining and hydrographic sur-
MORRIS ARBORETUM

PROVOST'S HOUSE
veying; and on construction, strength of materials, beams, arches and the special application to railroads, canals and water works."

When College Hall was opened in 1872, engineering was taught in the newly organized Department of Science, which had J. Peter Lesley, the distinguished geologist, as Dean of the Faculty, and L. G. Franck as Professor of Civil and Mechanical Engineering. The Department occupied the east end of College Hall, and the civil engineers and architects faced each other across the hall on the third floor. The traditional failure of these two active reagents to mix without more or less violent ebullition resulted in many of the "hall rushes" and "corner fights" so common in College Hall. The somewhat rural territory outside College Hall served as an admirable training ground, and the students laid out railway lines and thoroughly surveyed the terrain about the University, including the old Almshouse territory. In 1892 Edgar Marburg became Professor of Civil Engineering and immediately moved the civil engineers to the second floor of College Hall, where they remained until the completion of the Engineering Building, where, as a result of his own ability and the excellent new laboratories, the Department attained its maximum growth.

Dr. Marburg's greatest monument is the American Society for Testing Materials, which was organized mainly through his vision and efforts and of which he was Secretary-Treasurer from the time of its establishment until his death in 1918. A graduate of Rensselaer Polytechnic Institute, he came to Pennsylvania with a thorough practical training as a structural engineer. As a result of his special interest and ability in structural engineering, the Department has attained real prominence in the field. It has also received wide recognition for its work in hydraulic engineering. The course in civil engineering, however, is designed to provide a well-balanced training rather than a high degree of specialization. Graduates of the Department have found that this sort of engineering education constitutes a sound basis on which to build successful careers in the various branches of the profession.

*Mechanical Engineering*: With the establishment of the Towne Scientific School in 1875 the Whitney Professorship of Dynamical Engineering was set up. Although there had previously been an instructor in mechanical engineering, this chair was not filled until 1877, when William D. Marks became the first appointee.

Henry W. Spangler was Whitney Professor from 1889 to 1912, and
it was in 1906, during his régime, that the Engineering Building was completed. This was providential for the Department of Mechanical Engineering, for its laboratories (in a building on what is now the site of Irvine Auditorium) had just been destroyed by fire. Actually the Engineering Building was not complete at the time of the fire, but nevertheless on the next day, February 7, the mechanical engineers moved in, and on February 8, instruction began in the new quarters without the use of blackboards, shop, or laboratory equipment. During the rest of the year, shop and laboratory work was unusual but very practical. It consisted of installing salvaged equipment from the old building and new equipment in the extensive laboratories at the rear of the new building.

In 1912 Dr. R. H. Fernald was appointed Whitney Professor and Director of the Department of Mechanical and Electrical Engineering. In 1914, however, electrical engineering was divorced from mechanical engineering, later to become the Moore School of Electrical Engineering. After a long period of distinguished service as Director of the Department, Dr. Fernald assumed the additional duties of Dean of the Towne Scientific School in 1930, filling both posts until his death in 1937.

Under Dr. Fernald's leadership, the Mechanical Engineering Department followed the general trend away from the use of large and costly equipment intended to familiarize the students with machines as actually used in industry and away from courses calculated to develop mechanical skills and provide factual knowledge, toward the use of smaller and less costly equipment representative of current practice and toward courses of more fundamental and analytical character. A glance at the present curriculum with its fundamental courses in statics, dynamics, thermodynamics, heat transfer, fluid mechanics, and modern atomic and molecular physics shows the extent of this trend. And as is also demanded by the times, courses in economics, business law, and industrial management have been added to the curriculum.

In the heat power laboratory, besides an assortment of steam engines, gas engines, turbines, compressors, pumps, and condensers, there are various types of fluid meters, dynamometers, balancing machines, vibrosopes and torsographs, stroboscopes, and other instruments of the sort. The machine shop has somewhat heavier equipment. In addition to the usual modern tools found in small shops, there is a 22-inch turret lathe, a 30-inch boring mill, a 30-inch engine lathe, and a 10-foot planer. In the foundry there are electric
induction melting furnaces, a commercial cupola, a gas-fired core oven, and molding machines of various types. There is also a special sand-testing laboratory equipped with every device in use today and a complete pattern shop. The fuel calorimetry laboratory is equipped for determining the physical characteristics of solid, liquid, and gaseous fuels and particularly heating values, proximate and ultimate analysis.

In the Melville Laboratory of Metallography, made possible by a grant from Admiral George W. Melville, instruction and research are being done on the properties of alloys, both ferrous and non-ferrous, which are of increasing importance in modern engineering. Its apparatus includes a Leitz metallograph with which photographs of metal sections can be made at 2,500 diameters, four metallographic microscopes which magnify up to 1,200 diameters, and various grinders, polishers, and heat treatment furnaces.

Another laboratory is devoted to photo-elasticity, one of the most fascinating of the experimental methods used in the analysis of stress problems. The laboratory is equipped for fabricating and annealing the model specimens, and in addition there is especially designed apparatus by means of which measurements on soap films can be obtained to supplement in a very important way the purely photo-elastic data. This laboratory is mainly used in connection with graduate instruction, but it also serves to demonstrate some of the fundamental concepts of stress analysis to the undergraduate student.

Graduate work is an important activity of the Mechanical Engineering Department, and with it there is increasing activity in research, especially in aerodynamics, a branch of fluid mechanics dealing with the motion of compressed fluids. Apparatus embodying the Schlieren method of making the flow of gases visible is being used to study sub-acoustic velocities encountered in airplanes, heating and ventilating equipment, low-pressure turbine blades, etc., and also super-acoustic velocities encountered in impulse turbine blades and nozzles, jet compressors, and airplanes. An investigation of special interest to the air-conditioning engineer now being carried on in co-operation with the American Society of Heating and Ventilating Engineers attempts to evaluate small departures from Dalton's Law of partial pressures—a law which has been the basis of air-conditioning theory in the past. This attention to small defects in former methods of analysis is evidence of the engineer's respect for fundamental theory and his demand for precise data.
The Harrison Laboratory of Chemistry

The Department of Chemistry and Chemical Engineering is the only division of the Towne Scientific School that has its own building—the John Harrison Laboratory of Chemistry, at Thirty-fourth and Spruce Streets. The Laboratory is named for the prominent Philadelphia chemical manufacturer and is the gift of his grandsons, Provost C. C. Harrison, Alfred Harrison, and W. W. Harrison. It was dedicated in 1894 and is in an Italian Renaissance style.

The Laboratory was expected to accommodate five hundred students, but with the astonishing development of modern chemistry and the increase in enrollment (some 1,200 students study in the Department each year), many rooms are now devoted to uses very different from those for which they were intended, and chemistry has invaded several near-by buildings.

On the first floor of the Harrison Laboratory are two large laboratories for inorganic and physical chemistry, an electrochemical laboratory, and an amphitheatre seating two hundred. To the left of the entrance are the offices of the Director of the Laboratory. On the second floor are classrooms and two large laboratories for analytical chemistry. The third floor, which is devoted entirely to organic chemistry, has a large general laboratory and an analytical laboratory. On all the floors are small research laboratories for the staff and graduates, the usual balance rooms, store rooms, and dispensing rooms for reagents.

The Department also uses the entire fourth floor of the Hare Building as an organic chemistry laboratory, has a second laboratory for quantitative analysis in the Hygiene Building just north of the Harrison Laboratory, and uses three rooms in the Engineering Building for graduate instruction and research in physical chemistry. In the Engineering Building is also the large laboratory for chemical engineering, where its location between the mechanical and civil engineering laboratories provides unusual facilities for instruction. This laboratory is equipped for all the "unit" operations and has ample space for the erection and operation of apparatus for special projects and for research. Adjacent is a machine shop outfitted with precision equipment and operated by skilled craftsmen who, with the University glass-blowing service maintained in the Medical Laboratories, provide nearly all of the special apparatus required by both undergraduate and graduate students.

Equipment for instruction and research in chemistry is too extensive to be described here in detail. It includes apparatus so precise
that students can determine the amount of oxygen in refined copper or detect the minute traces of iodine in oyster shells. There is equipment for determining molecular weights of organic compounds, a necessary step in creating new chemical substances, for hydrogenation at pressures up to two hundred atmospheres and temperatures up to 250° centigrade. There are fractionating columns of all designs for purification of organic substances, along with electrical refrigerators for more rapid crystallization, drying " pistols" and pumps. There are potentiometers for the study of freezing points and the measurement of the most minute electric effects, dilatometers and precision thermostats accurate to within .03 of a degree, and a photo-electric colorimeter accurate to within .2 per cent. The largest piece of equipment is in the engineering laboratory. It is a circulating evaporator, the gift of the United States Cast Iron Pipe and Foundry Company.

