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Graduate Study and Research in the Arts and Sciences at the University of Pennsylvania

Hayward Keniston

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Abstract

The present *Report* is in large part based upon the individual studies of graduate training and research which have been prepared under the direction of The Educational Survey. Three of these-on the Humanities, the Physical Sciences, and the Social Sciences-deal in detail with the program in these quadrants. In addition, the studies on the Engineering Schools and the Medical School have contributed to the picture of graduate work in these professional schools and the study of the College has provided important data.

Because the separate studies were organized in different ways and with different criteria, the data which they present are not always comparable nor is their coverage uniform. In a few cases I have tried to supplement their materials with additional information. But I have not attempted to repeat their specific evaluations and recommendations. I have, however, discussed briefly certain problems which did not receive attention in any of the prior studies, such as the administration of research and the publication of research.

Comments

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**GRADUATE STUDY AND RESEARCH
IN THE ARTS AND SCIENCES
AT THE UNIVERSITY OF PENNSYLVANIA**

Titles included in the Reports of
THE EDUCATIONAL SURVEY

Joseph H. Willits, *Director*
Malcolm G. Preston, *Co-Director*
Julia M. H. Carson, *Assistant Director*

The University of Pennsylvania Faculty:
A Study in American Higher Education

by
Richard H. Shryock

Humanistic Teaching and the Place of Ethical and
Religious Values in Higher Education

by
Edwin E. Aubrey

Graduate Study and Research in the Arts and
Sciences at the University of Pennsylvania

by
Hayward Keniston

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in the
Arts and Sciences
at the
University of Pennsylvania

by

HAYWARD KENISTON

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Foreword

The present *Report* is in large part based upon the individual studies of graduate training and research which have been prepared under the direction of The Educational Survey. Three of these—on the Humanities, the Physical Sciences, and the Social Sciences—deal in detail with the program in these quadrants. In addition, the studies on the Engineering Schools and the Medical School have contributed to the picture of graduate work in these professional schools and the study of the College has provided important data.

Because the separate studies were organized in different ways and with different criteria, the data which they present are not always comparable nor is their coverage uniform. In a few cases I have tried to supplement their materials with additional information. But I have not attempted to repeat their specific evaluations and recommendations. I have, however, discussed briefly certain problems which did not receive attention in any of the prior studies, such as the administration of research and the publication of research.

I have laid particular stress on the reappraisal of the goals of graduate study and their relevance to the intellectual needs of our time. The proposals which I have suggested as deserving consideration are in no sense an invention of my own. During the course of the study I have visited the major graduate schools of the East and the Middle West, and the modifications which I have proposed represent what I be-

lieve to be the best practices currently accepted, as well as the tendencies already manifest. There well may be other preferable solutions, but the important issue is whether the graduate faculty is prepared to undertake a frank re-examination of its present program, in order that the University may make a maximum contribution to the training of the scholars and scientists whom society, today and tomorrow, so sorely needs.

It is inevitable that the consultants who came from outside to study the needs of the University should have seemed critical in their observations. They were not called upon to tell the University how good it is but rather to suggest ways in which it might be better. For myself, I hope that I have identified elements of strength in its present operation, but I have not hesitated to point out phases of graduate study in which it seemed to me there was room for improvement.

I count it my good fortune to have had this opportunity to live in the University for two years. I have come to have a profound respect for its traditions and for the devotion of its staff. Everywhere I have found cordial cooperation from officers, teachers and students. Above all, it has been a privilege to work with the directors of the Survey, Joseph Willits and Malcolm Preston, and the members of their staff, as well as with the other consultants who shared in the Survey. To all of them I am indebted for counsel and correction. However slight has been my personal contribution, it has been conceived in a spirit of sharing with all members of the University family in this effort to strengthen the University; even more, to intensify its contribution to the intellectual life of America.

H. K.

June, 1958

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**GRADUATE STUDY AND RESEARCH
IN THE ARTS AND SCIENCES
AT THE UNIVERSITY OF PENNSYLVANIA**

I

The American Graduate School

STRUCTURE AND ORGANIZATION

The American graduate school is a strangely amorphous institution. It has a "faculty," but the members of the faculty, with rare exceptions, as at Columbia or Johns Hopkins, are drawn from the faculties of other schools and are therefore engaged in undergraduate and professional as well as graduate instruction. They rarely meet as a group, except for the election of committees. Graduate schools also have a dean, but he usually has no instructional budget, no voice, except by courtesy, in the recruitment, appointment and promotion of the staff. His chief function is that of a record-keeper. In reality, the graduate school is a loose federation of autonomous departments.

As an instrument of central conformity, if not of control, most schools have created an executive board (or council) composed of members elected by the faculty, which sits with the dean to consider matters of common interest to all departments. In practice, most of the meetings of the Board are devoted to such matters as the approval of recommendations by the departments for the appointment of members of the graduate faculty and of courses acceptable for graduate credit. Inevitably their task in this respect tends to become largely perfunctory, for to overrule the recommendation of a department would be tantamount to a vote of lack

of confidence in the department. In most institutions the Executive Board is also responsible for the allocation of fellowships and scholarships; in a few, it is called upon for recommendations in the allotment of university funds for research. But the Board rarely undertakes to consider problems of the broad purpose of graduate education and the effectiveness of the program. Even less would it study the course offerings and program of a particular department.

At some time in the past, the faculty determined the general requirements for students in such matters as admission, residence, requirements for advanced degrees and the like. And over the years there has grown up a vast collection of rules, regulations and dead-lines that fill pages and pages of the *Announcement of the Graduate School*. The enforcement of these rules has become the chief business of the secretariat of the dean's office. Whether from inertia or conservatism, it has proved difficult to achieve modifications of the rules and regulations, which have acquired a kind of sanctity, as symbols of the integrity of the Graduate School.

The very looseness of the structure of the Graduate School has been and is a source of strength. Because the departments are independent and autonomous, they have in general accepted the responsibility of maintaining the highest standards both in staff and in students. They are accustomed to measuring their performance in competition with the departments at other universities. As a result there has been almost everywhere a steady improvement in the quality of graduate study. If there are weaknesses of detail in their programs, no one can doubt the excellence of graduate training at the leading institutions of the country.

THE GOALS OF GRADUATE STUDY

From its beginning, a century ago, graduate study in the United States has been dedicated to the single goal of the prosecution and promotion of scholarly research and the training of a new generation of scholars. The young men who returned from their studies in Europe in the first half of the nineteenth century brought with them a new enthusiasm for the rigorous methods of investigation which they had learned, especially in German universities, not only in the natural sciences but also in history, philology, and the other humanistic disciplines. The quest for truth had taken on a new dimension, in the exact measurements of the laboratory, in the objective study of historical documents, in the painstaking reconstruction of literary and linguistic texts. Common to them all was their faith in the "scientific method."

In the colleges to which they returned they set about, as best they could, carrying on the studies in which they had been trained. But progress was slow; laboratories lacked equipment, libraries were inadequate. Yet in spite of difficulties they tried to organize seminars for a few advanced students. In the late 40's Yale organized a "Department of Philosophy and the Arts" which was prepared to offer advanced instruction in a variety of subjects: chemistry, mathematics, philosophy, Greek, Latin, Arabic and general philology. The number of students was small; in 1860 there were only eleven. But in 1861, Yale granted its first Ph.D., based on two years of study, a dissertation, and a final examination.

The degree of "Doctor of Philosophy" was another German importation. Henry Tappan, at Michigan, had proposed

its adoption in the 50's, but his effort failed to bear fruit. It must be remembered that, in Germany and from the beginning in America, it was a degree which was not limited to "philosophy" in the narrow sense of the word. Rather the word was understood in its original sense of "love of learning" and hence was appropriate as a recognition of work in the sciences or any other field. It was precisely this "love of learning" that became the distinguishing trait of all graduate study.

It is not necessary to review the story of the gradual extension of graduate studies in the late 60's and 70's from Yale to Harvard, Columbia, Michigan and Princeton. The foundation of the Johns Hopkins University at Baltimore in 1876 marked the recognition of advanced study as a major function in American education, for here was an institution where "all departments of learning—mathematical, scientific, literary, historical, philosophical—should be promoted," where "instruction should be as thorough, as advanced, and as special as the intellectual conditions of the country will permit," and where scholars were to be chosen for their "devotion to some particular line of study; their power to pursue independent and original investigation and to inspire the young with enthusiasm for study and research." The ideals which Gilman set forth for the new university have remained to this day the goal of all graduate institutions.

At first advanced study was only loosely organized as a part of the college in most institutions. But as early as 1880, Columbia created a Graduate Faculty of Political Science, to be followed in 1890 by a Graduate Faculty of Philosophy and in 1892 by a Graduate Faculty of Pure Science. At Pennsylvania, the Trustees authorized the establishment of a "Department of Philosophy," designed to promote advanced studies, in 1883. The Graduate School at Harvard was for-

mally established in 1890; the Graduate Department at Michigan dates from 1892. With the opening of the University of Chicago in 1893, another institution largely devoted to graduate study and research was added to the growing list. Within the next two decades all of the leading universities, both private and public, had created "Graduate Schools" which offered training for the Ph.D. in the basic disciplines.

It was natural that in the early days the fields in which advanced instruction was offered were the traditional studies which had already developed a clear content and methodology—mathematics, chemistry and physics, history, philosophy, classical philology. But the impetus to thorough study provided by these subjects soon spread to other fields, like the biological sciences, modern languages and literature, economics and politics. At the same time, as the complexity of each of the subjects increased and their scope was widened and as the number of students grew, one man was no longer sufficient to provide adequate training and so, in each of the fields, the appointment of additional staff resulted in the formation of "departments," united by their common area of learning and a common methodology.

The established departments, solidly founded in their respective disciplines, were often far from hospitable to the new fields of study which were constantly emerging; they doubted whether they could properly be called "scientific," whether they possessed the body of literature and the research techniques which warranted their admission to the world of scholarship. But little by little the newer disciplines found their way into the fold of the élite, and finally, in their wake came the professional departments: agriculture, business, education, engineering, social work, and the like. Today there is hardly a field of study, basic or professional, which

is not included in the program of the American graduate school.

From their modest beginning in the 70's and 80's, graduate studies had been established at most of the universities by 1895. In 1900 there were programs at perhaps fifty institutions. From then on the number increased rapidly. Between 1936 and 1950 over a hundred institutions granted at least one Ph.D. Today there are more than one hundred and fifty graduate schools which offer programs leading to the doctorate in one or more departments. During the last few years they have granted the degree of Ph.D. to almost nine thousand candidates each year.

Inevitably there is wide variation in the quality of training offered, not only between institutions but also, within institutions, between departments. As early as 1900, fourteen universities joined in the formation of the Association of American Universities, with the avowed purpose of setting standards of admission to graduate study and defining in general terms the requirements for the doctor's degree. At intervals since then other institutions have been elected to join the group. At present the Association and its offspring, the Association of American Graduate Schools, have thirty-seven members, including two Canadian universities and two institutes of technology. While the thirty-three American universities included in the Associations certainly represent the major graduate schools of the country, there is little doubt that there are other schools which offer graduate work of as high quality and as wide variety as some of the institutions which were earlier elected to the fraternity. But at most there are hardly fifty schools in the country which offer adequate training in more than one or two fields.

In reality, there are only half a dozen truly great graduate schools, with a distinguished staff and adequate facilities—

laboratories and libraries—in almost every field of study. Another ten offer outstanding programs in at least half of the major disciplines. Beyond that, most of the graduate schools offer work of the highest quality in a few departments only. This concentration of strength in a relatively few institutions has had its advantages. It has enabled them to attract support for their research from foundations, government and other outside agencies. Their prestige has made it easier for them to attract distinguished scholars to their staff and superior students from the undergraduate colleges for their programs of training. This concentration is well illustrated by the first choice preferences expressed by candidates for the Woodrow Wilson National Fellowships, in 1957, where fifteen institutions were named by almost two-thirds of the candidates; the remaining 1320 candidates were scattered among 179 institutions. But this concentration also has its disadvantages, for fifteen or twenty centers of advanced study are not enough to meet the intellectual needs of the country. There must be at least twice as many schools with superior staff and promising students, if we are to train the scientists, the scholars, and the teachers which society requires. One of the tasks to which the Association of American Graduate Schools might well address itself is that of securing a wider distribution of graduate study which meets the highest standards.

It would be difficult to overestimate the contribution which the graduate schools have made to scientific research and thereby to American life. As they began to turn out an ever-increasing number of trained specialists, the practical American spirit started at once to apply their learning and their techniques to the invention and development of new drugs, new instruments, new machines. Great industrial organizations and the national government established

laboratories where these specialists could continue their researches. The spirit and methods of research which they fostered spread to professional schools of business, engineering, and medicine. Since World War I it has become increasingly apparent that it is to the graduate schools that government and society as a whole must look for the ideas and the men who will mold the future.

Research has, in fact, become a word of almost magic connotation. Advertising agencies, department stores, soap factories have their research divisions. Economic, political, and social problems are attacked by research methods. To say that a product or a plan is the "result of long years of independent research" is to lend to it an aura of authority and prestige which no one could question. Even the humanists, whose investigations are less obviously practical and material, have shared in this prestige. The degree of Ph.D. has become a status symbol because it is based on research. On many a college campus the title of "doctor" is more honorific than that of "professor." To address a man as "professor" would imply that he had not made the grade. This public respect for research may help to explain why graduate faculties have tended to stress research as their only proper concern and why college teachers express such general approval of the character of their own doctoral training. The Ph.D. is their hall-mark.

The dean of a graduate school recently wrote: "The American graduate school represents the triumph of specialization." If this is true—and it probably is—it is an unfortunate triumph. Specialization is necessary; it is the essential condition of all research. But there is even greater need for generalization, for the capacity to evaluate and interpret the results of research, to organize knowledge so that each of its parts may have meaning. Society must look to the graduate

schools to prepare not only the technologists but also the scientists, not only the experts in methodology but the scholars, who as a result of their training will be able to integrate the scattered findings of research, to bring their learning to bear on the political, social and personal problems of our time.

MASTERS AND DOCTORS

Although training for research has been the chief, if not the unique goal of graduate schools, from the very first a large proportion of their students have enrolled with other purposes in mind. Before 1900 many college graduates were seeking an opportunity to continue their studies at the advanced levels offered by the graduate faculties. To provide some formal recognition of this year of advanced studies, the graduate schools revived the degree of M.A., which had long been a sort of gentleman's degree in England and the United States, and made it an earned degree. However loosely defined, this degree has attracted an increasing number of candidates for whom it meant up-grading and an increase in salary, both in teaching and in non-academic spheres.

In many small graduate schools the master's degree is the only advanced degree offered; even in larger institutions, some departments provide training only for that degree. One can get some impression of the situation from the fact that in recent years, out of a total of about 250,000 students enrolled in our graduate schools, each year about 75,000 were awarded the master's degree, while about 9,000 received the doctorate. With a few exceptions, like Johns Hopkins or Princeton, even the strongest institutions are training more master's candidates and granting more master's degrees than doctorates.

Among those who receive the Ph.D. only a small number may look forward to a career wholly devoted to research, in fields such as chemistry or physics. The majority of doctors will make their career in teaching. Some of them will find posts in universities where they will at the same time continue their own research and train a new generation of investigators. But most of them will spend their lives as teachers in undergraduate colleges. There they may transmit to their students something of the spirit of scholarship, the zest for learning, the rigor of intellectual discipline which they have acquired during their graduate training. But few of them will be able to continue productive research in a highly specialized field; most colleges cannot provide the laboratories and libraries which are essential to this type of activity.

The graduate schools of the country are therefore faced with a dilemma. On the one hand they are the only institutions which are equipped to train the research workers of tomorrow and that is an obligation which they cannot escape. On the other hand they are the only institutions to which the colleges can look for a broadly trained staff and to which scores of other agencies must turn for more competent workers. Because graduate schools, like universities in general, are social institutions, they must be responsive to the needs of their time; they cannot take the position that they are not concerned with the training of teachers and other professional workers. Somehow they must find the compromise that will permit them to perform both of these essential functions.

PROBLEMS OF THE GRADUATE SCHOOL

For a generation now, there has been a mounting chorus of dissatisfaction with the program of training in the Amer-

ican graduate school, not at the excellence of its training for research, but for the irrelevance of its program for the careers which its products were to follow. The protest began in the liberal arts colleges, where the rules of the accrediting agencies made the degree of Ph.D. a license for appointments and promotion. The presidents and deans of the colleges insisted that the young men who came to them from the graduate schools had been prepared for highly specialized investigation but lacked the breadth of vision and the capacity for interpretation which were essential in liberal education; that they thought in terms of departments, not in terms of the inter-relationships of the disciplines nor the unity of learning; above all that they were interested in subjects, not in the human individual, in all his complexity, whom they were to mold in the intellectual and social context of the future.

More recently leaders in other fields, such as industry, labor, and government have added their voice to the protest at the inadequacy of graduate training. The men who came to them with a doctor's degree too often were expert technologists in a given field, without the grasp of fundamental principles and theory which would permit them to adjust themselves to new problems. There was, they felt, a growing gap between the kind of work that these young men had been doing in the graduate school, even in research, and the tasks they would be called upon to perform in the world outside.

Finally, within the last two or three years, the sudden realization that within the next decade or two we shall be faced with an unprecedented demand for teachers, particularly at the college level, has forced educators to face the question as to how the graduate schools, the chief source of college teachers, can meet the need. Our concern has been

the more acute because it has dawned upon us that our training programs in the secondary schools and colleges, not only in the sciences but in every field, are inadequate, lacking the necessary rigor and discipline, if we are to compete successfully for intellectual leadership in the world. To attain these ends, it is clear that we must have more and better trained teachers. And the only place where these teachers can be trained is in the graduate schools. There is a vast incongruity when a university president inveighs against the inadequate teaching of mathematics in the secondary school at the very time when his own graduate department of mathematics insists that it has no responsibility for the training of teachers.

There is, however, a growing awareness of the crucial need we face. A "Committee of Fifteen," appointed by the Fund for the Advancement of Teaching, and a committee of the Association of American Graduate Schools have issued reports calling attention to the weaknesses and irrelevancies of our present graduate programs. More recently, William Riley Parker has added a gay, but biting criticism in his "Graduate Training in the Humanities Today." In many respects their criticism has been exaggerated, even distorted; they have failed to recognize the substantial contributions which graduate study has made in raising the intellectual standards of undergraduate instruction and in cultivating respect for the integrity and satisfactions of scholarship. But at the same time they have identified aspects of graduate work which have been neglected, they have laid bare some of the causes which have deterred able students from entering on the doctoral program that is a prerequisite for college teaching, they have made it clear that within the doctoral program there is as great a need for breadth and vision as for narrow specialization, alike for teachers and for investiga-

tors. Let us examine some of the particular problems involved.

