A DOCTORATE PROGRAM FOR COLLEGE TEACHERS

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An increased interest in programs for training graduate students for college teaching is becoming evident. Two tendencies particularly in chemistry may be responsible for this interest. On the one hand, we have the attractive opportunities for scientists to accept industrial and government positions drawing potential good teachers away from academic careers. A young man, married, and thinking about creating a home has to have some of the inspiration of the missionary to choose college teaching today. On the other hand, we have the increasing tendency on the part of college administrators and of agencies concerned with teaching to stress better teaching. This tendency takes the form of teacher-evaluation charts given to students who rate their instructors on the various factors listed. Alumni are often asked who their good teachers were. The American Council of Education (*1*, *2*) and the U. S. Office of Education have sponsored conferences on the improvement of college teaching. Some excellent reports have been prepared by these conferences, but unfortunately those people who should read and benefit from such reports ordinarily do not see them—they go only to presidents, deans, and department heads. Also unfortunately, some of the younger men who would benefit most by these conferences do not have the opportunity to mingle with the older, experienced teachers from all fields to get the inspiration that comes from such sessions.

The Committee on Graduate Instruction of the Council on Graduate Work of the Land-Grant College Association (*3*) has been studying the problem of preparing college teachers. Last fall this Committee sent a questionnaire to 86 subject-matter departments in 25 member institutions and 83 answers were received. Departments to which the questionnaires were sent were those granting five or more Doctor of Philosophy degrees during the five years 1946–50. Departments of botany, chemistry, economics, English, history, mathematics, and zoology were polled.

Eleven departments, 13 per cent of the total, reported that their students take courses concerned with training for college teaching, or that courses are available for them.

Twenty departments, 24 per cent of the total, reported that seminars dealing with training for college teaching are available. Seven universities offer an opportunity to take courses dealing with training for college teaching; 12 provide an opportunity to participate in seminars. In some universities both courses and seminars are available, with 13 offering these facilities.

Ninety-nine per cent of the departments afford an opportunity for at least some of the graduate students to have predoctoral teaching experience. For laboratory departments, it is experience in laboratory and recitation sections. Ninety per cent of the departments reported that the predoctoral teaching is supervised, and 60 per cent reported that the teaching load of the supervisor was decreased to permit time for supervision. Teaching performance is observed in 80 per cent of the departments, but several departments are very emphatically opposed to such a practice.

Each person answering the questionnaire was asked to indicate which *one* of the three following statements best describes how he personally feels about the question of training graduate students for college teaching.

(*a*) Systematic training for college teaching should be required for those Ph.D. students who expect to enter a teaching career—13 replies or 16 per cent.

(*b*) Training opportunities for college teaching should be available for those who plan to engage in teaching but should not be required for the Ph.D. degree—53 replies or 65 per cent.

(*c*) The usual program leading to the Ph.D degree is in itself sufficient training for college teaching—15 replies or 19 per cent.

Referring particularly to chemistry, twenty-four questionnaires were sent out and twenty-three were returned. Twenty-two of these departments stated that opportunities are available for predoctoral teaching experience as teaching assistants for laboratory and/or for recitation sections.

All departments reported that teaching is supervised, and twenty-one that teaching is observed. Only one department reported that special attention was given to the preparation of teachers of beginning chemistry.

Two departments (Louisiana State and Oregon State) reported courses in training for college teaching. Louisiana State offers courses in the History of Chemistry and the Use of Demonstrations in Chemistry.

The courses are not required but 80 per cent of the students take them. They are taught by members of the chemistry department. Oregon State has four courses, dealing with the training of college teachers, entitled The College Student, College and University Teaching, The American College and University, and the Construction and Use of Objective Examinations. The courses are not required for students who plan to enter college teaching and are not in addition to the regular doctorate program. Two of 43 doctorate candidates chose the courses in 1950–51. The courses, available to students in all fields, are taught by the faculty of the School of Education.

Four departments reported the availability of seminars. In each case, the seminar is conducted by the Department or School of Education. The seminar is elective for doctorate candidates at Massachusetts, Missouri, and Oregon State, but required of students registered for the Ph.D. degree in college teaching at Michigan State College.

At Oregon State College, a graduate minor in college teaching is available. It is based upon the following considerations:

1. A department in which students may qualify for advanced degrees has the responsibility of preparing students for teaching as well as for research in the specific field.
2. Programs for preparation for college teaching are properly worked out in terms of higher education.
3. The graduate school gives leadership in the development of standards for teacher preparation and the coordination of the activities of departments in a common function.

Five basic courses constitute the graduate minor. The first three courses are prerequisite to the latter two. Graduate standing is prerequisite for all. The first three courses are called "The College Student," "College and University Teaching," and "The American College and University." These courses are designed to consider: (1) the college student as the central factor in teaching, (2) the dynamic process by which the university or college effects changes in the student, and (3) the situation in which the teaching takes place.

The other two courses are "Teaching Procedures Seminar" and "College Teaching Studies." In the "Teaching Procedures Seminar" the students observe, study, and demonstrate procedures in their fields. In the "College Teaching Studies," done in connection with an actual college teaching assignment, the students work out some concrete aspect of teaching aims, procedures, or evaluation.

Whereas the program at Oregon State College provides a minor to be coordinated into a doctorate program, the program for the Doctor of Philosophy degree for College Teachers at Michigan State College is defined more specifically, since it is a doctorate for a specific purpose.