Professor of Chemistry when the Harrison Laboratory was being planned was Edgar Fahs Smith, under whose direction the Laboratory achieved an international reputation. From 1894 until his death in 1928 he occupied rooms to the right of the main entrance—as Professor of Chemistry, Vice-Provost, Provost, and Provost Emeritus. In memory of his contributions to the University, the walk stretching from Thirty-third to Thirty-fourth streets has been given his name. At the west end of the walk, facing the main Library, is a bronze statue of him by R. Tait McKenzie.

The Edgar Fahs Smith Memorial Collection

An even more significant memorial to Dr. Smith is the library of more than nine thousand items housed in the rooms he occupied for so many years. On his death, Mrs. Smith gave the University her husband's extensive collection of books and ultimately endowed it.

The largest and most important section is devoted to the history of chemistry, a collection that is unquestionably the most important in the United States. The items include many incunabula, manuscripts, and rare French, German, and English prints on chemical and alchemical subjects.

Chemistry and Chemical Engineering: Unlike the Department of Physics, which is in the College, the Department of Chemistry is in the Towne Scientific School. The reason is that in 1893, while the Towne Scientific School was still a part of the College, the University established the Course in Chemical Engineering, the oldest of such courses in continuous existence in the United States and now
one of the comparatively few approved by the American Institute of Chemical Engineers.

But no matter why chemistry fits into the University organization where it does, it is certain that it has been important since the first college class entered in 1754. It was first taught by William Smith, the first Provost and Professor of Natural Philosophy. In 1769 Benjamin Rush was appointed Professor of Chemistry. His chair was the first independent chair of chemistry in America and he was the first American to publish a chemistry textbook. Other teachers of chemistry in the University were Robert Hare, famous as the inventor of the oxyhydrogen blowtorch; Robert M. Patterson, a student under Sir Humphrey Davy and later Director of the United States Mint; Alexander Dallas Bache, F.R.S., a grandson of Benjamin Franklin, President of the National Academy of Sciences, and first President of Girard College; and John Fries Frazer, who served on the Geological Survey of Pennsylvania and was a founder and Vice-President of the Academy of Natural Sciences.

With the appointment in 1874 of Dr. Frederick A. Genth as Professor of Analytical and Applied Chemistry and Mineralogy, chemistry at the University assumed its modern status as a department. In addition to Dr. Genth, who was noted for his researches on ammonia cobalt bases, there were two assistant professors. In 1876 Edgar Fahs Smith was appointed an assistant, becoming Professor of Chemistry in 1888. Under Dr. Smith graduate work in chemistry became important in the University; the first Ph.D. in Chemistry was granted in 1891 and since then 150 persons have received that degree.

During the tenure of Dr. Smith, who established the first laboratory for electro-analysis in the United States, research in chemistry at the University was directed largely toward electro-analysis, determination of atomic weights, and the study of the chemistry of rare metals. Probably the most significant achievement of technical interest during that time was Dr. Smith's own work on tungsten. This provided a basis for the preparation of tungsten salts of sufficient purity to make possible the technical development of the tungsten filament.

At present research in chemistry throughout the world has turned from inorganic chemistry toward the problems of organic and physical chemistry, and the research of the Department has followed this trend. In organic chemistry the staff and the graduate students have engaged in the study of the constitution of organic compounds,
the synthesis of new substances, the improvement of old and the development of new analytical methods. In physical chemistry the work centers largely around the study of the properties of solutions, including reaction velocities, the properties of non-aqueous solutions, the constitution of electrolytes, the accumulation of conductivity data, and the various factors determining ionic activity.

The Department now has a staff of thirty-two, who give instruction in seven divisions of the University. In the academic year 1938-39 a total of 148 students were enrolled in the chemical engineering course, forty-six in the four-year course in chemistry; 124 students in the various undergraduate schools were majors in chemistry, and there were 108 candidates for higher degrees, in addition to thirteen enrolled as graduate students in chemical engineering.

THE MOORE SCHOOL OF ELECTRICAL ENGINEERING

The Moore School Building

Electrical engineering, once but a part of what was offered by the professor of "Dynamical Engineering" in the Towne Scientific School, is now taught in a separate school and in its own building, on the southwest corner of Thirty-third and Walnut streets. It is a brick and limestone structure, 120 feet square, with two floors and a basement. The foundations provide for two additional stories when required. Before 1926, when the University purchased the building, it was used for the manufacture of musical instruments. By a kindly Providence the factory had been constructed in a style not inconsistent with that of near-by University buildings, and when the Moore School took over, it was able with some alterations to make its new home appear somewhat similar to the Engineering Building on one side and Bennett Hall on another.

The first floor contains most of the laboratories of the school. The second is devoted chiefly to classrooms, offices for the fourteen members of the staff, and a library containing nearly all of the published books on electrical engineering and many journals. There are also on this floor a short-wave radio station operated by the students and a student lounge. In the basement are lockers and one laboratory.

The laboratories are excellently equipped for experimentation
and research in the basic theories of virtually all the fields of electrical engineering. They consist of an extensive machinery laboratory that has been used as a model by other institutions, an instrument and measurements laboratory, a high-frequency laboratory, a laboratory especially devoted to graduate research, a photometric and illumination laboratory, an x-ray laboratory, a sound laboratory, and a differential analyzer laboratory. There is also a fully equipped shop outfitted with precision machinery for maintaining and making much of the apparatus used for instruction and research carried on in the Moore School.

The differential analyzer laboratory may be particularly noted because there are but three differential analyzers in this country. The instrument is an elaborate calculating apparatus, fifty feet in length and weighing sixty tons. It was built by the Moore School because advancement in the analysis of certain types of circuits had virtually ceased because of inability to handle the mathematics involved. The differential analyzer is an instrument that carries mechanical calculation beyond those operations usually considered when one speaks of calculating machines. Devices for adding, subtracting, multiplying, dividing, and similar processes are commonplace, and machines are also available for the solution of algebraic equations, one having been developed in the Moore School. Solving differential equations is vastly more complex, yet this is what the differential analyzer has been doing steadily in the Moore School since 1935, in some cases providing in one hour a solution that might otherwise require ten days or perhaps could not be reached at all. The analyzer is an important aid in the research in machinery and circuit theory problems, in which the staff and graduate students of the Moore School have been especially active, but it also has its immediate practical application in electrical engineering.

The analyzer, however, is but one piece of the array of equipment in the building at Thirty-third and Walnut streets. Other equipment is to be found in the machinery laboratory, where there are examples of virtually all types of electric machines and power equipment; in the instrument and measurements laboratory, where electric instruments of almost every description are to be found; in the high-frequency laboratory, which contains equipment for almost all types of measurements in the communication field; in the graduate laboratory, where special problems requiring special or unusual equipment are attacked; in the sound laboratory, in which is the only sound “prism” in this country.
THE MOORE SCHOOL OF ELECTRICAL ENGINEERING

In 1893 a course leading to the degree of B.S. in Electrical Engineering was established in the Towne Scientific School, and the term "Dynamical Engineering" was no longer used to cover both mechanical and electrical engineering. But the two subjects continued to be taught in one department, the Department of Mechanical and Electrical Engineering, until 1914, when the Trustees, recognizing the importance of electrical engineering, created a separate Department of Electrical Engineering. Chosen to head the new Department was Dr. Harold Pender, who, as a student of the famous American scientist H. A. Rowland, was the first to demonstrate experimentally Rowland's Law, which states that a moving electrical charge is an electric current.

In 1923 the University received a large endowment for a school of electrical engineering. The donor was Alfred Fider Moore, Philadelphia cable manufacturer, who in his will provided funds for the establishment of such a school as a memorial to his parents, Joseph Moore and Cecelia Fider Moore. As a result the Electrical Engineering Department of the Towne Scientific School became the Moore School of Electrical Engineering. For the next three years the School occupied the east end of the Engineering Building; in 1926 it moved into its present home.

The Moore School provides undergraduate and graduate instruction. It endeavors to give the student not only a thorough technical training but also to develop initiative, ability to work with other men, common sense, and other characteristics that are essential to success in engineering.

It is the purpose of the technical training to prepare the student to enter any of the major divisions into which electrical engineering is usually divided. These are the so-called power field (including the generation, transmission, and distribution of electrical energy); manufacturing (including the design and manufacture of electrical equipment); communications (including telephony, telegraphy, radio, and television); the industrial field (which includes the applications of electricity in branches of industry other than those mentioned above); and finally a field that comprises the multitude of other applications of electricity, for instance in medicine. But the most rigorous undergraduate training cannot do more than hope to prepare the electrical engineering student to enter these fields: a
long training period almost inevitably follows before the graduate evolves into the full-fledged engineer.