THE GRADUATE STUDENT

We may well begin with the material with which the graduate faculties are concerned—the graduate student. There is a widely held impression that the average quality of the men who enter graduate study is below that of those who embark on the other learned professions. Since there are no objective tests of measurement, the soundness of this impression cannot be demonstrated. Certainly many of the best minds among the undergraduates feel the call to a life of scholarly learning; they are certainly the equal of those who enter the study of law, medicine, or business. But what about the average student? Are there reasons for believing that graduate study is not attracting as high a level of intellectual ability as are the other professions?

Most students who enter the graduate school look forward to a career in teaching, particularly college and university teaching. In recent years it has become a matter of public knowledge that teaching is the most poorly paid of all the professions, except the ministry. College teachers have not only failed to share in the gains made in other occupations; they are actually worse off than were their predecessors twenty years ago. Nor is their inadequate income compensated for by a social status such as that enjoyed by professors in Germany or Russia. It is not surprising that many an undergraduate, faced with the choice of a career, decides that, while he himself might be willing to make the necessary financial sacrifice in order to enjoy the freedom and satisfactions of a scholarly life, he cannot ask his wife and children to show the same spirit of self-denial. Consciously or unconsciously, he accepts the fact that in American society

material rewards are the minimum essential of status. And he turns to law or medicine or business administration.

The student who enters the other professional schools knows that at the end of a prescribed course—two, three, or five years—he will have completed his training and will be able to start on his professional career. Since the prospective financial rewards are high, he and his family are prepared to make the additional investment in his education. If necessary, he will borrow money, knowing that within a few years his income will be sufficiently high to permit him to repay the loan. But nothing of the sort obtains in graduate study. In the first place, the goal of graduate education—the training of an independent, creative scholar—makes a fixed and prescribed curriculum impossible. Hence the period of study necessary for the attainment of a degree remains vague, uncertain; the minimum is three years, but it may be prolonged for many more. In the second place, in view of the meager financial rewards to which he must look forward, only a rash person would venture to borrow money for his graduate study with any hope of repaying it during his lifetime. In a recent study of the financial support of graduate students at the University of Michigan, the only students who were borrowing money to defray the cost of their graduate study were those in chemistry and physics, the fields in which there is a high prospect of financial reward. As a result a student must finance his way as he goes along and this further lengthens his period of study. Some students engage in other tasks, to save money, before enrolling in the graduate school. Even after entry, very few are able to devote themselves to continuous full-time study. Some of them help to support themselves by accepting part-time research or teaching assistantships; others leave the university to accept full-time appointments, when they have passed the

preliminary examinations, and work for years in a desultory fashion on their doctoral dissertation. In view of all these handicaps, it is not surprising to find that the average graduate student will not have received his Ph.D. until he has been out of college for ten or eleven years; the period is shortest in the natural sciences, longest in the humanities. It is not an alluring prospect for the young man who wants to be a scholar.

The country is faced with the necessity of preparing an unprecedented number of trained scientists, teachers, and scholars in the years immediately ahead. The need touches every phase of education; it will demand a greater discipline and a higher level of attainment at every level. If the training in mathematics, the sciences, and the other basic studies is poor in the secondary schools, the colleges will suffer. If college education is inadequate, the standards of the graduate schools will be jeopardized. The role of the graduate schools is particularly important because they are the only institutions equipped to prepare competent teachers of the various disciplines in schools and colleges. What steps can be taken to improve the quality of their student body, to shorten the "long road to the Ph.D.," without sacrificing the highest standards, to permit them to make a maximum contribution to the life of the nation?

THE RECRUITMENT OF STUDENTS

An improvement in the financial status of teachers is not something that can happen over-night. It can come about only because the American public becomes convinced that it must have more and better teachers at all levels and is willing to pay the cost of making the profession more attractive to the best qualified students. There are signs that the public is already beginning to awaken to the necessity.

Within the last few years teachers' salaries have been substantially increased. This is particularly true of salaries at the upper ranks in colleges and universities. The recent announcement by Harvard that, beginning with the fall of 1958, the scale of professorial salaries will range from \$12,000 to \$20,000 for the academic year with a median of approximately \$15,000 a year, is symptomatic of the change that is taking place. Other institutions, both public and private, will certainly accept the challenge. When most of the strongest institutions have reached this or a higher level, college teaching will begin to compete with the other professions in its appeal to superior students.

Meanwhile other steps must be taken to insure more rapidly a supply of trained scientists and scholars. At present many of the best candidates do not have the financial resources to undertake graduate study. If they are to enter on their advanced training promptly and proceed without interruption, they must be subsidized. The three-year fellowships now offered by the National Science Foundation are an example of the kind of support that is necessary, for the fellowships now available in the graduate schools are wholly inadequate. We need a vastly expanded fellowship program, if we are to prepare within the next two decades the number of men we shall need. The federal government will have to lead the way, but we should not look to Washington to carry the whole burden. State and local authorities, corporations, foundations, the public at large must accept their responsibilities to prepare for the intellectual demands of the future.

Perhaps the most critical need is for adequate fellowships for those who are beginning graduate study, so that they may devote all their time to their academic work without the necessity of earning money by outside work. The program of Woodrow Wilson National Fellowships, which now,

thanks to the Ford grant, permits them to offer a thousand fellowships a year to beginning graduate students, illustrates the type. The stipends offered are sufficient to permit the student to dedicate himself to his studies and the Fund also provides a stipend to the institution which he attends. This type of program should be greatly expanded. Even though it insures only a single year of study, the graduate schools themselves can help the student to continue his work by providing part-time apprenticeships in research or teaching for those who have completed a year of study. If the stipends for these part-time assistantships are adequate (\$1,800-\$2,000 a year, plus tuition), the student will be able to continue his studies without interruption. This may mean the addition of a year to the period of training, but it will be compensated for by the fact that when the student receives his doctorate, he will already have had a period of professional experience and can embark on his career at a higher level of appointment.

These are some of the ways in which we can help to encourage the more rapid production of a trained body of young men to meet the complex needs of society. But the graduate schools can also contribute to this end, if they will re-examine candidly the proper goals of graduate study, the requirements essential to the attainment of these goals, and the professional needs of their students.

THE REQUIREMENTS FOR THE PH.D.

Almost all graduate departments are in agreement as to the aims of their doctoral program: a broad knowledge of the particular field and mastery of the methods of research such as will permit the student to carry on independent, original work. In general, they prescribe three years of resident study, or its equivalent, as the minimum, although they

warn prospective candidates that most students require more than the minimum. Most departments permit a student to include in his program work done for the master's degree. They require a "preliminary examination," usually taken after two or more years of study, a reading knowledge of one or more foreign languages, and the presentation of a satisfactory dissertation, usually described as representing a "contribution to knowledge." But within this framework, there is wide variation of practice. Let us examine some of the problems.

Admission

There are no clear or accepted rules as to the qualifications for admission to graduate study. In most graduate schools the office of the dean exercises a preliminary screening. But this is usually limited to determining whether the candidate holds a bachelor's degree from an accredited college. The final decision rests with the department or with its graduate committee. A few departments require an undergraduate major in their field; this is particularly true of sequential subjects like foreign language, mathematics, or the physical sciences. Others are content with some undergraduate preparation in the subject; a few, like psychology, prefer an undergraduate major in a related or basic field. In almost all, a student with inadequate preparation for advanced study is permitted to make up his deficiency by additional undergraduate work.

In the matter of intellectual capacity, the criteria for admission are even more uncertain. A few of the strongest institutions receive so many applications that they are able to select only those whose undergraduate records seem to reveal outstanding promise. But even here there are no available measurements. Grades are notoriously uncertain indicators,

but they are all we have as a basis for comparison. A student with an A average at one institution may well have less potential ability than one with a B average at another college. It seems to be widely believed that the Graduate Record Examination is not a satisfactory instrument for testing the quality of the prospective graduate student. As a result many departments, even in relatively strong institutions, are admitting from 90% to 95% of all applicants. In part this practice arises from their desire not to deny any worthy student the opportunity for advanced study. But it may also be motivated in part by their desire to enroll enough students to insure a quota for their graduate courses.

In the long run, a department is judged by its products. As we have already observed, the average quality of graduate students is not high and it is hard to believe that all or most of them give promise of becoming productive scholars. The standards of graduate study would be raised if the departments were to exercise greater discrimination in selecting their candidates. Surely an over-all average of B in undergraduate study and a broadly based liberal education should be a normal minimum requirement for admission. And this process of selection should continue at the end of the first and second year of graduate work.

Course Requirements

Here again there is wide variation from institution to institution. At Cornell, Princeton, and Johns Hopkins, for instance, there are no fixed course requirements; a student may take courses, in fact does take some courses, but he may prepare himself in any way he wishes for his preliminary and final examinations. At other schools the student is required to take three full years of course work. At still others, this requirement is translated into credits or points, after

the undergraduate system of accounting; the total number of such units usually involves from two to three years of full-time course work.

It is strange that this mechanical system should have become established in graduate schools. Almost without exception they proclaim that their purpose is to train men for independent work. Yet in many institutions the course requirements occupy almost the entire program, with the result that each department offers a staggering list of graduate courses. One sometimes gets the impression that the professors believe that the only way a student can learn is by sitting a fixed number of hours in the classroom. Why should the mature graduate student not be given the freedom and responsibility of practicing that independence which he must display throughout his subsequent career?

It is interesting in this connection to note that most of the liberal arts colleges are developing honors programs in which superior students are released from the rigid requirements of courses and credits and are encouraged to work independently, under the guidance of members of the faculty, while they prepare themselves for their comprehensive examination and write their senior essay. Superior students who have enjoyed this freedom and responsibility in college will not be attracted to graduate schools which shackle them with arbitrary course and credit requirements.

Already there are signs that the graduate schools are awakening to the need for more flexible requirements. Last fall the graduate faculty at Harvard reduced the course requirement for the Ph.D. to four courses (eight half-courses) and recently the faculty Committee which prepared the report on *The Educational Future of Columbia University* recommended the abolition of the 90-point requirement which has been in force in their three graduate schools and

its replacement by the simple requirement of two years of full-time resident study.

This is, I believe, the proper first step toward a more rational and intelligent approach to graduate study. The program should be so planned that the average full-time student in three years can complete the work, including examination and dissertation. A few might finish their work in less than three years. A student who has taken an honors degree in college should not be required to mark time for a year while other students are catching up with him. Other students, especially in fields which do not offer undergraduate programs, might require more than three years. Students who were serving an apprenticeship as research or teaching assistants would also take four or five years to complete their studies. But three years should be the norm for full-time students, not the exception. This is the minimum contribution which the graduate schools should make toward the more expeditious training of the needed scientists, teachers, and scholars.

A PROPOSED THREE-YEAR PROGRAM

Graduate faculties must begin by taking a more realistic view of what they should try to accomplish in the training of their students. It is true that, as each discipline expands in quantity and complexity, there is more and more to learn. Some faculty men believe that even five or six years of study is not enough to enable a student to master a subject. But even they would admit that nowadays no one can hope to control all the possible aspects of their subject; selection is inevitable and here the important consideration is what aspects are essential, indispensable. In the same way, faculties must re-appraise the function of the dissertation. It is unfortunate that the expression "a contribution to knowledge"

should have become a description of the dissertation. That has come to mean the discovery of a new fact and has led investigators in the humanities and the social sciences to seek only objective data, new documents, new statistics—when what is needed is new theories, new interpretations, new insights. Somehow, too, we have got to thinking in fields outside the natural sciences that a dissertation must be a work of bulk, a *magnum opus*, a “definitive work,” when what we should really seek is evidence that the student has learned the methods of work in the field and can express his conclusions clearly and vividly, even though it be a paper of thirty or forty pages. In a word, we must give up the idea that the graduate student should emerge from his studies a fully formed scholar; the most that we can hope is that he has gained a fairly broad vision of his field, its problems and its limitations, that he has learned how to carry on independent research, and, above all, that he enters on his career with undiminished zest in the great adventure of learning. What specific steps might lead to such an outcome? If we were to accept the principle that three years of full-time work should be the normal program leading to the doctorate, it might be outlined as follows.

First Year of Study

During his first year of study, the average graduate student should spend much of his time in courses. The maximum in each term would be four. One of these in each term should be a proseminar or seminar, which would serve as an introduction to research methods and which would require a written report. The remainder of his time would be devoted to rounding out his general knowledge of the field. To aid him in this task, the department should offer a small number of fairly broad lecture courses, not of the under-

graduate "survey" type, but courses which would initiate him in the mature study of the basic problems of the field.

On entering the graduate school, each student should be assigned, by the departmental or group chairman, to a particular member of the staff to serve as his adviser. In so far as possible, the student should be allowed to express his preference in the matter, but no member of the staff should be burdened with more than a reasonable share of advising. It would be the duty of the adviser to plan with the student a program for his first year of work, with due regard to his prior training, his personal interests, and his professional expectations. This counseling should not be limited to a single conference at the beginning of each semester but should provide a continuing contact. At the end of the year it would be the duty of the advisor, after consultation with the student's teachers in lecture courses and seminars, to recommend to the department whether the student should be encouraged to continue his studies or should be urged to seek another career.

Second Year of Study

During his second year each student should continue his training for research by enrolling in at least one seminar throughout the year. The remainder of his time should be devoted to completing his preparation for the preliminary examination which should be taken at the end of the year.

The purpose of the preliminary examination is to test the breadth of the student's understanding of his major field and its relationship to other disciplines. It is important that each department should define as clearly as possible the scope of the examination and that it should be so planned that the full-time student should be able to complete his preparation for the examination within a period of two years of study.

Since no student can master the entire field, the departments must select those aspects which it considers essential for all students. In some departments this will mean the identification of a few sub-divisions of the field in which the student must be prepared. Other departments may prepare lists of the major texts on which the examination will be based. Still others will prefer to organize lists of the broad topics which the student must be prepared to discuss. In some cases the department or the student's committee may wish to indicate a special field in which the student will be expected to show a more thorough mastery; they will also determine the scope of the work expected in a related field. The two important considerations are that the student should have a reasonably clear idea of the scope and range of the examination and that it should be so designed that the student of average ability should be able to prepare himself in two years of study.

There should be no fixed requirement of course work in the second year, other than that of seminar training for research. Some students will need to enroll in additional lecture courses to complete their preparation, particularly in the related subject which they choose. Others may prefer to continue their study by independent reading. To aid those who elect this method, each department should create a course, "Directed Studies," which would list the members of the staff who were authorized to direct such individual study. The student's committee must approve of any such election. But in general, students should be encouraged to undertake this type of independent study under the guidance of a member of the staff.

In this connection it should be noted that if lecture courses were, in general, planned as a preparation for the preliminary examination and if, in general, the student enrolled for only four or five such courses (eight to ten half-courses)

during the first two years, it should be possible to reduce considerably the number of lecture courses offered. This would free members of the staff from assigned courses and permit them to devote more time to work with individual students.

At the beginning of the second year of study, the dean and/or the executive committee of the graduate school should appoint for each student a committee of three men to direct his further training. The chairman of the committee should be the person with whom the student expects to do his major work. One of the three should be a member of a related department. It should be the duty of the committee to help the student plan his program of study, to prepare and conduct his preliminary examination, to guide him in his choice of a career. During the course of the second year they should encourage each student to choose a particular aspect of the field in which he expects to write a dissertation and, where possible, to make a start on research in the field. At the end of the year, the committee should review the record of the student in lecture courses and seminars and in his preliminary examination and should recommend to the graduate school whether he should be admitted to candidacy for the doctor's degree or should be encouraged to terminate his studies and embark on a career.

Third Year of Study

The final year of the study should be largely devoted to the preparation of the doctoral dissertation, although it may also involve formal or informal exploration of problems or topics of wider range which have emerged as important during the process of research. Candidates who are specifically planning a career in college teaching should also be

encouraged to continue their reading and study in related fields.

The length of time required to complete a satisfactory dissertation, particularly in the humanities and the social sciences, has been one of the chief reasons for the prolonged period involved in attaining the doctoral degree. In the natural sciences, students rarely require more than a year of full-time research to write a dissertation. In every department the faculty must re-examine the purpose of the dissertation, must define more critically the standards which they demand, must set limits to the type of project which a student should be permitted to undertake. If quality, not quantity, is the desideratum, if the dissertation is to mark the beginning, not the end of a scholarly career, then the chief criteria for judging a dissertation are its mastery of the methods of research, its originality in the discovery of new ideas or the propounding of new theory, and its lucidity of presentation. Now all of these can be as well demonstrated in a brief monograph, or even an article of journal length, as in a vast compilation, *monstrum informe, ingens*, which often is largely made up of a re-hash of what others have written. A graduate student should not be discouraged from undertaking a project of wide scope, but he must be reminded that he has all of his life to complete his study and that, for the moment, he must limit his efforts to some particular aspect of the problem, which will serve as evidence of his capacity to handle the material and as a sample of the ultimately definitive work.

The problem of the doctoral dissertation is one of the most critical in graduate education. The prestige of the "scientific method" had led faculties in other fields to regard the discovery of new facts as the only evidence of scholarship.

Actually we are in danger of being swamped in a welter of facts. What society needs is an interpretation, an integration of the facts already at hand. And there is no reason why a graduate student should not undertake this sort of evaluation in his doctor's dissertation. No matter what his ultimate career may be, his capacity and experience in generalization will be valuable. Graduate committees should bear this in mind in recommending dissertation topics to the individual student. But most of all, they should endeavor to set such limits on the scope of the dissertation that the student may be expected to complete the task in a year of work. Such a limitation does not imply a lowering of standards; on the contrary, by placing the emphasis on quality, it may well mean a tightening of standards. It is a major contribution which the graduate schools must make to the more rapid preparation of trained scientists and scholars.

By the beginning of his third year of study the student should have chosen a topic for his dissertation. At that time the member of the staff who is to supervise the dissertation should become the chairman of the student's committee; if he is not already a member of the committee, he should be added to the group. All members of the committee should read the preliminary version of the dissertation in order that the student may have the benefit of their criticism and advice before he presents his final version. They should also be responsible for recommending the acceptance or rejection of the dissertation.

Final Examination

Almost all graduate schools require a final doctoral examination, to be taken after all other requirements have been met. This practice is a survival of the days when a graduate

student spent a few years in study, wrote a dissertation and then, for the first time, presented himself to the faculty to be examined on the whole field of his study. But as a preliminary examination, designed to test the student's broad knowledge of the field, was adopted in most institutions, the function of the final examination became more and more uncertain. If a student had passed a satisfactory preliminary examination and had written an acceptable dissertation, what else did a department need to know about his qualifications? It is true that in a few departments the approval of the dissertation is contingent upon the successful passing of a final oral examination; in others it is regarded as a defense of the thesis. But in most departments the final examination has become a mere formality; rarely does a student fail to satisfy his examiners. Some critics have argued that the final examination is not only unnecessary but actually harmful, setting up an additional psychological hazard for the already harassed student.

