A STUDY OF THE ACADEMIC AND PROFESSIONAL PREPARATION OF JUNIOR COLLEGE TEACHERS OF PHYSICAL SCIENCE

Thesis for the Degree of Ph. D.

MICHIGAN STATE UNIVERSITY
Kendall Scott Kinerson

1957

This is to certify that the

thesis entitled

A STUDY OF
THE ACADEMIC AND PROFESSIONAL PREPARATION OF
JUNIOR COLLEGE TEACHERS OF PHYSICAL SCIENCE

presented by

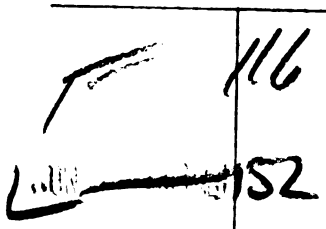
Kendall Scott Kinerson

has been accepted towards fulfillment
of the requirements for

Ph. D. degree in Education

Walker H Hill
Major professor

Date August 16, 1957



A STUDY OF

THE ACADEMIC AND PROFESSIONAL PREPARATION OF JUNIOR COLLEGE TEACHERS OF PHYSICAL SCIENCE

By

Kendall Scott Kinerson

AN ABSTRACT

Submitted to the School of Advanced Graduate Studies of Michigan State University of Agriculture and Applied Science in partial fulfillment of the requirements for the degree of

DOCTOR OF PHILOSOPHY

Department of Teacher Education

1957

Approved Walter H. Hill

K. Scott Kinerson An Abstract

The purpose of this study is to determine what would appear to constitute the most appropriate training for prospective junior college physical science teachers as seen by junior college teachers and administrators, and by a group of the outstanding leaders in the field of junior college education.

Questionnaire responses describing the current status of their formal training and non-academic work experience, and making recommendations regarding these same aspects of the preparation of prospective teachers, were obtained from 186 junior college physical science teachers located in 124 junior colleges in thirty-seven different states. Responses which listed recommendations for the training of prospective teachers were also obtained from 104 administrators in these same colleges, and from thirty-eight national authorities in the field of junior college education.

The findings pertaining to the status of training showed: (1) a median of eight years of junior college teaching experience; (2) qualification to teach in two, and often three, of the physical sciences; (3) preparation in an undergraduate major and two minors, and a graduate major and one or two graduate minors; (4) the equivalent of two years of study in one foreign language; (5) preparation equivalent to about fifteen semester hours in Education courses; (6) an average of eleven semester hours in research by about half of the teachers; (7) practice teaching experience in a high school; (8) a bachelor's degree held by 9 per

cent of the teachers, a master's degree by about 77 per cent of them, and a doctorate by 14 per cent; and (9) an average of nearly four years of non-academic work experience which the teachers rated as being of considerable value to them as physical science instructors.

The major recommendations for the training of these teachers include a two-year graduate program which is oriented toward the development of an understanding of the technical-industrial applications of physical science and toward an interest in teaching rather than one in research. The program should prepare a student to teach in at least two physical science areas. The following specific details are recommended: (1) a thirty to thirty-six semester hour major, and two twenty-credit minors at the undergraduate level; (2) a twenty-credit major and two ten-credit minors at the graduate level; (3) fifteen hours in a specified list of Education courses at the undergraduate level; (4) six to twelve credits in Education courses at the graduate level; (5) from nine to twelve credits in the social sciences and a similar number in the humanities at the undergraduate level; (6) a teaching internship in a junior college; and (7) the acquisition of some non-academic work experience in locations where practical applications of the physical sciences are being put to use.

A STUDY OF

THE ACADEMIC AND PROFESSIONAL PREPARATION OF JUNIOR COLLEGE TEACHERS OF PHYSICAL SCIENCE

By

Kendall Scott Kinerson

A THESIS

Submitted to the School of Advanced Graduate Studies of Michigan State University of Agriculture and Applied Science in partial fulfillment of the requirements for the degree of

DOCTOR OF PHILOSOPHY

Department of Teacher Education

1957

ACKNOWLEDGMENTS

The writer is indebted to many individuals who by their assistance and cooperation made this study possible. He is especially indebted to Professor Walker H. Hill, Chairman of his Guidance Committee, and Professors Max S. Smith, Clyde M. Campbell, and Charles P. Wells for encouragement, guidance, and helpful criticism.

The author is also grateful to the many junior college teachers and administrators, and to the national authorities in the field of junior college education, who cooperated so generously with this study.

The aid in editing and organization provided by the author's wife was especially valuable in the preparation of the manuscript.

TABLE OF CONTENTS

LIST OF TABLES

CHAPTER I

I Statement of the Problem

The purpose of this study is to determine what would appear to constitute the most appropriate training for prospective junior college physical science teachers as seen by junior college teachers and administrators, and by a group of the outstanding leaders in the field of junior college education. The study has attempted to find answers to the following questions:

1. What degree level would be most appropriate for prospective junior college physical science teachers?

2. What proportions of both graduate and undergraduate preparation should be spent in each of the following areas?

    a. Subject matter

    b. Professional Education courses

    c. Research

    d. General education

    e. Others

3. In how many specific physical sciences should a physical science teacher be qualified to teach?

4. How many of the following experiences are considered essential?

    a. Practice teaching; at what academic level?

    b. Non-academic work experience; what type and for how long?

5. If research experience is considered essential, should it be in Education or in one of the physical sciences?

6. Are there important differences, that should obtain, between the training of these teachers for private colleges and for the various sizes of publicly controlled junior or community colleges?

II Importance of the Problem

The phenomenal growth of the American junior college has made it evident that it meets an educational need that is not met by other institutions of higher education. This growth is illustrated by the fact that in the 1956-57 year there were approximately 762,000 students in 620 junior colleges in the country[1]. In 1930 there were 74,088 students in 435 colleges, and in 1915 there were only 2363 students in seventy-four colleges[2].

The steady growth of this institution appears to be due to the value of the service that it renders to the large groups of individuals who, for one reason or another, can profit more from junior college training than attendance at a four-year college or university. Among these groups are the following; (a) those who find it financially more practical to take the first two years of professional training at an institution close to their homes, (b) those who are preparing for technical and semi-professional work not requiring a bachelor's degree, (c) persons who can gain by obtaining training in occupations for which the

---

[1] Jesse P. Bogue and Joanne Waterman, "Junior College Directory," Junior College Journal 27:278-304; January 1957.

[2] Jesse P. Bogue, American Junior Colleges. Fourth Edition. 1956. Washington: American Council on Education. p. 14.

high schools provide basic instruction, (d) those who wish to add to their general education before entering employment or becoming homemakers, and (e) employed adults who wish to further their education through part-time courses. Junior colleges, operating within a philosophical framework of community service, can serve all of these groups more adequately than most four-year institutions.

In addition to these reasons for its past growth, the junior colleges can well play a vital role in relieving the pressure of large numbers of lower-division students from the four-year colleges and universities as they face unprecedented enrollment increases in the immediate future.

Because of the unique nature of its functions, the junior college is not generally expected to carry on any research program that is comparable to that which constitutes one of the major functions of a university. Thus, the two-year colleges of this type are teaching institutions . It would appear then that their primary instructional staff needs are for people who are philosophically oriented toward an interest in young people, the giving of instruction, and community service. As will be documented in Chapter II, these needs are currently being met primarily by teachers from three sources. The largest group is composed of those who have had high school teaching experience and who originally prepared themselves for this service. A second group is composed of semi-professional people with experience in business and industry. Their technical knowledge and skills are most appropriately employed in the teaching of the vocational courses. A third, and much smaller, portion of the teachers are obtained from among the ranks of experienced four-year college teachers.

It is evident from the above that very few of the present-day junior college teachers have had training which was designed for direct entry into this teaching field. One of the reasons for this curious situation appears to be that a community in which a junior college is established is almost certain to have had a good high school in operation for some years, and the opening of a junior college provides an avenue for the promotion of experienced and deserving teachers to a position of somewhat higher prestige and salary. It is also possible that some high school principals have used this means to "promote" some of their staff members who had tenure but whom they were otherwise unwilling to retain. In this way, and with smaller numbers from the other two sources mentioned above, the need for staff has been met without too much pressure being placed on colleges and universities to train people specifically for the junior college level.

An obvious question at this point concerns the adequacy of the preparation of the high school teacher who has been transferred to a junior college. Is he prepared to give college-level instruction? It seems most likely that he will have had an undergraduate major in a subject matter field, one minor in Education, and perhaps a second minor in another subject field; if he has an advanced degree, it is most likely to be in Education. A number of studies, which will be cited in the next chapter, have shown that junior college teachers should in general have at least a master's degree in the subject matter field. There appears to be divided opinion regarding the desirability of the doctor's degree. This immediately suggests that the high school teacher is not adequately prepared for his new position.

The studies, which are mentioned above, have dealt with the

training of junior college teachers in general[3], with selection and retention of these teachers in California[4], with preparation for teaching in the biological sciences[5], with preparation for teaching general education courses[6], and with the training of undergraduate college teachers in all types of institutions[7]. None have been found which dealt directly with the training needed by physical science teachers at the two-year colleges.

III Definitions

Junior college

In general the term is used in this study to refer to all institutions of higher learning that limit offerings to the first two years of post-high school work. It also includes those institutions designated as community colleges and those that extend their offerings downward to include one or two years of high school study. To be of interest to

---

[3] Amos L. Garrison, "Junior College Teachers: Their Academic and Professional Education." Unpublished Doctor's dissertation. Yale University, 1942.

[4] Selmer Ostlie, "The Selection and Retention of Junior College Teachers." Unpublished Doctor's dissertation. University of Southern California, 1951.

[5] Ralph P. Frazier, "The Competencies and Patterns of Training Desirable for Instructors of Biological Science Courses in College General Education Programs." Unpublished Doctor's dissertation. University of Illinois, 1956.

[6] Gerhard E. Ehmann, "Some Criteria for the Training of Teachers in General Education at the Junior College Level in California." Unpublished Doctor's dissertation. University of California at Los Angeles, 1951.

[7] Rex C. Kidd, "The Improvement of the Pre-service Education of Undergraduate College Teachers." Unpublished Doctor's dissertation. University of Florida, 1951.

this study a junior college must offer two-year programs of university parallel and college preparatory course work, or terminal programs in general education, or sub-professional areas leading toward the Associate in Arts or Science Degree or its equivalent in the form of a certificate or diploma. The institutions studied are all listed in the 1956 Junior College Directory[8], and it in general lists all junior colleges that are so designated by state departments of education.

junior college physical science teacher

This term is used to describe all junior college teachers whose principal duties involve the teaching of one or more of the physical sciences. Physical science teaching is construed as giving instruction in courses in astronomy, chemistry, geology, mathematics, meteorology, physical science, physics, and others which represent combinations of these.

IV Hypotheses

The hypotheses being tested in this study are:

1. Junior college physical science teachers need preparation at the graduate level; usually somewhat beyond the master's degree, and in at least two of the physical sciences.

2. These teachers also need considerable preparation in special professional Education courses which emphasize the history, philosophy, and purposes of the junior college as well as courses in teaching methods, psychology of the late adolescent, and guidance and counseling.

---

[8] Jesse P. Bogue and Zora Ritter, "Junior College Directory," Junior College Journal 26:281-307; January 1956.

3. These teachers should have some practice teaching in a junior college.

4. These teachers should have some non-academic work experience where practical applications of the physical sciences are being put to use.

5. These teachers do not need training in research beyond what could be obtained from a course which taught them an appreciation of the capabilities and limitations of research, and the usual rigor involved in a subject matter master's thesis.

V Assumptions

This study has been conducted on the basis of the following underlying assumptions:

1. That the prospective junior college teacher needs training that differs in some respects from that of both the high school teacher and the college teacher.

2. That current programs of preparation are inadequate.

3. That graduate school faculties, junior college administrators and teachers, state department of public instruction officials, and prospective junior college physical science teachers can obtain valuable information and usable recommendations from an analysis of the type of data gathered in the course of this study.

4. That junior college teachers and administrators and the outstanding leaders in the field constitute the best available sources of knowledge pertaining to the problem and, furthermore, that these groups are sufficiently interested in the problem to respond to a questionnaire survey.

VI Limitations of the Study

Several studies pertaining to junior college teacher education in general, and one or two pertaining to particular fields, have recently been reported[9]. For this reason it seems apparent that another study covering the field in a general way is not particularly needed at this time. However, no comparable study which dealt specifically with this question in the physical science area has been found. This, combined with the fact that the author's previous training has been centered in mathematics and physics, led to the limitation of this investigation to the physical science area.

In the interest of feasibility and financial practicability of a study conducted by a single individual, this investigations was further limited in two respects. The first of these concerns the limitation to the formal academic and professional requirements that seem advisable for these teachers. Thus, questions such as those dealing with the selection of promising students to be trained for this field, the competition between junior colleges and various industrial organizations for the services of university graduates in this highly critical area, and the benefits derivable from the in-service training of these teachers, have been left to other studies. A second limitation was imposed on the size of the sample to be drawn. There are approximately six hundred junior colleges in the country and it was felt that a sample which would adequately represent the population of physical science teachers would consist of those institutions which were chosen according to the criteria

---

[9] See Chapter II; particularly for studies reported by Blake, Ehmann, Frazier, Garrison, Ostlie, Koos, and Tapley.

listed in part I of Chapter III.

VII Procedures and Sources of Data

In order to obtain the most pertinent information bearing on this problem, two principal sources were used. These were: (a) a moderately extensive survey of the literature pertaining to junior college teacher education, and (b) a questionnaire survey of junior college teachers and administrators, and a group of the outstanding leaders in the field of junior college education.

The literature search was made in an effort to find answers to the following questions:

1. What studies have been recently reported that have a direct bearing on this problem? In this connection, anything appearing since 1940 has been considered sufficiently recent to be of significance to this study.

2. What could be learned from the above-mentioned reports concerning all of the questions listed in part I of this chapter?

3. What are the viewpoints of the leading authorities in the field regarding the current problem?

The questionnaire survey of the teachers was made in order to determine the current status of their formal training and non-academic work experience. They were also asked to make recommendations regarding the training that would be most appropriate for teachers in this field. The administrators and experts were asked for their recommendations in these same areas.

CHAPTER II

REVIEW OF LITERATURE

The literature pertaining to higher education in general, and to the junior and community college in particular, contains frequent references to the problem of adequate academic and professional preparation of teachers in this type of college. The publications concerned with this problem can be divided into three general types. These are: (1) publications describing state and regional certification requirements, (2) books and articles, which frequently reflect ideal rather than actual conditions, but nevertheless show the opinions held by the leading authorities in the field, and (3) research studies, which are frequently limited in scope but do portray the most complete factual data which are available.

I State and Regional Certification Requirements

Woellner and Wood[1] list the requirements for state certification of teachers at all levels in each of the forty-eight states. Variations in these requirements for junior college teachers are so great that few generalizations can be made. However, this publication does reveal the following:

---

[1] Robert C. Woellner and Aurilla M. Wood, Requirements for Certification of Teachers, Counselors, Librarians, Administrators for Elementary Schools, Secondary Schools, and Junior Colleges; 1956-57. Twenty-first edition. Chicago: The University of Chicago Press, 1956. Pp. iv-124.

1. Twenty-five of the states require some form of state certification for junior college teachers.

2. The master's degree is expected more frequently than any other but wide variations are permitted in the different states. For example, some states grant temporary certificates to holders of the bachelor's degree, others accept approximately thirty semester hours of graduate credit in lieu of the master's degree, still others specify minimum requirements that are different for teachers than for department heads, and in some states teachers are certified automatically upon recommendation by the state university.

3. A comparison of the 1956-57 requirements with those for 1938-39 reveals that changes in these requirements seem to have been relatively minor in the past eighteen years. Thus ten of the states that have such requirements have not changed them in that time and most of the observed changes were slight.

4. The requirements in a few of the states, where the junior college movement is particularly well developed, are as follows:

California requires a master's or doctor's degree, one teaching major and one minor, ten credits in professional Education courses, and four semester hours in directed teaching[2].

Florida requires a master's degree including at least twelve semester hours of graduate credit in the teaching subject area[3].

Illinois requires a master's degree, a total of forty-three credits

---

[2] Ibid., p. 14

[3] Ibid., p. 26

in a specified list of general education courses, a total of thirty-six credits in a major academic field, and twenty semester hours in Education[4].

Kansas does not list any state requirements[5].

Maryland requires a bachelor's degree, one year of graduate work (content unspecified), and "efficiency in teaching[6]."

Michigan requires a master's degree with a major in the teaching subject, and fifteen hours in a specified list of Education courses[7].

Minnesota requires a master's degree or its equivalent, eighteen semester hours in Education, and eight hours in practice teaching. The practice teaching requirement is waived for those with a master's degree in an academic area, and both professional requirements are waived for applicants who hold a doctor's degree[8].

Mississippi does not list any state requirements[9].

Missouri requires that these teachers be approved by the Committee on Accredited Schools and Colleges, University of Missouri[10].

New York does not list any state requirements[11].

North Carolina requires only that department heads hold a master's

---

[4] Ibid., p. 32.

[5] Ibid., p. 44.

[6] Ibid., p. 53.

[7] Ibid., p. 57.

[8] Ibid., p. 59.

[9] Ibid., p. 63.

[10] Ibid., p. 67.

[11] Ibid., pp. 81-83

degree or equivalent[12].

Accreditation data, obtained from each of the six regional accrediting agencies, were also reported by Tapley[13]. This report is in general agreement with Woellner and Wood and concludes with the statement that "the master's degree or its equivalent is usually expected of the junior college teacher."

II Authoritative Opinion

The junior college literature contains a large number of books and articles that pertain, in one way or another, to the training of instructors at this level of nigher education. This section contains a review of many of the significant items in each of the following categories: (1) the differences between junior and senior college teaching; (2) academic and professional training; (3) degree levels desired; (4) the desirability of non-academic work experience; and (5) the selection of candidates to be trained.

1. The Differences between Junior and Senior College Teaching.

The differences identified in the literature do not appear to be nearly as numerous as the similarities between these two types of teaching. In general those qualities which make for good teaching in a senior college are also desired at the two-year institutions. Those differences

---

[12] Ibid., p. 85.

[13] E. M. Tapley, "Preparation for Teaching General Education Courses in Junior Colleges," p. 38. Unpublished Doctor's dissertation. University of Chicago, 1955. Pp. xi - 200.

which have been identified are due to the different purposes which the two types of institutions serve. The Forty-Sixth Yearbook of the National Society for the Study or Education[14] emphasizes one of these that pertains particularly to science teachers. There it is pointed out that the senior college functions primarily for the purpose of training specialists or for general education. In addition to these the junior college has a third purpose; it is that of offering science for the terminal-vocational student, both for its practical applications to his particular field and for its general educational value.

In another article Donovan[15] points to a second frequently mentioned difference. The senior college instructor is typically expected to be not only a teacher of students but also a producer of independent research. The fact that many at this level contribute little if anything of this nature does not change the fact that this is one of the more important criteria which are used in determining promotions and as a measure of success in college teaching. The junior college teacher is more frequently referred to as a consumer of research, and is generally expected to carry a heavier teaching load than his senior colleague. The criteria used as measures of his success are much more likely to include excellence in teaching than such measures as number of publications and amount of original research accomplished.

This clearly implies that his training should be directed toward a future in teaching rather than in research. Current graduate degrees,

---

[14] Nelson B. Henry, Editor. Science Education in American Schools, Forty-Sixth Yearbook of the National Society for the Study of Education, PartI, Pp. 222-4. Chicago: University of Chicago Press, 1947.

[15] T. P. Donovan, "Problems of the Instructor in the Junior College," The Junior College Journal , 22:494-7: May 1952.

in fields other than Education, generally are research centered and thus appear to be far more appropriate for the university professor than for the junior college teacher.

In support of the previous point regarding teaching load, Eells had this to say in 1931[16].

> A common standard for teaching load in standard colleges is twelve to eighteen hours per week; the prevalent figure being fifteen or sixteen. While this is only one element of the teaching load, it is the single unit employed by all the accrediting agencies. Eight or ten hours is a more common university load, but there the professor is expected to devote at least half of his time to research.

In a series of studies reported by Koos[17] the median load for four-year colleges was thirteen hours per week; for universities, nine hours; for junior colleges, four different studies reported median loads ranging from fourteen to seventeen hours. As will be shown later[18], this study also demonstrated that work in Education courses constitutes an important part of the training of most junior college teachers. That this is not the case with senior college teachers is well known.

It should be mentioned in conclusion that although many writers have pointed to the differences mentioned above, there are also those who feel that no distinction should be made in the training of teachers for different types of higher education. Among these is Theodore Bleeen who commented as follows in an address to the Fifth Annual

---

16 Walter Crosby Eells, The Junior College. p. 412. New York: Houghton Mifflin Co., 1931.

17 Leonard V. Koos, "Junior College Teachers; Background of Experience," pp. 457-69, "Degrees and Graduate Residence," pp. 77-89, "Preparation in Education," pp. 332-44, "Subjects Taught and Specialized Preparation," pp.196-209, Junior College Journal, 18:(pp. as above); September 1947 to May 1948.

18 See p. 43

Conference on Higher Education in 1950[19].

> Should there be a specific differentiation in training for higher education--that is, for a junior or community college, or a liberal arts college, a teacher's college, or some other kind of college? The conference on the Preparation of College Teachers last year believed it would be a mistake to plan for such differentiation.

Since the above quotation represents the consensus of opinions held by a number of authorities, it is evident that authoritative opinion varies considerably, not only as it regards the question of what special types of training the junior college teacher needs, but also as to whether he actually needs any training that differs from that of the senior college instructor.

2. Academic and Professional Training.

The junior college literature contains frequent references to the training of instructors. These fall roughly into three categories. The first is concerned with more or less complete sets of recommendations of standards and criteria that should be used in determining the adequacy of a prospective teacher's preparation. The second deals with the well known controversy between those who favor academic courses only and those who favor the inclusion of some work in Education courses. The third concerns the question of practice teaching.

Training standards. One of the most frequently quoted authorities in the junior college literature is Walter Crosby Eells. In The Junior College, published in 1931, Eells made the following statement regarding the teacher training standards that should obtain in the future[20].

---

[19] Theodore Blegen, "Ferment in Graduate Education," National Education Association Journal 39:685-6; December 1950.

[20] Walter Crosby Eells, op. cit., p. 421.

> It is not too much to expect every permanent, well-qualified instructor to have had at least two years of graduate work, largely in the field in which he expects to teach, or in closely related work; and that he should have had a substantial training in professional courses in Education, to prevent him from being a narrow specialist in his own field, and to see his own work in its proper perspective with relation to the rest of the institution. It would be desirable that heads of departments should have had the equivalent of the training and breadth of view represented by the degree of Doctor of Education...Their (the instructors) normal teaching load should not exceed twelve to fifteen hours per week.
>
> Instructors in junior colleges should receive salaries somewhat better than lower-division instructors in universities. There should be other attractive features of permanence of tenure, professional development, and community standing to place them on a par with university instructors...It is true that these suggested standards are higher than those obtaining at the present time.