Graduate work has been carried on in the Moore School for many years. It was confined to daytime classes, however, until 1928, when the School inaugurated evening graduate courses for working engineers who wanted to continue their studies after receiving the bachelor's degree. These courses are completely independent of the regular graduate work given during the day for students who wish to prepare themselves by full-time graduate work for the more technical positions in electrical engineering.

THE FINE ARTS BUILDING AND THE SCHOOL OF FINE ARTS

The Fine Arts Building

The School of Fine Arts is in the dark red building in Renaissance style facing the Engineering Building to the north across the Edgar Fahs Smith Walk. Although it was not planned originally for the architectural faculty, whom it has housed since 1915, it was designed by one of their number, Edgar V. Seeler, who was appointed in 1894, fresh from the École des Beaux-Arts. Completed in 1896, when the more modern buildings were first beginning to appear on the Campus, it harbored the Dental School until 1915, when the School of Architecture was transferred from College Hall.

On the first floor, to the right of the front entrance, is a large exhibition hall, where finished architectural problems, beautifully rendered, are continually on display, along with charcoal and water-color studies that attract frequent visitors. To the left of the entrance are the offices of Dean George S. Køyl, who in his undergraduate days was the first of a long line of Pennsylvania men to win a major prize competition.

On the mezzanine floor in the rear wing of the building is the library. This is a well-lighted room, two stories high and fifty by ninety feet. Once used as a clinic amphitheatre by the Dental School, it now contains 8,000 volumes indispensable in the study of architecture and fine arts. Also of importance are the 190,000 mounted photographs and the 16,000 slides which are used largely in courses on the history of art. Of great benefit in such courses is a Carl Zeiss epidiascope, an apparatus that will project on a screen an image of any object placed in it—three-dimensional or flat, transparent or
opaque. Another library is the Godfrey S. Singer Collection of 12,000 selections of recorded music, which is in a room in the basement.

The largest room in the building is the atelier, 50 by 180 feet, formerly the dental clinic, which fills the entire second floor. Used only by men, for the women students have a smaller drafting room on the first floor, it has a somewhat bohemian atmosphere and is largely responsible for the *esprit de corps* for which the architectural students have been noted. When the students are *en charrette*, the electric lights shine all night on smocked figures bent over the drawing boards as final touches are given to a problem.

*The Studio*

Other buildings also serve the School of Fine Arts. Much of the work in music is carried on in rooms in Irvine Auditorium, and free-hand drawing has a studio in the dormitory quadrangle in a frame structure somewhat reminiscent of an army canteen. Its appearance is not an accident, however, for it originally housed a “commons,” run by a private individual who in the days before the dormitories were built attempted to supply board at $6.50 a week, served by uniformed waiters to the accompaniment of an orchestra. From the time when competition from boarding houses ended the enterprise, the building has been used as a studio, and in spite of its early history and appearance the place is affectionately regarded, for it has been the scene of many an architect’s play, and it is here that George Walter Dawson, noted for his water-color studies of flowers and beloved as an inspiring teacher, conducted his classes for many years.

**THE SCHOOL OF FINE ARTS**

The origin of the School of Fine Arts was the appointment in 1869 of an instructor in drawing, Thomas W. Richards, who almost immediately began the plans for College Hall and the other serpentine buildings on the Campus. Richards’ teaching at first was mechanical drawing primarily, but the use of architectural forms was unavoidable, and in 1875 he was appointed Professor of Architecture in charge of a fully organized four-year course in the Towne Scientific School.

The modern development of the study of architecture at Pennsylvania centers largely around two men, Warren P. Laird and Paul Philippe Cret. In 1890 the course in architecture became the School of Architecture, though still a division of the Towne Scientific
School. Temporarily in charge was Theophilus P. Chandler, who, assisted by Frank Miles Day, Walter Cope, John Stewardson, and Wilson Eyre, laid plans for a school organized on the principle that architecture is a fine art and not a mere adjunct to engineering. Appointed Director in 1891, Dr. Laird proceeded to gather a faculty whose students throughout the years have made a distinguished record in prize competitions and in practice.

Professor Cret's appointment in 1903 was the result of the desire to have on the faculty a Professor of Design with a record of achievement in the École des Beaux-Arts. Starting with but three months' study of English, he proved that few words are necessary for the able critic to convey an idea to a student. By the time of his resignation in 1929 to devote himself entirely to his practice, he had unquestionably become the most praised teacher of design in America. In 1931 he received the Philadelphia Award.

Architecture is now but one of the divisions of the School of Fine Arts. In 1920 a greater school came into existence, with Dr. Laird as Dean. There were to be four departments: Architecture, Music, Landscape Architecture, and Fine Arts. Under the plan, architecture continued to be the backbone of the school, with its own chairman, John F. Harbeson. Music, which had been a course of academic study given in the College since 1875 by Hugh Archibald Clark, was given a chairman, Dr. Harl MacDonald, now a noted composer and conductor, under whom has been developed a full curriculum, including the history, theory, and aesthetics of music, as well as composition. An important aspect of the work of the faculty of music has been the development of the Choral Society, composed of the Men's and Women's Glee Clubs. Beginning in 1930, the clubs became an "educational" activity, directed since 1933 by Dr. MacDonald. The Society has frequently sung with the Philadelphia Orchestra in Philadelphia, New York, Baltimore, and Washington.

Landscape architecture became a fully organized course in 1924, with Robert Wheelwright as its head. At that time the profession was relatively new, with few schools for the training of either men or women. Because the School of Fine Arts was in a city noted for gardens filled with a wide variety of plants both native and exotic, it was logical that work in landscape architecture be given. The private gardens and the University's own Morris Arboretum with its extensive plantings gathered from all over the world now provide laboratories, not only for undergraduate instruction but also for graduate research.

The Department of Fine Arts, which was headed by Dr. Leicester
B. Holland until he resigned to become Director of the Division of Fine Arts in the Library of Congress, at first included liberal courses in the history and appreciation of art primarily, with a modicum of technical study in drawing and interior design. But in 1925 the scope of the Department was extended to include a coordinated course with the Pennsylvania Academy of Fine Arts so that the degree of Bachelor of Fine Arts might be given to students in painting, sculpture, illustration, and mural decoration. In 1933 a similar course was offered to students of applied arts at the Pennsylvania Museum School of Industrial Art.

**BENNETT HALL AND THE EDUCATION OF WOMEN AT THE UNIVERSITY OF PENNSYLVANIA**

*Bennett Hall*

For many years the name Bennett has been associated with the education of women at the University of Pennsylvania. There is the Bennett Club, the *Bennett News*, and finally Bennett Hall, all deriving their names from Colonel Joseph Bennett, owner of a great deal of Philadelphia real estate, who bequeathed a considerable sum to the University to aid in the education of women.

At first the only physical evidence of the Bennett bequest was a group of residences on the south side of Walnut Street east of Thirty-fourth, which were a part of the Bennett estate. Some of these houses were subsequently torn down, and swings and seesaws, erected by the Philadelphia Playground Association, were kept busy during the summer months by neighborhood children. One of the houses that remained standing was fitted out in 1921 as the Bennett Club, a student union for the women, and in 1926 the Club expanded into an adjoining house. In 1924, because the 525 women who were in the School of Education were encroaching on the already overcrowded College Hall rather more than was approved by a part of the University family, the Trustees appropriated most of the Bennett fund to construct a building at Thirty-fourth and Walnut Streets to be used primarily for the education of women.

Bennett Hall was opened for use in 1925, and into it promptly moved the School of Education and its various divisions. The Summer School and the Graduate School were also allotted offices in the new building. Although none of these schools admitted
women alone, they formed a majority of the enrollment. The College of Liberal Arts for Women, which was not organized until 1933, was located in Bennett Hall when it came into existence.

The new building is in an English collegiate style which is somewhat simpler than that of the dormitories and other modern buildings on the Campus. The main section lies along Walnut Street from Thirty-fourth to Bennett Field, a vacant piece of ground now fenced in and used by women's classes in physical education. At each end a short wing extends south to Chancellor Street, forming a small court at the rear. The main entrance is at Walnut and Thirty-fourth streets, at the base of a tower seventy-five feet high. Very wisely, the architects placed the offices on the street side of the building and the classrooms—there are twenty-one, seating 971—at the back, overlooking the court.