The chief justification for the continuance of the examination is a sentimental one. We remember the good old days when the candidate in Germany, decked in white tie and tails, appeared before the august company of the faculty and was inducted into the "community of scholars." A vague remnant of that ritual survives in the white ties of "schools" at Oxford. We like to think that so important an event in the life of the student should be recognized in this crowning demonstration of his attainments. But if the examination is attended by only a handful of the faculty, perhaps by only the members of the student's committee, it is a ceremony without dignity or symbolic value. If the final examination is to be retained as one of the requirements, it would at least be more humane to assure the candidate that it is a merely perfunctory performance.

The Language Requirement

No issue of graduate study has been as hotly debated as that of the language requirement. It, too, is a survival of the early days of graduate study. When American professors first began to introduce students to advanced study, almost the only scholarly materials available were written in German, less often in French. Even at the beginning of this century, many of the text-books used were in German. Naturally the ability to use foreign languages was indispensable for graduate study. But as the body of scholarly texts in English increased, as the major works were translated from German and French into English, the need for a reading knowledge of other languages became less urgent. In some of the newer disciplines that made their way into the graduate schools the amount of scholarly literature in foreign languages was relatively small, and in all fields the bulk of materials available in English, especially in the current scholarly and scientific journals, became so large that it became difficult, even for the faculty, to cover it adequately, to say nothing of the production in foreign languages.

As long as forty years ago voices were being raised in protest against the fixed requirement of a reading knowledge of French and German for all students. Some professors, perhaps ill-informed, argued that for their students the requirement was meaningless and should be abandoned. This feeling was so strong that schools of education set up a new doctoral degree, the Ed.D., which required no foreign language study. And in many other departments there was increasing demand that the requirement be made more flexible.

The effect of these demands is manifest in the numerous modifications which have been made in the last decades.

The first of these was to permit the substitution of another foreign language for French or German. Some institutions decided that a thorough knowledge of one language was as good as a "reading knowledge" of two languages. Others authorized the replacement of one language by statistics. Finally, a few graduate schools allowed a student to replace the knowledge of one language by additional course work in some related field. But almost everywhere there is a token recognition of foreign languages, or at least one foreign language, as an essential part of doctoral training.

In theory the graduate student was expected to possess these skills when he began his study. But this was not realistically related to the normal program of the undergraduate colleges. Most good colleges require work in one foreign language; almost none requires two languages. Hence the graduate schools found it necessary to postpone the satisfaction of the requirement of two languages, at first till the beginning of the second year, then to the end of the second year. Most of them still cling to the rule that a student must meet the language requirement before he is admitted to candidacy. But exceptions are frequently tolerated; in many institutions students are taking their language tests in the last weeks before receiving their degree.

If a student is able to pass the preliminary examination and to write an acceptable dissertation without any knowledge of foreign languages, it is clear that the requirement, as a universal rule, has lost its meaning. And even when the rules are rigorously enforced, there is no reason to believe that in a few weeks or months of study a student can attain sufficient mastery of a foreign language to permit him to make an exact translation of a paragraph in a foreign book or journal. Many members of the staff seldom read foreign journals; almost never do they assign foreign books or

articles as a regular part of the reading in their courses. How, then, shall we explain the tenacity with which graduate faculties have clung to the language requirement?

One graduate dean has ascribed it to pure "sadism," a determination to make their students suffer the misery which they were forced to endure. But this, like most generalizations, is unfair. There are nobler motivations. Many faculty men have the vague feeling that there is some "cultural" value in language study. At the undergraduate level there is no question that the study of foreign languages and literatures is an essential part of a liberal education. But certainly we cannot expect that the kind of "cramming" which students undergo in preparation for the language examination will result in any real understanding of linguistic values or cultural content; these are often not achieved in years of language study. Other faculty men believe that we should hold to the language requirement, lest we become intellectually isolated from the rest of the world, narrowly parochial, although it is hard to see how we shall escape that danger if we and our students do not use the languages in which we once passed an examination. Finally, and perhaps most potent of the reasons, is the fear, in each institution, that if we relax the language requirement, we shall be lowering standards and thus lose caste among our institutional peers.

There is no question that in many fields and departments the knowledge of one or more foreign languages is essential. But it is no longer true that French and German are the most important tools in all fields. For a student of Romance Languages a knowledge of Latin is indispensable (though often dispensed with); in other fields the most important contemporary contributions will be found in Italian or Japanese or Russian. But there are other indispensable tools

of advanced study: in many fields statistics is a prerequisite, in others it is the calculus or factor analysis. There is no reason why a group of departments which feel the need of a particular tool or tools in their training of students should impose their requirements on all departments. The most sensible solution is to place on each department the responsibility for deciding what are the tools essential for work in its field. Once that is determined, it should insist that the requirements be met by the beginning of the second year of graduate study and that the tools be used during the preparation for the preliminary examination and the writing of the doctor's dissertation. That the adoption of such a flexible practice will not jeopardize an institution's prestige is indicated by the fact that Harvard no longer has a general language requirement, but has placed the responsibility for decision on the individual departments.

THE MASTER'S DEGREE

As we have already observed, the graduate schools of the country are producing many more masters than doctors; the master's candidates form the large majority of the graduate population. Yet nowhere is there any common agreement as to the meaning of the master's degree or the proper content of its program. In some instances it is merely the recognition of a year of advanced study beyond the baccalaureate. As such, the degree is often used as a means for upgrading persons in educational or other employment. At some institutions the master's program is primarily designed for the training of subject-matter teachers in secondary schools; at a few, a special degree, "Master of Arts in Teaching," is awarded to students in this program, as at Indiana, Harvard and Yale. In most graduate schools there is an increasing tendency to make the master's program a sort of miniature

doctoral program, complete with thesis and comprehensive examination. Finally, there are some schools that award the master's degree as a sort of sop, or consolation prize, to those doctoral candidates who fail to make the grade.

It is not possible, it is not even advisable, to find a common unity in these varied groups. But the graduate schools should recognize their different interests and needs and should undertake to provide for each of them a program which will best prepare the students for their respective careers. A student who is planning to teach mathematics in a secondary school will need one kind of program, with relatively little emphasis on research. On the other hand, a student who is planning to work in an engineering laboratory may require a program with strong emphasis on the techniques of research. In every case, the graduate faculty should appraise critically and realistically the kind of preparation which will at once insure the intellectual growth of the student and help him to perform more effectively in the career of his choice.

For students who are going to take a doctor's degree, the master's degree serves no real purpose. Some institutions, like Johns Hopkins and Princeton, do not admit candidates for the master's degree; at other schools some departments discourage candidacy for the M.A. Where it is granted, the requirements have become so demanding that students usually take three or four semesters to attain the degree, with the result that it comes to mark a level of attainment little different from that expected at the level of the preliminary examination for the doctorate. At one time, at some institutions, there was a tendency to make the master's degree a two-year degree. But the movement was checked by the fact that so many schools offered the degree for one year of study and there seemed to be no way of distinguish-

ing between the two degrees. Perhaps they should have added numbers: "M.A.(I)"; "M.A.(II)."

There still remains unsolved the difficult question as to how the graduate schools can identify the level of attainment achieved in two years of graduate study, usually marked by passing the preliminary examination for the doctor's degree. What is needed is some degree or title midway between the conventional master's degree and the doctorate, something comparable to the *license* of the French system. There is almost universal agreement that it is undesirable to introduce a new doctor's degree, such as "Doctor of Arts." The prestige of the Ph.D. is so great that any other non-professional doctorate would at once be considered spurious. At one time Princeton and some other schools offered a degree of "Master of Fine Arts," based on two years of work. It is possible that this might point the way to the general use of such a title in all departments: "Master of Anthropology"; "Master of Physics," etc., although it is terrifying to contemplate the proliferation of degrees which this would involve. Another alternative might be the granting of a "Diploma" in each of the fields, but this is subject to the same objection. If the deans who form the Association of American Graduate Schools would retire into the desert for a year of solitary fasting and contemplation, one of them might turn up at the end of the year with a solution of the puzzle. Meanwhile we shall have to get along with our present degrees. Students who have spent a year of study beyond the master's degree or have spent two years in attaining the master's degree can so indicate in their *curriculum vitae*. And discriminating employers will look more closely at the institution which grants the degree than at the number of years spent in study.

STUDENT LIFE

At most institutions the graduate student is truly "the forgotten man." While careful provision is made for the housing and recreation of undergraduates, even of students in law and medicine, residences for graduate students are the exception rather than the rule. And the problem is the more acute because almost half of the graduate students are married.

A few institutions have created "Graduate Centers" which provide rooms, eating-facilities and common meeting-places. The danger here is that, if they are too large, they become academic "hotels" with little identification of the groups with common interests. Some universities have developed modest housing projects for married graduate students, either by building new units or by converting residences. But in general graduate students, whether single or married, are living in shabby, unattractive quarters, without any of the contacts which they need for their personal and professional growth.

What the graduate student needs most of all is the sense of "belonging" in a relatively small professional group, an opportunity to meet informally with other men in his field and related fields and to discuss their common problems. While there is no single solution to the question, there are a number of steps which would help. (1) Each department should provide a "common room" where members of the staff and graduate students could gather for informal relaxation and talk over a cup of coffee or a dish of tea. (2) Each department should assign a room as a "work room" for graduate students, which would also serve as a "seminar room" and be equipped with a small collection of basic reference works in the field. (3) The University should take over

residences in the neighborhood and convert them into small "graduate centers," each one intended for students in a given area of study, such as the biological sciences. The ground floor of such a residence would be devoted to the common life of the group, with social and recreational facilities. The upper floors of the residence would be rented to individual students. Each house would be placed in charge of a student as director, who would receive living-quarters in return for services. This type of organization has proved its feasibility in a house leased by a group of graduate students in business administration at Pennsylvania and subsequently taken over by the University administration.

BASIC AND PROFESSIONAL FIELDS

During recent years there has been increasing discussion of the role of basic research as contrasted with applied or developmental research and it has been pointed out again and again that it is to basic research that we must look for the new ideas, the new discoveries without which even our national gift for the solution of practical problems would soon be barren. It is true that it is sometimes difficult to draw the line between basic and applied research; often they both deal with the same data. There is, nevertheless, a real difference between them. Basic research is prompted by a disciplined intellectual curiosity which aims to expand the horizons of knowledge without regard to its outcomes. Applied research is motivated by the desire, even by the necessity of solving a particular problem of national, social, economic or industrial interest. The fission of the atom is an example of the first; the development of the atomic bomb, of the second.

The problem is the more complicated because a great many agencies, public and private, are ready to supply the

funds necessary for the prosecution of applied research, whereas it is difficult to secure support for investigations which offer no immediate prospect of utility. It must be said, however, that both government and private agencies have become increasingly aware of the need for the study of basic questions and this same tendency is manifest in the great industrial research laboratories, like General Electric and Bell Telephone. It is here that the graduate schools have a strategic role to play, for it is they who must be uniquely devoted to the advancement of learning and to the training of a new generation of investigators.

Under these circumstances, it is essential that all of the basic departments be included in the graduate faculty of arts and sciences. They are as follows:

Biological Sciences

Biochemistry

Botany

Microbiology

Physiology

Zoology

Physical Sciences

Astronomy

Chemistry

Geology

Mathematics

Physics

Humanities

Classical Studies

English

Fine Arts (History of Art)

German

Linguistics

Music

Oriental Studies
Philosophy
Religion
Romance Languages
Slavic Studies

Social Sciences
Anthropology
Economics
Geography
*History
Political Science
**Psychology
Sociology

* Also one of the Humanities.

** Also one of the Biological Sciences.

These departments, or interdepartmental programs involving these departments, should offer programs leading to the Ph.D. By the same token, professional schools and departments would not be included in the faculty of the graduate school but would offer advanced professional degrees within their own jurisdiction. This would apply specifically to agriculture, architecture, business administration, education, engineering, forestry, law, library science, pharmacy, public health, and social work.

At the present time a number of these professional schools are offering a master's program in their field; a few, like education, law, or social work, offer a professional doctorate. It is my belief that all would profit by assuming responsibility for a professional master's and doctor's degree within the area of their competence. This does not mean that their graduate students would be cut off from work in the basic departments, but it would identify and clarify the objectives of their graduate professional programs. A student in

electrical engineering, for example, who was primarily concerned with preparing himself for a job in industry would take the professional degree; another student, whose interests were largely in theory, would take a Ph.D. in physics.

In view of the great prestige of the Ph.D. degree, there is little likelihood that this proposal will be received with enthusiasm by many of the professional faculties. But it is my conviction that, once generally adopted, it would enhance the value of the professional doctorate. In law the degree of "Doctor of Jurisprudence" or some similar title already enjoys a high repute. There is evidence that the Ed.D. in education is beginning to receive recognition within the field. Certainly the degree of "Doctor of Public Health" has attained a high professional status. We may look forward to the day when a professional doctorate, based on the most exacting standards, will be the most honored title for men entering a professional career. The Ph.D. would remain as the highest symbol of achievement in basic study and research.

II

The Graduate School of Arts and Sciences of the University of Pennsylvania

When the new "Department of Philosophy" at Pennsylvania opened its doors in 1885, the four students who enrolled—two men and two women—had a choice between eleven fields of study, but in three—history, mathematics and physics—no instruction was offered. Of the remainder, five were in the natural sciences, two were in the humanities, one was in political and social science. We need not trace here the development of graduate study at Pennsylvania in the variety of fields offered and the number of faculty and students. Today the 1,800 students enrolled in the Graduate School are scattered over fifty programs, with nearly 400 teachers. The *Announcement* for 1958-1959 lists over 1,000 courses for graduate students as offered in the coming year, with another 327 courses "to be offered in subsequent years."

In three quarters of a century it has become one of the great American graduate centers. If it does not belong in the top group with Harvard, California, Columbia, Yale, Michigan and Chicago, it certainly is included in the second group, along with Princeton, Wisconsin, Cornell, Illinois, Minnesota and Stanford. In a study of "Academic Eminence," made at Columbia in 1954, Pennsylvania ranked eleventh among American universities. In another study of

the "Standing of American Graduate Departments," made in 1957 for the Educational Survey, Pennsylvania was again in eleventh place. In the number of men on its staff who held Guggenheim Fellowships between 1925 and 1958 it was eleventh. In the number of doctorates granted between 1936 and 1950, it was sixteenth; in the number of different departments in which it granted the Ph.D. during that period it ranked fourteenth. While these ratings have no absolute validity, they do point to the conclusion that in the quality of its staff and the strength of its programs of graduate study, Pennsylvania is one of the dozen outstanding institutions of the country.*

There is naturally considerable variation in the relative strength of its programs in different areas. The strongest quadrants are the Humanities, especially the foreign languages, and the Biological and Medical Sciences. In both these areas, Pennsylvania belongs in the top ten among American graduate schools. The weakest quadrants are the Social Sciences, rated in the third five, and the Physical Sciences, rated in the fourth five. This difference in relative strength is also reflected in the recognition of members of the staff by election to one or another of the American academies. Eight members of the Humanities staff (including History) are members of the American Philosophical Society; six active men and four emeritus professors in the Biological and Medical Sciences have been elected to the National Academy of Sciences. In the Social Sciences, one man is a member of the American Academy of Arts and Sciences and also of the National Academy of Sciences; two have been elected to the American Philosophical Society. With the exception of the President of the University no member

* See Appendix.

of the present teaching staff in the Physical Sciences is a member of any one of the major academies.

A similar distribution is revealed in the number of men on the present staff who held Guggenheim Fellowships in the period from 1925 to 1958:

Humanities	21
Biological Sciences	15
Social Sciences	6
Physical Sciences	4

In this connection it should be noted that several of the departments which enjoy the highest prestige are among the smallest in number of staff and students. On the other hand several of the largest departments appear to have slight reputation among their peers. This should be a matter of grave concern, both to the departments in question and to the administration. The minimum goal for all departments which offer the doctorate should be a place among the top ten departments in the country. It can be achieved only by unremitting effort on the part of both administration and the departments.

THE FACULTY

Organization and Administration

As in most institutions, the Graduate Faculty at Pennsylvania is largely a "paper" organization. It meets once a year to elect members of the "Council of the Graduate School"; that is the extent of its activity as a corporate body. It does not discuss substantive questions such as the goals of graduate study or the appropriate content of a program leading to those goals or the relation of graduate study to the various careers and professions. In theory it is the "Council" which is supposed to concern itself with these problems which af-

fect the Graduate School as a whole. In practice, the deliberations of the Council are largely limited to the review of recommendations from the four quadrant "Committees on Instruction" with regard to appointments to fellowships and scholarships in the Graduate School.

In each of the four quadrants (Biological and Medical Sciences, Humanities, Physical Sciences, and Social Sciences) there is a "Committee on Instruction" consisting of the chairmen of the groups included in the quadrant. The chief function of these committees is to recommend the acceptance of teachers as members of the faculty and to nominate students for appointments to fellowships and scholarships.

While the present system seems to operate reasonably well, there are certain modifications which might be considered. If all the members of the Committees on Instruction were elected by the faculty of each of the Groups, there would be a stronger feeling of the responsibility of the faculty in the study of the problems which come before the committees. Moreover, the committees might properly be charged with reviewing all departmental recommendations of appointment at the rank of professor and associate professor, before they were submitted to the Provost. If a University Research Council were created, the committees might also be asked to express their opinion concerning all proposals for project research and for the allocation of University research funds which fell within the committee's field of competence.* Finally, it might be desirable for each of the committees to elect one of their members as a member of the Council of the Graduate School in order to insure more effective *liaison* between the committees and the Council.

* See page 107.

The Dean of the Graduate School at Pennsylvania is the official administrative officer of the School and is aided by two assistant deans and a secretarial staff. But his only apparent functions are to preside at the annual meeting of the faculty and to serve as chairman, *ex-officio*, of the Council and of each of the four Committees of Instruction. Except for a few departments which somehow have fallen under his jurisdiction he has no instructional budget, no voice in the appointment of the staff. His duties are therefore primarily those of a keeper of the records * and as the one unifying force which binds together the work of the Committees on Instruction and the Council.

By virtue of a concurrent appointment as Vice-Provost in charge of graduate affairs, the present Dean is a member of the Personnel Committee which sits with the Provost in reaching final decisions with regard to faculty appointments, but this participation is not inherent in his position as Dean and it offers no opportunity for him to share in the recruitment and selection of the faculty of the Graduate School. A possible administrative reorganization which called for the appointment of a Vice-Provost in charge of all instruction, both undergraduate and graduate, in the field of the basic arts and sciences, would make it possible for the Dean of the Graduate School and the Dean of the College to share with the Vice-Provost the responsibility for developing the strongest possible faculty in all departments, with due concern for the needs of both undergraduates and graduates.

Distribution of the Faculty

In 1957-1958 the Faculty of the Graduate School comprised almost 400 men of professorial rank, organized in 47

* It should be remarked that the records are inadequate with respect to graduate students, except in the matter of their semester-credits.

groups which offered the master's and doctor's degree. Of these, 38 were departmental groups; the remainder were interdepartmental programs. Table 1 shows their distribution by department and rank.