At Michigan State College a candidate for the Doctor of Philosophy for College Teachers meets the usual requirements for the doctorate degree with certain modifications. A minimum of three years full-time work (144 quarter credits) after the bachelor's degree, or two years full-time work (96 quarter credits) after the master's degree, is required for the Ph.D. degree. A guidance committee recommends to the graduate council the actual minimum residence time required, as well as whatever graduate credit from other institutions shall be accepted. On recommendation of the guidance committee, the candidate may be allowed to carry on part of his work *in absentia* either as a graduate student enrolled in some other institution of recognized rank or independently under detailed directions of his major professor.

The candidate must pass examinations before a representative of the Department of Foreign Languages, demonstrating his ability to read German and French. The completion of the second year of German with a grade of "B" at Michigan State College or at any other institution of recognized standing during the period of candidacy for the degree, or within a period of two years prior to admission to the School of Graduate Studies, may be accepted as satisfying the requirement in that language.

During his first term of candidacy the student files his application and the guidance committee is appointed. At the end of the student's first or second term the guidance committee meets with the candidate, reviews his previous studies, and prescribes a complete course of study including the fields for the comprehensive written examination.

At least one academic year before receiving the degree, the student must pass a comprehensive written examination covering his major and related fields. This examination is given sometime during the second to fourth week of the term including once in the summer session.

The usual rules for the publication of a doctoral thesis apply to thesis work in this field. A final oral examination is held about a month before the end of the term in which the candidate expects to receive his degree.

In addition to the above general requirements for the doctorate, the following modifications are included. Programs for the degree of Doctor of Philosophy for College Teachers will include: (*a*) advanced study in broader areas than the traditional programs, (*b*) a teaching internship in the general education area, and (*c*) an adequate foundation in a special field. The degree shall be given by a department now authorized to grant the Ph.D. degree or in one of the three divisional areas: biological science, physical science, or social science.

The dissertation shall be concerned with a problem having aspects and ramifications which extend across existing departmental lines. Experience in a seminar in higher education, not in excess of three credits, will be required.

The candidate shall teach and be fully responsible for one class in the Basic College of Michigan State College in the general area of his graduate study for at least one

quarter under the direction of a committee consisting of the Head of the Basic College Department, an experienced and competent teacher in that department, a representative from an upper-school department, and a representative from the Division of Education.

The guidance committee mentioned above shall include the director of the appropriate upper-school division, heads of appropriate upper-school departments, the head of the Basic College department representing the area in which the candidate is working, or their representatives, and such other persons as the student's program may require. At least three upper-school departments must be represented, except in cases where a department administers two or more recognized subject-matter fields such as sociology and anthropology.

Not over 50 per cent of the course credits earned beyond the bachelor's degree may be in any one department, except credits in research courses upon which the thesis is based, which may be allowed in excess of this 50 per cent.

Candidates who complete their degree requirements under one of these special programs will be awarded in addition to the regular diploma a certificate indicating the completion of a program in teacher-training.

One person has chosen this program with a major in chemistry, one with a major in physical science, and one with a major in biological science. The weakness in this program at Michigan State College is that the student must take too many courses in the fields designed to serve as adjunct fields. Accordingly, the course program is "top-heavy," forcing the candidate into a longer time of study than is usually required for a doctorate degree.

College and university scientists should strive in a graduate program toward three aims which are basically the activities of all scientists.

1. Scientists must be students, in order to increase their own knowledge.

2. They must be teachers, to transmit science to their students and to train future teachers of science.

3. They must be investigators, to advance science and its practical applications.

For a given individual it is not necessary that all three of these factors be equal in importance. For some of them the second aim should be of greater importance, because the responsibility of training and educating the oncoming generation is great. This scientist must know how to present science subject matter in the finest manner possible. He must know about good teaching materials and the methods of using them. He must demonstrate to students, colleagues, and administrators that he is not only a scientist but that he also knows how to "sell" his science to his audience.

A young scientist starting out on his teaching career is a freshman in experience. His only experience in handling large groups of people has been to note how others behave when before large groups. Maybe he will learn from the mistakes, the mannerisms, and the awkardness of other speakers, but very likely he will not. Maybe his supervisor has taught him the fine points of handling groups of individuals, and of organizing material for presentation. Maybe someone has pointed out to him that he says, "ah, and, uh," and connects all sentences with "and ah." More probably he hasn't had any practical suggestions. Should this young science teacher be helped? I firmly believe he should. How can he be helped? He can be by some teacher-training from experienced good teachers.

It is therefore proposed by the author that prospective young teachers have the opportunity of some training as part of their graduate program. Such training need not be a large number of credit hours. A brief indoctrination about the nature of the college student, the American college and university, and college teaching would be very valuable. Six semester credits would be sufficient if the material were properly organized. A description of the important points and not a collection of fancy words is all that would be needed. More important, however, is the need of good guidance in actual teaching, either by a brief course in teaching procedures or by an apprentice-type of teaching, properly supervised. In other words, a good course on the teaching of chemistry is essential. This latter can be brought about by one, two, or three department staff members devoting some of their time and energy to teacher-training problems, methods of demonstration, and to the communication of scientific ideas both to the future teachers of science and to the students.

Whose duty is it to lead in this teacher-training? It is the duty and the responsibility of the scientist to grasp this problem and to solve it. We who are chemists must be active and vigorous in developing teaching methods or the professional educators will tackle the problem. If the latter group assumes the leadership there will be more and more emphasis on how to teach and less on actual teaching. We chemists will have no one to blame but ourselves if we find it necessary to follow laws and requirements which qualify persons for becoming college instructors but which disregard whether the instructor knows his subject matter or not. We as chemists must assume that a graduate school and a department of chemistry have a responsibility for preparing both research scientists and science teachers. It also behooves us to take the latter responsibility very seriously by including a good background for prospective teachers, or other agencies will.

LITERATURE CITED

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