The academic and professional standards proposed by Eells have become relatively common today. In fact, they seem to have been in current practice eleven years ago when Sexson and Harbeson published The New American College[21]. In this work the following is stated[22]:

> As a general principle, it may be stated that in the academic departments the minimum amount of academic training acceptable for appointment as a junior college instructor is that represented by a master's degree with a major in the field of his teaching.

Regarding professional training, Sexson suggests[23]:

> Administrators probably need a more extensive training in the scientific study of Education than do the teaching faculty but certainly sixteen semester hours of professional training are none too many for the classroom teacher.

At about this same time (1947) Ruth E. Eckert[24] suggested a list of objectives toward which professional training of college

---

21 J. A. Sexson and J. W. Harbeson, The New American College, New York: Harper and Brothers, 1946. Pp. xviii-312.

22 Ibid., p. 180.

23 Ibid., p. 181

24 Ruth E. Eckert, "A New Design for the Training of College Teachers," Junior College Journal, 18:25-33; September 1947.

teachers should be directed. While these were not limited to junior college instructors, they would seem to apply equally well to that field. They were[25]:

1. An understanding of educational objectives.
2. An appreciation of social trends.
3. A sense of the functional relationship between aims and content.
4. An understanding of human development and human relations.
5. A knowledge of the psychology of learning.
6. An understanding of the major trends in education.
7. A knowledge of curriculum development.
8. An understanding of adjustment and guidance problems.
9. A knowledge of the basic principles of evaluation.
10. An understanding of the nature and significance of the teaching profession.
11. The development of a readiness to experiment.
12. The development of skill in democratic participation in the development of educational policy.

One of the very few articles which have made specific reference to the preparation needed by junior college physical science teachers was written by H. L. Smith[26]. He suggested that such teachers should have a broad foundation in all of the physical sciences, with some specialization in one. Specifically he urged that such teachers should have at least the equivalent of an undergraduate minor of fifteen semester hours in each of the major subdivisions of physical science.

Smith also favored a professional sequence of from nine to twelve hours which would include some work in psychology, techniques of teaching, the junior college, professional ethics, problems of administration, and curriculum construction. In addition to these he favored practice teaching (to be performed simultaneously with graduate study and not undertaken at the end of it); non-academic work experience, primarily

---

[25] Ibid., p. 29.

[26] H. L. Smith, "Better Education of College Teachers; Junior College," North Central Association Quarterly, 23:391-6; April 1949.

for teachers of terminal-industrial and semi-professional courses; and the ability to lead some extra-curricular activity.

Harold Andersen[27] also suggested a list of nine points which he considered desirable objectives for junior college teacher training programs. Most of these are similar to the suggestions previously cited, but he seems to put considerable stress on the importance of research for these candidates. Thus three of his points were[28]:

> 1. He (the teacher candidate) should have research experience to give him the experience of making a contribution to understanding.
>
> 2. The research problem should require a considerable variety of the principles, materials, and technics of his eventual teaching field.
>
> 3. He should have an acquaintance with the full range of basic research methods used in his division of studies.

This emphasis on research runs contrary to most writers in the field who have generally suggested that junior college teachers should be thought of as consumers and not producers of research.

In summary it appears that there is pretty general agreement with the desirability of the nine characteristics which Hawkins listed in 1955[29]. These were:

> The junior college teacher:
>
> 1. should have an understanding of the history, philosophy, and functions of the junior college.
>
> 2. should have some knowledge of junior college administration.

---

[27] Harold Anderson, "The Preparation of College Teachers," National Education Association Journal, 40:343; May 1951.

[28] Ibid., p. 343

[29] T. G. Hawkins, "Junior College Teachers, Some Unique Characteristics," Junior College Journal, 25:298-302; January 1955.

3. is a full-time public relations officer for the school.

4. should know his community.

5. should be able to communicate effectively with both adult and youth.

6. must know his field but must not be a narrow specialist.

7. must participate in extra-curricular activities of the school.

8. must understand the development stage of junior college youth.

9. should see to it that each student, youth or adult, gets what he needs and desires from the courses he takes.

Although there is considerable agreement that these attributes and characteristics should be possessed by junior college teachers, there seems to be considerable disagreement as to how prospective candidates can best acquire these qualities. The remaining divisions of this section will consider two of the more critical issues.

Academic versus professional training. At first thought it would not seem that these two phases of training should clash; they are both necessary and should complement rather than interfere with one another. Indeed, many writers such as Eells[30], Koos[31], and Sexson and Harbeson[32] have advanced this point. Nevertheless there seems to be continued friction between professors of the older academic disciplines and those whose specialty lies in the field of Education. The former object to their students "wasting time" in Education courses when they could more profitably be taking additional work in their academic specialty. The latter insist that the acquisition of knowledge in a field does not necessarily

---

[30] Walter Crosby Eells, op. cit., p. 421.

[31] Leonard V. Koos, op. cit., pp. 332-44.

[32] J. A. Sexson and J. W. Harbeson, op. cit., p. 181.

insure the ability to transmit it to one's students.

In an analysis of "the quarrel between professors of academic subjects and professors of Education", E. H. Reeder[33] presented arguments which obviously favored the professional educater's side of the debate. He saw the major source of friction as lying in the fact that the academic professor was primarily interested in subject matter while the professor of Education was primarily interested in individuals. It was further suggested that the Educationist is in an unenviably unique position among his colleagues in regard to the results of his teaching efforts at the university. Upon graduation, the students in all fields, except Education, generally go to work in those fields, and their work, or the product of it, is not generally subject to direct inspection by those who taught them. In Education the graduates become teachers who train students that are soon in the classrooms of both the academician and the Educationist. The argument proceeded with the statement that professors have always been dissatisfied with their student's preliminary education, but that now the professor of academic subjects has a scapegoat. He blames the Education department for producing poor high school teachers. Reeder insisted that this seems unjustified in light of the fact that these "poor teachers" probably spent about five-sixths of their college time in pursuit of academic subjects under the guidance of those same professors who now say they were badly trained.

The academic professor was also pictured by this author as generally holding certain misconceptions about the study of Education.

---

[33] E. H. Reeder, "The Quarrel Between Professors of Academic Subjects and Professors of Education; An Analysis," American Association of University Professors Bulletin, 37:506-21; September 1951.

These were[34]:

1. The nature of teaching and learning. These professors are prone to adhere to what Dewey once called the "cold storage" idea of learning, i.e. the mere accumulation of facts without learning how they are interrelated nor how to think or integrate these facts.

2. The social responsibility of the school and its teachers. These professors tend to view the school only as a place to train future scholars, and while vocational and general education courses are perhaps needed in high school, they are mere "training" and should not be dignified by inclusion in programs of higher education.

3. The content of Education as a field of study. The academician generally recognizes only three principal areas. These are methods, educational administration, and history of education. He sees little need for methods because of his own interest in training future scholars with "cold storage" heads. He sees little need for administration courses because "all it requires is common sense and a little on-the-job training." As for history of education, "that is a worthy subject for historians," but he fails to see a need for it in the training of teachers.

This writer freely admitted that there have been numerous instances of poor instruction in Education classes, but he believed that these were probably no more prevalent than in academic classes. The real reasons for the friction were thus seen as those cited above.

That this controversy affects the training of junior college teachers is evident from statements such as the following from Ingalls[35]:

Candidates for teaching positions frequently offer unbalanced programs. They have majored in Education with a subsequent lack of thorough subject matter knowledge, or in a subject matter field with no training in Educational psychology, guidance, and human relations.

In describing three different surveys of the adequacy of doctoral programs, Hollis made the following comment which appears to be typical

---

[34] Ibid., pp. 512-520.

[35] R. C. Ingalls, "Problems of Staffing the Community College," National Association of School Principals Bulletin, 37:393-401; April 1953.

of the experiences encountered by those who have conducted surveys where Education courses were being evaluated[36].

> The point of greatest tension within each group, attested to by the vigor and emotionalism of the statements concerned, had to do with the function and offerings of departments of Education. The heaviest criticism of all tended to come to a head over courses in Education and practice teaching.

Practice teaching. As mentioned in the last section, practice teaching has frequently been a controversial issue. Most of the writers in the junior college field seem to agree that some type of practical, on-the-job training of this kind is desirable. The controversy has centered around the question of how it should be conducted and at what educational levels. In practice this phase of the training of junior college teachers has generally been secured in high schools. This is true by virtue of the fact that the largest majority of these teachers have originally prepared to teach in the high school, and most states require such practice teaching before certification. Junior college authorities have, however, urged that this practice be obtained in a junior college. The teachers who have come directly from university training have frequently not had any supervised apprentice teaching of this type. They have generally had some experience as graduate assistants but there seems to be a considerable question as to the training value of such experience. In this connection, Rex Kidd surveyed the records of 561 college teachers in a study aimed at the "Improvement of the pre-service education of college teachers[37]." He found that seven out of ten had had

---

[36] E. V. Hollis, Toward Improving Ph.D. Programs., p. 171. Washington: American Council on Education, 1945. pp. xii-204.

[37] Rex C. Kidd, "The Improvement of the Pre-Service Education of Undergraduate College Teachers," Unpublished Doctor's dissertation. University of Florida, 1951.

graduate assistantship experience, but there was little evidence that these assistantships were used to provide help in preparation for better teaching.

At least one institution has inaugurated a program of internship in junior college teaching that seems to bear considerable promise. Such a program, which has been in operation at the University of Florida for the past eight years, has recently been described by Henderson[38]. In this program, interns are carefully selected after completion of all necessary course work, and then work under a directing professor who accepts only those interns who he feels are qualified. Their teaching, in lower division courses at the university, is closely supervised by this professor and all interns meet in a weekly seminar with a coordinator. At the end of the term the intern, the directing professor, and the coordinator meet in an attempt to evaluate the work of the student teacher.

In California, where practice teaching in a junior college is specifically required for a state certificate, the actual practices appear to depart considerably from the ideal as evidenced by these remarks from Ehmann[39].

> In view of the lack of satisfactory arrangements between credential-granting institutions and nearby junior colleges, candidates have been permitted to offer "other" or "equivalent" experience. Instead of doing a semester of practice teaching in their academic major in a regular junior college class, they have been

---

[38] L. N. Henderson, "Internship in Junior College Teaching," Junior College Journal, 27:388-95; March 1957.

[39] Gerhard E. Ehmann, "Some Criteria for the Training of Teachers in General Education at the Junior College Level in California," p. 230. Unpublished Doctor's dissertation. University of California, Los Angeles, 1951.

> allowed to offer instead experience obtained as a graduate assistant at a university. At the University of California, Los Angeles, for example, students have in the past evaded the specific practice teaching requirement and obtained a junior college credential on the basis of a teaching assistantship held for an academic year. Curious anomaly though it seems, teaching assistantships most often do not involve teaching of classes, but rather assisting professors in preparation of materials, correcting papers, constructing and correcting tests, and the like...Teaching assistants who really teach, do so not for the purpose of giving the graduate student any planned and thoroughly supervised experiences in teaching at the junior college level. Such teaching is rarely observed and used as training by master teachers or state education officer...This sort of experience...appears to be quite inadequate as a substitute for practicum in junior college teaching.

3. Degree Levels Desired.

As mentioned in the previous section, Walter Eells was one of the first to urge that junior college teachers should obtain training at a level somewhat beyond the master's degree. He favored a minimum of two years of graduate study[40]. Sexson and Harbeson have also been previously cited as favoring a similar level of training[41]. Colvert's[42] summary of research investigations of this question shows clearly that there has been a steady trend toward this objective since 1918. However, Punke's[43] study reveals that large numbers of junior colleges still have faculties with an average preparation that falls somewhat below, rather than above, the master's level.

The question of whether junior college teachers should have, or

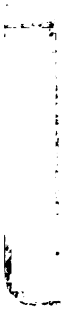
---

[40] See p. 17.

[41] See p. 17

[42] Clyde C. Colvert, "Professional Development of Junior College Instructors," Junior College Journal, 25:474-78; April 1955.

[43] Harold D. Punke, "Academic Qualifications of Junior College Faculties," Junior College Journal, 23:366-79; March 1953.



at least work toward, a doctorate, has been debated at considerable lenth. In this connection, H. L. Smith wrote[44], "the regimen required for the Ph. D. has engendered skills and subject matter fancies which very often cause a person to be ill-equipped to do the job." In contrast to this opinion one finds one of the leading authorities, Leonard V. Koos, saying[45]: "Junior college teachers should be held to a year of graduate residence and the master's program, and at the same time to look toward the doctorate degree."

Various special degrees and training programs have been proposed. Typical of these proposals, but unique in its actual inclusion in a university training program, is the series of degrees now available at the University of Florida[46]. At that institution it has now been possible, for the past eight years, to earn: (1) an M. Ed. degree requiring 12 - 18 credits in the subject field plus 18 - 24 credits in professional courses; (2) an Ed. S. (Specialist in Education) degree requiring thirty-six credits beyond the master's; and (3) an Ed. D. degree requiring the usual three years of graduate work.

A proposal for a similar program was made, but never activated, at the University of Texas in 1951[47]. This program would have offered a two-year graduate degree based on the completion of sixty hours of graduate work; forty-two of these credits to be in the subject matter field with not less than six semester hours in each of three departments; six

---

[44] H. L. Smith, op. cit., p. 392.

[45] Leonard V. Koos, op. cit., p. 88.

[46] L. N. Henderson, op. cit., p. 390.

[47] "A Two-Year Graduate Degree," mimeo. University of Texas, June 1951.

hours were to be in Education courses dealing specifically with the junior college; a six-credit, or larger, thesis based on research in the subject matter field or in Education, was to be required; and six hours were to be granted for a teaching internship either in a junior college or as a teaching fellow at the university.

4. Non-Academic Work Experience.

Although the literature contains some reference to the desirability of junior college teachers having had some experience of this type, there seems to be little evidence that it is particularly desired except for those in the terminal-vocational curricula. Gilger[48] urges it strongly for these areas but not for the teachers of academic subjects.

Contrasting with this, Novak[49] sees industrial experience as highly desirable for teachers of science. He feels that it should not be in the nature of regular summer employment for the purpose of augmenting income, but should be sought during an occasional summer to help bring more security, practicability, modernity, and enthusiasm to their teaching.

No research relating directly to this question, as applied to junior college science teachers, was found.

5. Selection of Candidates to be Trained and Training Institutions.

These aspects of the problem of securing adequate numbers of

---

[48] G. A. Gilger, "Should Instructors Have Work Experience?" Junior College Journal, 13:192-7; December 1942.

[49] B. J. Novak, "And As for Industrial Experience," Science Teacher, 21:221-3; October 1954.

junior college teachers appear to have been largely neglected both in the literature and in actual practice.

Blegen[50] calls attention to the desirability of taking steps to encourage promising students to enter the college teaching field. He was not specifically referring to junior colleges, but the proposal seems equally valid for them. He emphasizes the well-recognized fact that graduate schools are primarily concerned with the training of research scholars who come to consider themselves primarily as subject matter specialists and secondarily, in some cases, college teachers. After taking an informal poll of the members of his own staff, Blegen found that over 90 per cent of them became teachers because of the encouragement given by some one of their undergraduate teachers. He urged that there should be much more of this early "tapping" of promising prospects.

In a similar vein, Ruth Eckert[51] urged the adoption of Ph.D. programs that looked toward a teaching, rather than a specialist, career. She hoped that such programs would strive to develop early in graduate student's lives the feeling that they were to become teachers rather than physicists or chemists, etc.

As to institutions that offer training programs for junior college teachers, there seem to be very few in existence. The Junior College Journal[52] listed thirty-four institutions where some course work in this

---

[50] Theodore C. Blegen, "The Graduate School and Education of College Teachers," The Education Record, 29:12-25; January 1948.

[51] Ruth E. Eckert, "Some Neglected Aspects in the Preparation of College Teachers," The Journal of General Education, 3:137-44; January 1949.

[52] "Where to Go for Junior College Teacher Preparation," Junior College Journal, 18:444-45; April 1948.

area was being offered in 1948. However, none of these were described as well developed or complete in any adequate sense of the word. Many of these institutions have undoubtedly improved their offerings substantially in the past nine years, but adequate training programs still appear to be relatively rare.

III Research Studies

Several research studies which pertain directly to the training of junior college teachers have been carried out. Those which appear to be most pertinent to the current investigation are reviewed in this section under these headings: (1) Studies primarily concerned with the differences between junior and senior college teaching, (2) Studies primarily concerned with desirable teacher attributes and competencies, (3) Studies primarily concerned with academic and professional training of junior college teachers, (4) A study concerned with the desirability of high school teaching experience for junior college teachers, (5) Studies concerned with the availability of junior college teacher training programs in colleges and universities, (6) A study concerned with the ranking, tenure, and sex of junior college instructors, and (7) A study concerned with the physical science subject matter needed by general or physical science teachers.

1. Studies Primarily Concerned with Differences Between Junior and Senior College Instructors.

In 1929 a survey which attempted to identify the principal differences between junior and senior college instructors was reported by Reeves[53]. Questionnaire responses were obtained from seventy-nine

[53] F. W. Reeves, "How to Improve Instruction in Junior Colleges," Nations's Schools, 3:69-75; April 1929.

of the 180 junior colleges then in existence. Twenty of these same campuses were also visited personally by the author. Sixty four-year colleges were also canvassed in this study. The principal differences found were[54]:

1. Fifty-seven of the junior colleges required their teachers to have had some work in Education courses; twenty-nine required from fifteen to eighteen semester hours; nine required more than eighteen hours, and the remaining schools required less than fifteen. None of the senior colleges required their instructors to have any training in Education courses.

2. The number of years of graduate training for junior college personnel was found to be less than that for senior college teachers, but the differences were slight when the comparison was made between junior college teachers and lower division instructors in the senior college.

3. Fifty-three of the junior colleges exercised considerable supervision over their instructors; forty-seven of them to the point of frequent direct classroom observation. This kind of supervision was found to be virtually absent in the senior colleges.

In a Yale University doctoral dissertation, which was completed in 1940, Garrison[55] reported the results of a survey of the teachers and administrators in fifty-one local public junior colleges with enrollments between 150 and 750 students. The survey was conducted in an effort to: (1) determine the academic and professional qualifications of instructors then in service in junior colleges, (2) determine the professional

---

[54] Ibid., p. 74.

[55] Amos L. Garrison, "Junior College Teachers: Their Academic and Professional Education," Unpublished Doctor's dissertation. Yale University, 1940. Pp. v-173.

responsibilities carried by those instructors, (3) determine ways in which teaching in public junior colleges differed from that in high schools and in senior colleges, and (4) make recommendations concerning the preparation of junior college instructors. Returns were obtained from 716 teachers and forty-nine administrators, all of these coming from fifty-one of the sixty-five schools that had previously agreed to participate in the study.

The principal findings in this study were[56]: (1) The master's degree was an almost universal requirement. (2) A tendency to move toward requirement of the Ph. D. degree was identified. (3) Instructors were being recruited chiefly from high schools (70 per cent), colleges and universities (35 per cent), elementary schools (22 per cent), and junior high schools (16 per cent). (4) In order of preference, the administrators preferred teachers with experience in: (a) other public junior colleges, (b) college or university teaching, (c) high school teaching. (5) Most of the teachers in the survey held a state certificate. (6) Approximately ten Education courses were recommended by most teachers and administrators. (7) The average teacher gave instruction to three or four classes requiring three preparations and meeting for a total of twelve hours per week. (8) Many of the teachers also taught in other school units; chiefly high schools. (9) A majority of the teachers assumed extra-class responsibilities. (10) Most of the teachers were teaching in their subject matter majors. (11) Ninety per cent of the teachers reported no research or publications during the year of the study. (12) The principal factors considered in the employment of teachers

---

[56] Ibid., pp. 83-4

were: (a) ability as a classroom instructor, (b) professional growth, (c) knowledge of subject matter, and (d) understanding of the educative process. (13) The teachers considered the junior college to be more like a high school than like a senior college. (14) The administrators generally stated that from thirty-seven to forty-three semester hours were needed by the teachers in the subject matter areas in which they would give instruction. (In this light 26 per cent of the teachers in the sample were inadequately prepared.) (15) Many of the teachers were of the opinion that subject matter training should not be sacrificed to courses in Education, but a very large number approved of courses in psychology, practice teaching, college education, junior college guidance and counseling, philosophy of education, tests and measurements, and methods of teaching[57].

Garrison also found some difference in the total number of semester hours of training needed in different subject matter fields.[58] In this respect the social sciences led the list with 43.5 hours, while physical science and literature needed about forty hours; biological sciences, fine arts, vocational subjects, and languages each needed from thirty-seven to thirty-eight hours.

2. Studies Primarily Concerned with Desirable Teacher Attributes and Competencies.

In a study of the qualities of a good college teacher, conducted at a southern liberal arts college in 1943, Odom identified thirty-six

---

[57] Ibid., p. 48.

[58] Ibid., p. 55.

such qualities[59]. All of these were considered to be of some importance by 121 students and twenty-six faculty members. In rank order, the first six of these were: (1) knowledge of subject, (2) knowledge of teaching methods, (3) pleasing personality, (4) fairness and impartiality, (5) interest in student's viewpoint, and (6) high moral character. Most of the remaining qualities that were mentioned in the report did not receive rating scores high enough to be considered of significant value.

In this same connection, Geyer[60], in 1945 published a brief summary of several studies of the qualities desired in college instructors. While not all of these studies were in precise agreement as to the rank order of importance of these traits, the following appeared to be the most outstanding:

1. Knowledge of subject matter
2. Personality to put the course across
3. Fairness or impariality
4. Ability or skill in teaching or organizing subject
5. Ability to get along with students
6. Sincerity and honesty
7. Sense of humor
8. Appearance.

An extensive study related to this question was conducted by a team of research specialists at Rutgers University in 1947 and reported by Riley[61]. In this study each student at Brooklyn College was asked to rate five of his current instructors on ten different attributes that were considered important in good teaching. The traits on this list were

---

[59] S. L. Odom, "An Objective Determination of the Qualities of a Good College Teacher," Peabody Journal of Education, 21:109-16; September 1943.

[60] D. L. Geyer, "Qualities Desired in College," School and Society, 63:270-71; April 1946.

[61] John W. Riley Jr. et al, The Student Looks at His Teachers, New Brunswick: Rutgers University Press, 1950. Pp. iii-154.

essentially the same as those listed above by Geyer. Of particular interest to the present investigation is the fact that the Brooklyn College students showed a marked difference as to the relative importance of the various teacher characteristics as viewed by students from different academic divisions of the college.

The listings in table I[62] show clearly that science students were not only in closer agreement as to which were the most important attributes, but also they favored different attributes than the social science or arts students.