During the course of the Educational Survey, a number of studies were made, some of them complete, others by sample, in the effort to cast light on the character of the staff and their activities. The materials gathered concerning the departments in the College and in the Wharton School are fairly complete, but no similar data have been collected on the staff of the other professional schools. However, it is probable that the data available are fairly representative of the staff as a whole.

Age and Training

The data presented in Tables 2, 3 and 4, and summarized in Table 5, show the distribution of the graduate staff by age and training. They reveal striking differences between the groups in the Humanities and the Social Sciences on the one hand and in the Natural Sciences on the other. The staff in the former is relatively old; in the latter, relatively young. The median age of professors in the Natural Sciences is ten years less than that of professors in the other two divisions. At all ranks, the staff in the Natural Sciences is the youngest. Among the professors and assistant professors, the staff in the Humanities is the oldest; among the associate professors, it is the group in the Social Sciences which is oldest.

A similar difference appears in the graduate training of the staff. In the Social Sciences, two-thirds of the staff (67%) received their doctorate at Pennsylvania. It should be added that this is largely due to the departments in the Wharton School, where 76% of the staff are Pennsylvania

TABLE 1
DISTRIBUTION OF GRADUATE FACULTY
(1957-1958)

BY DEPARTMENT AND RANK

		<i>Associate</i> <i>Professors</i>	<i>Assistant</i> <i>Professors</i>	<i>Total</i>
Anatomy	3	5	3	11
Anthropology	6	3	—	9
Astronomy	1	1	2	4
Biochemistry	8	—	4	12
Biophysics	1	1	1	3
Botany	5	—	2	7
Chemical Engineering	2	2	1	5
Chemistry	8	3	5	16
City Planning	4	—	—	4
Civil Engineering	2	—	1	3
Classical Archaeology	1	—	1	2
Classical Studies	3	—	2	5
Economics	37	9	6	52
Education	10	5	1	16
Electrical Engineering	6	7	7	20
English	12	6	6	24
Fine Arts	2	2	1	5
German	4	—	1	5
History	7	3	6	16
Linguistics	1	1	1	3
Mathematics	4	4	2	10
Mechanical Engineering	3	3	1	7
Medical Microbiology	8	6	1	15
Metallurgical Engineering	1	2	1	4
Music	—	2	3	5
Oriental Studies	7	2	2	11
Parasitology	1	1	—	2

TABLE 1 (Continued)

	<i>Professors</i>	<i>Associate Professors</i>	<i>Assistant Professors</i>	<i>Total</i>
Pathology	7	4	2	13
Pharmacology	2	—	1	3
Philosophy	4	2	2	8
Physics	5	6	3	14
Physiology	5	—	1	6
Political Science	9	5	6	20
Psychology	6	6	4	16
Romance Languages	5	5	2	12
Slavic and Baltic	2	—	—	2
Sociology	5	4	3	12
Zoology	4	3	3	10
Totals	<u>201</u>	<u>103</u>	<u>88</u>	<u>392</u>

This list does not include interdepartmental groups nor does it include members of other departments which are listed under the several group committees.

TABLE 2
 DISTRIBUTION OF FULL-TIME FACULTY MEMBERS
 OF PROFESSORIAL RANK IN THE HUMANITIES
 (July 1, 1957)
 BY AGE AND TRAINING

X = Penn Ph.D.

O = Other "

<i>Age</i>	<i>Professors</i> (47)	<i>Associate</i> <i>Professors</i> (21)	<i>Assistant</i> <i>Professors</i> (27)
70	X O		
69	X X		
68	O		
67	X O		
66	X		
65	O	O	
64	X	O	
63		X	X
62	X X O O		
61	X O O O		X
60	X X	X	X
59	X X X		
58	X O O O (Mdn)	X	
57	X		X
56	X		O
55	X O O	X	
54	O	O O	X
53	X O		O
52	X O	X	
52			X
50	O O		
49	O O		
48	O		
47	X O	O O O (Mdn)	X

TABLE 2 (Continued)

Age	Professors (47)	Associate Professors (21)	Assistant Professors (27)
46	O	X	
45	O		
44		X	
43	O	O	O
42		O O O	X X O O (Mdn)
41		O	O
40			
39		O	
38			X X X
37			O O
36			X O
35			
34		O	O
33			
32			O O
31			

$$X = 21$$

$$O = \underline{26} \quad 47$$

$$X = 7$$

$$O = \underline{14} \quad 21$$

$$X = 13$$

$$O = \underline{14} \quad 27$$

Totals

$$X = 41 = (43\%)$$

$$O = \underline{54} \quad 95$$

Over-all Median - 53

TABLE 3
 DISTRIBUTION OF FULL-TIME FACULTY MEMBERS
 OF PROFESSORIAL RANK IN THE NATURAL SCIENCES *
 (July 1, 1957)
 BY AGE AND TRAINING
 X = Penn Ph.D.
 O = Other "

<i>Age</i>	<i>Professors</i> (26)	<i>Associate Professors</i> (13)	<i>Assistant Professors</i> (15)
70			
69			
68	O O		
67		X	
66			
65	O O		
64			
63			X X
62	X		
61	O		
60			
59			
58	O	X	X
57	X O		
56			
55			
54	X	X	
53		X	
52			
51	O		
50	O		
49		O	
48			

* Not including Engineering and Medicine.

TABLE 3 (Continued)

Age	Professors (26)	Associate Professors (13)	Assistant Professors (15)
47	O		
46	X X		
45	} (Mdn)		
44		O X (Mdn)	
43	O O		
42	O		
41	O	O	
40	X		
39		O	
38	O O O		O O
37	O		
36		O O O	X
35			
34	O		O O O (Mdn)
33			O O
32	O		
31			O
30		O	O
29			O O
Totals			
X = 15 = (28%)			
O = 39 54			
Over-all Median—43			

TABLE 4

DISTRIBUTION OF FULL-TIME FACULTY MEMBERS
OF PROFESSORIAL RANK IN THE SOCIAL SCIENCES *

(July 1, 1957)

BY AGE AND TRAINING

X = Penn Ph.D.

O = Other "

<i>Age</i>	<i>Professors</i> (70)	<i>Associate</i> <i>Professors</i> (29)	<i>Assistant</i> <i>Professors</i> (34)
69	X		
68	X		
67	XX		
66	XX	X	
65	X	O	O X
64	XX		O
63	X X X X	X	
62		X	
61		X	
60	O X X	O	
59	O X X X X X X X	X	X
58	XX	X X	
57	X X X X	O	
56	O O X X X X (Mdn)	X X	
55	O O O O X X		O
54	X X X	X	
53	X X X	O	
52	O O X X X	X (Mdn)	
51	O	X	
50	O O X X X	X	
49	O		
48	O X X	O	
47		X	

* Including Psychology.

TABLE 4 (Continued)

Age	Professors (70)	Associate Professors (29)	Assistant Professors (34)
46	O	X	O
45			X X X
44	O	O	
43	O		
42	O		X
41	O O		
40	O		O X X
39		O X X	
38		O X	X
37		X	X X X
36		O O	O } (Mdn)
35			O X X X
34			O
33			X X X
32			X O
31			X X O
30			O O
29			X

X = 48 X = 19 X = 22
 O = 22 70 O = 10 29 O = 12 34

Totals

X = 89 = (67%)

O = 44 133

Over-all Median—52

TABLE 5
SUMMARY OF
DISTRIBUTION OF PROFESSORIAL STAFF
BY AGE GROUPS AND TRAINING *

	<i>Men over 50</i>				<i>Men 50 and under</i>			
	<i>Penn</i>		<i>Other</i>		<i>Penn</i>		<i>Other</i>	
	<i>Ph.D.</i>		<i>Ph.D.</i>		<i>Ph.D.</i>		<i>Ph.D.</i>	
	<i>No.</i>	<i>%</i>	<i>No.</i>	<i>%</i>	<i>No.</i>	<i>%</i>	<i>No.</i>	<i>%</i>
Humanities	31	57	23	43	10	24	31	76
Natural Sciences	10	56	8	44	5	14	31	86
Social Sciences	57	76	18	24	32	55	26	45
Totals	98	67	49	33	47	35	88	65

T O T A L S

By Age Groups

	<i>Over 50</i>		<i>50 and under</i>	
	<i>No.</i>	<i>%</i>	<i>No.</i>	<i>%</i>
Humanities	54	57	41	43
Natural Sciences	18	33	36	67
Social Sciences	75	56	58	44
Totals	147	52	135	48

By Training

	<i>Penn Ph.D.</i>		<i>Other Ph.D.</i>	
	<i>No.</i>	<i>%</i>	<i>No.</i>	<i>%</i>
Humanities	41	43	54	57
Natural Sciences	15	28	39	72
Social Sciences **	89	67	44	33
Totals	145	51	137	49

* Not including City Planning, Education, Engineering and the medical groups.

** In the Wharton School, 76% of the professorial staff hold Penn Ph.D's.

TABLE 5 (Continued)

Median Ages

	<i>Professors</i>	<i>Associate Professors</i>	<i>Assistant Professors</i>	<i>Total</i>
Humanities	58	47	42	53
Natural Sciences	47	44	34	43
Social Sciences	56	52	37	52

trained. In the Humanities, 43% of the staff hold their doctorate from Pennsylvania. On the other hand, only 28% of the professorial staff in the Natural Sciences are "home grown." A comparison of the group over fifty years of age with those fifty or under shows that a former tendency toward "in-breeding" has been reversed. Of the men over fifty, 67% were trained here; of the younger men, only 35% hold the Pennsylvania Ph.D. The shift has been most striking in the Natural Sciences, where only 14% of the younger group come from Pennsylvania. The Social Sciences have shown some change, but even among the younger men, over half (55%) are still from Pennsylvania.

"In-breeding" is not itself an evil; it does not imply intellectual inferiority. But it does mean that a staff largely made up of men who are familiar only with Pennsylvania—and many of the Ph.D.'s received all their training here—will be inclined to accept the Pennsylvania pattern as the ideal one, to ignore what is happening at other institutions and even to resist any change. To insure the continuing vitality of the University it is essential that the present policy of recruiting a large proportion of the staff from other institutions be continued.

Over fifty members of the graduate faculty in these groups

(approximately 20% of the staff) will retire in the next ten years. It is not probable that many of the men in the age group from 50 to 60 will resign to accept appointments elsewhere, but some of them may die. Under any circumstances, in the years ahead there will be an opportunity for the administration and the departments to make significant changes in the constitution and complexion of the staff, if they so choose. It is greatly to be hoped that, as they fill vacancies, they will follow the example of the Natural Sciences and appoint younger men, to redress the present unbalance in age and ranks. If the salary scale can be raised to a competitive level, it may even be possible to appoint an increasing number of post-doctoral instructors.

It is interesting to discover where the present members of the staff who hold the doctorate from other universities received their training. A study of the staff in the basic arts and sciences under the jurisdiction of the College and the Graduate School shows the distribution presented in Table 6. It is clear that these departments have recruited their staff from the major graduate schools of the country; almost 85% have come from the universities which were rated as the top twenty in 1925; 70% came from the top ten. Naturally, most of them were drawn from institutions on the Atlantic seaboard, but there is a generous sprinkling of men from the South, the Middle and Far West. And it should be added that the number of men who received their training at foreign universities is large. These departments have obviously set their standards high.

A study of the training of the graduate faculties at Columbia (Table 7) reveals a similar pattern. The percentage of Columbia Ph.D.'s is high, but the proportion of foreign doctorates and the American institutions from which they have

TABLE 6

GRADUATE TRAINING OF THE PENNSYLVANIA FACULTY
IN ARTS AND SCIENCES *

<i>Ph.D. from</i>	<i>Number</i>
Pennsylvania	82 (42%)
Foreign universities.	26 (13%)
Other American universities	89 (45%)
Harvard	12
Columbia	9
Johns Hopkins	8
Chicago	6
Princeton	6
Yale	6
Michigan	5
Cornell	4
M. I. T.	4
Brown	3
California	3
Wisconsin	3
Dropsie	2
Illinois	2
Iowa	2
Ohio State	2
Tulane	2
Washington (St. Louis)	2
Eight others, each	1
Total	<u>197</u>
<i>From</i>	
Top ten (1925)	62
Second ten (1925)	13
Others	14
<i>From</i>	
Atlantic seaboard	55
Other regions	34

* Not including the faculties of the professional schools.

TABLE 7
GRADUATE TRAINING
OF THE COLUMBIA GRADUATE FACULTIES

<i>Ph.D. from</i>	<i>Number</i>
Columbia	168 (50%)
Foreign universities	51 (15%)
Other American universities	119 (35%)
Harvard	30
Chicago	15
Yale	12
Princeton	8
Wisconsin	8
Johns Hopkins	6
Cornell	5
Illinois	5
California	4
Brown	3
Stanford	3
M. I. T.	2
Michigan	2
North Carolina	2
Northwestern	2
Other universities *	12
Total	<u>338</u>

* None from Pennsylvania.

drawn their staff are closely parallel to those at Pennsylvania. It is, however, somewhat disconcerting to find that in 1956-1957, no Ph.D. from Pennsylvania was on the graduate faculty at Columbia. That is a problem to which we will return later (see page 97).

Faculty Services

Members of the graduate faculty, like other university teachers, are called upon to perform one or more of the following services: (1) teaching, (2) research, (3) administrative tasks, (4) community service. Almost all of them engage in the first two; a few in all four.

Teaching

Several studies of the teaching-load of the faculty were made during the Survey. But because of the differences in methods of reporting, the difficulty of distinguishing between full-time and part-time, and the like, almost the only conclusion that can be drawn is that on the average at Pennsylvania professors teach three courses, with eight hours in class; associate professors and assistant professors teach three or four courses, with nine or ten hours in class; and instructors teach four courses, with ten or eleven hours in class. There are wide differences from department to department, depending in part on the size of the staff and the student enrollment. Within departments there is similar variation. In some, the men at the lower ranks carry a heavier load than the senior men; in others, all men of professional rank appear to carry the same load.

Most members of the graduate faculty teach both undergraduate and graduate courses. In the College departments, 69% of the professorial staff are so engaged; 7% teach only graduate courses. The remaining 24% teach only undergraduates. Naturally, it is the professors who devote the largest proportion of their time to graduate teaching, the assistant professors who devote the least. But even the assistant professors spend a third of their teaching hours in mixed and graduate courses.

In a study of the Humanities groups, it appeared that in the spring semester, 1955, 30% of the hours of instruction of regular members of the staff were in courses primarily or exclusively for graduate students. Of the total student registrations in these departments in that semester, 15% were graduate students. The average teaching load was similar to that already mentioned:

Professors	7.6 hours
Associate Professors	9.4 hours
Assistant Professors	10.5 hours

Another aspect of the teaching function at the graduate level is the supervision of doctoral dissertations. Separate studies show that about two-thirds of the staff are so engaged. Most of them report the supervision of one to three dissertations, but a few list seven or more. The figures given are open to question, for there is no clear definition of the term "supervision." It may mean frequent consultation with a student throughout the year; it may also mean an occasional interview with a non-resident student who comes to Philadelphia at intervals.

The task is one of the most important that the faculty are called upon to perform, for it is here that they must guide and train their students in the methods of research. They must be ready to give to it whole-hearted time and thought. This means that no member of the staff should undertake, at any one time, the supervision of the work of more than four or five resident students. If he is carrying such a load, his schedule of formal teaching assignments should be reduced. In addition, a large number of men teach in the School of General Studies, Evening Courses and Extension Courses. In the College, over half the professorial staff of departments which offer courses in the School of General

Studies teach one or more such courses. It is the associate professors who show the largest proportion of men thus engaged. This situation is corroborated by a separate study of the Humanities departments. In the Wharton School, however, it is the assistant professors who are most heavily involved in supplementary teaching.

Some of the consultants from outside the University have deplored this activity as a serious interference with the research of the faculty. But it must be remembered that a large proportion of the staff is engaged in some form of work for remuneration aside from teaching. Within the University, some men receive additional salaries for administrative work or for work on sponsored projects. Many men accept appointments as consultants to outside agencies. In fact, at most universities it is accepted practice that members of the staff are free to devote a day a week to outside activity for pay. Still other faculty men write textbooks which they fondly—and sometimes foolishly—hope will produce a revenue.

There is, therefore, no reason why men for whom other sources of supplementary income are not available should not engage in supplementary teaching. The unhappy aspect is that the rewards for this work are so pitifully small. The trouble is that, as a result, the faculty are subsidizing a cheap education for the students who take these courses. The justification for this situation has been, in the past, that since these programs have no special endowment, they must pay their own way. If it seems desirable to continue them as a form of public service, the public should be required to pay for the cost at a level which will permit adequate remuneration to the faculty. The administration should undertake a thorough study of the problem.

Research

It is impossible to make any objective evaluation of the quality of the research activity of the faculty. Many men are engaged in research, in preparation for their advanced courses, which will never be published. And even the enumeration of the books and articles which are published casts no light on their value. A single scholarly article, the result of years of study, may be far more significant than a hastily compiled anthology.

Certainly the productivity of the faculty, as recorded in the annual *Bibliography*, is impressive. And certainly, over a period of years, a large proportion of the staff do some publishing. Here, too, there is some negative evidence, for if, during five or ten years, a man has no record of publication, he can hardly be a "productive" scholar. A study of the College staff in 1956-1957 showed that in that year 66% of the staff published something. The busiest beavers were the assistant professors; perhaps they were under the compulsion of the "publish or perish" doctrine. The least active were the associate professors; they had achieved tenure and could afford to rest on their oars. In the same study 19% of the professorial staff reported that they were not at that time engaged in any research.

Administrative Tasks

The major administrative officers of the University in charge of instruction and research, from the President down to the Vice-Deans, are all members of the graduate faculty. Some of them continue to teach, along with their other duties. Chairmen of departments and of group committees carry a heavy administrative load, ex-officio. In large de-

partments they may be relieved of part of their teaching responsibility. But for most members of the staff service on committees—University-wide, school or college, departmental—is the chief administrative task they perform.

Several studies have been made during the Survey to determine the distribution of this responsibility. They all reveal that it is very unevenly spread. About a third of the staff serve on no committee. Among those who are involved, the heaviest burden naturally falls on the senior men, especially on departmental chairmen. A considerable number (14% of the total in the College) serve on five or more committees. It is true that many of these committees meet infrequently, but others demand a large amount of time, particularly for the chairman of the committee.

In an institution as large and as complex as the University it is essential that the faculty share in administrative tasks, especially in those which involve educational policy. But there are certainly too many committees and too much of the time spent in their meetings is devoted to routine details which could better be delegated to an officer appointed for the purpose, once the general policies have been determined by the committee. The faculty would do well to reconsider the whole committee structure and reduce their number to the minimum essential.

Not all faculty men are willing to serve on committees, nor do all of them make good committee-men. But administrative officers should make every effort to distribute the burden as widely as possible in making their appointments. In particular, younger members of the staff should be called on to serve, both to lighten the load of their seniors and also to give them the opportunity to understand the educational problems of the University and to share in their solution.