Bennett Hall does yeoman service. On the first floor to the right of the main entrance are the offices of the College of Liberal Arts for Women and of the Graduate School; at the extreme opposite end of the building are the offices of the School of Education; and stretching between are the offices of the Summer School, Nursing Education, Vocational Teacher Training, a Bureau of Educational Measurements, and the office of the Directress of Women.

On the second floor, over the main entrance, is the Maria Hosmer Penniman Memorial Library of Education, in a room eighty by twenty feet and two stories in height. On this floor and the third floor are the offices of members of departments which give a great number of courses in the College for Women and the School of Education—English, history, philosophy, Latin, and, of course, education. There are also the offices of the Departments of Oriental Studies, Indo-European Philology, and History of Religion, the only instructional departments actually in the Graduate School.

On the fourth floor are the offices of the Women's Division of the Department of Physical Education, a gymnasium eighty-eight feet by forty-three, and a "correction room," which has nothing to do with breaches of discipline. The basement contains a fully equipped reading clinic, a room for commercial education that is equipped with typewriters and computing machines, a student store, and a lounge for the women students.

THE COLLEGE OF LIBERAL ARTS FOR WOMEN

The final creation in 1933 of a College for Women in the University was sensible. Since 1914, when the School of Education was
organized, large numbers of women had received undergraduate instruction on the Campus. Most of them were enrolled in the School of Education, and although that School gave preference in admissions to students who seemed clearly to intend to teach, it was obvious that many wished a course in liberal arts. Indeed, a great number of young women enrolled for a full schedule of afternoon and evening classes given as College Collateral Courses. These courses were offered by the College and were the only means for women to obtain an A.B. at the University.

That a college for women was needed is shown by the fact that it has not been possible to keep within the limit of five hundred students, the enrollment that was originally anticipated. With the establishment of the College for Women it became possible to put the School of Education on a strictly professional basis, admitting students after they had completed two years of a liberal arts course.

The College for Women is identical with the College (for men) in entrance requirements, curriculum, and the rest, instruction being given by the same faculty but in separate classes. At first the variety of courses was not so great as was offered to the men, owing to the smaller enrollment, but that discrepancy has virtually disappeared. The catalogue of the College for Women for 1939-40 lists a total of 467 different courses, not all of them given in one year, of course; while in the College catalogue a similar count gives a total of 546, the difference being represented to some extent by courses in engineering and military science, to which women are not admitted.

It is interesting to note that in recent years an increasing number of courses given by the members of the Wharton School faculty have been offered in the College for Women. The curriculum makers, realizing that women succeed in business as well as in the professions and also that they inherit much of the accumulated wealth of the nation, have made the courses available with the modest statement that "women may be faced with the problem of property management."

**THE SCHOOL OF EDUCATION**

The professional training of teachers in the University, which now requires the services of a staff of fifty-three, dates definitely from the creation in 1894 of the chair of the "History and Institutes of Education," to which Martin G. Brumbaugh was appointed, but
the opening of opportunities to women some years earlier was a related step. In 1891 the Graduate School created a "Graduate Department for Women," and in 1894 this Department stated that its work was "especially valuable ... to those who wish to become teachers." In 1892 a four-year course in biology, open to women, was organized in the College and was "designed to give a thorough preparation to those who purpose becoming teachers of Natural History." In 1893-94 a course in English literature, designed especially for teachers, was first given by Dr. Josiah H. Penniman. In 1887, even earlier than many of these developments, the Psychological Laboratory had been established, and soon its work was directed to teaching problems.

With the appointment of Dr. Brumbaugh, courses in education were offered in the College (but only to men), in the Graduate School, and in the newly organized College Courses for Teachers (now the College Collateral Courses). When Dr. Brumbaugh resigned in 1906 to become Superintendent of Schools in Philadelphia and later Governor of Pennsylvania, his successor was Dr. A. Duncan Yocum, who had received his doctor's degree from the University in 1900 and until 1914 had sole charge of the courses in education. During those years the professional offerings for teachers, particularly in the summer sessions, were greatly enlarged. In 1913 the Pennsylvania Legislature made a large appropriation to the University for teacher training, and Frank P. Graves and Harlan Updegraf were appointed professors to assist Dr. Yocum. In 1914 the School of Education was organized with Dr. Graves as Dean, a post which he held until 1921, when he became Commissioner of Education for the State of New York.

The work of teacher training in the University has changed much in quantity and character, especially since 1914. The earlier training was general; the later gave emphasis to special fields. History, philosophy, principles of education, and foreign systems were predominant in the program prior to 1914. In 1914 the sole curriculum was designed to prepare for the teaching of academic subjects in secondary schools, but other curricula were soon added. At present the School of Education also prepares for teaching in kindergarten and in the primary and intermediate grades, in vocational education, nursing education, home economics, music and art, physical education, and commercial subjects. Many of the courses in the respective curricula are for the training of administrators and supervisors.

The most significant event in the history of the School since its founding occurred in 1933, when it was reorganized on a five-year
basis. For long it had been the policy to restrict enrollment as far as possible to students who definitely planned to teach. With the establishment of the College for Women, it became possible to admit at the junior class level or higher. After devoting the junior and senior years mainly to academic courses, the student receives the B.S., but is not eligible for a teaching certificate until after completion of a year of graduate study in which professional training is emphasized.

Graduate study and educational research have always had their place. Although only eighteen doctoral dissertations in education appeared before 1916, at present about five are completed each year. These are a part of the work of the Graduate School, but since 1931 the program of the School of Education has included a curriculum leading to the degree of M.S. in Education.

The literature of education has been enriched even more by the many publications of the members of the faculty, beginning with Dr. Brumbaugh, who was author and editor of many studies in the historical as well as educational fields. But the influence of the faculty through their publications has been further increased by the activity of many of them in national, state, and local educational associations and on commissions and educational committees. While serving primarily the needs of Pennsylvania, the School of Education, through the activities of its faculty, has looked beyond the State to the nation and its educational needs.

The Penniman Library of Education

Of great value to faculty and students in the School of Education—and to many others—is the Maria Hosmer Penniman Library of Education, which is on the second floor of Bennett Hall. Housed originally in a special room on an upper floor of the main Library, it was moved to its present location when Bennett Hall was opened. Since that time the Penniman Library has filled the three levels of shelves in the large room at the head of the main stairway and has expanded to a classroom across the hall, where graduate students are assigned desks.

The Penniman Library, the gift of the late James Hosmer Penniman, brother of the Provost Emeritus, was presented to the University as a memorial to their mother. Throughout the later years of his life, Dr. Penniman collected books relating to education, and these he gave to the University of Pennsylvania, Yale University, of which he was an alumnus, and Brown University. On his death he bequeathed additional books to these universities and funds for
the maintenance of the collections. The collection at the University of Pennsylvania now numbers 47,000 volumes, among which are many rare incunabula and other important early editions.

Vocational Teacher Training: Within the School of Education are certain separate divisions, each with its own director. One of these is the Department of Vocational Teacher Education. This Department came into existence as a result of the passage in 1917 of the Smith-Hughes Act, following which the Pennsylvania State Department of Public Instruction assigned to the University of Pennsylvania responsibility for vocational teacher training in the eastern area of the State. Until 1920 no member of the faculty of the School of Education devoted his time exclusively to the work, but in that year the first full-time teacher was appointed as Assistant Professor of Industrial Education, and in 1922 the staff was doubled by the appointment of a Professor of Vocational Education, who also served as Director of Vocational Teacher Training.

Prior to the creation of the Department, it was the practice in the public schools to take men and women, skilled in their particular trades, and place them in charge of classes. There were no general educational or professional requirements for shop teachers, department heads, or even for trade school principals. At present the State of Pennsylvania requires twenty-four hours of college credit for certification as a teacher of vocational subjects and a Bachelor's degree for certification as a trade school principal or director of vocational education, the requirements for the City of Philadelphia being even higher.

During the college year 1917-18, nineteen students enrolled in the one course offered by the Department. During 1938-39, a total of 341 students, representing forty-one vocations, were registered in fourteen vocational teacher education courses. By 1940 more than 200 such students had earned the B.S. degree in the School of Education, 117 had earned either the M.A. or M.S., and three the Ph.D. Practically all of the teachers, supervisors, and directors of vocational industrial education in the eastern area of Pennsylvania, as well as many from other localities, have been students in the Department. As a result of these contacts and the studies of significant problems in this professional field, the Department has contributed materially to the development of the modern philosophy in vocational education.

Nursing Education: The Department of Nursing Education was founded in 1935 following a proposal by the Pennsylvania State
Nurses' Association that the University of Pennsylvania create a department of nursing education. The move was the natural result of the higher standards in the schools of nursing, the increasing importance of the public health nurse, and the desire of the nurses themselves for a higher degree of professionalization.