TABLE I

RELATIVE IMPORTANCE OF FACULTY ATTRIBUTES AS VIEWED BY BROOKLYN COLLEGE STUDENTS

Rank Order	Attributes	Percentage of students
	SCIENCE STUDENTS	
1.	Ability to Explain	89
2.	Organization of Subject Matter	78
3.	Knowledge of Subject	70
	SOCIAL SCIENCE STUDENTS	
1.	Encouragement to Thinking	70
2.	Organization of Subject Matter	48
3.	Tolerance to Disagreement	45
	ARTS STUDENTS	
1.	Knowledge of Subject	54
2.	Encouragement to Thinking	47
3.	Enthusiastic Attitude	46

[62] Ibid., p. 93.

The question of teacher competence was also studied by Ostlie[63]. A part of his thesis dealt with the deficiences which were most frequently identified in probationary (prior to placement on permanent tenure) teacher service. Out of a list of thirteen competencies, skill in teaching was identified as the one in which failures were most frequent. Ability to inspire students, ability to handle classroom discipline, and ability to deal with individual differences were the next three competencies in order of their importance on this list. Failure in the competency entitled "knowledge of subject matter" was not frequently noted.

In 1952, Oren R. Rankin[64] reported the results of "A Study of Competencies Desirable for Instructors of College General Education Courses in Physical Science." This study did not deal specifically with junior college teachers, but the findings from it appear to be particularly pertinent to the present investigation. Rankin's data were obtained from 348 questionnaires returned by general education physical science teachers in 184 schools in forty-two states. He also obtained responses from 148 administrators in these same schools. Mean ratings were obtained for thirty different competencies. These were based on a five-point scale with 5 the highest, and 1 the lowest possible rating. Excerpts, which are thought to be of particular interest to the present study, were taken from Rankin's report and are shown in Table II[65].

---

[63] Selmer Ostlie, "The Selection and Retention of Junior College Teachers," Unpublished Doctor's dissertation. University of Southern California, 1951. Pp. xxxiii-602.

[64] Oren R. Rankin, "A Study of Competencies Desirable for Instructors of College General Education Courses in Physical Science," Science Education, 36:297-306; December 1952.

[65] Ibid., pp. 96-7.

TABLE II

MEAN RATINGS ESTABLISHED FOR THIRTY STATEMENTS OF INSTRUCTOR COMPETENCE BY 348 INSTRUCTORS OF COLLEGE GENERAL EDUCATION COURSES IN PHYSICAL SCIENCE

The ability to:	Mean Rating
1. do research in a field of physical science	2.68
2. explain the basic facts, concepts, theories and laws of physical science	4.46*
.....	
12. devise and use effectively appropriate demonstrations of scientific principles.	4.07
13. relate the various fields of science to each other	4.04
.....	
18. construct suitable instruments for measuring student achievement.	3.12
19. direct research at the graduate level in a specialized area of physical science.	1.93
.....	
23. apply psychological principles to the teaching of science.	3.35
.....	
26. read scientific publications in one or more foreign languages.	1.75
27. give students adequate instruction in only one area or the physical sciences.	1.72**
.....	
30. give adequate instruction in all areas of the physical sciences.	3.66

* The highest mean rating on the total list.

** The lowest mean rating on tne total list.

A pioneering study which attempted to determine the validity of many of the criteria which are commonly used in the selection, retention, and promotion of college teachers was reported by Colvert.

In this report[66], the author summarized the results of two unpublished doctoral dissertations which were done at the University of Texas in 1951. The two studies analysed different aspects of the same data which were collected from 250 junior colleges.

On the assumption that a committee of administrators and faculty should be able to select one outstanding teacher from their own faculty, a list of 250 such "good" teachers was obtained on the basis of selecting one from each of that same number of colleges. The control group was selected by means of a random selection device which resulted in a similar number of supposedly average teachers; one coming from each of the campuses represented on the first list.

Data which pertained to thirty-three aspects of academic preparation, seventeen aspects of community activities, and nine aspects of professional activities were obtained from questionnaires and transcripts from each of the five-hundred teachers.

Significant differences between the "good" and "control" teachers were found in only a few of these areas and where they were found their implications were not very clear. The most surprising result of this study would appear to be the lack of difference between these two types of teachers. The list of aspects were as follows[67]:

Academic preparation

A significantly greater number of the "good" teachers:

1. Reported attendance at public elementary schools.

---

[66] Clyde C. Colvert, "Report of the Research Office, American Association of Junior Colleges," Junior College Journal, 26:95-107; October 1955.

[67] Ibid., p. 96-7.

2. Had a broad undergraduate college training.
3. Had received college credit for a course in History of Education.

A significantly greater number of the "control" teachers:

1. Reported attendance at kindergarten.
2. Reported the bachelor's as the highest degree earned.
3. Had college credit for a course in Educational Administration.
4. Reported more than three years of experience in vocational fields not closely related to their teaching fields.

No significant differences were found between the "good" and "control" teachers on the following aspects:

1. Junior-high school attendance.
2. Public or private high school graduation.
3. Junior college attendance.
4. Sources of highest earned degrees.
5. Total number of hours of college credit and the total in Education courses.
6. Semester hours in major teaching department.
7.- 16. College credit received in a selected list of specific Education courses.
17. - 19. Extra-curricular activities as an undergraduate, and as a graduate student.
20. - 23. Previous teaching experience in elementary school, junior high school, high school, and junior college.
24. - 25. Previous college teaching or school administrative experience.
26. Experience in vocational fields closely related to their respective teaching fields.

Community Activities

A significantly greater number of the "good" teachers:

1. Voted in the last primary or local election.

No significant differences were found between the "good" and "control" teachers on the following aspects:

1. - 3. Church attendance, service on church committees, or teaching a Sunday School class.
4. - 7. Membership in a lodge, attendance at lodge meetings, service on a lodge committee, or holding a lodge office.
8. - 11. Membership in a service club, attendance at service club meetings, service on a service club committee, or holding a service club office.
12. - 13. A similar list with respect to other types of clubs.
14. - 16. Teaching or helping in some other way in a volunteer group such as young peoples clubs, Scouts, Y.W.C.A., etc.

Professional activities

A significantly greater number of the "good" teachers:

1. Held an appointive office in a professional group.

No significant differences were found between the "good" and "control" teachers in the following aspects:

1. - 6. Connections with professional organizations whether through membership, attendance, presentation of papers, or serving on panels at professional meetings.
7. Participating in workshops during the past five years.
8. Number of publications in the last five years.

As mentioned previously, it is surprising to find so few differences between "good" and "average" teachers. The lack of differences may have been due to the inability of administrators and faculties to select even one outstanding teacher from among their entire faculty, but this seems unlikely. It would seem more likely that this study further illustrates the extreme difficulty involved in any effort to predict who will become effective teachers on the basis of past academic, social, and professional performance. It certainly throws considerable doubt on the validity of some of the standard criteria that are used administratively in the selection and promotion of teachers.

3. Studies Primarily Concerned with Academic and Professional Training of Junior College Teachers.

In 1927 Haggerty[68] published a report of a North Central Association committee that had been formed to "study the proposal to require professional training for instructors teaching the first and second years work in colleges and universities, and to ascertain the attitude of the members of the association regarding the requirement of

---

[68] M. E. Haggerty, "The Professional Training of College Teachers," North Central Association Quarterly, 2:108-23; June 1927. p. 108.

Educational qualifications for college and university teachers." Questionnaires were distributed to teachers in eight institutions; two of these were junior colleges, three were private colleges, and three were state colleges. The following findings were based on returns from 148 teachers[69]:

> The typical teacher of freshmen and sophomores has: (1) had little professional training outside of his subject matter specialty; (2) met many educational problems in which he has had no formal training; (3) found about four-fifths of his problems still unsolved after teaching for seven years; (4) felt that in about two-thirds of his problems he could have been helped by formal course instruction.

In the same study, seventy-two administrators answered questionnaires. These administrators rated professional Education training as "of little importance" in selecting teachers. Deans of several graduate schools in the North Central area were similarly uninterested in Education courses. Haggerty concluded the committee report by stating[70]:

> Despite the indifference of college administrators and graduate schools to the claims of professional training, there is a clear recognition on the part of college instructors that such training in formal courses would be useful.

The most significant research that appears to have been done in the area of professional and academic preparation was reported by Leonard V. Koos[71] in a series of articles which were published in 1948. The data on which these reports were based were gathered in 1941 from forty-eight local public institutions which were selected as representative

---

[69] Ibid., p. 114

[70] Ibid., p. 120

[71] Leonard V. Koos, "Junior College Teachers; Background of Experience." p. 457-69, "Degrees and Graduate Residence." p. 77-89, "Preparation in Education." p. 332-44, "Subjects Taught and Specialized Preparation." p. 196-209, Junior College Journal, 18:(pp. as above); September 1947 to May 1948.

of the community college concept. Reports were obtained from 1458 teachers, which was approximately 91 per cent of the teachers in these institutions. The questionnaire to which these teachers responded dealt with[72]: (1) the degrees held and (2) the degrees toward which the teachers were working at the time of the inquiry; (3) the period of undergraduate residence; (4) undergraduate and graduate major and minor subjects; (5) courses and semester hours in the field of Education; (6) previous educational experience; (7) the courses taught by the teachers during the two semesters of the year of report, with the predominant classification of students in each class; and (8) other duties."

The degrees toward which the teachers were working at the time of the inquiry are shown in Table III[73].

As to the courses taught by the teachers during the year of the report, Koos reported that[74] "fewer than half of all academic teachers in the forty-eight junior colleges were privileged to have assignments in a single subject only." Details reported for three of the physical science areas are included in Table IV[75].

As to the combinations most frequently reported by those who teach in more than one area, Koos stated[76]:

> The most frequent associates of chemistry in combination are physics, physical science (usually as a composite course), mathematics, and industrial or technical (engineering) subjects. For

---

[72] Ibid., p. 77.

[73] Ibid., p. 87.

[74] Ibid., p. 197.

[75] Ibid., p. 199.

[76] Ibid., p. 201.

TABLE III

PERCENTAGE DISTRIBUTION OF TEACHERS HOLDING THE MASTER'S AS THE HIGHEST DEGREE, ACCORDING TO FURTHER DEGREES TOWARD WHICH THEY WERE WORKING, FIELDS OF STUDY OF THE FURTHER DEGREES, AND POSITIONS FOR WHICH TEACHERS WERE WORKING

Degree, Field, and Position	Per Cent
Degree toward which working (900 teachers)	
Ph.D.	26.5
Other	4.4
Total	30.9
Field of the degree (280 teachers)	
Subject matter	78.2
Education	27.5
Other	7.1
Position for which preparing (185 teachers)	
Junior college teaching	43.8
College or university teaching	37.3
Junior college or teacher's college teaching	4.3
High school or junior college teaching	2.2
High school teaching	5.4
Administration	6.5
Other	0.5

TABLE IV

NUMBER AND PERCENTAGES OF JUNIOR COLLEGE INSTRUCTORS OF CERTAIN SUBJECTS TEACHING THESE SUBJECTS ONLY, AND TEACHING THEM IN COMBINATION WITH OTHER SUBJECTS

Subject	Subject named only		Combined with others	
	Number	per cent	Number	per cent
Chemistry	44	52.4	40	47.6
Physics	13	22.4	45	77.6
Mathematics	69	49.3	71	50.7

physics the most recurrent associates are chemistry, general physical science, astronomy, mathematics and industrial or technical subjects. For mathematics, they are chemistry, physics, astronomy, industrial and technical subjects, and business.

Concerning previous teaching experience, Koos stated that about three-fifths of all the teachers reported their last previous positions to have been in high school work; for an eighth of these teachers their experience was in college or university teaching. The proportion coming from schools below the high school was about the same as from colleges and universities.

In regard to Education courses that had been taken by junior college teachers of academic subjects, Koos reported on twenty-seven such courses. Table V[77] has been adapted from that report and includes only those courses that appear to be of particular value to the present

TABLE V

PERCENTAGES OF JUNIOR COLLEGE TEACHERS OF ACADEMIC SUBJECTS REPORTING HAVING HAD THE INDICATED COURSES IN EDUCATION

Courses in Education	Per Cent
Educational Psychology	81.7
History of Education	77.1
Practice Teaching	59.0
Tests and Measurements	58.3
Philosophy of Education	56.6
General Methods	51.3
Principles of Secondary Education	49.6
Principles of Teaching	42.4
Introduction to Education	39.0
Educational Administration	35.2
Psychology of Adolescence	28.4
Curriculum Construction	24.4
Guidance (educational and vocational)	18.9
Junior College	9.5
Junior College Administration	3.5

[77] Ibid., pp. 339-41.

discussion.

Commenting on these and other results of this study, Koos stated[78]:

> Described in terms of medians, the typical academic teacher has had about two years of graduate residence...Thus the period of residence exceeds notably the minimum required for the typical degree...This conclusion and the fact that large proportions of teachers with the master's degree reported that they were working toward the doctor's and other degrees force the inference that current programs for the master's degree afford inadequate preparation for teaching in the junior college.

In Blake's[79] study of "The Problems and Training of the Junior College Instructor," which was reported in 1942, data were gathered from 1369 instructors. The principal emphasis in this survey was on the problems confronted by these teachers. However, it was reported that[80] "932 or approximately two-thirds of the teachers have had ten or more semester hours of Education." Also[81], "on the graduate level, 802 or slightly less than two-thirds have had nine or less semester hours of Education." More than two-thirds held the master's degree, and more than one-third had studied the junior college in a separate course. Approximately four-fifths were teaching in their major field of concentration. As for teaching experience, Blake found that approximately half had had ten years or less in high school while slightly over half had had ten years or less in junior colleges.

The problems most frequently encountered by the respondents to

---

[78] Ibid., p. 89.

[79] Wainwright D. Blake, "The Problems and Training of the Junior College Instructor," Unpublished Doctor's dissertation. University of Missouri, 1942. Pp. iv-122

[80] Ibid., p. 23.

[81] Ibid., p. 24.

Blake's study were[82]:

Attempting to teach students whose high school preparation has been poor.

Adjusting assignments and written work to the ability of the student.

Making provision for individual differences.

Integrating the work of the high school and junior college.

Revising the curriculum.

Integrating the work of the junior college and higher institutions.

Cooperating with students in building loyalty to the college.

Assisting students to learn how to study effectively.

Cooperating with students in the development of their personalities.

Assisting students to learn their responsibility to society.

Significant differences in the professional training of teachers identifying these as serious problems were found only in respect to such training at the graduate level. In this connection[83], "nearly 60 per cent of the instructors who reported difficulty with these problems had no work in professional Education at the graduate level, or only a minimum." It was also noted that[84] "practically one-third of the instructors reporting the presence of these ten problems did not have enough hours of undergraduate Education courses to qualify under any of the standards published by the various accrediting agencies."

---

82 Ibid., p. 57.

83 Ibid., p. 79.

84 Ibid., p. 80.

Blake concluded by indicating that his findings[85] "clearly reveal the necessity of graduate professional work in Education." The courses suggested were similar in title to those listed by Garrison[86].

An American Association of Junior Colleges study of the preparation of instructors was reported in 1943 by Pugh and Morgan[87]. One hundred and five junior colleges participated in the study and the findings included the following specific shortcomings[88]:

1. Preparation is too frequently of a narrow and specialized nature.

2. Instructors have the content point of view rather than the student point of view.

3. Instructors generally lack a suitable balance of subject matter and professional training.

4. Teachers do not understand the junior college.

5. Teachers fail to develop personality traits adapted to dynamic leadership of youth.

6. Teachers lack ability or knowledge to relate their teaching to practical everyday problems.

7. Placement officers make recommendations upon insufficient evidence.

8. Teachers are too often interested in research, and not in classroom teaching.

9. Teachers tend to consider the junior college with an air of condescension.

10. Teachers lack work experience.

---

[85] Ibid., p. 80.

[86] See p. 32.

[87] D. B. Pugh and R. E. Morgan, "Shortcomings in Preparation of Instructors," Junior College Journal, 14:405-15; May 1944.

[88] Ibid., p. 406.

The following specific recommendations for the training of junior college teachers were made[89]:

1. They should have a sound liberal and cultural education.

2. They should have an adequate knowledge of the subject matter field. (No definition of what constitutes an "adequate knowledge" was given by the author.)

3. They should obtain professional preparation to fit them specifically for the junior college. This should include: (a) an understanding of the philosophy, aims, functions, organization, problems, etc., of the junior college; (b) educational psychology and methods with particular reference to the problems of the junior college student; (c) training in guidance and counseling; and (d) apprentice teaching and observation in the junior college.

In addition to the professional courses recommended by Pugh and Morgan, Dolan[90] found that junior college teachers in Illinois favored the inclusion of work in audio-visual education. His findings were based on a survey which obtained questionnaire returns from 57 per cent of the 889 junior college teachers in the state in 1949. The teachers were asked to evaluate their own professional Education courses and to indicate others which they now felt would have been of value to them. His final recommendations were quite similar to those of Garrison, Pugh and Morgan, Eckert, and Koos. Points not previously mentioned in this summary as being stressed by other authors were[91]:

Inasmuch as junior college teachers ordinarily also have to teach in high school, it is recommended that they be given the same Education courses commonly required of candidates for secondary school teaching, with the addition of audio-visual education plus special junior college courses.

The California State Department of Education conducted a survey

---

89 Ibid., p. 414.

90 F. H. Dolan, "The Preparation of Junior College Teachers," Junior College Journal, 22:329-36;February 1952.

91 Ibid., p. 333.

of academic preparation of junior college personnel in 1947[92]. Of the 1884 public junior college instructors canvassed, 90 per cent held advanced degrees, and 12 per cent of the total held the doctorate. Many who held the master's were said to be well along toward the doctorate. As to their actual teaching, only thirty-three out of 1452 were giving instruction outside of their major and minor fields.

An excellent summary of the California junior college teacher training programs and their shortcoming was reported in 1951 by Ehmann[93]. The data used were drawn from an extensive survey and analysis of the pertinent literature, and the collected opinions of a group of twenty-three of the thirty-nine "experts" to whom requests for such information were directed. Training which would meet the following objectives was proposed[94].

Teacher candidates should:

1. Develop breadth of training and interest.

2. Have a sense of social obligation.

3. Develop insight into the needs and characteristics of their pupils.

4. Develop advanced proficiency in the communicative skills.

5. Consider emotional stability as a necessary personal goal.

6. Have an interest in teaching integration.

---

[92] M. E. Mushlitz, "Academic Preparation of Junior College Personnel," California Journal of Secondary Education, 22:492-5; December 1947.

[93] Gerhard E. Ehmann, "Some Criteria for the Training of Teachers in General Education at the Junior College Level in California," Unpublished Doctor's dissertation. University of California, Los Angeles, 1951. Pp. iv-324.

[94] Ibid., pp. 297-300

7. Know how to maintain reasonably vigorous physical health.

8. Insist on continual evaluation, by themselves and others, of their general education teaching.

9. Know how to work educationally with older adults.

10. Serve an internship.

These recommendations were not translated directly into specific training practices. It appears to be the author's contention that such efforts in the other studies, particularly Garrison's, have resulted in a mere re-shuffling of familiar courses without particular practical benefit. He apparently preferred to have training institutions develop their own programs aimed toward the attainment of the above-listed goals.

Another pertinent study was reported by Tapley[95]. He obtained data from sixteen junior colleges in the southern area; at that time this area contained 196 junior or community colleges. His findings were based on data obtained from 74 per cent of the 180 teachers in a sampling of these schools, and on complete returns from twenty-eight administrators and a panel of fourteen "experts."

In his findings Tapley divided the teachers into two groups. Group A consisted of those who had had less than twelve hours in professional courses, and group B consisted of those who had had more than this.

Group A[96]: (1) largely contained those who would dispense with all professional courses, and (2) these teachers tended to relegate such

---

[95] E. M. Tapley, "Preparation for Teaching General Education Courses in Junior Colleges," Unpublished Doctor's dissertation. University of Chicago, 1955. Pp. xi-200.

[96] Ibid., p. 138.

courses to the undergraduate years.

Group B teachers[97]: (1) rarely felt that professional courses should be omitted at either the undergraduate or the graduate level; (2) favored having a significantly greater proportion of the teacher's total preparation time alloted to professional training at the graduate, rather than at the undergraduate, level; and (3) did not differ significantly with the experts or the administrators in the suggested proportions at either level.

Tapley also endeavored to determine how valuable the various Education courses taken by the teachers in the survey had been to them. Wide differences of opinion were noted, but the most general description of the results was given in the following statement[98]:

> 1. Teachers participating in this study who report they have taken courses in a professional area recommended by the literature or accrediting standards, tend to rate such courses significantly higher than do those teachers who do not report a course in the area.
>
> 2. Administrators and experts tend to give relatively higher value ratings to preparation in a majority of the professional areas than do the teachers.

Rankin's study, which has been previously cited on page 35, also made an effort to evaluate several different types of training programs for college teachers of general education courses in the physical sciences. Table VI shows the results of that evaluation. The mean ranks were computed after first assigning the number 1 to an item listed in first place, a number value of 2 to an item ranked in second place, etc. Thus the lowest mean rank values correspond to those seen as most

---

[97] Ibid., p. 139.

[98] Ibid., p. 110.

important.

TABLE VI

MEAN RANKS ESTABLISHED FOR SEVEN TYPES OF TRAINING BY ADMINISTRATORS AND INSTRUCTORS[99]

Type of Training	Mean Rank Admin.	Instr.
1. Specialization in one area of the physical sciences	5.72	5.31
2. Specialization in one area of the physical sciences with some training in other areas of the physical sciences.	3.35	2.79
3. Training in all areas of the physical sciences without specialization in any of the areas.	3.70	3.77
4. Training in both the physical and biological sciences without specialization in any one area.	4.28	4.28
5. Specialization in one area of the physical sciences with some training in psychology and methods of instruction.	4.15	4.28
6. Broad training in the physical sciences and some training in psychology and principles and methods of instruction.	2.73	3.28
7. Broad training in both the physical and biological sciences and some training in psychology and principles and methods of instruction.	3.18	3.68

Harold Punke[100] reported on the academic qualifications of junior college faculties in the country in 1953. Extensive tabulations were reported in this article. Colleges were rated as to level of faculty preparation on the part of both men and women teachers. Subdivisions included four different college enrollment divisions, three types of

[99] Oren R. Rankin, "A Study of Competencies Desirable for Instructors of College General Education Courses in Physical Science," Science Education, 36:297-306; December 1952.