Public Relations

There is no way of determining the extent to which members of the graduate faculty participate in the activities of the world outside. Many of them serve on national, state, or local boards and councils. Others are officers of national professional associations. The staff of the professional departments in business administration and engineering have close relationships with the agencies and laboratories in their field. But many members of the staff feel—and perhaps rightly—that their best contribution to society is their research; public relations are the responsibility of someone else. As a result, one gains the impression that, as a whole, the faculty is not distinguished for its public-mindedness.

There is, however, one unit in the University which is definitely oriented toward the public—the University Museum. It is anomolous that an archaeological museum should have accepted this function, yet the Museum is so conscious of its service that it has a “Director of Public Relations” of its own. It offers a variety of programs both entertaining and instructive—lectures, concerts, movies—for the benefit of young and old. Its facilities provide a meeting-place for educational and social gatherings. Whether these are appropriate functions for a university museum is another question. At least it must be said that the Museum, by assuming this task, is meeting a real need in maintaining contact between the University and the public which it serves.

The Spirit of the Faculty

All of the consultants who have shared in the Educational Survey have commented on the faculty's dedication to research; it is the distinguishing trait of the staff. That it is not mere lip-service is manifest in the impressive list of its

scientific and scholarly publications. Faculty morale is high. The staff has confidence in the central administration and is grateful for the freedom and security which it enjoys. These are the factors that have enabled the University to attract and retain the services of outstanding scholars, in spite of the low salary scale.

The visitors from outside the University have also identified certain other characteristics of the faculty—their conservatism, their isolationism, their complacency. In part, these traits are to be explained by the fact that, except in the Natural Sciences, the proportion of older men and of men who received their training at Pennsylvania is high. In a sense, then, the spirit of the University is a reflection of the spirit of Philadelphia, not the Philadelphia of Benjamin Franklin but that more recent Philadelphia which Agnes Repplier described in her *Philadelphia; the Place and the People*:

A strong attachment to whatever has been, an equally strong, and often well-founded dislike for innovations characterizes Penn's city, which has seldom thirsted after novelties. Her prejudices are ancient, deeply venerated and unconquerable.

Or the Philadelphia of which another good Philadelphian, Edward P. Cheyney, wrote in his *History of the University of Pennsylvania (1740-1940)*:

Cooperation has never been a strong point in Philadelphia. Repeated approaches have been made toward the attainment of unity among her cultural institutions, only to be blocked by her ingrained individualism.

It is not surprising, therefore, that individualism—a rugged, nineteenth-century individualism—is a dominant trait of the faculty. At most, members of the staff are prepared to join hands with other members of their department,

but the departments remain isolated, vigorously maintaining their independence and autonomy. Except in the Biological Sciences, there is surprisingly little contact between men in different departments; most of the graduate groups are made up almost wholly of members of a single department. There are very few interdepartmental programs. There are no "Faculty Seminars," such as are common at other universities, which bring together men from different fields for the discussion of common problems.

One of the chief causes of this separatism is the physical location of the University. Situated in a "blighted area" of the city, the University has not been able to create a "university community." As a result, most of the faculty have become commuters, living in the suburbs and coming to the University only for a part of the day or even only on the days when they meet classes or seminars. The plight of the faculty has been the more acute because of the lack of a faculty club where they might meet, at least for luncheon, in attractive surroundings with congenial companions. It is true that the Lenape Club has provided a modest luncheon at modest cost, but the membership is limited and the number of younger men who belong is small. The construction of the Faculty Club, now under way, will do much to relieve the situation. And if the experience of faculty clubs at other universities is repeated, it may in time become a real intellectual and social center in the life of the faculty.

There still remains the problem of developing a residential community for the faculty close to the University. At Columbia and at New York University great progress in this direction has been made in recent years by the purchase of apartment-houses in the university neighborhood. No such solution is possible in Philadelphia. But there is a prospect which offers real promise for the future. The Redevelopment Authority has created a "University Redevelopment Area,"

with the intention of clearing the slums and rehabilitating the West Philadelphia area. Here is a golden opportunity for the University. It is not enough to provide dormitories and recreational facilities for undergraduates. The need for faculty housing is even more urgent and the University authorities should continue to press vigorously for the early construction of housing units and schools which would be available for faculty men and their families, as deserving high priority in the plans of the Redevelopment Authority.

The creation of a physical community will not insure a heightened sense of common interest among the faculty, but it will help. And if, as new appointments are made, the administration and the departments seek for men with broad interests and a vital concern with the unity of learning, transcending the limits of the traditional departments, a new spirit of mutual understanding and cooperation—the dream of contemporary America—can be developed. The future lies in their hands.

GRADUATE DEPARTMENTS

At the present time the Graduate School offers programs leading to advanced degrees in fifty fields, each under the direction of a "Group Committee." In most cases these committees consist of the members of a given department who are authorized to conduct graduate courses; in some cases, the committee, while predominantly departmental, may include representatives of other departments; in a few cases the Group Committee is truly "interdepartmental." Within the general framework of the Graduate School, each Group Committee is responsible for the special rules and regulations applicable to the special field. The Chairman of the Group Committee, who may be also the Chairman of the Department or appointed by the Chairman of the Department or elected by the members of the group, usually serves

as adviser to all graduate students enrolled in the field.

Most of the groups in the Graduate School are based on departments of the College, but there are also groups drawn from the faculties of the professional schools—business administration, education, engineering, fine arts and the medical faculties. Some of these groups, though administratively attached to a professional school, are in reality “basic” departments, engaged in training and research which transcends limited professional interests. As has already been remarked, the broader interests of these departments and their relationship to other basic departments would be better served if they were placed under the jurisdiction of a Faculty of Arts and Sciences. Such a step would also insure that their needs, in staff and in the support of research, would be considered in the light of their total contribution to the work of the University. It implies, however, the appointment of an administrative officer (“Vice-Provost” or “Dean of the Faculty of Arts and Sciences”), whose function would be the study of the needs of *all* departments in the basic disciplines. The following departments, now under the administrative control of professional schools, might be considered for such a transfer:

Biochemistry

Biophysics

Economics

Geography

History of Art

Medical Microbiology

(to be combined with Microbiology)

Physiology

(to be combined with General Physiology)

Political Science

Sociology

There are, of course, many objections to moving these departments from their traditional place in the structure of the University. But such a step would be in line with the practice of most of the strongest institutions in the country and would, I believe, promote the best interests of the departments and of graduate study in general, by emphasizing the essentially "non-professional" character of their programs of training and research.

At present several departments are assigned to the budget of the Graduate School: American Civilization, Archaeology, Music, Oriental Studies and South Asia Regional Studies. All of them (except Archaeology, which is not a department of instruction) offer courses open to undergraduates as well as to graduate students. It does not appear that they have been thus allocated with any intent to set up a separate graduate faculty; their present situation seems to be the result of chance or expediency. The experience of Columbia and of Chicago in creating two different faculties for graduate and undergraduate instruction has not proved fruitful. It is difficult to maintain a satisfied college staff beside a graduate staff; the most mature, creative minds are cut off from contact with promising undergraduates. It would seem wise to continue the Pennsylvania tradition of maintaining a single faculty in the arts and sciences, engaged in instruction at all levels. If this is accepted, the departments now on the budget of the Graduate School should be transferred to the budget of the College.

Among the groups which are already within the area of the arts and sciences, there are several changes which should be considered. The group called "Archaeology" is a "paper" organization made up of members of the staff of the University Museum. It offers no courses and no programs leading to advanced degrees. It might well be discontinued, since

its members are already members of the groups in Anthropology and in Oriental Studies, which offer degree programs.

The group in "Classical Archaeology" consists of two persons. It should be incorporated in the group of "Classical Studies" to the profit of both groups. There seems to be little justification for a group in "Economic History." This is a field which is normally a part of the program in economics; that it offers little professional future is evidenced by the small number of students who have enrolled. The needs of these few could be adequately met either in economics or in history. Since the group in "General Literature" offers no graduate courses and no degree programs, it should be discontinued as a graduate group. However praiseworthy its purpose, it must be remarked that the group in "Inter-science" has never granted an advanced degree nor is there reason to believe that the goals it sets up cannot be attained in the established disciplines.

There still remains the difficult question as to the proper advanced degrees which should be offered in the professional schools. I have already expressed my belief that both the master's and the doctor's degrees in these schools should be professional degrees, rather than the M.A. and Ph.D. of the basic disciplines. At Pennsylvania, professional master's degrees are already offered in business administration, education, engineering, fine arts, law, and social work; professional doctor's degrees are offered in education, law, and social work. If this practice were extended to all professional graduate programs, it would involve the transfer of the following groups now in the Graduate School:

Chemical Engineering
City Planning and Regional Science
Civil Engineering

Education

Electrical Engineering

Engineering Mechanics

Mechanical Engineering

Metallurgical Engineering

Public Health and Preventive Medicine

This transfer would not necessarily imply an intellectual divorce of graduate study in the professional departments from the basic departments of the Graduate School. Even if there is "separate maintenance" they must continue in close relationship for the sake of their children—the students. Many members of the staff would hold dual appointments, in the professional school and in a basic department. But it would stress the difference in the goals at which they aim and in the training of their advanced students. Whether such a proposal would be acceptable to the groups concerned is open to question. But it should be remarked that the recent report of the Columbia Faculty Committee expressed the belief "that the professional schools should, in general, give professional doctorates rather than the Ph.D." If this step is not taken, the name "Graduate School of Arts and Sciences" should be changed to "Graduate School of the University of Pennsylvania."

FACULTY, STUDENTS, AND DEGREES

Table 8 presents the data concerning the staff, graduate majors, and higher degrees granted in each of the graduate groups. As is to be expected, the departments with the largest number of students are also those which have the largest staff and which have granted the largest number of degrees. A few facts deserve comment.

The Graduate School, in recent years, has granted almost

TABLE 8

DISTRIBUTION OF STAFF, STUDENTS AND DEGREES

<i>Departments</i>	<i>Professorial Staff</i>	<i>Graduate Majors</i>		<i>Degrees (1950-1957)</i>	
	(1957-1958)	1956	1957	M.A.	Ph.D.
American Civilization	*	54	55	90	29
Anatomy	11	3	3	9	6
Anthropology	9	33	38	37	10
Astronomy	4	3	6	3	2
Biochemistry	12	20	23	9	16
Biophysics	3	4	3	—	7
Botany	7	4	10	4	13
Chemical Engineering	5	9	11	16	9
Chemistry	16	139	132	121	110
City Planning	4	6	11	—	1
Civil Engineering	3	3	2	—	1
Classical Archaeology	2	5	3	4	—
Classical Studies	5	10	13	18	5
Economic History	*	2	3	—	1
Economics	52	142	166	163	98
Education	16	16	14	12	15
Electrical Engineering	20	109	182	—	24
Engineering Mechanics	*	10	21	—	—
English	24	142	176	286	142
Fine Arts	5	7	14	9	—
General Physiology	*	1	9	—	3
German	5	15	20	30	17
History	16	115	108	248	70
International Relations	*	31	25	45	1
Interscience	*	5	3	—	—
Linguistics	3	12	14	13	9
Mathematics	10	60	58	65	25
Mechanical Engineering	7	3	13	—	3

* Interdepartmental program.

TABLE 8 (Continued)

Departments	Professorial Staff (1957-1958)	Graduate Majors		Degrees (1950-1957)	
		1956	1957	M.A.	Ph.D.
Medical Microbiology	15	40	39	45	57
Metallurgical Engineering	4	8	11	22	8
Microbiology	*	16	10	15	8
Music	5	11	15	35	3
Oriental Studies	11	20	15	4	8
Parasitology	2	—	1	4	1
Pathology	13	5	4	1	1
Pharmacology	3	3	2	2	1
Philosophy	8	38	27	27	12
Physics	14	109	121	86	63
Physiology	6	20	13	7	5
Political Science	20	53	50	125	35
Psychology	16	76	73	120	66
Public Health	*	4	2	12	6
Romance Languages	12	56	54	34	19
Slavic Studies	2	9	8	25	15
Sociology	12	46	48	54	29
South Asia	*	22	13	17	1
Zoology	10	33	30	27	45
Totals	392	1542	1672	1844	1000

* Interdepartmental program.

twice as many master's as doctor's degrees (1,844 against 1,000). Although no exact figures are available, a sample study of the Humanities groups showed that about a third of those who receive the master's degree continue their studies. Some departments, particularly in the Biological Sci-

ences, discourage candidacy for the master's degree. In the Engineering groups all master's degrees now awarded are professional degrees. In a few departments—American Civilization, Anthropology, History, and Political Science—the ratio of master's to doctor's degrees is high. In two of the interdepartmental programs (International Relations and South Asia) the first degree is almost the only one granted.

At the doctoral level, 26 departments granted an average of at least one degree a year during the past eight years. During this period, three departments (Classical Archaeology, Engineering Mechanics, and Fine Arts) awarded no doctoral degree; eight others granted only one degree. In proportion to their size, some of the small departments, like German, Linguistics, and Slavic Studies, produced a relatively large number of Ph.D.'s. On the other hand, among the large departments, Economics, Electrical Engineering and Political Science appear to have been relatively unproductive in the training of doctoral candidates in proportion to the size of the staff.

On the whole, the programs seem to be in a healthy balance of staff and students. A few very small groups with few students might profitably be combined with closely related departments; some of the professional departments should perhaps be transferred to the professional schools. I have discussed this elsewhere in the Report (see pp. 47-48, 80-81).

STUDENT PROBLEMS

The Graduate Student Body

The number of graduate students has been increasing slowly in recent years. The figures for the last two years are:

	<i>Full-time</i>		<i>Part-time</i>		<i>Total</i>
	<i>Number</i>	<i>%</i>	<i>Number</i>	<i>%</i>	
Fall 1956	404	26	1118	74	1522
Spring 1957	301	21	1114	79	1415
Fall 1957	350	21	1322	79	1672
Spring 1958	414	26	1139	74	1553

The distinction between "full-time" and "part-time," as reported by the Graduate School, has to be interpreted, since the Graduate School counts as "full-time" only those students who are registered for at least ten semester-credits. In reality, many of the part-time teaching and research assistants who are taking only two or three courses are "full-time" in the sense that they are devoting all their time to their professional growth. But the fact remains that a very large proportion of the graduate students are not truly "in residence." Many of them are employed in agencies and institutions outside the University and come to the University for a class or two each week. One of the most pressing needs of the Graduate School is the development of a larger body of "resident" graduate students (see pp. 88-89).

Table 9 shows the sources from which the graduate students are drawn. Almost half were trained in institutions in the state of Pennsylvania; almost two-thirds received their baccalaureate in Pennsylvania and the nearby Middle States. The rest were trained in various sections of the country and abroad. It is noteworthy that more than twice as many come from foreign universities as from the institutions of the West. Another study, made in 1956, of graduate students in the Social Sciences showed almost exactly the same distribution.

Almost two-thirds of the students received their prior training at small universities and at liberal arts colleges.

TABLE 9

DISTRIBUTION OF GRADUATE STUDENTS ADMITTED IN 1953-1954

By Area of Undergraduate Preparation

<i>Area</i>	<i>Number</i>	<i>%</i>	
University of Pennsylvania	307	20	
State of Pennsylvania	441	23	
Middle States	247	<u>16</u>	64
New England	142	9	
Midwest	156	10	
South	134	8	
West	42	<u>3</u>	30
Foreign	96	6	6
Totals	<u>1565</u>	<u>100%</u>	<u>100%</u>

By Type of Institution

University of Pennsylvania	307	20
Major universities (22)	191	12
Smaller universities and colleges (273)	971	62
Foreign universities	96	6
Totals	<u>1565</u>	<u>100%</u>

Only 12% come from the major universities of the country. On the whole it may be said that the typical graduate student at Pennsylvania—if there is such a thing—is a graduate of a college in Pennsylvania or the Middle States of the Atlantic seaboard.

Recruitment

It seems to be generally believed by the faculty at Pennsylvania that while there are a number of first-rate graduate

students, the average quality of the graduate student body is low. There are no objective measures to test the validity of this belief, but it will be worthwhile to examine some of the conditions which might justify it.

It is universally accepted that under the present circumstances graduate study must be subsidized. The prospective graduate student therefore naturally turns to those institutions which offer him the greatest financial assistance in terms of fellowships, assistantships and other aids. It is true that he is also motivated by the prestige of the staff, but the most distinguished faculty in the country cannot, with a fellowship of \$1,000, hope to compete with another institution which offers a fellowship of \$3,000. In this respect Pennsylvania has been and is at a disadvantage. Except in a few departments it does not offer fellowships in number or in size of stipend which compete with those of other institutions. This is also true of the stipends paid to part-time teaching and research assistants. Even with the recent increase to \$1,500 for half-time work, Pennsylvania is still out of line with institutions which pay \$2,000 a year for similar work.

This does not mean that the University is making no effort to subsidize graduate study. During the present year, the number of students who received some aid is as follows:

Fellowships and scholarships	196	
Teaching assistantships	362	
Research assistantships		
University supported	66	
Project supported	250	874

While there may be some duplication in these figures, the total is large, and in many cases the University provides free

tuition in addition to the stipend. Apparently most of the *bona fide* graduate students are receiving some financial assistance from the University. The difficulty lies in the fact that the individual stipends are too small to compete with other schools. As long as this is true, there is little prospect of attracting the superior students.

There is another respect in which the University is at a disadvantage. That is the problem of graduate student housing. The Office of the Graduate School has no information on the subject; but a sample of a small group showed the following distribution:

RESIDENT STATUS OF GRADUATE STUDENTS

West Philadelphia

University dormitory	1%	
At home	13	
Temporary residence	<u>25</u>	39%

Philadelphia area ("commuters")

At home	49	
Temporary residence	<u>12</u>	61%

The group who are living "at home" offer no particular problem. It is the group of 37% who are living in temporary quarters, either in West Philadelphia or in the wider Philadelphia area, who presumably have come from a distance and would welcome an opportunity to live in decent quarters near the University.

Living conditions in West Philadelphia are singularly unattractive and even depressing. And in the past the University has made no effort to provide adequate quarters for either unmarried or married graduate students. There is no Graduate Center or Graduate Club; there are no dormitories

or apartments for graduate students. While there is little prospect that the University will be able to finance in the immediate future a Center like that at Harvard or the one now being planned at Columbia, it is gratifying that a provision for graduate dormitories is included in the program for the physical expansion of the University. It could also take over older residences in the neighborhood and convert them into graduate houses where men of common interests might live and work together in that community of experience which is so important for the intellectual growth of students.

Many of the departments issue an annual leaflet or bulletin advertising their offerings for distribution among other institutions and this practice should be continued. Another form of recruitment which has not been fully exploited is the establishment of more intimate personal relationships between members of the staff and the undergraduate colleges of the area, in the effort to identify and attract to the University more of their superior students. This is a task in which not only chairmen of departments but men of all ranks should participate.