With the aid of a permanent advisory committee composed of the Dean of the School of Education, the President of the Pennsylvania State Nurses' Association, and administrators chosen from a school of nursing, a hospital, and public health nursing, Miss Katharine Tucker, the Director of the Department, who formerly had been Director of the National Organization for Public Health Nursing, organized curricula designed to prepare students to become teachers, supervisors, and administrators in schools and hospitals, and for positions in public health nursing. The courses in these curricula lead to the B.S. or M.S. in Education and are given both on the Campus and at extension centers.

Starting with a faculty of two full-time professors and one special lecturer and an enrollment of 176 students, mainly from the Philadelphia area, the Department had grown by 1939 to a faculty of two professors, two assistant professors, and seven lecturers. Likewise, the enrollment had jumped to 560, and an increasing number of students were coming from other states than Pennsylvania.

*The Illman-Carter Unit:* Approximately seventy children from four to twelve years old are now a part of the University of Pennsylvania. The connection, it must be admitted, is somewhat tenuous, for they are in the Illman School for Children, which is a part of the Illman-Carter Unit for Kindergarten and Primary Teachers, which is a division of the School of Education. The School for Children serves as a demonstration school for more than one hundred students registered for a four-year course in kindergarten and primary training.

The academic courses are given in the various departments of the University; the professional courses at the headquarters of the Unit, at 4000 Pine Street, and at the Annex, 4112 Spruce Street. The building at 4000 Pine Street is a remodeled residence with a modern, three-story addition at the rear. In it are offices, classrooms, a large kindergarten, and a dormitory for the training students, who come from a wide area. The Annex contains more classrooms and the Primary Department.

The Illman-Carter Unit is an outgrowth of the school established in 1904 by Miss Alice Carter of Philadelphia as a result of her
interest in kindergarten work and her realization of the value of two mission kindergartens which she had organized in the poorer sections of the City. Miss Caroline M. Hart, one of the well-known educators of the time, was appointed Director, and the school bore her name.

Until 1912 the school was located in the central part of the city, but in that year increased enrollment forced it to move to 3600 Walnut Street. After the death of Miss Hart in 1918, Miss Adelaide T. Illman became Director, and in 1920, following the extension of the work of the school to the primary grades, the name was changed to Miss Illman's School for Kindergarten and Primary Teachers. In 1921 a further increase in enrollment made necessary the purchase of the building at 4000 Pine Street, and in 1927 an addition was erected.

An affiliation with the University of Pennsylvania was established in 1932 by which full credit toward the B.S. in Education was granted to graduates, and this relationship naturally led in 1936 to the School's becoming an integral part of the University.

Schoolmen's Week: In the spring of every year some five thousand teachers, school officials, and professors throng the Campus and various large lecture rooms in Bennett Hall and other buildings, where they attend nearly a hundred meetings. The occasion is known as Schoolmen's Week and serves as a Teachers' Institute for the schools of Philadelphia and various suburban school districts and as a general educational conference for the Southeastern Convention District of the Pennsylvania State Education Association. What takes place in the meetings and conferences is later published as *The Proceedings of Schoolmen's Week*, a volume that is kept down to something like six hundred pages only with considerable difficulty.

The conference, which was first instituted in 1914, is sponsored by the School of Education, with which Drexel Institute coöperates both financially and in providing facilities. The Philadelphia Teachers' Association and the suburban school districts also contribute financially, and representatives of all these groups plan the program. The purpose of Schoolmen's Week is to provide free discussion of vital topics in education, to promote worthwhile research, and to demonstrate progressive school practices.

The Cultural Olympics: The Cultural Olympics is an activity designed to stimulate interest in the fine arts as leisure time activities. It was conceived by Mr. Samuel Fleisher, founder of the Graphic
SUMMER SCHOOL

Sketch Club, and was established in 1936, largely through the interest of Mr. George H. Johnson, a prominent Philadelphia merchant. Festivals in music, dancing, speech, dramatics, and literature are held both on and off the Campus, and a number of art exhibitions are shown at the Cultural Olympics Gallery, 3425 Woodland Avenue. The office of the Director is in Bennett Hall.

Considered a part of the School of Education, the Cultural Olympics arranges conferences and demonstrations for teachers. Although none of the activities is competitive, high standards of excellence are maintained by a group of judges who analyze each performance and recognize outstanding ability by granting certificates of merit. The Cultural Olympics does not award scholarships, but it has been influential in placing especially qualified young people on free scholarships in prominent schools of art, music, and dance. Each year the activities on the Campus attract approximately six thousand participants and an audience of well over one hundred thousand.

THE SUMMER SCHOOL

Although it is administered as a division of the College, the Summer School has its offices in Bennett Hall. The reason is not merely that College Hall is crowded, but that there may be closer contact with the School of Education and the Graduate School, for courses in education and graduate work generally are a major part of the work of the Summer School.

It was not always so. The first official summer session, held in 1904, offered sixty-one courses, virtually all of which were for undergraduates, and no course in education was included until 1906. The purpose was primarily to give flunkees a chance to make up deficiencies, but the fact that the School afforded faculty members some additional income was also a consideration. For at least some of the faculty, however, the additional income was not overwhelming, for they were paid according to the number of students they taught, rather than on a salary basis, and the fees of the 137 students enrolled were split among twenty-nine members of the staff for an average of considerably under one hundred dollars.

Conditions from a faculty standpoint were probably even less satisfactory in the earlier, unofficial summer sessions. As early as 1889 summer classes in certain subjects had been conducted on the Campus under various auspices, including those of the American Institute of Biblical Literature, the State Department of Education,
and the faculty members themselves. These involved official permission for the use of University rooms, but were otherwise private enterprises. Most interesting was the summer school of chemistry conducted in 1894 by the late Edgar Fahs Smith and several assistants. Although Dr. Smith refused compensation, the meager tuition fees ($25.00 per student for four courses) when divided among the assistants amounted to very little. A survivor recalls that he received $30.00 for teaching six weeks. And in 1895 Dr. Smith took his vacation and the assistants did all the teaching.

Following the establishment of the School of Education in 1914, the function of the Summer School as an advanced training school for teachers began to develop rapidly. With the increasing complexity of the educational system and the progressive heightening of the requirements for teachers, it has become more and more necessary for the latter to seek advancement and stimulation through summer study. From 1914 to 1926 this tendency was felt at the undergraduate level, since most in-service teachers did not have college degrees, but were being forced to meet new and higher standards of certification or lose their positions. Undergraduate attendance reached its peak in 1926, when the School had 2,510 students. Now, however, most teachers must take their degrees before beginning to teach, and after employment they are encouraged to pursue higher studies and in many cases to attain the Master’s degree. Of the nearly 1,900 students in the 1939 Summer School, about forty-four per cent were graduates, as compared with twenty-five per cent in 1926, and about sixty-five per cent were teachers or prospective teachers.

In 1939 there was a faculty of 118, including twenty professors, seventeen associate professors, thirty-seven assistant professors, twenty-six instructors, and eighteen visiting lecturers. They offered 252 courses, 170 of which carried graduate credit. In addition, the catalogue listed 182 courses as “omitted in 1939”—advanced courses given in cycles. A few students were making up conditions or were seeking to shorten the time required to earn the Bachelor’s degree, but the great majority were present or future teachers—men and women whose influence will largely determine what our future undergraduate students will be like.

THE GRADUATE SCHOOL.

In 1882, when the Graduate School was founded, most of the schools of the University of Pennsylvania were still known as depart-
ments, and the present departments were merely chairs devoted to the various subjects of instruction. And so the Graduate School was called the Department of Philosophy, a name which remained until 1907.

The first students, four in number, were enrolled in 1885, when there were but fifteen members in the faculty, and all supposedly were working for their doctorate, for no arrangement was made for part-time study, and until 1892 the M.A. and M.S. continued to be given in the College. The first Ph.D. was granted in 1889, to Arthur W. Goodspeed, later Professor of Physics and Director of the Randal Morgan Laboratory. Dr. Goodspeed, however, was not the first to receive the Ph.D. from the University, for the Auxiliary Faculty of Medicine, created in 1865 to enlarge and improve medical training, granted that degree from 1871 to 1879 to holders of the M.D.

Not all of the Masters' degrees are now given in the Graduate School. In 1930 the School of Education established a course leading to the M.S. in Education; in 1932 the Graduate Course in Business Administration, which had been offered in the Graduate School since 1921, was transferred to the Wharton School along with the authority to grant the degree of M.B.A.; and since 1936, when the D.Sc. was abolished, the M.S. in the various branches of engineering except chemical engineering has been conferred by the engineering schools. But in spite of the consequent transfer of a considerable number of students to other schools, the enrollment at present is but slightly less than it was in the peak year 1931-32, when there were 2,025 students. In 1938-39 there were 1,597, of whom 53 received the Ph.D. and 152 the M.A. or M.S.