[100] Harold H. Punke, "Ranking, Tenure and Sex of Junior College Faculties," School Review, 62:480-7; November 1954.

financial control, and nine different geographic areas. The author's statistics showed that:

> A larger percentage of the men on the faculties of church or private schools had doctor's degrees than was the case for men in the publicly controlled schools[101].
>
> Faculty members in the publicly controlled junior colleges had a higher level of training than in either of the other two types of institutions[102].
>
> A slightly higher percentage of the schools in the South Atlantic and Mountain divisions had faculties with training which averaged below the bachelor's degree than was true of the schools in other divisions[103].
>
> The junior colleges in the East North Central division had a higher average level of training among their faculty than the schools of any other division[104].
>
> An examination of the data does not indicate that the faculties of junior colleges with enrollments of more than 500 students are consistently superior to the faculties of smaller schools. However, in the Pacific division...the training of faculty members in institutions of this size was on the whole definitely superior to that of faculties in smaller schools[105].

Table VII shows average faculty ratings for schools of various sizes as obtained by this study. The averages were obtained by allowing two points for each faculty member who held only the bachelor's degree, four points for each master's, and eight points for each staff member who held the doctorate. From the totals it can be seen that 3 per cent of the schools had an average rating below the bachelor's level, 32.6 per cent averaged at that level, 57.3 per cent averaged midway between the

---

[101] Ibid. p. 367

[102] Ibid.

[103] Ibid., p. 370

[104] Ibid.

[105] Ibid., p. 371.

bachelor's and master's levels, and 7.1 per cent averaged just at the master's level.

TABLE VII

AVERAGE FACULTY RATINGS FOR JUNIOR COLLEGES ACCORDING TO SIZE AS MEASURED BY STUDENT ENROLLMENT[106]

School Size (Student enrollment)	No. of Schools	Percentage Distribution for Each Rating			
		1	2	3	4
200 or under	128	4.7	42.9	46.9	5.8
201 - 500	134	1.5	27.6	66.4	4.5
501 - 1000	42	4.8	31.0	57.1	7.1
over 1000	33	--	15.1	60.6	24.3
Total (number)	337	10	110	193	24
(per cent)	100.0	3.0	32.6	57.3	7.1

Three other surveys of the academic and professional preparation of junior college teachers have been reviewed, but will not be discussed in this summary because their findings were essentially the same as others that have been extensively reported on the preceding pages. The first of these was by Merson[107] who reported on a study which was completed in 1952. The second, by Melvin[108], was reported in 1957 and dealt with

---

[106] Ibid., p. 371.

[107] T. B. Merson, "Preparation and Selection of Instructors for Community Colleges," California Journal of Secondary Education, 31:496-501; December 1956.

[108] K. L. Melvin, "Instructional Practices Used in Selected Public Junior Colleges," Junior College Journal, 27:402-5; March 1957.

junior colleges in Colorado, Iowa, Kansas, and Nebraska. The third, by Petitjean[109], was reported in 1956 and dealt with terminal education in the junior colleges in Connecticut.

TABLE VIII

THE PER CENT OF THE INSTRUCTORS IN PUBLIC JUNIOR COLLEGES FOR THE YEARS DESIGNATED WHO HAVE THE DOCTOR'S, MASTER'S BACHELOR'S, AND NO DEGREE FOR THEIR HIGHEST DEGREE[110]

Year and Study	Total No. of Instructors	Doctor's per cent	Master's per cent	Bachelor's per cent	No Degree per cent
1918 McDowell	180	2.8	39.5	45.0	2.8
1922 Koos	163	3.0	47.0	47.0	3.0
1953 Colvert and Litton	4955	6.3	67.5	20.9	5.3
1955 Colvert and Baker	6985	7.2	68.5	17.9	6.5
1955 Tapley*	139	9.0	77.6	13.4	0.0
PRIVATE JUNIOR COLLEGES					
1918 McDowell	343	8.2	27.0	51.0	13.4
1922 Koos	129	1.0	34.0	60.0	5.0
1953 Colvert and Litton	1209	6.0	67.7	22.9	3.4
1955 Colvert and Baker	1813	7.7	62.9	26.7	2.7

*This item was not listed in Colvert's summary but was reported by Tapley as previously cited on pages 49 - 50.

[109]Charles F. Petitjean, "A Study of Terminal Education in the Junior Colleges in Connecticut," Unpublished Doctor's dissertation. New York University, 1956. As found in Dissertation Abstracts; vol. 16, part 2, p. 2067.

[110]See footnote 111.

The changes that have ocurred in the highest degree levels held by junior college teachers have been well summarized by Colvert[111]. Table VIII shows clearly the trends that have developed. In general this appears to be toward higher degree levels in more recent years. It also shows some tendency on the part of the private colleges to lag behind the public institutions in this respect.

4. A Study Concerned with the Desirability of High School Teaching Experience for Junior College Instructors.

Regarding the question of how appropriate high school teaching is as preliminary experience, Hamlin[112] reported the results of a survey of forty-three of the fifty-eight junior colleges in California in 1950. Sixty-three per cent of the administrators in these institutions preferred teachers with high school experience; 7 per cent preferred that their teachers should not have high school experience; and 30 per cent indicated they had no preference regarding this question.

Those in favor of high school experience listed reasons for this preference that indicated: (1) a concern for a sympathetic attitude on the part of the teacher; (2) better teaching ability; (3) more familiarity with modern education theory; (4) better organized classroom routine; and (5) better ability to correlate junior college and high school subject matter.

---

111 Clyde C. Colvert, "Professional Development of Junior College Instructors," Junior College Journal, 25:474-78;April 1955.

112 N. E. Hamlin, "Preferences of Junior College Administrators Toward High School Teaching Experience," Junior College Journal, 21:236-9; December 1950.

Those opposed to such experience described their reasons as: (1) such teachers cannot speed up enough to teach college courses; (2) they take too long to get rid of their high school methods: and (3) they have a tendency to "become ossified and treat students as children."

5. Studies Concerned with the Availability of Junior College Teacher Training Programs in Colleges and Universities.

Koos[113] reported a survey of the graduate schools in the country, which was made in 1948 in an attempt to learn what was then being offered in the way of training programs for junior college teachers. The results of this study indicated that complete programs of this type were practically non-existent, although many institutions were offering one or more courses pertaining to the junior or community college.

Hillway[114] reported the results of a survey of the deans of 160 American graduate schools which was conducted in 1952. Replies from 124 of them indicated[115]:

> Twenty-two rejected the idea that the preparation of effective college teachers can be considered one of the essential functions of their graduate schools.
>
> Three described their programs as aimed exclusively at the development of well trained research scholars.
>
> Forty-one of the deans (chiefly in colleges of Education) indicated that they do not regard education for research as one of the primary purposes of their schools.

---

113 Leonard V. Koos, "Programs of Junior College Teacher Preparation," Junior College Journal, 19:333-46; February 1949.

114 Tyrus Hillway, "Professional Preparation of College Teachers," Journal of Teacher Education, 3:306-7; December 1952.

115 Ibid., p. 306.

Ninety-six of the deans reported that their schools perform a variety of functions in the graduate programs, depending upon the varying needs of their students.

Only two of the deans reported that their programs require prospective college teachers to complete a course or courses in the principles, methods, or problems of instruction.

6. A Study Concerned with Ranking, Tenure and Sex of Junior College Instructors.

In a study which was conducted in 1953, based on data from 448 junior colleges, Punke[116] reported that private junior colleges were more orthodox than the public institutions in regard to their use of customary ranks that are in common use in four-year colleges and universities.

In this same study the factors considered in making promotions were also evaluated. In order of importance, they were found to be[117]: (1) graduate training and advanced degrees; and (2) quality of teaching. Little emphasis was reportedly placed on research and publications, or on non-teaching service to the community.

About half of the colleges reported that tenure was not granted to their staff members, while the remainder followed this practice with varying minimum service requirements that ranged from one year to as high as twenty years. (The latter figure was required by only one college; the most common probationary period being three years.)

As to sex, Punke reported that the private school teachers were divided in the ratio of fifty-four men to every forty-six women, while

---

116 Harold D. Punke, op. cit., p. 480

117 Ibid., p. 485.

the public institutions had seventy-three men for every thirty-seven women.

7. A Study Concerned with the Physical Science Subject Matter Needed by General or Physical Science Teachers.

In a bachelor's thesis, which was completed in 1952, Williams[118] reported the results of a brief study which endeavored to identify the "physical science subject matter a competent teacher of general or physical science needs to know." Limited data were collected, at Tennessee A. and I. State University, from reference books, periodicals, text books, and expert judgments. Ninety-one science principles were identified as being of great importance in general or physical science courses. All of these were covered in courses offered at the university but approximately one-fifth of them were not considered treated adequately for a prospective teacher. It was recommended that all general and physical science teachers take a one-year course in physical science, or courses in geology, meteorology, and astronomy in order to learn the principles which would not otherwise be adequately covered.

Summary

The literature pertaining to junior college teacher training reveals wide areas of agreement, some areas of disagreement, and simple

---

[118] C. J. Williams, "An Analysis of the Physical Science Subject Matter a Competent Teacher of General or Physical Science Needs to Know," Unpublished Bachelor's thesis. Tennessee A. and I. State University, 1952. As found in Phillip G. Johnson, "Science Education Research Studies," Science Education, 38:36; February 1954.

lack of information concerning still other areas.

Both the authorities in the field and factual data obtained in research studies appear to be in general agreement regarding the following aspects of this problem.

1. Areas of Agreement.

There is agreement regarding the fact that junior and senior college teachers differ in a number of respects.

a. Senior college teachers have only those students who are training as specialists or are there for purposes of general education, while junior college teachers frequently have both of these types of students, and terminal-vocational students whose backgrounds, motives, and interests differ markedly from the former types.

b. Junior college teachers are considered consumers of research which is, at least in part, produced by the senior college professor.

c. Teachers in the two-year institutions frequently carry heavier teaching loads than do those in four-year colleges and universities.

d. Junior college teachers are generally supervised to the extent of actual classroom observation while this practice is virtually absent in the senior institution.

e. It is common practice to require state or regional certification of junior college teachers but this is not done in the senior institutions.

f. The ideal minimum degree level for junior college teachers is seen as the master's while their senior colleagues are expected to hold the doctorate.

g. Professional Education courses are frequently required in the

preparation of junior college teachers while the four-year college teacher is not subject to this requirement. Courses in either history or philosophy of Education, the junior or community college, educational psychology, testing and measurement, and general methods are most frequently mentioned on lists of such courses that seem desirable.

There is agreement regarding certain aspects of a junior college teacher's academic and professional training.

a. His master's degree should be obtained in his academic subject area but he should not be a narrow specialist.

b. Most writers in the field favor the requirement of some work in Education courses and some practice teaching. It should not be inferred from this that there is agreement regarding how much work is needed in Education courses, what courses constitute the most important training, how much practice teaching, or where and how this practice teaching experience should be obtained.

There is agreement regarding certain attributes that should be possessed by junior college teachers.

a. Many writers have suggested various lists of the attributes which should be possessed by college teachers in general. Most of these apply equally well to the junior college situation. Lists suggested by Odom[119], Geyer[120], Riley[121], and Rankin[122] are typical of the attributes

---

[119] See p. 33.

[120] See p. 33.

[121] See p. 34.

[122] See p. 36.

considered to be of particular importance.

2. Areas of Disagreement.

There is disagreement regarding the degree levels desired.

While the general consensus favors the master's degree as a minimum, there are many schools which accept teachers in academic subjects with only the bachelor's. A general trend toward the possession of higher degrees has been noted, but there is considerable disagreement as to whether this should be extended to the doctoral level. Some favor the Ed. D. while others would prefer only a master's. A two-year graduate degree such as the University of Florida's Ed.S. (Specialist in Education) appears to be a possible solution to the controversy.

There is disagreement regarding the actual content and extent of Education courses that should be required.

a. Documentary evidence such as Ostlie's[123] has shown that junior college teachers appear to have a greater need to learn how to teach than they have for subject matter competence. However, other evidence suggests considerable dissatisfaction with the courses that have typically been offered by departments of Education. Some writers favor as little as ten semester hours in professional courses at the undergraduate level while others favor twenty or more at the graduate level. Courses in administration, audio-visual education, psychology of adolescence, the junior or community college, curriculum construction, and guidance (educational or vocational) have not generally been taken by junior college teachers. These courses are strongly favored by some writers.

---

123 See p. 35.

all except the one involving a study of the junior college itself are occassionally omitted by others who list desired sequences of this type.

b. Practice teaching is generally considered desirable but the amount that should be acquired, the educational level at which it should be performed, and the type of supervision exercised during this experience are all subject to considerable variation in actual practice and in statements of what should obtain. The most common preference appears to be for a teaching internship at a junior college but many prefer the common practice of obtaining this aspect of training in a high school. In many cases the requirement for such teaching is waived for those who have had practically unsupervised teaching experience as a graduate assistant.

There is disagreement regarding the desirability of previous teaching experience in a high school.

Previous high school teaching experience is favored by some authors while others feel that instructors with this type of experience do not make good junior college teachers. It would seem that this question would be of minor concern if more teacher candidates could be encouraged to train specifically for junior college teaching. This would be much more likely to obtain if more, and better, teacher training programs were available.

3. Areas in which there is a Lack of Information.

The specific training needed by junior college physical science teachers.

The training needed by junior college teachers in general, by those who teach general education courses, and by those in biological

Sciences have been investigated, but a similar study concerning physical science teachers has not been found.

Subject matter content needed by physical science teachers.

Two studies have dealt briefly with this question. Garrison reported on the total number of semester hours needed in each of a number of subject matter areas[124]. Physical science teachers were reported to need approximately forty semester hours, but no breakdown into specific courses was recommended. Only one study[125], and this was only a bachelor's thesis, has dealt with the specific content needed by these teachers.

Non-academic work experience.

Writers have frequently urged that junior college teachers should have sufficient practical experience of a non-academic nature to enable them to better visualize their students' future needs and to relate their teaching more directly to these needs. Little documentary evidence regarding the practicability and actual value of such experience appears to exist.

---

[124] See p. 32.

[125] See p. 58.

CHAPTER III

QUESTIONNAIRE TECHNIQUES AND FINDINGS

I Questionnaire Techniques

The most feasible and practical means of securing data bearing on the problem presented in Chapter I appeared to be the use of questionnaires. Two principal kinds of information were needed. The first of these concerned the kinds of preparation that have been obtained by those who are now doing the actual physical science teaching in junior colleges of the type being considered. To obtain this information, a "Questionnaire for Teachers" (see appendix C-1) was prepared. In addition to this status information it was desired to know what would be the most desirable pattern of professional preparation for these teachers. To obtain this information, not only the teachers, but also the administrators who are most intimately concerned with the appointment, supervision, and promotion of these teachers were consulted. In addition to these two sources, information on this second point was sought from a group of the nation's outstanding leaders in the field of junior college education. This "panel of experts" was composed of the forty-nine men named by Dr. S. V. Martorana, of the U. S. Office of Education, in response to a request for a list of these outstanding authorities. (See appendix D-1) Thus, all three groups were asked to make recommendations concerning the professional preparation they would consider most appropriate for prospective junior college physical science teachers.

Concerning their own background, the teachers were asked to list

their years of teaching experience; present position; academic background in majors, minors, Education courses, practice teaching, foreign languages, and research; and some details regarding levels, supervision, and value of their practice teaching experience. They were also asked to list the subject areas and the grade levels in which they were qualified and those in which they were expected to teach. A description and evaluation of their non-academic work experiences were also requested.

All three groups of respondents were asked to make recommendations regarding the desired numbers of credits in academic majors and minors, Education courses, practice teaching, foreign languages, humanities, social sciences, and research. Recommendations regarding a list of nine specific types of Education courses were also requested. Practice teaching was evaluated in reference to whether it should be required and, if so, at what levels. Other questions involved the number of areas prospective teachers should plan to teach, the desirability of requiring some non-academic work experience, and finally the most appropriate degree levels for these teachers. A final question in each instrument asked for comment regarding any phases of training which had not been covered in the preceding sections.

The questionnaires were designed by the author, submitted to a seminar group of graduate students, redesigned and submitted to a committee of faculty members, and reproduced in quantity after incorporation of final changes suggested by this committee. They were then mailed to 194 junior colleges, and to the panel of experts.

The sample was selected in accordance with the following criteria:

1. The college was listed in the 1956 Junior College Directory.[1]

[1] Jesse P. Bogue and Zora Ritter, "Junior College Directory," Junior College Journal, 26:281-307; January 1956.

2. The program offerings of the college were such as to be of interest to this study as described on page 5 under "definitions."

3. The college had at least two hundred students. (Certain exceptions to this requirement were made in states where most of the junior colleges were very small, and in Michigan where it was deemed desirable to include all of the community colleges in the state.)

4. Every other one of the colleges meeting the above requirements was then chosen from the alphabetical listing in the Directory. (Exceptions to this requirement were made in Michigan, as noted above, and in California. Sixty-six junior colleges were listed in the latter state and it was felt that every fourth college on the alphabetical list would constitute an adequate sample.)

The original mailing, which was made on March 20, 1957, was in the form of a packet sent to each of the 194 colleges. This packet contained: (1) A letter to the administrative officer (see appendix B-1) requesting his participation in the study by completing the questionnaire directed to him, and by distributing the enclosed copies of the teacher questionnaire to the appropriate members of his staff; "appropriate" being defined as any teacher whose principal (i.e. more than half-time) duty was in the teaching of one or more of the physical sciences. (2) One copy of the "Questionnaire for Administrators." (3) Enough copies of the teacher questionnaire for each physical science teacher. The number sent was based on the assumption that there would be one physical science teacher for every twenty full-time staff members as reported in the Directory. Additional copies were subsequently supplied to a number of institutions upon request. In all, 426 teacher questionnaires were mailed. (4) Stamped, self-addressed envelopes for the return of each questionnaire. The

questionnaires for experts, and an accompanying letter were mailed at the same time (see appendices D-2 and D-3).

On May 6, 1957, follow-up letters (see appendices B-3, B-4, C-2, and D-4) were mailed to all who had not responded at that time. In this letter, June 25th was indicated as a final deadline after which returns would not be included in the analysis.

II Questionnaire Returns

The data on which these findings are based were obtained from 186 junior college physical science teachers, 104 junior college administrators, and 38 outstanding leaders in the field of junior college education. The distribution of colleges from which these data were obtained and the percentages in the various categories are shown in Table IX.

TABLE IX

DISTRIBUTION OF INSTITUTIONS COVERED IN THE SURVEY

Type of Institution	Number of colleges to which questionnaires were mailed	Number of Colleges responding	per cent responding colleges
Private	58	34	58.7
Small Public	77	45	58.4
Medium Public	43	29	67.7
Large Public	16	16	100.0
All Colleges	194	124	63.8

The 124 cooperating colleges were located in thirty-seven states. No answers were received from colleges in Connecticut, Deleware, Louisiana, Montana, Nevada, Oregon, Rhode Island, South Carolina, South Dakota, Vermont, and West Virginia. The public junior college movement has not been well developed in any of these states, although there are a few private institutions in each.

The method of distributing the teacher questionnaires made it impossible to tell how many of the 426 instruments of that kind were actually received by individual teachers. Packets of questionnaires were sent to the chief administrative officer, or to the department heads in certain large institutions. In the case of schools from which no response was obtained from either teachers or administrators, it is not known whether the teachers ever received the questionnaires. Table X shows the teacher returns based only on the numbers sent and received from the 124 cooperating colleges.

TABLE X

INDIVIDUAL RETURNS RECEIVED FROM TEACHERS AND ADMINISTRATORS

Type College	Teacher Questionnaires			Administrator Questionnaires		
	Sent	Received	Per Cent	Sent	Received	Per Cent
Private	46	30	65.5	58	28	48.3
Small Public	60	46	75.7	77	39	50.7
Medium Public	100	52	52.0	43	24	55.8
Large Public	109	58	53.2	16	13	81.2
Totals	315	186	59.0	194	104	53.7

Although the percentage of returns is dissapointingly low in most categories, it should be noted that responses were obtained from all of the large colleges as shown in Table IX. Also, 81 per cent of the administrators in these same colleges returned usable questionnaires. Since the final recommendations are in essential agreement with this particular group of respondents, it appears likely that opinions expressed by the respondents in the other categories are representative of those groups. It is, however, impossible to justify statements regarding significant differences that appear to exist between certain groups when the data are obtained from such a limited portion of the original sample. For this reason statistical measures of such differences have not generally been reported.

III Previous Teaching Experience

The teachers covered by this survey exhibited a wide range of previous teaching experience as shown in Appendix E which is summarized in Table XI.

Looking first at their high school teaching experience, it is evident that a majority in all groups have spent several years teaching at this level. The large public colleges show the smallest percentage reporting this kind of experience and the smallest median number of years. This is probably due to two facts: (1) The large public colleges in this survey are principally located in California, Illinois, Michigan, and Texas. In these states the junior colleges are well developed and well known, and the teachers are somewhat more likely to have prepared directly for junior college teaching. (2) The smaller junior colleges

TABLE XI

NUMBER OF YEARS OF PREVIOUS TEACHING EXPERIENCE IN HIGH SCHOOLS, JUNIOR COLLEGES, AND SENIOR COLLEGES AS REPORTED BY 185 TEACHERS

Type of Teacher	Type of Experience	Teachers Reporting Experience		
		Number	Per Cent	Median Number of years
Private College	High School	19	63.3	8.6
	Junior College	30	100.0	4.8
	Senior College	12	40.0	3.8
Small Public College	High School	37	80.4	6.2
	Junior College	46	100.0	7.5
	Senior College	12	26.6	3.9
Medium Public College	High School	36	69.2	6.3
	Junior College	52	100.0	9.5
	Senior College	21	40.4	3.1
Large Public Colleg	High School	31	53.4	4.3
	Junior College	57	100.0	8.2
	Senior College	22	37.9	3.7
All Teachers	High School	123	66.5	6.1
	Junior College	185	100.0	7.8
	Senior College	67	36.2	3.7

frequently share facilities with local high schools. Teachers in institutions of this type frequently teach at both levels and thus accumulate high school experience while teaching in a junior college, but this is less likely to occur in the larger institutions.

Table XI also shows that the teachers in the private colleges reported a median of about five years of junior college teaching experience while those in the public institutions reported higher medians that ranged from about eight to ten years.

Only slightly over one-third of the teachers reported any experience at the senior college level. Although the data do not show this, it is suspected that much of this was teaching done as graduate assistants while working toward advanced degrees.

It should finally be noted that the overall median of approximately eight years of junior college experience on the part of the teacher respondents in this survey should have made them well aware of the needs and shortcomings of such teachers, and should be convincing evidence that their recommendations are worthy of consideration.

IV Number of Teaching Areas

One of the hypotheses of this study was that junior college teachers should be prepared to teach in two or more of the physical sciences. This was based on the known fact that many of the junior colleges are small institutions in which it is not practical to employ a full-time teacher even for each of the three major branches of physical science (physics, chemistry, and mathematics).

In testing this hypothesis the teachers were asked to name each

of the physical science areas in which they felt qualified to teach, each in which tney were expected to teach in their present position, and the grade levels at which they did this teaching. They were also asked to recommend the number of areas in which a prospective teacher should be prepared if he were to teach at a school of the size of their own present institution.