Admission

Sample studies of the admission practices in a number of departments in the Graduate School reveal that the present requirements are extremely lax (Table 10). Many departments admit, either regularly or provisionally, from 90% to 95% of all applicants; almost all, with the exception of Psychology, admit 70% or more. About half of those who are admitted matriculate. Since there is no reason to believe that the applicants as a whole represent a higher level of ability than candidates for admission to other graduate schools, which often reject 50% or more of the applicants, one can

TABLE 10
ADMISSIONS PRACTICES

<i>Field</i>	<i>Percent Accepted (regularly or provisionally)</i>
American Civilization	83
Anthropology	83
Astronomy	100
Chemistry	82
Classical Studies	100
Economics	75*
English	99
Fine Arts	100
German	100
History	90
Linguistics	100
Mathematics	92
Music	100
Oriental Studies	100
Philosophy	85
Physics	95
Political Science	91
Psychology	31
Romance Languages	93
Sociology	70-80*
South Asia	100

* Estimated.

only conclude that the Graduate School is admitting a large number of mediocre students. To this statement many members of the staff would give assent.

There are a number of explanations of the present practice. One is the feeling that all persons who wish to continue their studies should be given an opportunity to demonstrate

their capacity and that the incompetent can be weeded out after admission. This is the practice in the admission of undergraduates at many state universities. But it is doubtful whether members of the graduate faculty would be willing to see it adopted by the College of the University. Another, more cynical suggestion is that the departments are willing to accept all comers in order to insure a quota for their graduate classes. Somewhat similar is the widespread feeling that the number of students enrolled is an index of the strength and prestige of a department.

Whatever be the explanation, it is certain that the Graduate School should re-examine the situation. As the number of applicants increases in the years ahead, every effort should be made to raise the quality of the graduate student body, rather than to increase the numbers. The minimum standard should be the attainment of an over-all honors grade (B or better) in the undergraduate college. Within each special field, the departments should accept only those candidates whose record revealed a broad liberal education, and superior capacity in the special field or a closely related field. Perhaps the Graduate Council should create a class of "Special Students" for those who wish to take only a single course each semester. But even for such students the requirements for admission should be the same as those for regular students, since the presence of incompetent or inferior students in a graduate class lowers the standards for all.

It is typical of American institutions to "point with pride" to an increase in enrollment. The University of Pennsylvania should resolutely set its face against any such measure of its intellectual contribution. Above all, the Graduate School should lead the way in insisting on the quality, rather than the quantity of its product. To that end, its standards of admission must be the highest. It has been the experience of

other institutions that the higher the standards, the more superior students will seek the privilege of admission.

Degree Requirements

One of the disadvantages from which the Graduate School suffers in its appeal to superior students is the mechanically rigid character of its requirements for advanced degrees. In most American graduate schools it is possible for the average student to meet the minimum requirements for the master's degree in a year of academic work, those for the doctor's degree in three years of work. In many departments at Pennsylvania this is not only difficult, but impossible. Why should a prospective graduate student, faced with a choice, prefer Pennsylvania with its heavy course requirements, to another of a dozen schools of equal prestige where he can attain his degree in a shorter time?

In the early days of graduate study, most courses met three days a week and almost everywhere it was felt that four courses were all that a student could profitably carry at one time. This meant a total of twelve hours of class work each week and the graduate schools, under the influence of the undergraduate system of accounting, translated these hours into "credits" or "points." Hence a year of work was no longer measured in courses, but as 24 "credits." In some departments at Pennsylvania, for example Mathematics and Philosophy, all graduate courses carry three "semester credits," without regard to the number of hours of class work. In History, seminars carry four "semester credits." And in the Natural Sciences most of the departments provide a course in directed research which carries an indefinite number of credits. In all these departments the "semester-credit" system sets few obstacles in the way of students.

In the Humanities and in the Social Sciences, however, a

different situation obtains. Because of the large number of commuters, almost all courses meet in a single, two-hour session each week. Now it might have been possible to rule that four such courses should constitute a full program of work. But somehow there has been adopted the theory that a student's intellectual growth could be measured only by the number of hours in which he listened to professors in a class-room. Hence, in order to maintain the old standard of twelve hours a week, it became necessary for him to take six courses instead of four. Such a scattering of effort was obviously unwise and so the departments discouraged, in some cases forbade, a student's taking a full program of work. The result was the automatic lengthening of the period of study.

There was another unfortunate outcome of the semester-credit requirements. Since they could be met only by taking lecture courses and seminars, the student inevitably came to think of his graduate work as the arithmetical accumulation of credits. It is not surprising that the graduate faculty should have thus centered their interest in the courses taken; it helped to assure each one of them a share in the program. But it is surprising that they showed so little concern for the intellectual development of their students. The announced goal of graduate study is the training of men for independent, original work. Yet the requirements made little or no provision for independent study; all of the student's time was taken up in formal courses. Only when he embarked upon his dissertation was he free to develop his capacity for independent work.

It is my conviction that Pennsylvania and the other graduate schools must courageously re-examine the goals and purposes of their program and must realistically face the problem of their social function. It is not enough for them to dedicate themselves exclusively to research. Research is not

an end in itself; it is an instrument in the service of man and society. This is the question that the graduate schools must ask: for what are we training our students?

The need for such a reappraisal is the more imperative because we are faced with an unprecedented demand for highly trained personnel in every field—in government, in industry, in the professions, in the schools. And on every hand we hear that the products of our graduate schools have not been trained for the tasks that they are to perform. I believe that the graduate schools must abandon their ivory tower and endeavor to find out what are the needs of the society they serve—not in terms of the mastery of techniques but in the capacity to grasp the basic problems and principles of a field and to implement them within the framework of a human situation.

In the first part of this Report I have outlined a proposal for the organization of graduate programs leading to the degree of Ph.D. It is possible that the graduate faculty at Pennsylvania may wish to study this proposal as it examines the ways in which the University may make a maximum contribution to the intellectual life of our time.

It would involve many changes both in attitude and practice. It would mean a new emphasis on the necessity of breadth along with specialized training; it would transfer the center of interest from the professor and his courses to the student and his intellectual growth; it would release the superior student from the restraints of formal requirements and encourage him to proceed with all possible speed to the completion of his studies. It would encourage a more intimate relation between teacher and student. It would necessitate a frank re-appraisal of the functions which the graduates were to perform in the world outside and the planning of programs which would equip them to serve more effectively in the career of their choice.

Certainly such a proposal would meet with vigorous opposition. In a faculty unaccustomed to change, many men sincerely believe that any modification of the rules and regulations is a pretext for lowering standards. The only answer to that position is that standards which depend on formal requirements are indeed precarious; the only assurance of the maintenance of standards is the integrity and courage of individual members of the staff. It would also be opposed because it would result in the reduction of the number of lecture courses offered at the graduate level and hence prevent some men from offering lecture courses on their particular field of specialization. To that, it should be replied that, if the number of courses were reduced, the formal teaching-load could also be cut down so that members of the staff would be freed for individual work with undergraduate honors candidates and with graduate students.

There still remains the question of the language requirement. A study of the doctoral dissertations accepted in 1954-1955 shows the extent to which foreign language titles were used in the preparation of the dissertation.

Foreign languages	100%
Linguistics	80
Natural Sciences	77
Political Science	58
History	50
English	43
Education	33
Behavioral Sciences	21
Economics	17

The wide variation between the departments seems to reveal that there is a real difference in the need for foreign languages in the various areas. I would recognize this difference, and I have already indicated my belief that it and

other tool requirements should be made a responsibility of the individual departments.

If this seems too drastic a change, I would suggest that, since almost all undergraduate colleges now require a reading knowledge of one foreign language, such a proficiency be made a requirement for admission to the Graduate School, to be validated by examination during the first term of residence, and that no student be permitted to enroll for a second year until he has met this requirement. If individual departments felt that other languages or other tools were necessary for the successful prosecution of graduate study, they too should require that these tools be acquired by the beginning of the second year of work.

Placement

In most departments the responsibility for placing their graduates rests with the staff, particularly with the chairman. A few depend upon the Placement Office and many rely upon that office to forward credentials to prospective employers. The Placement Office also makes an effort to secure appointments, but last year, although there were more vacancies than candidates, only 18% of the students who registered were placed. It must be remembered that a large number of recipients of the Ph.D. already hold full-time posts and merely continue in their present position; for them it is not a question of placement but of promotion. Furthermore, a number of former students, in answering an alumni questionnaire, reported that they had found their first position through their own efforts or through some personal friend.

In a few fields—chemistry, physics and psychology—a majority find employment in laboratories or clinics. But in all the rest most of the doctoral candidates enter the teaching

profession, largely in undergraduate colleges. All of the consultants in the various quadrants commented on the small number of Pennsylvania Ph.D.'s who found posts in the top universities of the country, the institutions from which Pennsylvania recruits its own staff. As Dr. Bennett put it in his Report: "Pennsylvania's exports fail to balance her imports." Except at Columbia, there is no easily available information concerning the source of the faculty at the ten major institutions of the country. But a study of the graduate staff of seven universities shows the distribution of the institutions at which they were trained (Table 11).

TABLE 11

GRADUATE TRAINING OF GRADUATE STAFF AT SEVEN UNIVERSITIES
(Columbia, Indiana, Iowa, New York University,
North Carolina, Texas and Washington (Seattle))

<i>Ph.D. from</i>	<i>Number</i>	<i>Rank</i>	
		(1925)	(1957)
1. Chicago	178	1	6
2. Harvard	152	2	1
3. Columbia	108	3	3
4. Yale	92	5	4
5. California	87	9	2
6. Wisconsin	80	4	8
7. Princeton	62	6	7
8. Cornell	59	10	9
9. Michigan	57	8	5
{ 10. Illinois	51	11	10
{ 10. Johns Hopkins	51	7	16
12. Minnesota	41	13	12
{ 13. Pennsylvania	34	12	11
{ 13. Stanford	34	14	13

It should be remembered that, outside of Columbia, all these institutions hold a relatively low rating among American graduate schools; the highest is Indiana which is ranked fifteenth. The universities from which they have recruited their staff over the last generation are almost identical with those to which Pennsylvania has had recourse. And it is astonishing to find how closely their relative contribution in the production of teachers parallels their over-all rank in 1925 and 1957. Pennsylvania's share is not significantly out of line with its over-all rating. But the gap which separates it from the top group is striking.

THE TRAINING OF TEACHERS

In recent years the graduate faculty at Pennsylvania has shown almost no interest in the training of secondary-school and college teachers. At one time a number of the departments offered programs leading to the master's degree for subject-matter teachers in the secondary schools but most of these programs have lapsed except in the School of Education. It is said that the demand for such programs has disappeared because high-school teachers can gain the master's degree required for promotion more easily at other institutions. If one may judge from the *Announcement* of the Graduate School, no department considers the preparation of college teachers as one of its functions.

This indifference to the training of teachers is the more surprising, because at least 60% of all Ph.D.'s, here and elsewhere, actually enter the teaching profession (Table 12). In some fields from 80% to 90% of the graduates become teachers. The only fields in which less than half the Ph.D.'s enter teaching are chemistry, physics, psychology, and engineering. In reality, the graduate school is the only source to which schools and colleges can look for trained teachers

TABLE 12
PH.D.'S WHO ENTERED TEACHING

<i>Field</i>	U.S.A.* (1954-1956)		U. of P. (Samples)
	<i>Total Number</i>	<i>Percentage in Teaching</i>	<i>Percentage in Teaching</i>
Biological sciences	608	70.9	—
Education (Ph.D.)	503	88.1	—
Engineering	427	37.0	—
English	362	93.9	86
Fine Arts			
Music	72	88.9	100
All other	22	81.8	—
Foreign languages	164	92.7	81
Geography	64	76.6	—
Health and medical sciences	341	61.3	—
Mathematics	229	74.2	81
Physical sciences			
Chemistry	1,082	28.9	7
Physics	420	43.3	19
All other	225	38.7	—
Philosophy	77	85.7	100
Psychology	771	40.5	—
Social sciences			
Economics	164	77.4	—
History	254	87.4	91
Political Science	169	81.7	—
Sociology	189	79.4	—
All other	76	71.1	—

* *Teacher Supply and Demand in Colleges and Universities*. [1957]

of the several disciplines; it is these schools and colleges which are preparing the students who will enroll in the graduate school. Yet the graduate school has remained

strangely aloof from the rest of education, of which it is properly the crown.

This attitude is explained in part by the fear of the graduate faculty that they will be tarred with the brush of "pedagogy" if they become concerned with the problems of teaching. Years ago this led them to abandon the field of secondary-school teaching to the schools of education and the teachers colleges, although they have never ceased to lament at the low quality of teachers and teaching at this level. At the college level they have continued to maintain a monopoly. But they have not felt it incumbent on them to question whether their programs were wisely designed to meet the needs of college teaching; they have felt that training in research was all that was necessary. At Pennsylvania, if one may judge by the stagnation of the undergraduate program, they have not even been greatly concerned with the quality of their own College work.

As I have already remarked, we are faced now with a critical situation in the demand for more and better college teachers. If the graduate schools of America do not take steps to meet this need, particularly in the sciences where the best men are turning to other fields of work, we may be sure that the teachers colleges will step into the breach and undertake to satisfy the demand, as they did in secondary education. There is no doubt that they perform an important educational function, but they are not now staffed nor can they hope to be staffed with the men who are qualified to provide advanced training in the various subject-matter disciplines. For this reason, the graduate schools must accept their responsibility, if the standards of undergraduate teaching are to be maintained.

This does not mean the introduction of courses in method as a part of graduate training. It does mean a new attitude of respect for the dignity of the teaching career, a new con-

cern for breadth and understanding as essential elements in the graduate program, a new regard for the student as a human individual. Certainly every department should have on its staff at least one man who has a major interest in undergraduate education, who is familiar with the problems and needs of the undergraduate teacher. The Board of Consultants in the Physical Sciences has suggested that the University might borrow such persons temporarily from undergraduate colleges. It is my belief that they should be regular members of the staff, eligible for recognition in terms of salary and promotion as are other professors.

One of the chief functions of such a professor would be the supervision of the apprentice teachers in his department. For I believe that every graduate student who intends to become a teacher should have an opportunity to serve as a part-time teacher during the course of his formal training in the field. This opportunity will not be effective unless he is guided and supervised in his class-room work, unless he can share in organization of the work, in the choice of textbooks, in the preparation of examinations, in the academic counseling of students. Wherever possible he should be given an opportunity to participate in the teaching of more advanced undergraduate courses, as well as in elementary courses. At some institutions, graduate students who serve as assistants to a professor in a lecture course are required to offer lectures from time to time, not only when the professor is absent, but when he is present and can give the student the benefit of his comment and criticism of his performance.

UNIVERSITY SUPPORT OF RESEARCH

In 1954-1955, out of total "academic" expenditures of \$17,082,000, \$6,533,000 was spent for research (Government

research, \$3,958,000; "organized research," \$2,575,000). This was 38.3% of the total "academic" budget.

It must be remembered, however, that in addition to these formally recognized items, a considerable part of the remainder of the expenditures is devoted to the support of research. Members of the staff are, in general, supposed to carry on both instruction and research. It is for this reason that their formal teaching-load is light (six to ten hours a week); in theory, they devote approximately one-half of their time to research. The operation and development of the University libraries are also in large part a contribution to research. The laboratories of the University have a major part in the research program. It is not an exaggeration to say that about half of the other "academic" expenditures of the University redound to the benefit of the research program.

This would add \$5,275,000 to the amount formally assigned to research, making a total of \$11,808,000 or 69.2% of the total "academic" expenditures. No one could question the importance which the University attaches to research in the allocation of its resources. In fact, it is so great that it raises the question as to whether instruction, both graduate and undergraduate, is not being short-changed.

The amount expended for research has continued to increase. In 1957-1958 the total of "project" research alone was \$6,718,000, of which \$5,076,000 came from Government grants. The total was distributed as follows:

Medical departments	\$3,809,000
Engineering	952,000
Physical sciences	747,000
Biological sciences	199,000
Graduate School	261,000

Wharton School	252,000
Fine Arts	149,000
Education	111,000
Law	102,000
All other	136,000
	<hr/> \$6,718,000

This means that 85% of the sponsored research is going to the medical sciences, the natural sciences and engineering. A small amount is devoted to the social sciences; only a trickle reaches the humanities. There is an obvious danger in this situation: that only those areas in which outside agencies are interested will receive adequate support; that the natural and applied sciences will prosper, to the neglect of the study of man and society. The universities of the country have a special obligation to foster research in those fields which do not find outside backing; they must be increasingly active in their efforts to secure funds for this purpose. And they must remember that in many fields the chief aids to individual research are the library, freedom from routine tasks, and funds that will insure the publication of research, once it is completed. Certainly the present allocation of current University funds for the support of unsponsored research is inadequate.

ADMINISTRATION OF RESEARCH

Since the support of research and training for research absorbs so large a part of the resources of the University, it is desirable to look at the methods by which these activities are administered.

In general, proposals for the support of a particular research project are initiated by individual members of the staff. If approved by the chairman of the department, they are transmitted to the dean of the particular school or col-

lege. In most of the professional schools the dean, with the assistance of a "Research Advisory Committee," reviews the proposals, with an eye to their impact on the general operation of the school and of the University. Although some members of the staff have objected to such a review, as an invasion of their personal freedom or a reflection on their professional competence, such a position is hardly tenable. A professor who seeks support from an outside agency is not acting as an individual. He is a member of the University faculty; he will use the resources of the University; and it is the University which must assume responsibility for the contractual arrangements. As a matter of prudence, the University must be sure that every project meets the standards it has set and will promote its purposes.

In the College, members of the staff follow the same procedure—securing the approval of the departmental chairman, who in turn transmits the proposal to the Dean of the College. The Dean does not have a standing "Research Advisory Committee" nor does he appoint *ad hoc* committees for the review of proposals, but, relying on the approval of the department chairman, transmits them to the Office of Project Research. It would seem more appropriate if proposals for the support of research in the College were directed to the Dean of the Graduate School, as the officer most concerned with research and training for research, and if, as in the professional schools, he were assisted in his review by a Research Advisory Committee. It is possible that the Council of the Graduate School, or a sub-committee of the Council, should accept this responsibility.

When a proposal has received the approval of the appropriate dean and his advisory committee, it is sent to the Office of Project Research and Grants for advice and for the formulation of the proper financial terms of the application

for support. The formal request for support is submitted by the Office, with the approval of the Provost or one of the Vice-Presidents.

In addition to these types of initiation of research, there are other methods. The Institute for Cooperative Research also initiates proposals for research in three main areas: interdisciplinary projects proposed by outside agencies; interdisciplinary projects proposed by groups within the University; "contract" projects proposed by outside agencies which desire research on a particular problem and which may involve the temporary employment of a special technical staff. The Director of the Institute, with an Advisory Research Council, reviews all projects before they are transmitted to the Office of Project Research.

Out of current funds the University each year allocates a small amount (\$10,000 to \$13,000) for the promotion of faculty research. This sum is administered by a faculty committee, which elects its own chairman and receives requests for grants from individual members of the staff. Inevitably, these grants are small; in recent years the largest have been for a few Faculty Summer Research Fellowships. A former practice of defraying the cost of printing the annual "Bibliography of Publications of Members of the Faculty" out of this fund has happily been discontinued. A large increase in this form of support is urgently needed. It would seem natural for the Dean of the Graduate School to function as *ex-officio* chairman of the committee in charge of this fund.