Until 1896 all examinations for degrees were oral and public, and all the members of the faculty of whatever department were privileged to question the candidates. Whether in the spirit of fun or with an earnest desire to maintain educational standards, some of the professors badgered the candidates unmercifully. The story is told of one who asked, "Who wrote the Areopagitica?" When the candidate confessed ignorance, the professor said, "My second question will be, What else did he write?"

Several years of discussion ultimately led to the decision that each department might examine its own students privately and by means of written examinations if it saw fit. However, to insure the maintenance of high standards by making public the work of each student, the ceremonial of presentation and the requirement that the dissertation be published were put into effect in 1900.

The graduate faculty, which now numbers 311, has usually con-
sisted of professors from all other faculties, but there are exceptions to this: the Professor of Comparative Philology, who is chairman of the Department of Indo-European Philology, and the entire staff of the Department of Oriental Studies. These two departments and a third, the Department of History of Religion, are a part of the Graduate School organization for the reason that their work is primarily graduate in nature. They offer certain courses, however, in the undergraduate schools.

The administrative organization of the Graduate School remained practically unchanged until the Spring of 1936, when the faculty was separated into four divisions: the Biological Sciences, the Humanities, the Physical Sciences, and the Social Sciences. Each division elects its own chairman and its own executive committee, and also appoints three members of the Council of the Graduate School, which is presided over by the Dean. The chief advantage of this new organization is the provision for specialized executive committees which are more efficient than a single executive committee such as existed previously.

One of the concerns of the executive committees and the Council is the quality and extent of the research carried on by both faculty and students. Two other organizations in the University are entirely concerned with research and with the publication of its results. One of these is the Board of Graduate Education and Research, which was established in 1931 with jurisdiction over all research activities throughout the University. Another is the Faculty Research Committee. By allotting funds, arranging teaching schedules more conveniently, and in many other ways, both of these have been effective in stimulating research.

Fellowships and scholarships are a necessity in the work of any graduate school. This was recognized by Provost Charles C. Harrison, and in 1895, one year after he had assumed office, he gave the University its first large endowment for fellowships and scholarships in the Graduate School by setting up the George Leib Harrison Fund. Since then the endowments for this purpose have been increased, and in addition the University awards thirty or more scholarships which provide free tuition. But the supply is considerably short of the demand, for each year nearly five hundred applications are received.

*Indo-European Philology*: The ordinary Ph.D. is required to have a sight-reading knowledge of French and German, and if he knows other modern languages and Greek and Latin besides, he is no or-
GRADUATE SCHOOL

ordinary Ph.D. But even the latter linguistic accomplishments are mere preliminaries to professors of Indo-European philology, who are concerned with Sanskrit and the later Indian dialects, Iranian, and perhaps Hittite, in addition to most of the European languages in their ancient and modern forms. Indeed, the list includes languages which exist only as hypotheses, for instance, primitive Germanic and the original Indo-European itself.

The founder of the Department of Indo-European Philology was Morton W. Easton, A.B., Yale, 1863; M.D., Columbia, 1867; Ph.D., Yale, 1871. The last degree was taken in Sanskrit, to which he had turned as a result of his interest in linguistics as a branch of physiology. Dr. Easton's philology, no doubt, would be considerably revised today, for he died in 1917, but it is certain that he was a man of unusual learning. His teaching included Sanskrit, general comparative philology, the linguistics of Greek and Latin, phonetics, and Old and Middle English. An inspiring teacher, he revealed an astounding range of exact knowledge, which embraced such remote subjects as botany and heraldry. It is said that on occasion he substituted with notable éclat as a teacher of calculus.

There is some uncertainty concerning the proper date to assign for the founding of the department which Dr. Easton headed. He had been appointed Instructor in French and Elocution in the College in 1880, and Professor of Comparative Philology in the Graduate School in 1883, continuing for some years to teach French and Elocution. Perhaps, then, the Department was founded in 1883, but neither the Graduate School nor Dr. Easton as Professor of Comparative Philology had any students until 1885. In that year twelve intellectually robust undergraduates requested a course in Sanskrit, and the date of founding might therefore be assigned to the year in which the Department began to function. Indeed, from 1869 to 1880 Samuel S. Haldeman bore the title of Professor of Comparative Philology, but there is no evidence that he did any teaching or even ventured more than occasionally from his home near Columbia, Pennsylvania.

Because of the importance of Sanskrit in Dr. Easton's work, the Department was known as the Department of Comparative Philology and Sanskrit until 1897. In that year the name changed to Indo-European Philology, in 1914 to Indo-European Philology and Sanskrit, and in 1931 to Indo-European Philology again. The last change resulted from the organization of a new Department of Oriental Studies, with which the Professor of Sanskrit has since
been connected, though the linguistic courses in Sanskrit continued to be an essential part of the work of the Department of Indo-European Philology. At the same time the Department was reorganized to include all the linguistic courses of graduate rank given in the Departments of English, Romanic, and Germanic languages, as well as the linguistic courses in other Indo-European languages, including Balto-Slavonic, Greek and Latin, and Indo-Iranian. As a result the Department has a faculty of nine recruited mainly from various departments under the chairmanship of Dr. Roland Grubb Kent.

Dr. Kent was appointed Instructor in Greek and Latin in 1904. In 1909 he became Assistant Professor of Comparative Philology, offering courses in Latin and Greek linguistics, Italic and Greek dialects, Sanskrit, Old Persian and Avestan, and later in Lithuanian. In 1916 he succeeded Dr. Easton, who had retired in 1913, as Professor of Comparative Philology. A voluminous writer and past president of the American Oriental Society, Dr. Kent has been conspicuously active in the Linguistic Society of America since its founding in 1924.

Oriental Studies: The first evidence of interest in Oriental studies at the University of Pennsylvania was entirely extra-curricular. It consisted of the publication in 1858 by three undergraduates of a Report of the Committee Appointed by the Philomathean Society of the University of Pennsylvania to Translate the Inscription on the Rosetta Stone. Based on Champollion’s publication of the key to the ancient Egyptian, the work was a chef-d’œuvre, with its original chromolithographic plates and its philological exposition of the ancient languages on the Rosetta Stone.

But the formal entrance of the University into the field of Oriental studies came in 1885, with the appointment of Dr. J. P. Peters as Professor of Hebrew, and Morris Jastrow as Lecturer in Arabic and Rabbinical Literature, later Professor of Semitic Languages and Librarian of the University. A still more ambitious project was the University’s excavations, under the direction of Dr. Peters, at Nippur from 1888 to 1891. These excavations were carried on by the first American expedition of the kind in the Orient. With Dr. Peters was associated Dr. H. V. Hilprecht, the first occupant of the University’s chair of Assyriology, endowed by Mr. E. W. Clark, the patron of the expeditions—the first chair of this title in the world. These beginnings culminated in the founding of the University Museum by Provost William Pepper. Until the publication of the
series of volumes on the expeditions to Nippur, the University was little known abroad except for its Medical and Dental Schools.

With these masters and the rich treasures of the Museum, there was an immediate blossoming of Oriental studies in the University. It at once took leadership in the fresh science of Assyriology, producing such scholars as A. T. Clay, who later established the study of Assyriology at Yale, and D. D. Luckenbill and Edward Chiera, both of whom later joined the newly founded Oriental Institute at Chicago. A number of brilliant foreign students were also brought to the University: in Egyptology W. M. Müller, Hermann Ranke, later Professor at Heidelberg and now at Pennsylvania once more as Professor of Egyptology and Curator in the Museum, and B. G. Gunn, later Professor at Cambridge; in Semitics S. H. Langdon, later Professor at Cambridge, A. F. Ungnad, later Professor at Göttingen and Berlin, C. L. Woolley, and Leon Legrain, the present occupant of the Clark chair of Assyriology.

Both in the University Museum and in the Graduate School, studies relating to the Middle East and Far East were developed. The first classes in Sanskrit were given by Dr. M. W. Easton. Later Dr. Franklin Edgerton served as Professor of Sanskrit, subsequently joining the Yale faculty. In the meantime Dr. Jastrow had become an Orientalist of recognized distinction, with great interest in biblical studies, and later Dr. G. A. Barton, now Professor Emeritus of Semitic Languages, and Dr. J. A. Montgomery, now Professor Emeritus of Hebrew, had become ranking officers of the American School of Oriental Research and had served as directors of the School in Jerusalem. Carrying on Peters' and Jastrow's interest in biblical studies, these two members of the Department have each contributed a volume to the *International Critical Commentary* (on Ecclesiastes and Daniel), with another volume in preparation by Dr. Montgomery. These and a volume on Ezra-Nehemiah by an alumnus make the University's contribution to that important series the largest among American institutions.