The responses to each of these questions are summarized in Table XII. It shows that only approximately 40 per cent of all teachers are privileged to give instruction in only a single area. Thus, approximately 60 per cent teach in two or more, and about half of these give instruction in more than two areas. This situation depends, however, on the type of school being considered. A complete distribution of responses to this question is shown in Appendix F. It indicates that only 50 per cent of the teachers in the large and medium colleges are expected to teach in two or more areas, while about 75 per cent of those in the private and small public institutions are thus burdened.

The number of areas in which the teachers considered themselves qualified is encouragingly large; the median is approximately four areas, and includes only twelve who claim a single area, while twenty-six listed six or more areas.

Since these teachers most frequently give instruction in two or more areas, it is not surprising to find that they generally recommend more than one area of preparation for prospective teachers. Table XIII shows the recommendations given by teachers, administrators, and experts. It shows very small percentages that favor preparation in only one area, while two areas are favored by a majority of the respondents in all categories. An examination of Appendices I and J shows that this is the

TABLE XII

NUMBER OF TEACHING AREAS IN WHICH TEACHERS ARE QUALIFIED AND EXPECTED TO TEACH

Number of Areas	All Teachers			
	Qualified		Expected	
	Number	Per Cent	Number	Per Cent
1	12	6.6	67	39.9
2	27	14.8	53	31.5
3	32	17.6	29	17.3
4	33	18.1	10	5.9
5	52	28.6	6	3.6
6 or more	26	14.3	2	1.8
Totals	182		168	
Median Number of Areas	4.1		1.8	

TABLE XIII

NUMBER OF TEACHING AREAS FOR PROSPECTIVE TEACHERS AS RECOMMENDED BY TEACHERS, ADMINISTRATORS, AND EXPERTS

Number of Areas	Recommendations by					
	Teachers		Administrators		Experts	
	No.	Per Cent	No.	Per Cent	No.	Per Cent
1	28	15.6	5	5.1	1	2.9
2	98	54.9	66	66.7	19	54.3
3	36	20.0	21	21.2	10	28.6
4	11	6.1	6	6.1	4	11.4
5	5	2.8	1	1.0	1	2.9
6	2	1.1	0	0.0	0	0.0
Totals	180		99		35	
Median No. of areas	2.2		2.2		2.4	

general pattern in all types of schools covered in this survey.

Although it is true that training in at least two areas is generally favored, it should be observed that twenty-eight, or 15.6 per cent, of the teachers favored only a single area. Comments from this group generally insisted that attempting to teach in more than one area would result in instruction being given without adequate preparation. Those in the large majority who favored more than one area gave two reasons for this distribution of effort: (1) It is a practical necessity in many of the colleges, (2) It results in better integration of the physical sciences as they are taught.

V Training in the Subject Matter Specialties

1. Subject Matter Training Reported by Teachers.

One of the most important aspects of this study is concerned with the subject matter training that would be most appropriate for junior college physical science teachers. For this reason the teachers were first asked to list the semester hours they obtained in their majors and minors at both the undergraduate and graduate levels. They were subsequently asked to make recommendations regarding the number of semester hours that would be most appropriate for prospective teachers in their subject matter specialties.

The distribution of reported semester hours in the major fields is shown in Table XIV. The medians for each group of teachers show a slight trend toward more intensive training on the part of the teachers in the public institutions, particularly in the largest of these. The differences between the teachers in the various sizes of public colleges

TABLE XIV

DISTRIBUTION OF REPORTED SEMESTER HOURS IN THE MAJOR SUBJECT FIELD

Number of Semester Hours	Number of Teachers				
	Private	Small Public	Medium Public	Large Public	All Teachers
UNDERGRADUATE LEVEL					
10-24	3	3	5	2	13
25-30	12	16	16	9	53
31-36	3	3	8	6	20
37-42	4	13	9	10	36
43-48	2	1	2	5	10
49-54	0	5	2	5	12
55-162	0	2	5	10	17
Number reporting	24	43	47	47	161
No. of teachers in survey	30	46	52	58	186
Per Cent Reporting	80.0	93.5	90.4	81.1	86.5
Median No. Hrs.	28.8	35.5	32.4	40.4	34.8
GRADUATE LEVEL					
0-15	4	12	5	9	30
16-25	11	8	16	12	47
26-35	2	10	11	11	34
36-130	4	11	9	15	39
No. reporting	21	41	41	47	150
No. of teachers in survey	30	46	52	58	186
% Reporting	70.0	89.2	78.8	81.0	80.7
Median Number of hours	18.5	26.0	25.2	27.8	25.1

are generally small and probably not significant at the graduate level. However, there is an indication that the teachers in the medium sized institutions have had less subject matter training than those in either the smaller or large colleges.

Perhaps the best indication of the broadness of the training of these teachers has already been given in the section that reported the total numbers of areas in which they considered themselves qualified to teach. However, another measure of this aspect of their preparation is available from the reported credit hours in minor fields of study. Table XV shows the mean number of minors per teacher, and the median number of credits per minor, at both the undergraduate and graduate levels. It shows no important differences between the various types of teachers at either level of study. Although the range in number of undergraduate minors is from one to five, the number most commonly reported was two. At this level the median number of credits per teacher ranges only from seventeen to eighteen in all categories.

TABLE XV

REPORTED ACADEMIC TRAINING IN SUBJECT MATTER MINORS

Type of Teacher	Mean Number of Minors Per Teacher		Median Number of Credits Per Minor	
	Undergraduate	Graduate	Undergraduate	Graduate
Private	2.0	1.6	16.8	7.5
Small Public	2.0	1.3	17.9	8.3
Medium Public	2.0	1.3	16.6	10.5
Large Public	1.8	1.4	17.8	9.9
All Teachers	1.9	1.4	17.7	9.3

At the graduate level the number of minors is more frequently

one than two, but the median falls near the half-way point between these two values in all teacher categories. The median number of credit hours reported varies only from approximately eight to nearly eleven. The actual distribution of credit ranged from fifty-two teachers having from one to six credits, fifty-four in the range from seven to twelve, and forty-nine who reported more than twelve credits. A more complete distribution of these responses is shown in Appendix G.

In summarizing the findings regarding subject matter training, it is evident that the typical junior college physical science teacher, who responded to this survey, has had: (1) an undergraduate major with total credits ranging from twenty-nine to forty hours; (2) a graduate major with total credits ranging from nineteen to twenty-eight; (3) two undergraduate minors of from seventeen to eighteen credits each; and (4) one or two graduate minors of from eight to eleven credits each.

2. Recommended Subject Matter Training.

All three types of respondents made recommendations regarding the desired numbers of semester hours in major and minor fields. Since the averages recommended by each type of teacher were all within the narrow range from thirty to thirty-two, these responses are summarized in a single column, including all teachers, in Table XVI. For the same reason administrator responses are grouped together in this table, which also shows the recommendations made by the experts.

Not only do the teachers agree as to the median numbers of hours recommended, but the administrators and experts are also shown to be in almost exact accord with each other and the teachers regarding the desirability of a thirty-credit undergraduate major. It should be noted, however, that these medians represent a balancing process which partially

conceals the true nature of the recommendations. Thus, although thirty was the most popular number, the recommended training ranged from twelve to sixty credits, with thirty-six and twenty-four credit-hour recommendations being second and third respectively in order of popularity with respondents in all categories.

TABLE XVI

RECOMMENDED SEMESTER HOURS IN THE UNDERGRADUATE MAJOR

Number of Hours Recommended	Number of Responses		
	Teachers	Administrators	Experts
12-22	9	3	1
23-29	37	18	9
30	41	42	14
31-35	9	5	1
36	40	28	7
over 36	26	4	2
Totals	162	100	34
No. in survey	186	104	38
Per Cent Responding	87.2	96.0	89.5
Median No. of Hours	30.4	30.2	30.0

Regarding the graduate major, Table XVII shows the distribution of recommendations made by all respondents. It shows close agreement at the median of twenty semester hours on the part of the teachers and administrators and a distinctly lower level of sixteen hours being favored by the experts. In this the median is not a good indication of the whole picture. The distribution is quite flat in the range from twelve to

TABLE XVII

RECOMMENDED SEMESTER HOURS IN THE GRADUATE MAJOR

Number of Hours Recommended	Number of Responses		
	Teachers	Administrators	Experts
6-12	42	16	14
13-18	27	22	12
19-24	45	34	7
25-30	20	14	3
31-60	17	10	0
Totals	151	96	36
No. in Survey	186	104	38
Per Cent Responding	81.2	92.3	94.8
Median Number of Hours	20.3	20.0	15.8

twenty-four credits (a majority of the respondents in the six-twelve range are at its upper limit). Also a substantial portion of both the the teachers and administrators recommend more than twenty-four hours. Thus, it would seem that the recommendation for these two should include at least the range from twelve to twenty-four semester hours. The experts tend to favor somewhat lower totals and the most appropriate range to quote for them would seem to be from twelve to twenty credits. It will be noted in part seven of this chapter that this lower level of recommended subject matter training on their part is partially balanced by generally higher total credits in Education courses.

The desired training in minor subject matter areas is summarized in Table XVIII. Here again there appears to be substantial agreement among all three types of respondents. About twenty hours in each

TABLE XVIII

RECOMMENDED SEMESTER HOURS IN MINOR AREAS

	Teachers	Administrators	Experts
	UNDERGRADUATE		
No. Responding to Question	158	93	34
Per Cent Responding	84.8	89.4	89.5
Median Number of Hours per Minor	20.4	21.0	19.8
	GRADUATE		
No. Responding to Question	116	77	33
Per Cent Responding	62.3	74.1	10.4
Median Number of Hours per minor	10.0	10.4	9.7

undergraduate minor is noted, while ten would be required by the typical respondent at the graduate level. It is interesting to note that this level of twenty hours in each minor is very close to the median of eighteen credits per minor which was reported in the academic training of the teachers in this survey.

Appendix I lists the complete distribution of recommended credits in each undergraduate minor. It shows that the range of desired totals extends from ten to sixty, with significant numbers of all respondents favoring each of the totals twenty, eighteen, thirty, and twenty-four in that order of popularity. Thus, it would seem that the final recommendation should include the entire range from eighteen to thirty semester hours per minor.

The question of how many undergraduate minors should be taken

was not answered by a very large percentage of the respondents. However, such data as are available are summarized in Table XIX. It indicates that the most frequent number was two, except for the experts who were evenly divided between those who favored a single minor and those who would have two.

TABLE XIX

RECOMMENDED NUMBER OF UNDERGRADUATE MINORS

	Teachers	Administrators	Experts
Number in Survey	186	104	38
Number answering	115	54	30
Per Cent	61.8	51.8	79.8
Mean Number of Minors	1.9	1.7	1.5

Since this question was not well covered by direct responses, it should be observed that other data bear on this point. Two was the most frequently recommended number of teaching areas, as mentioned in part three of this chapter. However, the median was at an intermediate level between two and three and thus indicated that many favored three or more areas. This immediately indicates that two minors are needed, at least by those who would be prepared to teach in three fields. At the graduate level other data will show, in part ten of this chapter, that the question of a second minor depends on the degree level to be attained. A thirty-credit master's program, which includes a twenty-credit major and one ten-credit minor, obviously does not have room for a second minor. If these teachers pursue an additional year of graduate work, it is apparent that at least a third of the time in that year should

be devoted to the development of a second minor.

VI Training in Foreign Languages, Social Sciences, and the Humanities

The teachers in this survey were not questioned regarding their background in the humanities or the social sciences. They were asked, however, to list the total credits obtained in foreign languages. Table XX summarizes the results obtained from this question. An inspection of the percentages reporting this training reveals that it is more commonly found among the teachers at the large public institutions than at either the private or small public colleges. About three-quarters of all the teachers reported some training in foreign languages with an average credit of 15.4 semester hours. The larger numbers at the larger

TABLE XX

FOREIGN LANGUAGE CREDITS REPORTED BY TEACHERS

Type of Teacher	Number Reporting	Per Cent	Mean Number of Credit-Hours
Private	20	66.7	15.6
Small Public	27	58.6	16.7
Medium Public	45	86.5	14.0
Large Public	49	84.4	15.8
All Teachers	141	75.8	15.4

colleges probably reflect the higher degree levels found among these teachers (see part eight of this chapter) and university requirements for this training on the part of advanced degree candidates.

The foreign language recommendations by each group of teachers are summarized in Table XXI. These data reveal the fact that about two-thirds of all teachers favored some training in foreign languages. However, this overall figure is elevated considerably by the private colleges where 80 per cent of the teachers favored this kind of preparation. Although a majority of the public college teachers favored foreign language training, it is perhaps significant that fewer voted for this aspect of education than had had it themselves. Just the opposite trend is noted among the private college teachers. This difference is quite possibly due to the traditionally more conservative programs offered at the private institutions where college parallel work is most frequently the program of major emphasis.

TABLE XXI

FOREIGN LANGUAGE TRAINING AS RECOMMENDED BY TEACHERS

Type of Teacher	Number Favoring	Per Cent	Mean Number of Credit Hours
Private	24	80.0	11.0
Small Public	26	56.5	11.0
Medium Public	31	59.6	14.5
Large Public	39	67.3	10.6
All Teachers	120	64.5	11.0

Table XXII, which summarizes administrator reaction to this question, appears to confirm the higher interest in foreign language training at the private institutions. Seventy-one per cent of the administrators favor an average of twelve semester hours. It is also evident that this aspect of education is decidedly less popular among

TABLE XXII

FOREIGN LANGUAGE TRAINING AS RECOMMENDED BY ADMINISTRATORS AND EXPERTS

Respondents	Number Favoring	Per Cent	Mean Number of Credit Hours
	ADMINISTRATORS		
Private	20	71.4	12.0
Small Public	19	48.7	11.4
Medium Public	12	50.0	12.2
Large Public	9	69.2	12.6
All Administrators	60	57.7	11.6
	EXPERTS		
All Experts	13	34.2	8.8

the experts; only 34 per cent of them recommended any work in this area and the mean of their recommendations is somewhat lower than those favored by the administrators and the teachers.

As shown in Table XXIII, preparation in the humanities and social sciences was uniformly favored by large majorities of each type of respondent. Thus, eighty to ninety per cent of all respondents favored approximately four or five three-credit courses in the humanities, and three or four courses in the social sciences.

The question of whether any of this work should be done at the graduate level was also asked. Seventeen out of 186 teachers indicated that they were in favor of some graduate work in the humanities; eleven favored some work at this level in the social sciences. Twenty-six of the 104 administrators recommended graduate work in the humanities; eleven of the thirty-eight experts agreed with this minority group of

TABLE XXIII

RECOMMENDED TRAINING IN THE HUMANITIES AND SOCIAL SCIENCES

Humanities Recommendations	Teachers	Administrators	Experts
Number making recommendations	146	95	35
Per Cent	78.5	91.3	92.1
Mean No. of Semester Hours	12.0	15.4	14.1
Social Science Recommendations			
Number making recommendations	149	92	35
Per Cent	80.1	88.5	92.1
Mean No. of Semester Hours	9.4	12.9	11.9

administrators. Similarly in the social sciences, twenty-two administrators and seven experts recommended graduate work. Thus, it is abundantly evident that the overwhelming majority of all respondents felt that the work in these areas, as summarized in Table XXIII, should be done at the undergraduate level.

VII Training in Education Courses

Undoubtedly the most controversial questions answered, particularly by the teachers in this survey, were those that dealt with Education courses. The fact that considerable disagreement exists regarding the desirability, and the extent, of such training is well documented in the literature. This disagreement was confirmed by a small but vociferous minority of the teachers who indicated disfavor of Education courses with varying degrees of vigor and emotion. One respondent wrote the

word "bull" in large heavy letters across the question concerning detailed courses in Education; others filled in the recommended semester hour spaces with unusually large and heavily printed zeroes. Hardly typical of all teachers, but nevertheless illustrative of the attitude expressed by this group, is the following quotation taken from one of the teacher questionnaires.

> The most general comment concerning preparation for teaching among our faculty (in science courses) is a deep contempt for most of the Education courses we were compelled to take to get our teaching credentials. The utter waste of so many courses in Education, warming over and re-serving the same historical trivia in a different course! Unfortunately even the mystic sesquipedalian nomenclature of Education cannot completely disguise such duplication. How much better it would be to condense the useful facts and give them to us <u>just once</u> and with a direct and forceful approach. Scientists do not worship at the musty archives of educational history as educators do. We would rather be at our work, doing an effective job of instructing youth, than meditating on lofty thoughts while we kiss the toe bone of some long departed patron saint of education.

In spite of the attitude indicated in this quotation, the author of these remarks recommended a total of twelve hours in Education courses and twelve additional hours in practice teaching.

As has been previously indicated, many states require certification for junior college teachers. Most of these certification statutes require a certain amount of training in Education courses. Thus, it is not surprising to find that most of the teachers reported this type of training.

Table XXIV summarizes the data obtained on this point. This table shows considerable overlapping between graduate and undergraduate work. Thus, for private college teachers, twenty-one reported some training in Education courses; nineteen of these reported work at the undergraduate level, while only fourteen had some, or all of it, at the

graduate level.

TABLE XXIV

REPORTED TRAINING IN EDUCATION COURSES

Type of Teacher	Training Levels	Total No. Reporting	Per Cent	Median No. of Semester Hours
Private	Undergraduate	19	63.3	16.1
	Graduate	14	46.7	16.5
	Total at Both Levels	21	70.0	19.5
Small Public	Undergraduate	39	84.8	18.3
	Graduate	28	60.8	18.5
	Total at Both Levels	43	93.5	27.3
Medium Public	Undergraduate	40	76.8	14.3
	Graduate	33	63.4	17.3
	Total at Both Levels	47	90.4	23.6
Large Public	Undergraduate	35	60.3	13.6
	Graduate	42	72.3	17.3
	Total at Both Levels	53	19.3	21.0
All Teachers	Undergraduate	124	66.7	16.0
	Graduate	117	62.9	17.6
	Total at Both Levels	164	88.2	23.5

An examination of the percentages of teachers reporting work in Education courses shows a tendency for fewer of the private college teachers to report any training of this type; seventy per cent of them did

have such a background, but the corresponding percentages in the public institutions are in the low nineties. Similarly, the median number of hours reported is slightly lower among the private college teachers. This is quite possibly a part of the trend, noted when considering foreign language preparation, toward more teaching of traditional college parallel courses in these institutions.

One additional observation is pertinent to the data in Table XXIV. It concerns the level at which Education courses were taken by the teachers. Thus, 117 of the 164 teachers reporting such training had at least part of it at the graduate level. Since 124 of them reported undergraduate Education courses, it is evident that the difference between this number and the 164 who reported this training represents a large minority of forty teachers who had all of their Education courses at the graduate level. Similarly, the difference between 164 and 117 reveals that forty-seven of the respondents reported all of this training at the undergraduate level. The balance, or seventy-seven teachers, reported part of this experience at both levels.

The median total credits that should be accumulated by teachers did not differ significantly among the various types of teachers and administrators. Therefore, they are summarized as single groups in Table XXV. These data indicate considerable difference of opinion among individual respondents as to the extent of training considered desirable in this area. The range of credits which are favored by many respondents covers several popular numbers such as twelve, fifteen, twenty-one, and thirty.

The conclusions that can be drawn from these data are: (1) significantly large percentages of all respondents favor the inclusion of some

TABLE XXV

DISTRIBUTION OF RECOMMENDED TOTAL CREDIT IN EDUCATION COURSES EXCLUDING PRACTICE TEACHING

Range of Credit	Number of Teachers	Number of Administrators	Number of Experts
1-6	17	7	0
7-12	30	9	4
13-18	21	19	11
19-24	37	24	12
25-30	18	23	6
over 30	9	9	4
Totals	132	91	37
Per Cent Recommending	71.0	87.5	97.4
Median No. of Credits	17.5	20.6	20.6

training in Education courses, (2) there is little agreement regarding how much of this training is desired; popularly recommended totals vary from twelve to thirty credits, (3) the experts are nearly unanimous in their recommendation of work in this area, while some of the administrators do not favor it, and only 71 per cent of the teachers see it as desirable.

After learning that the respondents generally favor the inclusion of some work in Education courses, it is appropriate to consider which aspects of this field of study are considered most desirable for junior college physical science teachers. Accordingly, they were asked to indicate the number of semester hours they considered most appropriate in each of the nine courses listed in Table XXVI. Majorities, ranging from 60 to 90 per cent of the administrators and experts, favor one three-

credit course in each of these subjects except junior college administration. The teachers are somewhat less enthusiastic about all of these courses. Testing, measurement, and evaluation is recommended by more

TABLE XXVI

RECOMMENDED TRAINING IN SPECIFIC EDUCATION COURSES

Type of Course	Recommendations Made By 186 Teachers		104 Administrators		38 Experts	
	Per Cent	Median No. of Hours	Per Cent	Median No. of Hours	Per Cent	Median No. of Hours
Curriculum Construction	48.9	3.1	58.7	3.1	71.2	3.1
Guidance and Counseling	62.9	3.1	82.7	3.2	89.3	3.1
History and Philosophy of Ed. (General)	54.8	3.1	63.3	2.9	60.6	3.0
History and Philosophy of The Junior College	55.4	2.8	78.8	2.9	86.8	2.8
Junior College Administration	30.6	2.7	27.8	2.9	29.0	2.3
Psychology (General)	68.8	3.3	85.6	3.3	73.7	3.1
Psychology of the Late Adolescent	55.4	3.0	70.2	3.0	76.3	3.0
Techniques of Teaching	65.6	3.2	78.8	3.2	74.3	3.3
Testing, Measurement and Evaluation	71.0	3.2	85.6	3.2	83.2	3.1

teachers than any other course and a clear majority also favor three-credit courses in general psychology, techniques of teaching, and

guidance and counseling. Teacher opinion is quite evenly divided regarding all others except junior college administration, where the consensus appears to agree with the administrators and experts in opposition to this type of course for prospective teachers.

Conclusions from these data appear to agree with those obtained from the question regarding total credits in Education courses. There it was observed that the recommended totals ranged from twelve to thirty. Here, there are five three-credit courses which stand out as being generally more popular among all respondents. Thus, if one were to take only fifteen credits in this area, a program which would fit their recommendations would include three each in the following: (1) guidance and counseling, (2) history and philosophy of the junior college, (3) general psychology, (4) techniques of teaching, and (5) testing, measurement, and evaluation. In order of their favor by respondents to this survey, additional work, up to twenty-four credits, might well be of value in these areas: (1) psychology of the late adolescent, (2) curriculum construction, and (3) history and philosophy of education. Course work in junior college administration was favored by only about 30 per cent of all respondents. If more than twenty-four hours of credit were to be taken it would probably be desirable to take additional courses in such fields as guidance and counseling, psychology, and techniques of teaching, rather than in administration.