Finally there is a considerable amount of research conducted by various units of the University with the support of income from special endowments. Each of these units is naturally responsible for the allocation of funds for research to the members of its staff.

On the whole, the present administration of research, in

spite of its wide distribution of responsibility, seems to be working effectively. There are, however, some problems of the criteria for judging the desirability of accepting projects which deserve to be considered.

The Board of Consultants which studied the Engineering Schools of the University set forth six basic criteria for judgment:

1. A university should undertake only fundamental research, that is, research that would be done if only private resources were available.
2. Research projects and ideas must have their initiation within the academic staff.
3. The size of the research operation as a whole must be in keeping with the academic operations.
4. The results of research should be available for publication.
5. The research operations should have long-range stability, both financially and in terms of the continuing interests of the faculties.
6. Research work should be done mainly by full-time faculty and full-time graduate students working in collaboration and should result in graduate theses and graduate degrees.

In addition to these there are a number of corollaries which might be considered.

7. No project which requires "clearance" for participants or which forbids the publication of the results should be accepted by the University. This would mean that it should decline "classified" projects. The University exists for the promotion of free inquiry and the advancement of learning. The Government should look to it for aid and should support its efforts to widen basic scientific knowledge; it should set up its own laboratories and testing-grounds for the application of that knowledge to the needs of national defense.

8. No "contract" research which does not depend primarily on the present staff and which does not involve the training of graduate students should be accepted. The University should not compete with commercial research agencies.
9. No member of the staff should receive extra remuneration from project research, except for summer employment.
10. No full-time member of the staff should have his teaching load reduced because of participation in project research.
11. Appointments involving tenure should not be made when the salary is wholly dependent on sponsored research funds.
12. Members of the staff should not be diverted from their main research interest to engage in sponsored projects.
13. Graduate students should not be permitted to devote more than half-time to work on sponsored projects. Their stipends should be comparable to those of teaching assistants and University supported research assistants (\$1,800-\$2,000 a year and free tuition for half-time).

The chief weaknesses in the present structure are: (1) the lack of clearly defined standards and criteria for the appraisal of research projects, applicable to all sectors of the University, and (2) the lack of any agency with the responsibility of studying the over-all resources and needs of the University in the field of research and of securing funds for the support of work in the fields which do not at present find adequate sponsorship. To meet the situation I would suggest the possibility of creating a "University Research Council," made up of faculty members representing the different quadrants and under the chairmanship of a "Coordinator of Research." It would be the function of such a Council to formulate general criteria for judging research projects, to study the total needs of the University in the field of research, and to seek support for individual or group research not now adequately provided.

UNIVERSITY SUPPORT OF SCHOLARLY PUBLICATIONS

As at most American universities, the funds available at Pennsylvania for the publication of research are incommensurable with the amount dedicated to the production of research. And this is true as well of the grants made by foundations and other outside agencies. There was a time when Frederick Keppel of the Carnegie Corporation used to require that a tenth of the amount granted for a particular study should be reserved for the publication of the results of the study. But that has not been the usual practice. In the case of classified projects of the armed forces publication is not permitted. And there may be instances in which the sponsors of an industrial project would prefer not to have its results publicly known. But, in general, sponsors of many projects have taken the position that if they were willing to finance the investigation, the University must find the funds to publish the outcome.

This is an obligation which most universities cannot undertake. There are so many demands on their limited resources—increases of faculty salaries, new libraries and laboratories, new squash courts—that there is not enough to go around. Some of the research finds its way into professional journals; the University Press can undertake a few books that seem likely to return a part of the cost of publication. But in many a professor's study lies a manuscript representing years of work for which no publisher can be found. In some cases professors have been known to draw on their meager personal savings to defray the expense of publishing their *magnum opus*. On the whole it is a disheartening picture.

In this, the University of Pennsylvania has not differed from other institutions. After years of uncertain operation,

it entered into a contract with a commercial publisher to assume the direction of the University Press, with a guarantee of support to the extent of \$30,000 a year. The first two years of operation seem to have demonstrated the wisdom of this solution. Twenty to twenty-five books a year have been published; sales have increased; there has been no deficit. The Director of the Press states that no worthy manuscript has been turned down for lack of funds. The outlook for the future is modestly promising.

At most universities, the Press is not the only outlet for the publication of scholarly work. Many of them sponsor and subsidize scholarly journals, monograph series, "occasional papers," and the like, which at once provide for the publication of work done by members of the staff and add to the prestige of the institution in the learned world. In this respect Pennsylvania's contribution has been relatively slight. Since there is no central office charged with publication it has proved difficult to compile exact information, but the following outline shows some of the ways in which the University is involved, directly or indirectly, in publication.

As a direct charge on the budget, the University subsidizes the *Hispanic Review*, published by the Department of Romance Languages (\$1,200), and *Chymia*, published through the University Press (\$500). It also contributes to the cost of publishing the *Proceedings of Schoolmen's Week* (\$830). Indirectly, it supports the publication of the *American Quarterly*, by providing an office for the editor, and of *Biological Abstracts*, by providing a house for its headquarters.

In addition the University Press publishes a few series which are subsidized from research funds, such as *Orbis*, supported by the Foreign Policy Research Institute, the Industrial Research Studies (Wharton School), the Albert

M. Greenfield Studies in Human Relations, the Rosenbach Foundation Lectures. Besides, individual departments or agencies publish scholarly series, such as the *Bulletins* and *Monographs* of the University Museum, or the *Law Review* of the Law Faculty. These are supported either from endowment income or from specially solicited contributions.

From this brief summary it is clear that the University's contribution of support to publication from its operating budget is a drop in the bucket. It is idle to suggest that it increase the amount now allocated; that raises the whole question of priorities in the needs of the University. The only obvious solution would be a special endowment for the Press. Perhaps the fund-raisers could find some eccentric benefactor who would give a million dollars or two for this worthy cause. Or perhaps, following the example of those institutions which have created societies of "Friends of the Library," it might organize a new society of "Friends of the University Press."

GENERAL RECOMMENDATIONS

The separate studies of the quadrants of the Graduate School discussed in detail the needs of the individual departments in such matters as staff, libraries and laboratories, office space and secretarial assistance. Their suggestions and recommendations need not be repeated here. But it will be well to summarize some of the general recommendations in which almost all the consultants concurred.

(1) Salary scales, particularly at the two upper ranks, must be raised by 20% to 25% to permit the University to compete with other institutions in the search for outstanding scholars and teachers and in the retention of the best men on the present staff.

(2) The normal teaching load of men of professorial rank

should be three courses a semester. Men who are heavily involved in the direction of individual work by honors candidates or graduate students should often teach only two formal courses or seminars. This is the practice at Harvard, Columbia, Princeton, Johns Hopkins and other institutions.

(3) The Administration should adopt a definite policy in the matter of leaves of absence for research. The majority of the consultants favored a flexible system, designed to provide maximum encouragement to the men of greatest promise, rather than a "sabbatical" system, which limits the possibility of a leave to once in seven years and which tends to become a "right" for all members of the staff, without regard to merit. It is particularly desirable that men who receive a fellowship from an outside agency should be granted leave at half-pay, in order that they may be free to devote an entire year to their studies. This applies especially to younger men at the rank of assistant professor. Some institutions, like Harvard and Princeton, are now providing for a half-year of leave, at full pay, for assistant professors during the period of their five-year appointment.

(4) As a further incentive to younger members of the staff, the number of Faculty Summer Research Fellowships should be increased. Such fellowships, with a stipend comparable to a salary in the Summer School, should be granted only to men who hold the rank of post-doctoral instructor or assistant professor.

(5) Individual departments should be encouraged to bring to the campus visiting professors of distinction who will provide the stimulus of new ideas to both faculty and students.

(6) The allocation of University funds for the promotion of research should be greatly increased from the present \$12,000 a year, to insure that areas of study which do not

receive outside support will not be neglected. The Board of Consultants in the Physical Sciences suggested that each of the departments should have from \$20,000 to \$25,000 a year for such investigations. While such a proposal could hardly be applied to all departments in the University, the sum of \$100,000 a year would be a very modest beginning.

(7) As rapidly as possible and in all planning for the future, provision should be made for a "common room" in each department where faculty men and graduate students may meet for informal exchange of ideas. The lack of facilities for personal contact between teachers and students is one of the serious problems of American education, particularly in urban universities. The construction of the Faculty Club will not solve this problem and for this reason the provision of "common rooms" is a matter of prime importance.

(8) The Administration should make every effort to increase the stipends of fellowships and of teaching and research assistantships to a level competitive with other institutions.

(9) The departments should endeavor to improve the intellectual quality of the graduate students by a more rigorous selection among candidates for admission.

(10) The University should give high priority to the provision of housing for graduate students, both by the rehabilitation of private houses in the neighborhood and by the construction of new housing units, in cooperation with the Redevelopment Authority.

The earlier reports on the quadrants and the present Report contain a number of suggestions which deserve careful consideration by the administration and the graduate faculty. Some of the problems raised are listed here.

(11) The goals of graduate training and their relevance to the needs of society and the ultimate careers of students.

(12) The appropriate requirements for advanced degrees to achieve these goals.

(13) Possible methods of shortening the "long road to the Ph.D."

(14) The role of the University libraries in the graduate program.

(15) The administration and coordination of research in the University.

(16) The most effective devices for aiding and stimulating individual research among members of the faculty.

(17) Methods of subsidizing the publication of faculty research.

(18) The relations of undergraduate and graduate instruction.

(19) The relations between the Graduate School and the professional schools.

(20) The development of a true "University Community."

Appendix

Standing of American Graduate Departments in the Arts and Sciences

The present study was undertaken as part of a survey of the Graduate School of the University of Pennsylvania in an effort to discover the present reputation of the various departments which offer programs leading to the doctorate.

A letter was addressed to the chairmen of departments in each of twenty-five leading universities of the country. The list was compiled on the basis of (1) membership in the Association of American Universities, (2) number of Ph.D.'s awarded in recent years, (3) geographical distribution. The list did not include technical schools, like the Massachusetts Institute of Technology and the California Institute of Technology, nor state colleges, like Iowa State, Michigan State or Penn State, since the purpose was to compare institutions which offered the doctorate in a wide variety of fields.

Each chairman was asked to rate, on an accompanying sheet, the strongest departments in his field, arranged roughly as the first five, the second five and, if possible, the third five, on the basis of the quality of their Ph.D. work and the quality of the faculty as scholars. About 80% of the chairmen returned a rating. Since many of them reported the composite judgment of their staff, the total number of ratings is well over 500.

On each rating sheet, the individual institutions were given a score. If they were rated in order of rank, they were assigned numbers from 15 (Rank 1) to 1 (Rank 15). If they were rated

in groups of five, each group alphabetically arranged, those in the top five were given a score of 13, in the second five a score of 8, and in the third five a score of 3. When all the ratings sheets were returned, the scores of each institution were tabulated and compiled and the institutions arranged in order, in accordance with the total score for each department.

To determine areas of strength or weakness, the departmental scores were combined to determine divisional scores. Somewhat arbitrarily the departments were assigned to divisions as follows:

Biological Sciences

Botany, Zoology (2)

Humanities

Classical Studies, English, Fine Arts, German, History, Linguistics, Music, Oriental Studies, Philosophy, Romance Languages, Slavic Studies (11)

Physical Sciences

Astronomy, Chemistry, Geography, Geology, Mathematics, Physics (6)

Social Sciences

Anthropology, Economics, Political Science, Psychology, Sociology (5)

The pre-clinical medical sciences were not included since not all institutions have medical schools.

Finally, the scores of each institution given in the divisional rankings were combined to provide an over-all rating of the graduate standing of the major universities.

From a similar poll of opinion, made by R. M. Hughes, *A Study of the Graduate Schools of America*, and published in 1925, it was possible to compile the scores for each of eighteen departments as they were ranked at that time and also to secure divisional and over-all rankings. These are presented here for the purpose of showing what changes have taken place in the course of a generation.

The limitations of such a study are obvious; the ranks reported do not reveal the actual merit of the individual departments. They depend on highly subjective impressions; they reflect old and new loyalties; they are subject to lag, and the halo of past prestige. But they do report the judgment of the men whose opinion is most likely to have weight. For chairmen, by virtue of their office, are the men who must know what is going on at other institutions. They are called upon to recommend schools where students in their field may profitably study; they must seek new appointments from the staff and graduates of other schools; their own graduates turn to them for advice in choosing between alternative possibilities for appointment. The sum of their opinions is, therefore, a fairly close approximation to what informed people think about the standing of the departments in each of the fields.

Although the institutions have been ranked in accordance with the actual scores, the figures cannot be interpreted as having real validity. Differences of a few points are plainly meaningless. But there is sound reason to believe that those that are rated in the top five are really the outstanding departments. Neither the order nor the composition of the second five is as well established. And the third five is so uncertain that they might well have been omitted. They are included because they reveal the emergence of departments at institutions which do not have high over-all strength.

Any individual, studying these rankings, will find them unsatisfactory, at least as far as his own institution is concerned, perhaps also in other respects. But he must remember that he, too, is depending on opinion, his own opinion, and that however well he may be informed as to the merit of his own department, he may be ignorant of the merit of others.

If one compares the over-all standing of the graduate departments in 1925 with their standing in 1957, certain things stand out very clearly. The older private institutions—Harvard, Columbia, Yale and Princeton—have held their ground. Chicago, however, has declined in prestige and Johns Hopkins has fallen greatly.

On the other hand, four of the state universities—California, Michigan, Indiana and the University of California at Los Angeles—have made considerable gains, while Wisconsin and Iowa have lost in prestige. The other institutions have retained approximately their earlier standing.

It is true that departments inevitably suffer ups and downs. But not all of it is due to the whim of chance. A strong or a weak chairman may be the explanation of some of the shifts. But when an institution as a whole is gaining in strength it can be explained only by the vigilance and vision of the central administrative officers, whether they are presidents or deans. The present study may be of some use to them in identifying the subjects and the divisions which need consideration.

OVER-ALL STANDING
(Total Scores)

1925		1957	
1. Chicago	1543	1. Harvard	5403
2. Harvard	1535	2. California	4750
3. Columbia	1316	3. Columbia	4183
4. Wisconsin	886	4. Yale	4094
5. Yale	885	5. Michigan	3603
6. Princeton	805	6. Chicago	3495
7. Johns Hopkins	746	7. Princeton	2770
8. Michigan	720	8. Wisconsin	2453
9. California	712	9. Cornell	2239
10. Cornell	694	10. Illinois	1934
11. Illinois	561	11. Pennsylvania	1784
12. Pennsylvania	459	12. Minnesota	1442
13. Minnesota	430	13. Stanford	1439
14. Stanford	365	14. U. C. L. A.	1366
15. Ohio State	294	15. Indiana	1329
16. Iowa	215	16. Johns Hopkins	1249
17. Northwestern	143	17. Northwestern	934
18. North Carolina	57	18. Ohio State	874
19. Indiana	45	19. N. Y. U.	801
		20. Washington	759

BIOLOGICAL SCIENCES

1925		1957	
1. Chicago	148	1. Harvard	461
2. Columbia	133	2. California	430
3. Harvard	122	3. Wisconsin	300
4. Wisconsin	97	4. Michigan	266
5. Johns Hopkins	94	5. Indiana	257
6. Cornell	91	6. Cornell	250
7. Michigan	90	7. Yale	245
8. Yale	79	8. Columbia	218
9. Illinois	78	9. U. C. L. A.	206
10. California	69	10. Pennsylvania	180
11. Minnesota	51	11. Illinois	171
{ 12. Princeton	50	12. Johns Hopkins	162
{ 12. Stanford	50	13. Stanford	145
14. Ohio State	48	14. Chicago	141
15. Missouri	33	{ 15. Duke	115
16. Bryn Mawr	23	{ 15. Princeton	115
17. Indiana	16	17. Minnesota	112
18. Pennsylvania	15	18. Ohio State	93
		19. Texas	51
		20. N. Y. U.	50

HUMANITIES

1925

1. Harvard	705
2. Chicago	560
3. Columbia	537
4. Yale	396
5. Princeton	378
6. Johns Hopkins	319
7. California	293
{ 8. Cornell	292
{ 8. Wisconsin	292
10. Pennsylvania	283
11. Michigan	253
12. Illinois	231
13. Bryn Mawr	186
14. Minnesota	114
15. Stanford	113
16. Ohio State	110
17. Northwestern	78
18. Iowa	68
19. North Carolina	35
20. Indiana	29

1957

1. Harvard	2462
2. Yale	2174
3. Columbia	2095
4. California	2034
5. Michigan	1651
6. Princeton	1378
7. Chicago	1176
8. Pennsylvania	1082
9. Cornell	1015
10. Wisconsin	946
11. Illinois	813
12. Indiana	615
13. Johns Hopkins	598
14. N. Y. U.	568
15. North Carolina	502
16. U. C. L. A.	466
17. Minnesota	389
18. Washington	342
19. Northwestern	298
20. Texas	291

PHYSICAL SCIENCES

1925		1957	
1. Chicago	489	1. California	1291
2. Harvard	396	2. Harvard	1169
3. Yale	301	3. Chicago	1117
4. California	295	4. Princeton	871
5. Princeton	273	5. Columbia	868
6. Columbia	253	6. Wisconsin	798
7. Wisconsin	242	7. Michigan	758
8. Michigan	214	8. Yale	742
9. Johns Hopkins	199	9. Illinois	635
10. Cornell	189	10. Stanford	487
11. Illinois	132	11. Cornell	486
12. Minnesota	121	12. Minnesota	361
13. Stanford	118	13. U. C. L. A.	336
14. Iowa	62	14. Ohio State	328
15. Pennsylvania	60	15. Northwestern	309
16. Ohio State	59	16. Indiana	245
17. Northwestern	44	17. Johns Hopkins	222

SOCIAL SCIENCES

1925

1957

1. Columbia	393	1. Harvard	1311
2. Chicago	346	2. Chicago	1061
3. Harvard	312	3. Columbia	1002
4. Wisconsin	255	4. California	995
5. Michigan	163	5. Yale	933
6. Minnesota	144	6. Michigan	928
7. Johns Hopkins	134	7. Minnesota	580
8. Cornell	122	8. Stanford	520
9. Illinois	120	9. Cornell	488
10. Yale	114	10. Wisconsin	409
11. Princeton	104	11. Princeton	407
12. Pennsylvania	101	12. U. C. L. A.	373
13. Iowa	85	13. Illinois	315
14. Stanford	84	14. Pennsylvania	314
15. Ohio State	77	15. Northwestern	299
16. California	55	16. Johns Hopkins	267
17. North Carolina	23	17. Washington	217
18. Northwestern	21	18. Indiana	210
		19. North Carolina	205

ANTHROPOLOGY

1957

1. Chicago	264
2. Harvard	255
3. Columbia	243
4. California	231
5. Yale	227
6. Pennsylvania	177
7. Michigan	156
8. U. C. L. A.	154
9. Cornell	126
10. Northwestern	115
11. Washington	70
12. Minnesota	60
13. Indiana	58
14. Stanford	52
15. Wisconsin	36

Some chairmen mentioned the departments at Arizona and New Mexico.