The University has now the most inclusive group devoted to Oriental studies to be found in the country. All of the members of the present staff have had notable experience in their several foreign fields—in Palestine, Egypt, Iraq, India, and China. Three members of the Department have worked in India, Palestine, and Iraq as Guggenheim fellows, and these and others have made various visits to the Orient for archaeological and literary research. Dr. W. N. Brown, chairman of the Department and Professor of Sanskrit, is President of the American School of Indic Studies, and Dr. E. A.
Speiser, Professor of Semitics, is a director of the American School of Oriental Research in Baghdad. The latter has conducted several expeditions in Iraq in partnership with the University Museum and the School of Baghdad, the results having been published in several notable volumes. At present all of the editors of the *American Oriental Journal* are University men.

*History of Religion*: It was in 1893-94 that a special grouping of courses under the title "History of Religions" first appeared in the curriculum. These courses were offered in the Graduate School by some of the most prominent scholars of that period, Professors Hilprecht, Jastrow, Brinton, and Easton. Not until 1910 was an independent department organized under the leadership of Professor Morris Jastrow, who taught and wrote extensively on Semitic religions, languages, and literatures, and served as Professor of Semitic Languages from 1892 until his death in 1921. Another eminent contributor to the study of the history of religion was Dr. George A. Barton, who also served as chairman of the Department for a number of years and is now Professor Emeritus of Semitic Languages.

The primary impetus to the study of the history of religion has come from scholars who have dealt with Oriental history and culture, for all the major religions of the modern world have originated in the Near East or the Far East, but equally important contributions have been made by specialists in other fields. The study of religion, in fact, demands a rich equipment in many branches of learning—linguistics, art and archaeology, ethnology, philosophy, psychology—and a historical perspective which ranges from the fragmentary data on the worship of prehistoric races and the better documented beliefs of contemporary aboriginal peoples to the refinements of Jewish or Christian theology. The range is so extensive that the thirty graduate courses now offered by the Department of History of Religion are given by members of seven other departments: Anthropology, Germanic Languages, Greek, History, Latin, Oriental Studies, and Philosophy. An eighth department, English, coöperates in the courses given to undergraduates who study the Bible in English.

But it should not be inferred that the history of religion is a subject composed merely of elements of other branches of learning. For many decades it has been regarded as an independent field of research, occupying a prominent position in many institutions of higher learning both here and abroad. No chair devoted exclusively
to the history of religion, however, has yet been established at the University.

THE UNIVERSITY LIBRARY

"A fair Librarie is not onely an ornament and credit to the place where it is, but an useful commoditie by itself to the publick." So wrote an English librarian three hundred years ago. Successive generations have made the Library of the University of Pennsylvania a credit to the institution, even though the ornamental value of the building it occupies is questionable; and year by year it is becoming a more useful "commoditie" to the University, to Philadelphia, and to visiting scholars.

The Library stands on Thirty-fourth Street, facing College Hall and flanked on the south by Irvine Auditorium. The main part of the building was erected in 1890, from plans drawn after consultation with the most eminent librarians of the day. It was a day when grotesque ornamentation was considered art, and the chief requirement for interior plans for a library was to give readers no easier access to the books than was necessary. The building has been frequently enlarged, to provide space for the constantly increasing collection of books and a vastly increased body of readers, and today it contains nearly 750,000 volumes—more than double the original maximum capacity—and serves a student population nearly ten times that of 1890.

Daily between 8:15 in the morning and 10:00 at night some three thousand persons visit the Library, withdrawing approximately one thousand books. Most of these go to the circulation, reference, and periodical desks, which are in the reading rooms on the first floor. Lesser numbers visit the special reference rooms and seminar rooms on the second and third floors; and only graduate students and faculty are permitted in the stacks, which are at the southern end of the building. But the basement, seen by but few of the visitors, is perhaps as busy a place as any in the Library. Here are extensive offices where members of the staff order and catalogue new books, and here also is the union catalogue, which lists books in the Library of Congress and the important university and college libraries. It is indispensable, for a modern library must be able to inform readers where books may be borrowed and must arrange for inter-library loans.

Among the books now crowding the shelves of the old building and its additions are many valuable collections, some of which in themselves constitute libraries of considerable size. A great library
for research cannot be built up in a day, and ours has been forming since 1750, when a committee of the Trustees was authorized to spend "a Sum not exceeding one hundred pounds Sterling to be disposed of in Latin and Greek Authors, Maps, Drafts and Instruments for the Use of the Academy." One member of this committee was Benjamin Franklin, that bibliophile of the most practical sort, who loved books chiefly as sources of useful information and stimulators of thought. Among the memorials of the early days still preserved in the Library are several volumes presented by Franklin and others selected for the Academy by him. Two of these are the first edition, then new, of Johnson's Dictionary, and another best-seller of the time, a Chronology and History of the World, from the Creation to the Year of Christ, 1753.

On the right of the main entrance as one approaches the building, is a "Shakespeare Garden," directly beneath the windows of the Furness Memorial Library of books relating to Shakespeare. This memorial occupies the most recent addition to the building, erected in 1930. In the Garden are cultivated as many as possible of the flowers and plants mentioned in Shakespeare's plays.

As one enters the building, the door on the right immediately inside the entrance opens into this Furness Memorial, which contains some twelve thousand volumes of Shakespearean and other Elizabethan dramatic literature, acquired by Horace Howard Furness and by his son in connection with their editing of the Variorum edition of Shakespeare's plays. The library which they accumulated came to the University as a bequest from the younger Dr. Furness and his wife.

The interior of the Furness Library is patterned closely after the interior of Merton College, at Oxford University. Here are copies of all the Folios and of many of the Quartos, and many contemporary books containing mention of Shakespeare or the sources from which he drew in writing his plays. Here, too, are a number of interesting Shakespearean relics: among them a pair of gloves worn by Shakespeare, the dirk of Macbeth used by Edwin Booth as Macbeth, and the cloak worn by Sir Henry Irving as Shylock. A small room off the Furness Library contains a piece of equipment now an essential to any library devoted to literary and historical research. This is a projection apparatus for the use of microfilm reproductions of rare books.

Directly opposite the entrance to the building is the outer reading room, in which are the circulation desk, where books may be obtained for borrowing or for use in the building, and the card cata-
logue of the books contained not only in the main library building but in the various departmental libraries located elsewhere. In this room are a number of cases in which are displayed volumes acquired by the Library in its earliest days and various other works illustrative of different phases of the University's history.

At the rear of this room, opposite the entrance, is another of the choice collections by which the Library has been enriched, as valuable in its field as is the Furness Library to Shakespearean scholars. This is the Henry Charles Lea Library of Medieval History, containing approximately twelve thousand volumes and a large number of manuscripts. The collection was acquired over a long period of years by Mr. Lea while preparing his books on the Spanish inquisition, on witchcraft, and on various aspects of ecclesiastical history. Included are more than one hundred volumes of incunabula. The Library was bequeathed to the University by Mr. Lea, and through the generosity of his children an addition to the building was erected in 1924 to give it suitable accommodation. The room in which the famous scholar's library now has its permanent home is in effect the actual room in which he did his work, for it is an almost exact reproduction of that room, and the bookcases, fittings, ceiling, and all woodwork were removed from his house and reassembled here.

Beyond the outer reading room (on the left as one enters) is the main reference room, constructed on the once popular plan of semi-circular outline and dark alcoves. Here the "solitary student" was once pictured, "as secluded as though he were in a rock-hewn cell of the Valley of Engedi." The semicircle and the alcoves remain, but the students have banished solitude and seclusion.

In one of the alcoves of the reference room is now shelved a notable collection of eighteenth-century English fiction, which includes first editions of most of the major novels of that century and more than fifteen hundred volumes by minor novelists. It is known as the Godfrey F. Singer Memorial. The collection was formed by the late Dr. Singer while a graduate student and later an instructor in English at the University. After his death in 1934 it was presented to the Library by his parents.

Opening from the rear of the outer reading room and adjoining a large periodical room is the Librarian's office, in which are cases containing the Curtis Collection of Franklin Imprints—placed here until a new building shall make possible its more suitable display. This collection, a gift from the Curtis Publishing Company in 1920, has few rivals as an exceptionally large collection of books printed
by Benjamin Franklin. Some of the choice treasures of the collection are on view in the exhibition cases in the reading room, among them the Proposals Relating to the Education of Youth in Pennsylvania, written, printed, and distributed by Franklin, and an important milestone in the history of the University.