Table XXVI also reveals some differences between the three groups of respondents. In general a greater proportion of the experts favored each of these courses than did either the teachers or the administrators although the latter tended to agree with the experts more than did the teachers. Also, it is noted that while guidance and counseling would

rank first with the experts, general psychology is more popular with the administrators, and testing, measurement, and evaluation are favored by the largest group of teachers.

VIII Training in Research

The extent of the research experience which is desirable for junior college teachers has received some attention in the literature and it is generally considered to be of little value to these teachers. However, some authorities favor the ultimate acquisition of the doctoral degree and this implies considerable research experience. Others have pointed out that extensive research experience tends to cultivate tasts and interests that are not compatible with junior college teaching.

In this study the teachers were asked to report on the extent of their own research experience and to make recommendations for prospective teachers in their fields. Their reported experience is summarized in Table XXVII. As might be expected, it shows that very few of the teachers reported any research in Education. On the other hand, it shows a surprisingly low percentage who report research experience in their subject matter fields; surprising in the light of the fact that over 90 per cent of these teachers had acquired at least a master's degree. Small differences in the percentages of those who reported this experience in the various groups suggest that somewhat more research has been done by teachers at the large public institutions. This follows the general pattern of higher levels of preparation at these colleges which has been previously noted.

TABLE XXVII

RESEARCH EXPERIENCE REPORTED BY TEACHERS

Type and Number of Teachers	Research in Subject Matter Field		Research in Education	
	Per Cent Teachers Reporting Experience	Mean No. of Semester Hours	Per Cent Teachers Reporting Experience	Mean No. of Semester Hours
30 Private College Teachers	50.0	8.1	13.3	3.2
46 Small Public College Teachers	45.6	8.3	26.1	5.3
52 Medium Public College Teachers	51.9	10.7	9.6	5.0
58 Large Public College Teachers	62.0	13.9	10.3	18.1
186 Teachers	53.2	11.0	14.5	7.8

The research experience which was recommended by all respondents is summarized in Table XXVIII. It indicates clear agreement between teachers and administrators as to the desirability of prospective teachers doing some research in their subject matter field. About six credits, or a normal amount for a master's thesis, is recommended. A greater proportion of the experts favored some research experience in the subject field and the extent of the experience recommended is slightly, but not significantly, lower than that proposed by the other groups. The sharpest contrast in these data occurs between the experts and the respondents actually located at junior colleges in respect to research in Education. To this question 40 per cent of the experts said, "Yes, they should have some experience," while only 20 per cent of the other two groups were

of this opinion.

TABLE XXVIII

RECOMMENDED TRAINING IN RESEARCH

Type and Number of Respondents	Research in the Physical Sciences		Research in Education	
	Per Cent Respondents Favoring	Mean No. of Sem. Hrs.	Per Cent Respondents Favoring	Mean No. of Sem. Hrs.
186 Teachers	67.2	6.3	18.8	3.4
104 Administrators	68.3	6.0	22.1	11.5
38 Experts	86.8	4.5	39.5	4.1

The general conclusion from these data appears to be that about six credits in research in the subject matter field is recommended by all groups of respondents.

IX Practice Teaching

One of the hypotheses advanced for this study was that junior college physical science teachers should have some practice teaching, and that it should occur in a junior college rather than in a high school as is the more common practice.

In order to first determine whether practice teaching is considered valuable by the teachers themsleves, they were asked to describe their own experience as to its value to them, and then to make recommendations as to whether it should be required of prospective instructors. Table XXIX summarizes the responses obtained from these questions. It shows that about 93 per cent of those who rated their own experience as "very valuable", said "Yes" to the question, "Should practice teaching be

required?" Although only fifteen, out of 120 who reported some practice teaching, rated it as "of very little value," approximately half of them favored the requirement of this experience. One-third of the teachers with no such experience were undecided about the desirability of requiring it. However, the overall response shows that two-thirds of all teachers in the survey would require practice teaching for prospective instructors.

TABLE XXIX

PRACTICE TEACHING RECOMMENDATIONS BY 186 TEACHERS ACCORDING TO THE VALUE OF THEIR OWN EXPERIENCE

Ratings Given to Their Own Experience	"Yes" No.	"Yes" %	"No" No.	"No" %	"Undecided" No.	"Undecided" %	Total
"Very Valuable"	54	93.2	1	1.7	3	5.2	58
"Or Some Value"	39	83.0	3	6.4	5	10.6	47
"Or Very Little Value"	7	46.7	7	46.7	1	6.6	15
Had No Practice Teaching	25	37.9	19	28.8	22	33.3	66
Totals	125	67.2	30	16.1	31	16.7	186

Since it is evident, from Table XXIX, that those who had a "very valuable" practice teaching experience favor its requirement much more strongly than others in the survey, an attempt was made to ascertain whether this value was not strongly affected by the degree of supervision exercised over the teaching intern during this phase of his training. Table XXX compares the value ratings given by teachers to the degree of supervision exercised during their own internship. The figures shown

suggest that some positive correlation exists between these two. A chi square test of significant differences, shown in Appendix K, reveals that the differences between those rating their own experience as "very valuable," and those in the other two groups combined, are highly significant.

TABLE XXX

THE VALUE OF PRACTICE TEACHING AS REPORTED BY TEACHERS ACCORDING TO THE DEGREE OF SUPERVISION EXERCISED DURING THEIR OWN PRACTICE TEACHING

Ratings Given to Their Own Practice Teaching Experience	Degree of Supervision						
	Considerable		Moderate		Very Little		Total
	No.	%	No.	%	No.	%	
"Very Valuable"	32	55.2	21	36.2	5	8.6	58
"Or Some Value"	14	29.8	23	48.9	10	21.3	47
"Or Very Little Value"	2	13.3	6	40.0	7	46.7	15
Totals	48		50		22		120

Since the chi square test shows that these differences are significant at the 1 per cent level of confidence, a coefficient of correlation was also calculated. Using the formula for a contingency coefficient, as shown in Appendix K , this correlation was found to be .32. This indicates a definite, but low, positive correlation between these two aspects of practice teaching.

Having established that the respondents in this survey favor the

requirement of practice teaching, and that this experience should probably be closely supervised, it next seems appropriate to inquire as to the type of institution in which this phase of training should be carried out. The literature indicates that most junior college teachers come from a background of high school teaching and have had practice teaching in that kind of a school.

TABLE XXXI

PRACTICE TEACHING LOCATIONS REPORTED BY TEACHERS

Type of Teacher	Practice Teaching Location						
	High School Only	Junior College Only	Senior College Only	H. S. and J. C.	H. S. and S. C.	No. P.T. Location Reported	Total
Private							
Number	16	0	5	0	0	9	30
Per Cent	53.3	0.0	16.7	0.0	0.0	30.0	100.0
Small Public							
Number	25*	1	3	0	1	16	46
Per Cent	54.3	2.7	6.5	0.0	2.7	34.8	100.0
Medium Public							
Number	27	1	5	1	1	17	52
Per Cent	51.9	1.9	9.6	1.9	1.9	32.7	100.0
Large Public							
Number	28	2	2	1	0	25	58
Per Cent	49.3	3.4	3.4	1.7	0.0	42.2	100.0
All Teachers							
Number	96	4	15	2	2	67	186
Per Cent	51.6	2.1	8.1	1.1	1.1	36.0	100.0

*Includes one whose practice teaching was in elementary school

The teachers in this survey were asked at what educational level they had had their practice teaching, if at all. Table XXXI shows that this experience was obtained in the high school by an overwhelming majority of those who reported it at all. Thus, about 52 per cent reported

at this level, 36 per cent reported none, and only 2.1 per cent had had this practice at the educational level where they are now teaching. This tabulation also indicates that, for those who had it at the junior college level, the reports came from the public institutions. It also indicates that practice teaching is less commonly reported by large public college teachers than by those in the smaller, or private, colleges.

While most of the reported practice teaching was done in high schools, it is significant to note, in Table XXXII, that only 4.3 per cent of the teachers recommend this as the most appropriate level. The biggest single group of teachers favored the choice labelled "high school or junior college." However, 20 per cent favored the junior college as their first choice. At present very few junior colleges, outside of one or two in California, have made agreements with universities whereby it is possible for teacher candidates to obtain practice teaching at the junior college level. It is possible that knowledge of this situation may have influenced many of those who voted in favor of the "high school or junior college" choice. A complete distribution of these recommendations as given by teachers at each type of institution is given in Appendix L.

Table XXXII also shows the recommendations regarding this same question as given by administrators and experts. Here it is seen that the "junior college" is the most highly favored choice, with the experts favoring it more strongly than other group. To summarize the practice teaching response, it appears that all groups of respondents recommend its requirement, and that they favor either the junior college or the the high school as the educational level at which this experience should be obtained.

TABLE XXXII

RECOMMENDED PRACTICE TEACHING LOCATIONS

Recommended Locations	Teachers		Administrators		Experts	
	No.	Per Cent	No.	Per Cent	No.	Per Cent
High School	8	4.3	6	5.8	1	2.6
Junior College	38	20.3	41	39.4	19	50.0
Senior College	3	1.6	0	0.0	0	0.0
High School or Junior College	49	26.4	31	29.8	8	21.0
Junior College or Senior College	19	10.2	10	9.6	5	13.2
High School, Junior College, or Sen. Col.	23	12.4	9	8.7	2	5.3
High School and Junior College	3	1.6	4	3.8	0	0.0
No Recommendation	43	23.2	3	2.9	3	7.9
Totals	186	100.0	104	100.0	38	100.0

X Degree Levels

The junior college literature contains frequent references to the degree levels which are most appropriate for teachers at this educational level. The most commonly required degree is the master's, but some institutions operate with staffs whose average level of training is considerably below this. Some of the better known authorities have urged the ultimate acquisition of doctoral degrees by these teachers, while others have indicated that this is definitely undesirable. This study has attempted to learn what degree level should be recommended for

junior college physical science teachers.

It was hypothesized that training at an intermediate level, approximately equal to a master's degree plus thirty semester hours of credit, would be found best. Accordingly, the teachers were asked first to report their highest earned degrees and to list the graduate credits earned. The results obtained are shown in Table XXXIII, which is based on data from the 169 teachers who gave sufficiently complete information

TABLE XXXIII

DEGREE LEVELS REPORTED BY 169 TEACHERS*

Type of Teacher	Highest Earned Degree			
	Bachelor's	Master's	Master's Plus 30**	Doctor's
Private				
Number	5	9	7	5
Per Cent	19.2	34.6	26.9	19.2
Small Public				
Number	7	25	11	0
Per Cent	16.3	58.1	25.6	0.0
Medium Public				
Number	4	20	19	4
Per Cent	8.5	42.6	40.4	8.5
Large Public				
Number	1	21	15	16
Per Cent	1.9	39.6	28.3	30.2
All Teachers				
Number	17	75	52	25
Per Cent	10.0	44.4	30.8	14.8

*The seventeen responding teachers, whose degree levels are not included in the table, did not list their total graduate credits. All of them reported that they held the master's degree.

**This includes all who reported totals or 50 or more graduate credits.

to make it possible to tabulate those at the intermediate levels. It is evident that 90 per cent have obtained at least a master's degree. The table also shows that nearly half, actually 45.6 per cent, have had considerable graduate work beyond the master's level. Looking at the different types of schools, it is evident that lower levels of training are reported by both the private and small public institutions than by those at the larger colleges. Also it is noted that a greater proportion of the private college teachers report bachelor's degrees than do those in the public schools. However, a compensating factor is evident in that they also show a greater proportion of doctor's degrees than are shown by the small and medium public colleges.

If one includes those who failed to give details regarding their total graduate credit, and lists only the highest degree actually reported, this distribution takes the form shown in Table XXXIV.

TABLE XXXIV

HIGHEST EARNED DEGREES REPORTED BY 186 TEACHERS

Degrees	Number Reporting	Per Cent
Bachelor's	17	9.1
Master's	144	77.4
Doctor's	25	13.5
Totals	186	100.0

The degree levels recommended by the respondents in this survey are shown in Tables XXXV and XXXVI. The first of these contains a breakdown of the recommendations by the teachers according to the type of

institution in which they are located. It is noted that the only important difference lies in the fact that the large public college teachers more frequently favor the "master's plus 30," while all other groups would require only a master's degree. Taken altogether, the teachers do not seem particularly enthusiastic about the intermediate degree level which was hypothesized as most desirable; only about 34 per cent voted in its favor.

TABLE XXXV

DEGREE LEVELS RECOMMENDED BY 186 TEACHERS

Type of Teacher	Degree Levels Recommended				
	Bachelor's	Master's	Master's Plus 30	Doctor's	No Answer
Private					
Number	1	18	7	4	0
Per Cent	3.3	60.0	23.4	13.3	0.0
Small Public					
Number	1	28	13	0	4
Per Cent	2.2	60.8	28.3	0.0	8.7
Medium Public					
Number	0	29	14	3	6
Per Cent	0.0	55.8	26.9	5.8	11.5
Large Public					
Number	0	23	29	3	3
Per Cent	0.0	39.6	50.0	5.2	5.2
All Teachers					
Number	2	98	63	10	13
Per Cent	1.1	52.7	33.8	5.4	7.0

In Table XXXVI it is evident that this same degree level is much more popular with the other two types of respondents than it is with the teachers. Thus, about 52 per cent of the administrators favor the intermediate level, and 71 per cent of the experts would require a two-year graduate program.

TABLE XXXVI

DEGREE LEVELS RECOMMENDED BY ADMINISTRATORS AND EXPERTS

Type of Respondent	Degree Levels Recommended			
	Bachelor's	Master's	Master's Plus 30	Doctor's
Private College Administrators				
Number	1	9	15	3
Per Cent	3.6	32.2	53.6	10.6
Small Public College Administrators				
Number	0	20	18	1
Per Cent	0.0	51.3	46.2	2.5
Medium Public College Administrators				
Number	0	7	14	3
Per Cent	0.0	29.2	58.3	12.5
Large Public College Administrators				
Number	0	5	7	1
Per Cent	0.0	38.5	53.8	7.7
All Administrators				
Number	1	41	54	8
Per Cent	1.0	39.4	51.9	7.7
All Experts				
Number	0	8	27	3
Per Cent	0.0	21.0	71.1	7.9

XI Non-Academic Work Experience

Practical work experience in business, industry, and wherever their students may be employed has frequently been recommended for junior college teachers. Several advantages, and certain important disadvantages, seem to accompany this kind of background for physical science teachers.

The teachers in this survey were asked to list the work experiences which they felt had been of significant value to them as teachers. They were also asked to list similar experiences, if any, which they felt had

been of little or no value to them in this connection. Table XXXVII summarizes the reported work experiences in terms of the numbers who reported it and the mean number of months reported.

TABLE XXXVII

REPORTED NON-ACADEMIC WORK EXPERIENCE

Type and Number of Teachers	Number Reporting Experience	Per Cent	Mean Number of Months
Private College (30)	22	73.3	32.8
Small Public (46)	32	69.6	41.7
Medium Public (52)	29	55.7	46.0
Large Public (58)	49	84.4	53.8
All Teachers (186)	132	70.9	45.7

The most important conclusion obtainable from this table is that the majority, in each category of teachers, have had a considerable amount of such experience. Thus, the average for all teachers is nearly four years. It should be observed that this average is based on reported figures that ranged from three months to a high of 242 months. However, there was only one person reporting over two-hundred months and very few in the range from one-hundred to two-hundred. The most common figures reported were in the vicinity of the reported averages. The kinds of work reported ranged through various types of naval and military service, summer jobs, permanent appointments for one or more years in business, industrial, and research organizations, and regular operation of self-owned businesses on a part-time basis.

The large amount of this experience is somewhat affected by the fact that some of it was obtained in military service. However, only

forty of the 132, who reported such experiences, listed military service averaging twenty-five months, in answering this question. The types of experience reported included many that obviously contributed to practical knowledge in the physical sciences. Among those listed were; ordnance service involving research in the chemistry of explosives, establishing schools in Europe for families of army personnel, radar instructor, communications officer, and electronics officer.

In a free-response question, the teachers were asked to give some of the reasons why they considered this non-academic work experience to be of value to them as teachers. All of the reasons given appeared to fall within the general meaning of one or more of the eleven statements contained in Table XXXVIII. This table also shows the number of times each reason was observed among the 132 teachers who reported such work experience. It shows that almost half of them considered this work to have contributed most to their knowledge of practical applications of their subject fields, while another large group saw it as having added to their general knowledge of their subject matter fields.

Although the statements given fitted most directly into the above-mentioned eleven categories, a little reflection makes it apparent that there is considerable overlapping among these statements. They could be all summarized under the following three statements:

1. Such experience adds depth, objectivity, and an improved balance of emphasis to one's teaching by increasing his knowledge of his subject field and its practical applications. (This includes reasons 1, 2, 7, and 8.)

2. Through its contribution to a better understanding of human relations, such experience improves one's general maturity level, and

aids in the ability to counsel students, and in obtaining rapport with them. (This includes reasons 3, 5, and 6.)

TABLE XXXVIII

REASONS WHY NON-ACADEMIC WORK EXPERIENCE WAS OF VALUE AS GIVEN 132 TEACHERS

Reason	Number of Times Noted
1. Contributed to a knowledge of practical applications of the physical sciences and provided useful illustrations for classroom teaching.	62
2. Contributed to knowledge of subject matter.	51
3. Improved ability in counseling students.	29
4. Contributed to a better understanding of the skills, knowledge, and abilities required in business and industry.	24
5. Increased ability to obtain student respect and rapport while supervising their work.	21
6. Increased general maturity level.	16
7. Provided a better balanced perspective as to the relative value of subject matter and its practical applications.	15
8. Added depth to teaching	13
9. Improved ability to evaluate student progress	2
10. Experience of giving instruction while in military or naval service inspired them to take up teaching as a career.	2
11. Provided numerous "contacts" which are of great value in assisting students with vocational placement.	1

3. Through a first-hand acquaintance with actual knowledge, skills, and abilities needed for success in business and industry, one should be better able to advise students regarding their vocational plans, and to

evaluate their progress while acquiring the knowledge, skills, etc. that they will need. (This includes reasons 4 and 9.)

The last two of the eleven reasons were not frequently mentioned and are not thought to have very wide application to this question of whether non-academic work experience has real value for junior college teachers.

Non-academic work experiences, other than short-term or minor jobs, which had been obtained, but which were considered of no value, were asked for because it was assumed that some might report certain jobs to be of high value, while others considered the same type of work to be valueless. Such did not turn out to be the case. Few reported any work that was considered of no value to them as teachers. In fact, several commented that they didn't consider this to be possible. Those who did report such work were twenty-five in number and listed primarily laboring and clerical tasks. One surprising exception to this observation was a teacher who listed six months service as an analytical chemist, and thirty months as a research chemist, under the heading of non-academic work experience which he considered of no value to him as a junior college physical science teacher.

From all of the above considerations, it seems that the teachers in this survey have generally had considerable non-academic work experience which they regard as having been of significant value to them in their teaching. They were also asked to state whether they would favor the requirement of some such experience in the training of prospective teachers. The answers were counted according to those who would require it, those who would recommend it, those who were indifferent, and those opposed. The results are shown in Table XXXIX. It shows substantial

agreement between each of the groups to the effect that this should not be required but should be recommended. Those who opposed this suggestion gave reasons that centered around two main points. These were: (1) There is already a critical shortage of teachers in this field and setting up any additional requirement of this nature is too likely to discourage promising prospects from entering this field of teaching. (2) Current salary levels in business and industry are generally higher than those in education, and a good many teachers might decide to stay with companies for whom they originally intended to work only temporarily.

TABLE XXXIX

RECOMMENDATIONS REGARDING THE REQUIRMENT OF NON-ACADEMIC WORK EXPERIENCE

Type of Respondent	Require	Recommend	Indifferent	Opposed
All Teachers				
Number	29	99	26	32
Per Cent	15.6	53.2	14.0	17.2
Administrators				
Number	11	71	14	8
Per Cent	10.6	68.2	13.5	7.2
Experts				
Number	5	26	4	3
Per Cent	13.2	68.4	10.5	7.9

In summary, it appears that non-academic work experience has generally been obtained by the junior college physical science teachers in this survey. They considered it to be of significant value to them as teachers, and would recommend, but not require it, for prospective teachers.

XII Miscellaneous Recommendations

The fianl question on each of the three questionnaires was: "Is there any phase of training for prospective junior college physical science teachers, that has not been mentioned in this questionnaire, which you feel should be stressed?" A detailed summary of the teachers' comments elicited by this question is found in Appendix M-1. It should first be noted that most of the teachers made no comment. Of those that did, twenty-three took this opportunity to criticise, some with extreme severity, almost everything about colleges and departments of Education. The alleged lack of substance and repetitive nature of Education courses were mentioned most frequently. Others criticised professors of Education for being "the poorest teachers I ever had" or for not "practicing what they preach."

Numerous constructive suggestions were made in this section. Of particular value would seem to be the following:

(a) Physical Science teachers should have special training in the techniques of using demonstration apparatus.

(b) They should have some training in the use, care, maintenance, and improvising of laboratory and audio-visual equipment.

(c) They need course work that attempts to integrate the physical sciences.

(d) They need to study the functions of various types of committees that teachers serve on.

(e) They should have careful supervision by a good teacher for at least two years.

Comments elicited from administrators are summarized in Appendix M-2, and those from the experts in Appendix M-3. Administrators' and Experts'

comments tended to reinforce some of those made by the teachers, particularly those items (a) and (b) above. Once again there is some comment that higher emphasis should be placed on subject matter training than on Education courses. It is particularly significant that one of the experts, a nationally known professor of higher education, cautions against the danger of requiring too many Education courses. Of the many other comments that were made, those that express a need for interest in people, broad rather than narrow training, ability in handling general education courses, and a spirit of community service appear to be the most significant.

XIII Michigan Teachers

In Michigan the two-year, post-high school institutions, of the type being discussed in this survey, are officially designated as community colleges. Questionnaires were sent to all seventeen of these institutions in the state and responses were received from fifteen of them. As nearly as can be estimated from these responses, there are fifty-three physical science teachers in these fifteen colleges. Thirty-three, or 62.3 per cent, of them returned questionnaires. Also, thirteen, or 76.4 per cent, of the administrators completed the questionnaire.

Eight of the public colleges are small, five are medium, and one is a large institution, and there is one private college. However, the teacher returns were distributed as follows: nine from small public colleges, twenty from medium, and three from large institutions. There was one from a private college.

An analysis of the data obtained from these teachers did not, in general, reveal many important differences between them and the means and medians found for all teachers in the survey. For this reason only certain areas are being reported. Results in areas not specifically mentioned were found to agree closely with the other groups in the survey.

A greater proportion of the Michigan teachers reported work in Education courses than was generally true. Thus, thirty-two, or 96.9 per cent, of them reported credit in this kind of training while only 85 per cent of all teachers indicated a background in Education. This difference is probably due to the legal requirements in these areas in this state, whereas many respondents to the survey are in states where these requirements do not exist. The mean number of hours reported was approximately thirty for all groups including the Michigan teachers.