ASTRONOMY

1925		1957	
1. California	77	1. California	205
2. Chicago	62	2. Chicago	203
3. Michigan	41	3. Michigan	187
4. Princeton	35	4. Harvard	176
5. Yale	26	5. Princeton	173
6. Harvard	24	6. Indiana	117
{7. Northwestern	12	7. Ohio State	109
{7. Wisconsin	12	8. Yale	100
		9. Wisconsin	96
		10. Pennsylvania	74
		11. Columbia	42
		12. Illinois	30
		13. Northwestern	29

Chairmen noted that Cal. Tech. has one of the strongest departments and that there are programs at Case, Colorado, Vanderbilt and Virginia.

BOTANY

1925

1957

1. Chicago	77	1. Harvard	209
{ 2. Columbia	54	2. California	194
{ 2. Cornell	54	3. Wisconsin	164
{ 2. Harvard	54	4. Michigan	160
5. Wisconsin	52	5. Cornell	154
6. Michigan	45	6. Illinois	115
7. Johns Hopkins	33	7. Yale	93
8. Illinois	31	{ 8. Indiana	90
9. Minnesota	28	{ 8. Minnesota	90
10. California	27	{ 8. Pennsylvania	90
11. Ohio State	25	11. Duke	87
12. Stanford	21	12. U. C. L. A.	85
13. Yale	16	13. Ohio State	64
14. Pennsylvania	15	14. Stanford	61
15. Missouri	11	15. Columbia	34

Chairmen called attention to the programs at Cal. Tech., California (at Davis), Michigan State, Rutgers, and Vermont.

CHEMISTRY

1925

1957

1. Harvard	126	1. Harvard	249
2. M. I. T.	110	2. California	239
3. California	105	3. Illinois	202
4. Chicago	100	4. Chicago	177
5. Yale	98	5. Wisconsin	169
6. Cal. Tech.	96	6. Yale	168
7. Cornell	87	7. Cornell	147
8. Illinois	85	8. Columbia	138
9. Princeton	83	9. Minnesota	115
10. Columbia	75	10. U. C. L. A.	106
11. Johns Hopkins	74	11. Princeton	72
12. Michigan	71	{12. Northwestern	55
13. Wisconsin	61	{12. Washington	55
{14. Ohio State	48	14. Michigan	51
{14. Stanford	48	15. Stanford	35
		16. Ohio State	34

Chairmen noted strong programs at Cal. Tech. and M. I. T.

CLASSICAL STUDIES

1925

1957

1. Harvard	76	1. Harvard	313
2. Princeton	73	2. Yale	273
3. Chicago	71	3. Princeton	256
4. Johns Hopkins	51	4. California	236
5. Pennsylvania	43	5. Columbia	195
6. Columbia	42	6. Cornell	183
7. Michigan	39	7. Chicago	181
8. Yale	36	8. Michigan	176
9. California	30	9. Johns Hopkins	149
10. Illinois	28	10. Illinois	123
11. Wisconsin	27	11. North Carolina	112
12. Bryn Mawr	26	12. Bryn Mawr	108
13. Cornell	17	13. Pennsylvania	61
14. Northwestern	15	14. N. Y. U.	41
15. Iowa	14	15. Stanford	23

Chairmen noted the program at Cincinnati.

ECONOMICS

1925		1957	
1. Harvard	92	1. Harvard	298
2. Columbia	75	2. Chicago	262
3. Chicago	65	3. Yale	241
4. Wisconsin	63	4. Columbia	210
5. Yale	42	5. California	196
6. Johns Hopkins	39	5. Stanford	196
7. Michigan	31	7. Princeton	184
8. Pennsylvania	29	8. Johns Hopkins	178
9. Illinois	27	9. Michigan	174
10. Cornell	25	10. Minnesota	96
11. Princeton	23	11. Northwestern	70
12. California	22	12. Duke	69
13. Minnesota	20	13. Wisconsin	66
14. Northwestern	18	14. Pennsylvania	45
15. Stanford	17	15. Cornell	32
16. Ohio State	15	16. U. C. L. A.	31

According to some of the chairmen there are strong departments at Carnegie Tech. and M. I. T.; also at Vanderbilt.

ENGLISH

1925

1. Harvard	142
2. Columbia	107
3. Yale	99
4. Chicago	79
5. Princeton	59
6. Cornell	53
7. Bryn Mawr	42
8. Johns Hopkins	40
9. Pennsylvania	37
{10. Illinois	35
{10. North Carolina	35
12. Stanford	32
13. Wisconsin	30
14. California	26
15. Michigan	24
16. Iowa	22

1957

1. Harvard	320
2. Yale	280
3. Columbia	259
4. California	242
5. Princeton	210
6. Wisconsin	175
7. Michigan	170
8. Chicago	156
{9. Cornell	101
{9. Johns Hopkins	101
11. Illinois	100
12. Pennsylvania	87
13. Indiana	80
14. U. C. L. A.	78
15. Stanford	70
16. Minnesota	69

FINE ARTS

1957

1. Harvard	218
2. N. Y. U.	209
3. Princeton	201
4. Yale	179
5. Columbia	169
6. Michigan	118
7. Chicago	105
8. Minnesota	98
9. California	76
10. Iowa	67
11. Pennsylvania	57
12. Indiana	47
13. Illinois	39
14. Johns Hopkins	28
{ 15. Northwestern	24
{ 15. U. C. L. A.	24

GEOGRAPHY

1925		1957	
1. Chicago	61	1. Wisconsin	218
2. Clark	38	2. Chicago	201
3. Wisconsin	31	3. California	190
4. Columbia	24	4. Michigan	136
5. Harvard	13	5. Northwestern	133
{6. California	11	6. U. C. L. A.	132
{6. Michigan	11	7. Washington	107
8. Yale	10	8. Ohio State	90
		9. Illinois	81
		10. Minnesota	63
		{11. Columbia	57
		{11. Indiana	57
		13. Iowa	43
		14. Johns Hopkins	35
		15. Yale	28

Many chairmen noted the strong departments at Syracuse, Clark, and Louisiana State. Others mentioned Cal. Tech., Maryland and Kansas.

GEOLOGY

1925		1957	
1. Chicago	78	1. Columbia	226
{ 2. Columbia	62	2. Harvard	224
{ 2. Yale	62	3. California	218
4. Harvard	59	4. Yale	213
5. Wisconsin	51	5. Princeton	179
6. Johns Hopkins	45	6. Stanford	148
7. California	41	7. Johns Hopkins	132
8. Stanford	38	8. Wisconsin	125
9. Cornell	29	9. Michigan	97
10. Princeton	26	10. Chicago	95
11. Minnesota	21	11. Illinois	82
12. Michigan	19	12. Northwestern	79
13. Illinois	14	13. Minnesota	71
14. Iowa	13	14. U. C. L. A.	64
15. Ohio State	11	15. Cornell	49

There are strong departments at Cal. Tech., M. I. T., and Penn State; Louisiana State was also mentioned.

GERMAN

1925

1957

1. Wisconsin	83	1. California	278
2. Harvard	75	2. Yale	254
3. Columbia	64	3. Harvard	249
4. Johns Hopkins	60	4. Columbia	203
5. Chicago	59	5. Michigan	200
6. Illinois	57	6. Wisconsin	174
7. Yale	46	7. Pennsylvania	170
8. Michigan	38	8. Illinois	157
9. Northwestern	35	9. Texas	138
{10. Bryn Mawr	33	10. Indiana	117
{10. Cornell	33	11. Chicago	116
12. Princeton	29	12. Cornell	78
13. California	26	13. U. C. L. A.	59
14. Pennsylvania	24	14. Northwestern	51
15. Ohio State	23	15. Ohio State	48

HISTORY

1925

1957

1. Harvard	119	1. Harvard	243
2. Columbia	85	2. Columbia	220
3. Chicago	81	3. Yale	200
4. Yale	73	4. California	191
5. Cornell	65	5. Wisconsin	187
6. Wisconsin	59	6. Princeton	176
{ 7. Michigan	47	7. Chicago	127
{ 7. Pennsylvania	47	8. Cornell	103
9. California	42	9. Johns Hopkins	95
{ 10. Illinois	41	10. Pennsylvania	85
{ 10. Princeton	41	11. Northwestern	67
12. Minnesota	29	12. Michigan	66
13. Johns Hopkins	25	13. Illinois	54
14. Iowa	18	14. Minnesota	52
{ 15. Bryn Mawr	13	15. Stanford	49
{ 15. Indiana	13		
{ 15. Ohio State	13		
{ 15. Stanford	13		
{ 15. Texas	13		

LINGUISTICS

1957

1. Cornell	156
2. Yale	147
{3. California	140
{3. Pennsylvania	140
5. Michigan	135
6. Indiana	117
7. Chicago	108
8. Harvard	104
9. Columbia	94
10. Texas	67
11. Wisconsin	50
12. Washington	24

MATHEMATICS

1925		1957	
1. Chicago	74	1. Harvard	246
2. Harvard	70	2. Chicago	238
3. Princeton	53	3. Princeton	232
4. Illinois	33	4. California	168
5. Columbia	32	5. Michigan	166
6. Yale	27	6. Yale	149
7. Cornell	25	7. Columbia	147
8. Wisconsin	24	8. N. Y. U.	126
9. Johns Hopkins	23	9. Stanford	108
10. Michigan	17	10. Cornell	105
11. California	16	11. Wisconsin	93
12. Pennsylvania	14	12. Illinois	82
13. Minnesota	12	13. Ohio State	40
		14. Minnesota	35
		{ 15. Pennsylvania	27
		{ 15. Texas	27

Chairmen mentioned strong departments at Brown and M. I. T.

Music

1957

1. Harvard	183
2. Yale	152
3. Columbia	148
4. California	146
5. Michigan	124
6. N. Y. U.	118
7. Illinois	115
8. Princeton	109
9. Cornell	91
10. Indiana	80
11. North Carolina	60
12. U. C. L. A.	47
13. Northwestern	45
14. Iowa	44
15. Minnesota	28

ORIENTAL STUDIES

1957

1. Harvard	155
2. Columbia	151
3. Yale	149
4. California	145
5. Chicago	138
6. Michigan	128
7. Washington	100
8. Pennsylvania	91
9. Cornell	77
10. U. C. L. A.	58
11. Johns Hopkins	43
12. Stanford	40
13. Princeton	39

These ratings include the scores in Far Eastern Studies, Near Eastern Studies and South Asia programs.

PHILOSOPHY

1925		1957	
1. Harvard	99	1. Harvard	275
2. Columbia	94	2. Yale	261
3. Chicago	65	3. Michigan	256
4. Cornell	61	4. Columbia	204
5. Yale	54	5. Cornell	199
6. Princeton	43	6. Princeton	192
7. California	42	7. Chicago	136
8. Johns Hopkins	41	8. California	134
9. Michigan	40	9. Minnesota	108
10. Pennsylvania	33	{ 10. Illinois	89
11. Wisconsin	32	{ 10. U. C. L. A.	89
12. Ohio State	25	12. Pennsylvania	88
13. Bryn Mawr	24	13. Wisconsin	70
14. Minnesota	18	14. Washington	67
15. Northwestern	16	15. Iowa	53

PHYSICS

1925		1957	
1. Chicago	114	1. California	271
2. Harvard	104	2. Harvard	260
3. Cal. Tech.	84	3. Columbia	258
{ 4. Princeton	78	4. Princeton	204
{ 4. Yale	78	5. Chicago	203
6. Wisconsin	63	6. Stanford	191
7. Columbia	62	7. Cornell	166
8. Johns Hopkins	57	8. Illinois	158
9. Michigan	55	9. Michigan	121
10. Cornell	48	10. Wisconsin	97
11. Minnesota	43	11. Yale	84
12. California	41	12. Minnesota	63
13. Stanford	32	13. Pennsylvania	51
14. Iowa	15	14. Ohio State	32
		15. Johns Hopkins	31

There are also strong departments at Brown, Cal. Tech., and M. I. T.

POLITICAL SCIENCE

1925		1957	
1. Harvard	73	1. Harvard	212
2. Chicago	59	2. Chicago	183
3. Columbia	53	3. California	177
4. Wisconsin	46	4. Columbia	173
5. Illinois	39	5. Princeton	154
6. Michigan	31	6. Michigan	142
7. Princeton	29	7. Yale	130
8. Johns Hopkins	21	8. Wisconsin	91
{9. Iowa	17	9. Minnesota	86
{9. Pennsylvania	17	10. Cornell	80
11. California	12	11. Illinois	64
		12. U. C. L. A.	55
		13. Stanford	53
		14. Johns Hopkins	38
		15. Duke	33

It was noted that Michigan State has a strong department.

PSYCHOLOGY

1925		1957	
1. Columbia	156	1. Harvard	276
2. Harvard	117	2. Michigan	249
3. Chicago	91	3. Yale	244
4. Cornell	81	4. California	217
5. Johns Hopkins	74	5. Stanford	206
6. Iowa	68	6. Minnesota	190
7. Stanford	67	7. Illinois	184
8. Michigan	63	8. Iowa	167
9. Princeton	52	9. Wisconsin	138
10. Yale	50	10. Chicago	125
11. Ohio State	47	11. Columbia	118
{12. Illinois	36	12. Indiana	99
{12. Minnesota	36	13. Ohio State	89
14. Wisconsin	35	14. Cornell	64
15. Clark	33	15. Johns Hopkins	51

Brown and Clark were also mentioned by some chairmen.

ROMANCE LANGUAGES

1925		1957	
1. Chicago	205	1. California	314
2. Harvard	195	2. Columbia	312
3. Columbia	145	3. Harvard	257
4. Princeton	133	4. Pennsylvania	241
5. California	127	5. Michigan	234
6. Johns Hopkins	102	6. Yale	233
7. Pennsylvania	99	7. Wisconsin	198
8. Yale	88	8. North Carolina	188
9. Illinois	69	9. Princeton	169
10. Michigan	65	10. Ohio State	135
11. Cornell	63	11. Illinois	127
12. Wisconsin	61	12. N. Y. U.	105
13. Stanford	53	13. Johns Hopkins	94
14. Minnesota	48	14. Indiana	92
15. Ohio State	40	15. Chicago	78

The scores for French and Spanish, when separately rated, are included in these totals.

SLAVIC STUDIES

1957

1. Harvard	145
2. Columbia	140
3. California	132
4. Washington	60
5. Yale	56
6. Pennsylvania	49
7. Michigan	48
8. Wisconsin	47
9. Indiana	40
10. Cornell	19

Yale, Michigan and Indiana offer only a Master's program.

SOCIOLOGY

1925

1957

1. Chicago	131	1. Harvard	270
2. Columbia	108	2. Columbia	264
3. Wisconsin	71	3. Chicago	227
4. Minnesota	52	4. Michigan	207
5. Michigan	36	5. Cornell	186
6. Harvard	30	6. California	173
7. Missouri	29	7. Minnesota	148
8. Pennsylvania	24	8. North Carolina	135
9. North Carolina	23	9. Washington	132
10. Yale	22	10. Yale	91
11. Illinois	18	11. U. C. L. A.	88
12. Cornell	16	12. Wisconsin	78
13. Ohio State	15	13. Northwestern	60
14. Bryn Mawr	14	14. Ohio State	57
		15. Pennsylvania	52

Some chairmen mentioned the departments at Michigan State and Southern California.

ZOOLOGY

1925

1957

1. Columbia	79	1. Harvard	252
2. Chicago	71	2. California	236
3. Harvard	68	3. Columbia	184
4. Yale	63	4. Indiana	169
5. Johns Hopkins	61	5. Yale	154
6. Princeton	50	6. Johns Hopkins	147
7. Illinois	47	7. Wisconsin	136
8. Michigan	45	8. U. C. L. A.	116
8. Wisconsin	45	9. Princeton	115
10. California	42	10. Chicago	109
11. Cornell	37	11. Michigan	105
12. Stanford	29	12. Pennsylvania	90
13. Bryn Mawr	23	13. Cornell	88
13. Minnesota	23	14. Stanford	84
13. Ohio State	23	15. Illinois	54

NUMBER OF DEPARTMENTS IN TOP TEN

1925

1957

{ 1. Chicago	18	1. California	24
{ 1. Harvard	18	2. Harvard	23
3. Columbia	17	3. Yale	22
4. Yale	16	4. Michigan	21
5. Michigan	15	5. Columbia	20
{ 6. Johns Hopkins	13	6. Chicago	19
{ 6. Princeton	13	7. Cornell	15
8. Wisconsin	12	{ 8. Princeton	14
{ 9. Cornell	11	{ 8. Wisconsin	14
{ 9. Illinois	11	{ 10. Illinois	9
11. California	10	{ 10. Minnesota	9
12. Pennsylvania	8	{ 10. Pennsylvania	9
		13. Indiana	7
		{ 14. Johns Hopkins	6
		{ 14. U. C. L. A.	6

A TYPICAL RATING
(by Rank)

<i>Universities</i>	<i>Department</i>
California (Berkeley)	
California (Los Angeles)	Zoology
Catholic University	
Chicago	<i>First five</i>
Columbia	(15) California (Berkeley)
Cornell	(14) Harvard
Duke	(13) Chicago
Harvard	(12) Indiana
Illinois	(11) California (Los Angeles)
Indiana	
Iowa	<i>Second five</i>
Johns Hopkins	(10) Johns Hopkins
Michigan	(9) Yale
Minnesota	(8) Columbia
New York University	(7) Michigan
North Carolina	(6) Stanford
Northwestern	
Ohio State	<i>Third five</i>
Pennsylvania	(5) Duke
Princeton	(4) Cornell
Stanford	(3) Texas
Texas	(2) Minnesota
Washington (Seattle)	(1) Northwestern
Wisconsin	
Yale	

A TYPICAL RATING
(Alphabetical, by Groups)

<i>Universities</i>		<i>Department</i>
California (Berkeley)		
California (Los Angeles)		Philosophy
Catholic University		
Chicago		<i>First five</i>
Columbia		
Cornell		{ Cornell
Duke	(13)	{ Harvard
Harvard		{ Michigan
Illinois		{ Princeton
Indiana		{ Yale
Iowa		
Johns Hopkins		<i>Second five</i>
Michigan		{ Columbia
Minnesota		{ Illinois
New York University	(8)	{ Iowa
North Carolina		{ Minnesota
Northwestern		{ North Carolina
Ohio State		
Pennsylvania		<i>Third five</i>
Princeton		{ California (Berkeley)
Stanford		{ California (Los Angeles)
Texas	(3)	{ Chicago
Washington (Seattle)		{ Ohio State
Wisconsin		{ Wisconsin
Yale		