Space does not permit a description of other special collections and treasures, ranging from Sanskrit manuscripts to early American fiction and drama, and including Spanish and Italian literature, the classics of Greece and Rome (particularly a notable collection of Aristotle, including early editions of his writings and important translations and commentaries, which has been acquired in recent years through the generosity of Dr. Charles W. Burr) and many other fields. Mention must be made, however, of one room of historical interest, the Founders’ Room. This is on the second floor, on the first landing of the stairway ascending from the entrance hall. In this room have been assembled all of the books acquired by the Library before 1820, when the first printed catalogue was published, which are still in our possession, and a number of interesting relics. The books include ninety-two volumes which remain from a collection of one hundred volumes presented by Louis XVI of France in 1784. Among the relics two that are most highly prized are a desk and a chair that belonged to Benjamin Franklin.

THE UNIVERSITY PRESS

The University of Pennsylvania buys books for its Library, and like many modern universities it also publishes them—through the University of Pennsylvania Press.

Although “The University Press Company” was chartered in 1869 to publish The Penn Monthly, and the title-page of a University Museum report of 1890 bears the imprint of the “University Press,” the first organized program for University publishing began when The Press of the University of Pennsylvania was incorporated in 1920. It published three books, under the supervision of the Secretary of the University, but it did not commence active operation until 1927. Shortly thereafter the corporation was dissolved, and the University of Pennsylvania Press became a department of the University.

From May 1927 to December 1931 the office of the University Press was in what had been the dining room and kitchen of an old residence at 3438 Walnut Street. It then moved to its present quarters at 3622 Locust Street. The building, a two-and-a-half-story brick
The University Museum is one of the most widely known divisions of the University of Pennsylvania and the occupant of what is perhaps the University's most beautiful building. This stands on a tract of twelve acres south of Spruce Street and east of Thirty-fourth granted to the University by the City of Philadelphia in 1894. On the corner, facing north over the Campus, is a statue by Carl Bitter.
of the late Provost William Pepper, founder of the Museum and of many other departments of the University.

The Museum building, designed in a style inspired by the round-arched brick architecture that prevailed in northern Italy from the twelfth to the fourteenth century, is of brick, limestone, and marble. The principal entrance is through an ornamental iron gateway on Spruce Street, past a reflecting pool flanked by wings of the Museum. Farther to the east two impressive gateways surmounted by marble figures guard a carriage entrance, but most of the Museum's hundred thousand visitors a year walk in past the pool and up a flight of steps to a huge oak doorway.

Inside the doorway are marble staircases leading down to a lower level of exhibition rooms and up to an entrance hall off which branch exhibition rooms and, at the rear, the Charles Custis Harrison Hall. The latter is a rotunda ninety feet in diameter and ninety feet in height lighted by a series of windows high up under the arches that support the dome. On the floor level below the rotunda is a circular auditorium of perfect acoustics seating 750 people.

The Museum as it exists at present was built in four stages. The original section, which was completed in 1899, is in the shape of a U surrounding the reflecting pool. Its construction was made possible by a grant from the Pennsylvania Legislature and funds raised through the efforts of Provost Pepper and Mrs. Cornelius Stevenson, Secretary of the Department of Archaeology, as the Museum was originally known, which then and now had its own Board of Managers. Provost Pepper himself was a principal donor; others were William L. Elkins, P. A. B. Widener, Bernard N. Farren, Daniel Baugh, and the heirs of Edwin H. Fitler, all prominent Philadelphians, in whose honor various rooms and halls of the original building have been named.

On the first floor of this section of the Museum are exhibited the archaeological and ethnological collections from North, Central, and South America. On the second floor are the Babylonian (the most comprehensive in the country), early Islamic, and later Islamic collections. Here also are administrative offices and the library of fifteen thousand volumes on archaeology, anthropology, and allied subjects, including the Brinton Library, which contains the Berendt manuscripts and many important examples of aboriginal literature.

The second section to be completed (in 1915) is the tower that contains Harrison Hall and the auditorium. The Hall is named for the late Provost Harrison, who served as President of the Museum
from 1917 until 1929, a period during which, largely because of his own generosity and support, the Museum enjoyed perhaps its most extraordinary growth. The Hall contains the finest collection of Chinese sculpture in the world. The auditorium is used chiefly for public lectures, given on Saturday afternoons by distinguished archaeologists and travelers. Begun in 1900 as a part of the Museum’s educational program, these lectures were later endowed by the children of Dr. Harrison.

Adjoining the tower to the east is the Coxe Memorial Wing, which was completed in 1926. This wing was named for the late Eckley B. Coxe, Jr., President of the Museum from 1910 to 1916 and a munificent donor. On the first floor are some of the most striking exhibits in the Museum. One of these consists of great columns and doorways from the palace of Merenptah (the Pharaoh of the Exodus) at Memphis, obtained by the Coxe expeditions to Egypt. Another is the tomb of Ra-ka-pou, which was presented by the late John Wanamaker. This floor also contains Arabic and Palestinian collections, the latter obtained by the Museum’s own expeditions at Beth-Shan, and an exhibit of the art of India.

The second floor of the Coxe wing consists mainly of an impressive hall, 75 feet high and 136 feet long, devoted to Egyptian sculpture. A statue of Rameses II uncovered at Ahnas-el-Medine dominates the exhibit. Smaller galleries on this floor also contain Egyptian sculptures and objects of daily use, and in one room is an archaeological collection recovered by the four Coxe expeditions to Nubia. Unequaled save by the collections in the Cairo Museum, the latter exhibit is especially interesting because little investigation has taken place in Nubia and because the finds are a link between the culture of Egypt and the peoples to the south.

The last wing of the Museum completed thus far extends east from the base of the U that forms the original section of the Museum. It was completed in 1929. The first floor of this wing houses the Educational Department, which conducts classes and gallery talks attended by thirty thousand school children each year from Philadelphia and its vicinity. The second floor contains the ethnological exhibits from Africa and the islands of the Pacific. The many bizarre African figures, forming one of the finest collections in existence, attract numerous art students. Especially notable are the bronzes and ivory carvings of the Negroes of Benin in West Africa. The third floor, known as the Sharpe Gallery because it was presented and endowed by the children of Mr. and Mrs. Richard
Sharpe, contains the Museum's great collections from Greece, Italy, and the islands of the Mediterranean.

Not all of the Museum is seen by the general public. A special room, available to visiting scholars, houses the unrivaled Tablet Library with its more than twenty thousand cuneiform documents from Nippur, Ur, and other important Babylonian cities. There are also laboratories for photography, for modeling and the maintenance and repair of exhibits, and numerous storage rooms for material waiting to be exhibited. One storage room contains films recording the progress of expeditions, the methods of excavation and restoration, and the manners and customs of primitive tribes. The latter type of film will be of unusual scientific value in later years, when civilization may have made an end of either the tribe or its customs.

Many of the exhibits in the Museum have been acquired by purchase or by gift, but expeditions are responsible for most of the acquisitions. A complete list of these cannot be given, but beginning with the famed expedition under Peters and Hilprecht to Nippur, which was followed by the even more notable expedition (jointly with the British Museum) to Ur, the Museum has carried on almost continuous work in Mesopotamia, other sites being at Fara Khafaje, Tepe Gawra (with the Baghdad School of Oriental Research), and Tell Billah. In Iran, where work has been done at Tepe Hissar and Rayy, an interesting project was the Museum's archaeological air survey of ancient Persia.

In Europe excavations have been made in Crete, Cyprus, Italy, France, Central Europe, and the Crimea. In Africa, numerous expeditions have been sent to Egypt and Nubia and others to regions farther south. The most remote expeditions have visited China, Korea, Japan, Borneo, Sumatra, and the Luchu Islands; and nearer home the three Americas—North, Central, and South—have received plenty of attention. These expeditions have extended from Alaska and many other regions in North America, through Guatemala, to the Amazon area, southern Colombia, and Peru. In recent years an important phase of the Museum's work, carried on in cooperation with the Academy of Natural Sciences, has been the investigation of the origin of man in America.

Obviously the Museum does not exist merely for the purpose of acquiring and exhibiting archaeological and ethnological objects. Since 1888, when the Department of Archaeology was established, the first in any American university, research has been the principal purpose. Famed scholars have been and continue to be on the staff,
the results of their work being published in the Museum's *Bulletin* and *Journal* and in numerous separate publications from time to time. The Museum cooperates closely with such divisions of the University as the School of Fine Arts and the Departments of Anthropology, History, Greek, and Latin, and in some instances, notably the Department of Oriental Studies, members of the staff serve as professors.