Practice teaching in high schools was reported by 78 per cent of the local teachers while only 53.8 per cent of all teachers indicated this experience. None of the Michigan teachers reported practice teaching experience in a junior or community college.

Table XL shows the degree levels reported by the in-state teachers. From this table it is evident that only about 27 per cent have had substantial work beyond the master's level. Comparing this with the data on each type of school, as shown in Table XXXIII, it is evident that this measure of total preparation is considerably lower in this state than is the case for all other groups except the small public colleges.

In this same connection, only 69.7 per cent of the local teachers reported work in graduate majors. Table XIV shows that this compares

TABLE XL

DEGREE LEVELS REPORTED BY 33 MICHIGAN TEACHERS

	Highest Degree Earned			
	Bachelor's	Master's	Master's Plus 30*	Doctor's
Number	3	21	9	0
Per Cent	9.1	63.7	27.2	0.0

*This includes all who reported 50 or more graduate credits.

favorably with the private college teachers, 70 per cent of whom reported work in this area. However, 81 per cent of all teachers reported substantial graduate credit here.

Also, the degree levels recommended by the Michigan teachers appear generally lower than the comparable figures for other groups. Table XLI shows the in-state results.

TABLE XLI

DEGREE LEVELS RECOMMENDED BY 32 MICHIGAN TEACHERS

	Bachelor's	Master's	Master's Plus 30	Doctor's
Number	0	21	10	1
Per Cent	0.0	65.7	31.2	3.1

A comparison of these figures with those in Table XXVII shows that about two-thirds of the local teachers favor the master's as the most appropriate level, while only about one-half of all teachers favored levels as low as this. The Michigan teachers' recommendations agree more closely with those made by the private and small college instructors

in this case.

In general it appears that the Michigan teachers differ from the other groups in one important respect, that being the matter of degree levels as just discussed above. In all other respects they agree closely with the averages for all teachers in the survey.

Summary

The findings obtained in this study show that:

1. The teachers covered in the survey have generally had a substantial number of years of teaching experience in junior colleges; a median of eight years was reported at this level, and about two-thirds of them have also had high school experience.

2. Over 90 per cent of the teachers are qualified in more than one of the physical science areas, and about 60 per cent of them are expected to give instruction in two or more areas. As might be expected, this number of areas is larger for teachers in small colleges than for those in the larger institutions. However, the teachers in the large colleges are frequently expected to teach in at least two areas. Two is the most commonly recommended number of areas for prospective teachers.

3. The "typical" teacher reported an undergraduate major of from twenty-nine to forty credits, a graduate major of from nineteen to twenty eight credits, two undergraduate minors of from seventeen to eighteen credits, and one or two graduate minors of from eight to eleven credits each. The recommended undergraduate work includes a major with from twenty-four to thirty-six credits and two minors of about twenty hours each. Graduate work would consist of about twenty credits in a major subject matter field, and additional work in one or two minors of about

ten credits each.

4. Three-fourths of the teachers reported foreign language training which averaged to fifteen semester hours per teacher. About two-thirds of the teachers, slightly over half of the administrators, and only about one-third of the experts recommended foreign language training for prospective teachers. About eleven credits were favored by the two groups of respondents, while those experts who favored it indicated that about nine hours would be sufficient. Twelve to fifteen credits in the humanities were generally favored by all respondents, and from nine to twelve hours were recommended in the social sciences.

5. About two-thirds of the teachers reported medians of approximately fifteen semester hours in undergraduate work in Education courses. Nearly as many had also had graduate work in this area, with medians ranging from sixteen to eighteen hours. Over two-thirds of the teachers, nearly 90 per cent of the administrators, and virtually all of the experts favored the acquisition of from seventeen to twenty credits in this area by prospective teachers. These credits should apparently be distributed among all of the nine specific Education courses listed in Table XVIII with the exception of "Junior College Administration" which was favored by only small percentages in each group.

6. Only about one-half of the teachers reported any work in subject matter research. Most of this was at the master's level, but enough doctor's degrees were reported to bring the average to eleven semester hours. About fifteen per cent reported some research in Education. However, subject matter research, amounting to about six credits, was recommended by large majorities in all groups. Research in Education was favored by only 20 per cent of the teachers and administrators, and

40 per cent of the experts.

7. A majority of the teachers reported practice teaching experience; practically all of it was done in high schools, and it was generally rated as either "very valuable" or "of some value." The degree of supervision exercised over it appears to have some positive correlation with the value of the experience. About three-fourths of the teachers, and well over 90 per cent of all in each of the other two groups of respondents, recommended that practice teaching be required of prospective teachers. Many favored the junior college as the most appropriate location for this training, but equally large numbers recommended that it be either a high school or a junior college.

8. Nine per cent of the teachers reported the bachelor's as the highest degree, while 13.5 per cent hold the doctorate. Thus, over three-fourths are at the master's level, and somewhat over a third of these have had approximately one additional year of graduate work. The recommended minimum degree is the master's in the subject matter field, while nearly 40 per cent of the teachers favor considerable work beyond this level. Significantly larger proportions of the other two groups favor an additional year, or more, beyond the master's degree for prospective teachers.

9. Most of the teachers reported considerable non-academic work experience which they considered to be of real value to them as physical science teachers. Majorities in all groups recommend, but would not require, the acquisition of some experience of this kind for prospective teachers.

10. Numerous miscellaneous comments are reported. Among the more important would seem to be those that: (a) criticise content and

requirements in Education courses, (b) suggest training in the use, maintenance, and improvization of laboratory and demonstration apparatus, and (d) suggest the need for an interest in people and a spirit of community service.

11. Analysis of the data received from teachers in the state of Michigan reveals that in general they are very much like all teachers responding to this survey. However, in one important respect they appear to be somewhat less well trained than those in the other groups. Thus, the degree levels reported by the in-state teachers are lower than is generally the case except for those in the small public colleges. Their recommendations in this area follow their own lower levels of preparation and are typically lower than those urged by the entire group.

CHAPTER IV

INTERPRETATIONS AND RECOMMENDATIONS

In a number of respects the data obtained in this study show close agreement with the training patterns which have generally been recommended by authorities in the field and by those who have reported research in this area. There is also disagreement in one or two areas and it is believed that new information has been obtained in others. The discussion in this chapter includes the following aspects of the problem: (1) academic training in the subject matter specialties, (2) social sciences, humanities, and foreign languages, (3) professional Education courses, (4) research, (5) practice teaching, (6) degree levels desired, (7) non-academic work experience, and (8) a recommended program for the preparation of junior college teachers of physical science.

I Academic Training in the Subject Matter Specialties

An inspection of Table XII[1] reveals that only about 7 per cent of the teachers consider themselves qualified to teach in only one of the physical science subject areas, while about 15 per cent claim qualification in two areas. The remainder, which is over 75 per cent of them, claim three or more areas and the largest single group estimated that they were prepared to teach in five areas. However, the data in Table XV[2] suggest

---

[1] See p. 73

[2] See p. 76

very strongly that the teachers were somewhat generous in estimating the number of areas in which they are qualified to teach. This table shows that they generally reported undergraduate work in two minor areas and graduate work in either one or two. Thus, it would appear that they are not generally qualified to teach in more than three areas. As for the number in which they actually teach, it is evident that most of them give instruction in either one or two areas[3], but nearly one-third of them are expected to teach in three or more.

It is also noted that majorities of each of the three groups of respondents recommended training in two or more areas for prospective teachers[4]. The fact that these same respondents also recommended undergraduate work in a major and two minors[5] suggests the possibility of the need for training in three areas. Thus, it would appear that a prospective teacher should be prepared in at least two of the major subdivisions of physical science, and that there is a considerable likelihood of his being called upon to teach in three.

The depth of training needed by these teachers is suggested by the recommended total credits in majors and minors as shown in Tables XVI[6], XVII[7], and XVIII[8]. The medians on all of these show general agreement regarding the need for a thirty-credit undergraduate major, a twenty-

---

[3] See p. 73.

[4] See p. 73.

[5] See pp. 78 and 81.

[6] See p. 78

[7] See p. 79

[8] See p. 80

credit graduate major, two undergraduate minors of twenty credits each, and either one or two graduate minors of about ten credits each.

If the prospective teacher plans to give instruction in two areas, the above-outlined program, with a single minor at the graduate level, would probably prepare him adequately in his teaching subjects. To teach in three areas he would need a second graduate minor. If he were to obtain this he would obviously need about forty graduate credits in subject matter fields.

II Social Sciences, Humanities, and Foreign Languages

The totals recommended in the social sciences and humanities appear to warrant little further comment[9]. Physical science teachers need some work in these areas as a necessary part of their general education. The recommended totals of 12-15 hours in the humanities and 9-12 hours in social science may appear small for a broad liberal education of the kind needed by junior college teachers, but they undoubtedly represent practical limits that cannot be violated without sacrificing other, and even more vital, course requirements.

Foreign language training was recommended by about two-thirds of the teachers, only a little over one-half of the administrators, and by about one-third of the experts[10]. In this connection, it is noted that the teachers were recommending something that they had probably been required to study themselves. Perhaps there is some significance in the

---

[9] See p. 85.

[10] See pp. 83-4.

fact that 76 per cent of the teachers reported training in this field and only 65 per cent recommended it. Its value is evidently doubted by a large majority of the experts and nearly half of the administrators.

Based on this conflicting evidence and on this writer's opinion, it is recommended that, if taken at all, foreign language training should be acquired during the early undergraduate years. It is further recommended, primarily because of its doubtful value in the eyes of the outstanding authorities in this field, that it should not be a pre-requisite for the subject matter master's degree that junior college physical science teachers are expected to obtain.

III Professional Education Courses

Although the teachers indicated considerable discontent with the quality and content of the Education courses they had taken, 71 per cent of them still considered training in this area to be desirable, at least to the extent of about eighteen semester hours[11]. Both the administrators and experts favored slightly higher totals in this field.

The reason for the continued criticism of Education courses deserves some comment. In this survey, as has been previously noted[12], the criticisms most frequently made were those that had to do with the so-called repetitive nature of Education courses, and their lack of stimulating content. Undoubtedly some of this criticism is based on misconceptions and narrow-minded thinking on the part of those who see themselves primarily as specialists in a subject matter field and

---

[11] See p. 89

[12] See pp. 86 and 109

secondarily as teachers. However, the frequency of this criticism, combined with the absence of similar comment with regard to other fields of academic training, suggests that part of it is probably valid.

It is the author's opinion that much of this criticism stems from the apparent fact that mastery of the subject matter content in a typical Education course is considerably easier than is a similar mastery of the content in a course in any of the physical sciences. If this is true, it suggests that more content could be added to the typical Education course without altering the credit value assigned to it. However, true or not, it should be evident that the ease with which a subject can be understood does not necessarily have an important bearing on its value. Thus, even the teacher whose sharp criticism is quoted on page 86 recognized the need for this work by recommending considerable credit in Education courses for prospective teachers.

It should further be noted that the physical science "specialist" who criticises Education courses for lack of content is probably failing to recognize the difference in objectives between his field and that of Education. Physical science is an old and well-established field in which content mastery should undoubtedly be a primary objective in most of the course work. Education is a newer and more nebulous field of knowledge, i.e. it involves attempts to learn how the human mind functions, how personalities develop, and how teachers and professors can most effectively educate ever better minds and personalities. The answers to these questions are being sought but are not yet known. The science of Education has not yet been, and may well never be, reduced to the simple mathematical statements of fact that characterize the physical sciences. Thus, although a huge proliferation of information

has been amassed in Education, a knowledge of all of its details is not generally a valid objective of the Education student. His professors are trying to train teachers, and in doing so they are more interested in developing teacher attitudes and interests commensurate with a Christian-democratic philosophy of service to his fellow man (particularly his students) than they are in content mastery.

While it is undoubtedly true that Education courses frequently fail to attain these objectives, it is also true that measuring progress toward their accomplishment is so difficult that the Education professor frequently falls back on measurement of content mastery as a basis for assigning grades.

In the light of the above considerations it is the opinion of this author that:

(1) Professors of Education should use every possible precaution to avoid repetition of previously mastered content in their courses.

(2) They should take similar precautions against awarding high grades for mere content mastery in courses where this should not be a primary objective.

(3) Evaluation procedures should be evolved to permit measurement of progress toward the actual objectives in Education courses.

Turning to the totals that were reported and those that were recommended in this survey, there is no doubt that majorities in all groups favored the inclusion of from eighteen to twenty hours in Education. The recommendations varied considerably as to the level at which this training should be obtained. Table XLII shows a breakdown of the recommended totals at both the graduate and undergraduate levels. Here it is seen that only about one-third of the teachers, over one-half of

the administrators, and over 90 per cent of the experts favor the inclusion of some graduate work in Education

TABLE XLII

RECOMMENDED LEVELS FOR EDUCATION COURSES

	Teachers	Administrators	Experts
UNDERGRADUATE			
Number of respondents	125	85	34
Per Cent	67.2	81.7	89.3
Average Number of Semester Hours	14.3	16.2	15.6
GRADUATE			
Number of respondents	58	58	35
Per Cent	31.2	55.8	92.1
Average Number of Semester Hours	9.3	9.7	7.9

Turning to Table XXIV[13] one finds that nearly two-thirds of the teachers reported graduate work in this field in their own training. The reason that many of them relegate this work to the undergraduate level is probably tied up with the suspected ease of mastery and a feeling that this is an area which is not worthy of graduate study. However, in view of the previous discussion of Educational objectives, it seems entirely appropriate to this writer to require some of this work at both levels. Table XLII shows that the administrators, and particularly the experts, agree with this plan. The reasons that appear

[13] See p. 87

pertinent are: (1) Education courses are needed by prospective teachers at the undergraduate level for the purpose of developing, early in their careers, a "teacher" rather than a "specialist" attitude. (2) They are needed at the graduate level in order to take advantage of the increased maturity of the student at this point in his career. Also it is believed that some of this work would be of greatest value if postponed until some actual teaching experience had been acquired.

As to the actual courses that should be taken, the list previously cited[14] appears to cover the necessary areas. No data pertaining to the level at which each of these courses should be taken were gathered. The final recommendations[15] place philosophy of Education, guidance and counseling, and curriculum construction at the graduate level because of the author's opinion that the maturity and practice teaching experience of the graduate student are needed if the full value of these courses is to be realized.

IV Research

It was hypothesized that not more than a small amount of training in research is needed by junior college physical science teachers. The recommendations made by all groups in this survey appear to support this hypothesis. Thus, two-thirds of the teachers and administrators, and nearly 90 per cent of the experts, favored from five to six credits in this aspect of graduate training. Since this fits in well with the

---

[14] See p. 90

[15] See p. 132

usual master's degree it appears to be a reasonable recommendation. It is significant also to note that, whatever graduate training these respondents do favor at levels beyond the master's, it is clearly not in research.

V Practice Teaching

An effort was made in this study to determine:

(1) How many of the teachers in this field had practice teaching in their own experience? One hundred and twenty , or 64 per cent, reported that they had[16].

(2) What value did these teachers see in their own practice teaching experience? Fifty-eight, or 49.7 per cent, of those who had it rated it as "very valuable." Forty-seven, or 39.5 per cent, rated it as "of some value." The other fifteen, or 12.6 per cent, rated it as "of very little value[17]."

(3) What effect did the degree of supervision exercised during this experience have on its value to the teaching intern? As previously reported[18], a positive, but rather low, correlation was found to exist between these two aspects of the question.

(4) At what educational level did the teachers do their practice teaching, and at what level is it recommended, if at all, by all respondents? In general they reported at as done in high schools and recom-

---

[16] See p. 96

[17] See p. 96

[18] See p. 96

mended that it be done either there or in a junior college[19]. It is suspected that if teaching internships were readily available in junior colleges, a larger proportion might have favored this as the recommended level. That such internships are not available at present is attested to by the fact that only 2.1 per cent of the reporting teachers had their practice teaching at this level. In spite of this, 20 per cent of them recommended that it should be done in a junior college, and an additional 26 per cent checked the choice marked "junior college or high school." It is also noted that although 51.6 per cent of the teachers, who had practice teaching, had it in high schools, only 4.3 per cent recommended this as the single most desirable choice. The "junior college" was the most popular choice on this question with each of the other two groups.

All of the above considerations make it evident that a carefully supervised practice teaching experience in a junior college should be recommended for prospective teachers.

VI Degree Levels

The data on degree levels reported by the teachers, and recommended by all groups, generally support the hypothesis that approximately one year of graduate work beyond the master's level should be accomplished by prospective junior college physical science teachers. This was generally recommended by both the administrators and experts[20], and is

---

[19] See pp. 97 and 99.

[20] See p. 103

stated in spite of the low numbers of teachers[21], who favored the intermediate level, for three reasons; (1) The administrators are more likely to determine the type of teacher who is appointed, and they favor the higher level. (2) The teachers themselves have, for some reason, generally reported higher levels of graduate training than they are here recommending. (3) If one followed all of the other recommendations, he would inevitably accumulate considerably more than the usual requirement of thirty credits for a master's degree. Thus, the most appropriate training is seen as including twenty credits in a graduate major, two ten-credit graduate minors, and about ten credits at this level in Education courses. This totals to fifty credits and thus comes much closer to two years of graduate work than it does to a single year.

VII Non-Academic Work Experience

Little additional comment seems needed regarding the fact that a considerable amount of non-academic work experience was reported by the responding teachers, and that they considered it to be of real value to them as teachers. Similarly there was substantial agreement that this should be recommended for, but definitely not required of, prospective teachers. A note of warning was sounded by a few in each group who feared that teachers might be lost to the profession while acquiring such experience. This would undoubtedly happen in isolated cases, but it is felt that, if such experiences are obtained during summer "vacation" periods after beginning service as a teacher, this danger would not be

---

[21] See p. 102

serious, and the values accruing from this kind of experience would far outweigh such occasional losses.

VII A Recommended Program for the Preparation of Junior College Teachers of Physical Science

The training program which is recommended in this section is based primarily on the recommendations made by 186 junior college physical science teachers, 104 junior college administrators, and thirty-eight of the outstanding leaders in this field today. Due consideration has also been given to authoritative opinion and research studies as found in the junior college literature.

It is recommended that students who plan to become physical science teachers in junior colleges should acquire the following academic and professional training:

1. The Undergraduate Program.

a. Subject major. This should consist of a major in either chemistry, mathematics, or physics with not less than twenty-four, and preferably thirty to thirty-six, semester hours of credit.

b. Subject minors. There should be two such minor fields of emphasis with not less than twenty credits in each. Because of its prerequisite value in all of the physical sciences, it is recommended that, if mathematics is not a major, it will be one of the minors. The second minor could be in a single physical science or composed of a selection of three or four one-year courses in each of several of the sciences.

c. Education courses. If the student plans to teach in a state which has specific credential requirements in this area, these should

obviously be consulted in planning the program. Otherwise the program should include from twelve to fifteen hours in course work which covers the most important aspects of: (1) history of education, (2) history and philosophy of the junior college, (3) psychology, particularly as applied to the late adolescent, (4) techniques of teaching, and (5) testing, measurement, and evaluation. The course in teaching methods, or techniques, should not be a theory course. It should be taught either by, or in collaboration with, an expert teacher of some lower-division course in one of the physical sciences at the university. It should require considerable practical work on the part of the students in such things as planning assignments, the use of demonstration apparatus including audio-visual equipment, and the preparation and delivery of at least partial "lectures" on suitable topics in the subject field, and should also include some observation of instruction in this field in a junior college.

d. Social sciences and humanities. From nine to twelve credits should be elected in each of these areas.

e. Electives. The program outlined above will result in the acquisition of from ninety to one hundred credits. General university requirements in basic subjects, physical education, and military or naval science may consume the balance of a bachelor's degree program of from 120 to 130 credits. If they do not, the student should determine whether the university at which he intends to take his master's degree requires a reading knowledge of a foreign language as a pre-requisite for that degree in his field. If this is the case, it is recommended that he take from six to twelve credits in either German or French during his undergraduate years rather than postponing such work to the time when

a graduate degree is being sought. In order to gain a better perspective of the sciences as a whole it would be desirable to elect some work in biological science and, to improve his effectiveness as a teacher, he should also elect some course work in speech, and audio-visual education.

2. The Graduate Program.

a. Subject major. This should consist of from fifteen to twenty credits in the physical science area of the student's greatest interest. It should include either a master's thesis in this field or course work specifically designed to develop appreciation of the value of and knowledge of the methods used in research. It is also noted at this point that the emphasis in this program should be different from that for the usual graduate student who plans to go on to the doctoral level and possible university teaching or industrial research activities. It is recommended that some of the courses which are selected should be such as will: (1) give the prospective teacher a more thorough understanding of scientific principles as they relate to industry and business than usually obtains in research-oriented graduate courses in the physical sciences, and indicate to him ways and means of applying these to practical job situations; (2) develop the prospective teacher's manipulative skill, in order that he may give effective demonstrations and become effective in directing laboratory instruction; and (3) by means of occasional field trips, point out the relationships between principles and their application to production problems at the semi-professional level. While courses which recognize these as primary objectives are probably not available at most universities, it is believed that this study has suggested a need for this kind of practical orientation

on the part of teachers in these areas. Thus, it is recommended that a university that would train junior college teachers of physical science should establish one or two such courses at the graduate level, either as interdisciplinary offerings or in each of the major physical science areas.

b. Minor areas. Two minors of approximately ten credits each should be acquired. At least one of these should consist of graduate work which is countable toward a subject matter master's degree. The second minor would probably be deferred until the degree had been conferred. At this point, since a doctor's degree is not being recommended, the student should be free to choose undergraduate work in a minor area designed to develop a third teaching field, if he had not already acquired a second minor in a single subject area at this level.

c. Practice teaching. During the first term following the conferral of the master's degree the candidate should spend from eight to fifteen weeks as a teaching intern in a junior college. This should be done under the direct supervision of an experienced junior college teacher. Until such time as some two-year graduate degree may become popularly accepted, the question of university credit for this internship does not seem too important. However, the program should be formalized under the control of the university and should probably carry from nine to twelve credits.

At the completion of his internship, the candidate might return to the university for the balance of the second year of graduate work that he should ultimately acquire, or remain as a full-time instructor at the junior college for the remainder of the year. If the latter plan is followed, he could well complete his graduate work during summer

sessions at the university.

d. Education courses. These should include from six to twelve graduate credits in the fields of philosophy of education, curriculum construction, and guidance and counseling.

Concluding Statement

The program that is here recommended represents a minimum that appears desirable for the initial preparation of a well-qualified junior college physical science teacher. In addition to the formal course work described in this program, it is strongly recommended that such teachers acquire some non-academic work experience in locations where practical applications of the physical sciences are being put to use. This work should be performed during summers when teachers are free of instructional duties, but should not become an annual financial necessity, nor should it be done at the expense of ocassional attendance at university summer sessions for "refresher" courses.

If this program were followed by prospective junior college teachers of physical science, it is believed that they would be adequately trained in both breadth and depth within their teaching fields, in general education, and in professional training suitable for this field of higher education.

BIBLIOGRAPHY

BOOKS

Blegen, Theodore C., and Cooper, Russell M., The Preparation of College Teachers. American Council on Education Studies, Series I, Volume 14. Washington: American Council on Education, 1950. 186 p.

Bogue, Jesse P., American Junior Colleges: 1956. Fourth Edition. Washington: American Council on Education, 1956. xi - 584 p.

Bogue, Jesse P., The Community College. New York: McGraw-Hill, 1950. xxi - 390 p.

Colvert, Clyde C., and Heyl, Arnold A., "Qualifications of Junior College Teachers, Administrators and Board Members." American Association of Junior Colleges Research Bulletin, Volume 11, Number 2. Austin: American Association of Junior Colleges, 1951. 55 p.

Diekhoff, John F., The Domain of the Faculty in Our Expanding Colleges. New York: Harper and Brothers, 1956. 204 p.

Eells, Walter C., Associate's Degree and Graduation Practices in Junior Colleges. Washington: American Association of Junior Colleges, 1942. vi - 833 p.

Eells, Walter C., The Junior College. New York: Houghton Mifflin Co., 1931. xxvii - 833 p.

Good, Carter V., and Scates, Douglas E., Methods of Research. New York: Appleton-Century-Crofts, Inc., 1954. xx - 920 p.

Henry, Nelson B., Editor, The Public Junior College. Chicago: University of Chicago Press, 1956.

Higher Education for American Democracy: A Report of the President's Commission on Higher Education. Volume I, Establishing the Goals, vii - 103 p.; Volume II, Equalizing and Expanding Individual Opportunity, vii - 69 p.; Volume III, Organizing Higher Education, v - 74 p.; Volume IV, Staffing Higher Education, vii - 63 p.; Volume V, Financing Higher Education, vii - 68 p.; Volume VI, Resource Data, vii - 57 p. Washington: U. S. Government Printing Office, 1947.

Hollin, Ernest V., Toward Improving Ph.D. Programs. Washington: American Council on Education, 1945. xii - 204 p.

Justman, Joseph, and Mais, Walter H., College Teaching: Its Practice and Potential. New York: Harper and Brothers, 1956. vii - 204 p.

Kelley, Fred J., Editor, Improving College Instruction. Report of a Conference held at Chicago, Illinois, December 7 - 9, 1950, Sponsored by the American Council on Education and U.S. Office of Education. In American Council on Education Studies, Series I, No. 48.

Reed, A. Y., The Effective and Ineffective College Teacher. New York: The American Book Co., 1935. xiv - 344 p.

Reynolds, James W., "Preparation Needed for Faculty Members in Junior Colleges," Proceedings, Institute for Administrative Officers of Higher Education; 1946. Volume 18, pp. 34-46. Edited by John Dale Russell. Chicago: The University of Chicago Press, 1946.

Riley, John W., Jr., et al., The Student Looks at His Teacher. New Brunswick: Rutgers University Press, 1950. xi - 166 p.

Sexson, John A., and Harbeson, John W., The New American College. New York: Harper and Brothers, 1946. xviii - 312 p.

Smith, Huston, The Purposes of Higher Education. New York: Harper and Brothers, 1955. xix - 218 p.

Woellner, Robert C., and Wood, M. Aurilla, Requirements for Certification of Teachers, Counselors, Librarians, Administrators: for Elementary Schools, Secondary Schools, and Junior Colleges: 1956-57. Twenty-First Edition. Chicago: The University of Chicago Press, 1956. vi - 124 p.

ARTICLES

Anderson, Harold A., "The Preparation of College Teachers," National Education Association Journal, 40:343; May 1951.

Baller, W. R., and Worcester, C. A., "Supervised Teaching for Doctoral Students," Journal of Higher Education, 25:383-4; October 1954.

Blegen, Theodore C., "Ferment in Graduate Education," National Education Association Journal, 39:685-6; December 1950.

Blegen, Theodore C., "The Graduate School and the Education of College Teachers," The Education Record, 29:12-25; January 1948.

Bogue, Jesse P., and Ritter, Zora, "Junior College Directory," Junior College Journal, 26:281-307; January 1956.

Bogue, Jesse P., and Waterman, Joanne, "Junior College Directory," Junior College Journal, 27:278-304; January 1957.

Bousfield, W. A., "Student Ratings of Qualities Considered Desirable in College Professors," School and Society, 51:253-56; February 1940.

Breed, F. S., "A Guide for College Teaching," School and Society, 24:82-7; July 1926

Buechel, J. F., "Desirable Backgrounds for Community College Teachers," Junior College Journal, 19:117-18; November 1948.

Bullington, R. S., "Teachers and Teaching Procedures in College General Education Science Courses," Science Education, 35:92-106; March 1951.

Clark, Selby G., "Eighty Institutions Produce Doctors," Phi Delta Kappan, 35:387-89; June 1954.

Colvert, Clyde C., "Ideal Junior College Instructor," Junior College Journal, 25:502-7; May 1952.

Colvert, Clyde C., "Professional Development of Junior College Instructors," Junior College Journal, 25:474-78; April 1955.

Colvert, Clyde C., "Report of the Research Office, American Association of Junior Colleges," Junior College Journal, 26:95-107; October 1955.

Colvert, Clyde C., and Bright, H. F., "Research Problems Preferred by Junior College Administrators," Junior College Journal, 20:350-54; February 1950.

Davis, J. B., "Administrative and Supervisory Practices for Improving Instruction III," Junior College Journal, 18:365-73; March 1948.

Dolan, F. H., "The Preparation of Junior College Teachers," Junior College Journal, 22:329-36; February 1952.

Donovan, T. P., "Problems of the Instructor in the Junior College," Junior College Journal, 22:494-7; May 1952.

Duryea, E. D., Jr., "A Graduate Major in College Teaching," School and Society, 76:167-8; September 1952.

Eckert, Ruth E., "A New Design for the Training of College Teachers," Junior College Journal, 18:25-33; September 1947.

Eckert, Ruth E., "Some Neglected Aspects in the Preparation of College Teachers," The Journal of General Education, 3:137-44; January 1949.

Eells, Walter C., "The Junior College," Encyclopedia of Educational Research, Walter S. Monroe, Editor, pp. 630-34. New York: MacMillan Co., 1950. xxv - 1520 p.

French, Sidney J., "Educating the College Teacher of Science," The Journal of General Education, 3:87-97; January 1949.

Garrison, Lloyd A., "Preparation of Junior College Instructors," Junior College Journal, 12:135-41; November 1941.

Garrison, Lloyd A., "Preparation of Junior College Instructors," Junior College Journal, 12:204-9; December 1941.

Geyer, D. L., "Qualities Desired in College," School and Society, 63:270-71; April 1946.

Gilger, G. A., "Should Instructors Have Work Experience?," Junior College Journal, 13:192-7; December 1942.

Goette, M. H., and Roy, H. L., "Ten Year Survey of Scholastic Aptitude of Junior College Students," Junior College Journal, 21:3-8; September 1950.

Gordon, T. E., "Realistic Training for Junior College Service," California Journal of Secondary Education, 24:480-2; December 1949.

Gray, John E., "Administrative and Supervisory Practices for Improving Instruction II," Junior College Journal, 18:238-46; January 1948.

Gruenberg, Benjamin, "Dilemmas of the Science Teacher," Science Education, 33:288; October, 1949.

Guthrie, E.R., "Evaluation of Faculty Service," Bulletin of the American Association of University Professors, 31:255-62;January 1945.

Haggerty, M. E., "The Professional Training of College Teachers," North Central Association Quarterly, 2:108-23; June 1927.

Hamlin, N. E., "Preferences of Junior College Administrators Toward High School Teaching Experience," Junior College Journal, 21:236-9; December 1950.

Hawkins, T. J., "Junior College Teachers, Some Unique Characteristics," Junior College Journal, 25:298-302; January 1955.

Henderson, L. N., "Internship in Junior College Teaching," Junior College Journal, 27:388-95; March 1957.

Hillway, Tyrus, "Professional Preparation of College Teachers," Journal of Teacher Education, 3:306-7; December 1952.

Hollis, Ernest V., "Preparation of Teachers for Terminal Curricula," Junior College Journal, 11:555-7; May 1941.

Houghton, Donald E., "A Ph.D. for Junior College Teachers in the Social Sciences and the Humanities," Junior College Journal, 23:225-28; December 1952.

Ingalls, R. A., "Problems of Staffing the Community College," National Association of Secondary School Principals Bulletin, 37:393-401; April 1953.

Koos, Leonard V., "Junior College Teachers Cooperations," Junior College Journal, 19:399-411; March 1949.

Koos, Leonard V., "Junior College Teachers: Background of Experience," (pp. 457-69), "Degrees and Graduate Residence," (pp. 77-89), "Preparation in Education," (pp. 332-44), "Subjects Taught and Specialized Preparation," (pp. 196-209), Junior College Journal, 18: (pp. as above); September 1947 to May 1948.

Koos, Leonard V., "Preparation for Community College Teaching," Journal of Higher Education, 21:309-17; June 1950.

Koos, Leonard V., "Programs of Junior College Teacher Preparation," Junior College Journal, 19:333-46; February 1949.

Koos, Leonard V., "Programs of Junior College Teacher Preparation Imperative," Junior College Journal, 18:423-24; April 1948.

Martorana, S. V., "Washington's Teacher Education Plan Related to Preparation of Community College Instructors," Junior College Journal, 22:125-29; November 1951.

Melvin, K. L., "Instructional Practices Used in Selected Public Junior Colleges," Junior College Journal, 27:402-5; March 1957.

Merson, T. B., "Preparation and Selection of Instructors for Community Colleges," California Journal of Secondary Education, 31:496-501; December 1956.

Mushlitz, M. E., "Academic Preparation of Junior College Personnel," California Journal of Secondary Education," 22:492-5; December 1947.

Novak, B. J., "And as for Industrial Experience," Science Teacher, 21:221-3; October 1954.

Odom, S. L., "An Objective Determination of the Qualities of a Good College Teacher," Peabody Journal of Education, 21:109-16; September 1943.

Payne, Fernandus, "Teaching Science at the College Level," Bulletin of the American Association of University Professors, 36:497-510; Fall 1950.

Pike, A. H., and Fields, R. R., "Community College Problems," Teacher's College Record, 51:528-36; May 1950.

Price, Hugh G., "Can Junior Colleges Achieve Superior Teaching?," Junior College Journal, 24:63-4; October 1953.

Pugh, D. B., and Morgan, R. E., "Shortcomings in Preparation of Instructors," Junior College Journal, 14:405-15; May 1944.

Punke, Harold D., "Academic Qualifications of Junior College Faculties," Junior College Journal, 23:366-79; March 1953.

Punke, Harold D., "Ranking, Tenure, and Sex of Junior College Faculties," School Review, 62:480-7; November 1954.

Rankin, Oren R., "A Study of Competencies Desirable for Instructors of College General Education Courses in Physical Science," Science Education, 36:297-306; December 1952.

Rauch, Walter E., "Instructor Rating Sheets," Junior College Journal 22:441-46; April 1952.

Reeder, E. H., "Quarrel Between Professors of Academic Subjects and Professors of Education; An Analysis," Bulletin of the American Association of University Professors, 37:506-21; September 1951.

Reeves, F. W., "How to Improve Instruction in Junior Colleges," Nation's Schools, 3:69-75; April 1929.

Remmers, H. H., "Qualities College Students Desire in College Instructors," School and Society, 30:232; August 1929.

Reynolds, James W., "Administrative and Supervisory Practices for Improving Instruction I," Junior College Journal, 18:181-90; December 1947.

Rislov, Sigurd, "The Community College," Atlantic Monthly, Volume 199, Number 6:64-7; June 1957.

Rodgers, Robert, "Planning the In-Service Training Program," Junior College Journal, 23:185-90; December 1950.

Russo, S., "Qualifications of the Junior College Faculty," Junior College Journal, 8:193-4; January 1938.

"Science Teaching at the Junior College Level," Forty-Sixth Yearbook of the National Society for the Study of Education, Part I, Edited by Nelson B. Henry, pp. 224-4. Chicago: University of Chicago Press, 1947. xii - 306 p.

Smith, A. A., "What is Good Teaching?," Journal of Higher Education, 15:216-18; April 1944.

Smith, H. L., "Better Education of College Teachers; Junior College," North Central Association Quarterly, 23:391-6; April 1949.

Starrack, J. A., "Student Rating of Instructors," Journal of Higher Education, 5:88-90; February 1934.

Tapley, Earl M., "General Education and the Training of Junior College Teachers," School Review, 64:191-6; April 1956.

Trabue, Marion R., "Characteristics of College Teachers Desired by College Presidents," Journal of Teacher Education, 2:133-38; January 1951.

Trabue, Marion R., "What Traits Should Junior College Teachers Possess?" Junior College Journal, 21:140-42; November 1950.

Traphagen, A. L., "Student Teaching in Junior College," Junior College Journal, 23:147-9; November 1952.

Umstattd, J. F., "Course on College Teaching," Journal of Higher Education, 25:76-81; February 1954.

Unruh, A. "Special Training Needed for Teachers in Junior Colleges or Community Colleges," Education, 71:139-43; November 1950.

"Where to Go for Junior College Teacher Preparation," Junior College Journal, 18:444-5; April 1948.

Wood, William R., "Professional Personnel for Community Colleges," Junior College Journal, 20:513-22; May 1950.

UNPUBLISHED MATERIALS

Blake, Wainwright D., "The Problems and Training of the Junior College Instructor," Unpublished Doctor's dissertation. University of Missouri, 1942. iv - 122 p.

Ehmann, Gerhard E., "Some Criteria for the Training of Teachers in General Education at Junior College Level in California," Unpublished Doctor's dissertation. University of California, Los Angeles, 1951. iv - 324 p.

Frazier, Ralph P., "The Competencies and Patterns of Training Desirable for Instructors of Biological Science Courses in General Education Programs," Unpublished Doctor's dissertation. University of Illinois, 1956. As found in Dissertation Abstracts, Volume 16, Number 6, p. 1086. Ann Arbor: University Microfilms, 1956.

Garrison, Lloyd A., "Junior College Teachers: Their Academic and Professional Education," Unpublished Doctor's dissertation. Yale University, 1940. v - 173 p.

Hagie, Daryl G., "A Comparative Study of Junior College Students with Students in Lower Divisions of Colleges Having only Undergraduate Programs," Unpublished Doctor's dissertation. State College of Washington, 1955. As found in Dissertation Abstracts, Volume 15, Part 2, p. 2438. Ann Arbor: University Microfilms, 1955.

Kidd, Rex C., "The Improvement of the Pre-Service Education of Undergraduate College Teachers," Unpublished Doctor's dissertation. University of Florida, 1951. As found in Henderson, L. N., "Internship in Junior College Teaching," Junior College Journal, 27:388-95; March 1957.

Ostlie, Selmer, "The Selection and Retention of Junior College Teachers," Unpublished Doctor's dissertation. University of Southern California, 1951. xxxiii - 602 p.

Petitjean, Charles F. , "A Study of Terminal Education in The Junior Colleges in Connecticut," Unpublished Doctor's dissertation. New York University, 1956. As found in Dissertation Abstracts, Volume 16, Part 2, p. 2067. Ann Arbor: University Microfilms, 1956.

Redemsky, Louis W., "The Educational and Vocational Plans of Senior High School Students with Special Reference to the Occupational Pattern of the Community, the Occupations of High School Graduates, and the Terminal Curriculum of the Junior College," Unpublished Doctor's dissertation. Michigan State College, 1952. xxiv - 330 p.

Tapley, Earl M., "Preparation for Teaching General Education Courses in Junior Colleges," Unpublished Doctor's dissertation. University of Chicago, 1955. xi - 200 p.

"A Two-Year Graduate Degree," University of Texas, June 1951. (mimeo.)

Williams, C. J., "An Analysis of the Physical Science Subject Matter a Competent Teacher of General or Physical Science Needs to Know," Unpublished Bachelor's thesis. Tennessee A. and I. State University, 1952. As found in Johnson, Phillip G., "Science Education Research Studies," Science Education, 38:36; February 1954.

APPENDIX A

JUNIOR COLLEGES COOPERATING

College and Location	Equivalent Full-time Faculty
PRIVATE COLLEGES	
Snead College, Boaz, Alabama	13
Fort Smith Community College, Fort Smith, Arkansas	18
Little Rock Junior College, Little Rock, Arkansas	30
Jacksonville University, Jacksonville, Florida	26
Graceland College, Lamoni, Iowa	31
Northwestern Junior College, Orange City, Iowa	22
Waldorf College, Forest City, Iowa	21
Ricks College, Rexburg, Idaho	46
Vincennes University, Vincennes, Indiana	19
Donnelly College, Kansas City, Kansas	12
Sacred Heart College, Wichita, Kansas	27
Campbellsville College, Campbellsville, Kentucky	19
Caney Junior College, Pippa Passes, Kentucky	10
Westbrook Junior College, Portland, Maine	27
University of Baltimore Junior College, Baltimore, Maryland	16
Pine Manor Junior College, Wellesley, Massachusetts	29
Spring Arbor Junior College, Spring Arbor, Michigan	10
Suomi College, Hancock, Michigan	13
Christian College, Columbia, Missouri	35
Southwest Baptist College, Bolivar, Missouri	24
Colby Junior College, New London, New Hampshire	44

College and Location	Equivalent Full-time Faculty
Bennett Junior College, Millbrook, New York	38
Paul Smith's College of Arts and Sciences, Paul Smith's, N.Y.	19
Centenary College for Women, Hackettstown, New Jersey	47
Campbell College, Buie's Creek, North Carolina	35
Louisburg College, Louisburg, North Carolina	18
Peace College, Raleigh, North Carolina	16
Sinclair College, Dayton, Ohio	20
Johnstown Center, University of Pittsburgh, Johnstown, Penn.	31
Keystone Junior College, LaPlume, Pennsylvania	18
Wyomissing Polytechnic Institute, Wyomissing, Pennsylvania	7
Freed-Hardeman College, Henderson, Tennessee	20
Concordia College, Milwaukee, Wisconsin	20
SMALL PUBLIC COLLEGES	
San Luis Obispo Junior College, San Luis Obispo, California	14
Tart College, Tart, California	24
Lamar Junior College, Lamar, Colorado	8
Chipola Junior College, Marianna, Florida	27
Georgia Southwestern College, Americus, Georgia	18
Middle Georgia College, Cochran, Georgia	18
South Georgia College, Douglas, Georgia	18
Elgin Community College, Elgin, Illinois	21
Lyons Township Junior College, LaGrange, Illinois	14
Moline Community College, Moline, Illinois	18
Morton Junior College, Chicago, Illinois	29

College and Location	Equivalent Full-time Faculty
Boone Junior College, Boone, Iowa	6
Centerville Community College, Centerville, Iowa	7
Mason City Junior College, Mason City, Iowa	17
Arkansas City Junior College, Arkansas City, Kansas	15
Chanute Junior College, Chanute, Kansas	15
Dodge City College, Dodge City, Kansas	15
El Dorado Junior College, El Dorado, Kansas	13
Hutchinson Junior College, Hutchinson, Kansas	23
Kansas City Kansas Junior College, Kansas City, Kansas	20
Ashland Junior College, Ashland, Kentucky	9
Alpena Community College, Alpena, Michigan	15
Battle Creek Community College, Battle Creek, Michigan	5
Community College and Technical Institute, Benton Harbor, Mich.	17
Gogebic Community College, Ironwood, Michigan	9
Northwestern Michigan College, Traverse City, Michigan	15
Port Huron Junior College, Port Huron, Michigan	23
South Macomb Community College, Van Dyke, Michigan	16
Baltimore Junior College, Baltimore, Maryland	30
Montgomery Junior College, Takoma Park, Maryland	27
Holyoke Junior College, Holyoke, Massachusetts	14
Austin Junior College, Austin, Minnesota	14
Brainerd Junior College, Brainerd, Minnesota	10
Hibbing Junior College, Hibbing, Minnesota	22
Worthington Junior College, Worthington, Minnesota	9
Pearl River Junior College, Poplarville, Mississippi	19

College and Location	Equivalent Full-time Faculty
Joplin Junior College, Joplin, Missouri	29
Fairbury Junior College, Fairbury, Nebraska	12
Scottsbluff College, Scottsbluff, Nebraska	18
Asheville-Biltmore College, Asheville, North Carolina	15
Connors State Agricultural College, Warner, Oklahoma	20
Murray State Agricultural College, Tishomingo, Oklahoma	23
Navarro Junior College, Corsicana, Texas	23
Carbon College, Price, Utah	19
Northern Wyoming Community College, Sheridan, Wyoming	16
MEDIUM PUBLIC COLLEGES	
Phoenix College, Phoenix, Arizona	59
College of the Sequoias, Visalia, California	60
Hartwell College, Salinas, California	45
Yuba College, Marysville, California	40
Pueblo Junior College, Pueblo, Colorado	70
Armstrong College of Savannah, Savannah, Georgia	35
Pensacola Junior College, Pensacola, Florida	50
Boise Junior College, Boise, Idaho	50
Chicago City Junior College (Crane Branch), Chicago, Illinois	34
Bay City Junior College, Bay City, Michigan	41
Flint Junior College, Flint, Michigan	70
Grand Rapids Junior College, Grand Rapids, Michigan	56
Jackson Junior College, Jackson, Michigan	33

College and Location	Equivalent Full-time Faculty
Muskegon Community College, Muskegon, Michigan	32
Rochester Junior College, Rochester, Minnesota	54
Meridian Municipal Junior College, Meridian, Mississippi	50
Northeast Mississippi Junior College, Booneville, Mississippi	33
Junior College of Kansas City, Kansas City, Missouri	66
Orange Community College, Middletown, New York	54
North Dakota State Schoool of Science, Wahpeton, North Dakota	54
Cameron State Agricultural College, Lawton, Oklahoma	44
Pan American College, Edinburg, Texas	52
San Antonio College, San Antonio, Texas	90
Texas Southmost College, Brownsville, Texas	38
University of Tennessee (Martin Branch), Martin, Tennessee	52
Clark College, Vancouver, Washington	64
Grays Harbor College, Aberdeen, Washington	38
Milwaukee Institute of Technology, Milwaukee, Wisconsin	32
Casper College, Casper, Wyoming	42

LARGE PUBLIC COLLEGES

Bakersfield College, Bakersfield, California	113
East Los Angeles Junior College, Los Angeles, California	142
El Camino College, El Camino, California	159
Long Beach City College, Long Beach, California	256
Los Angeles Valley College, Van Nuys, California	135
Mount San Antonio Junior College, Pomona, California	118
Orange Coast College, Costa Mesa, California	105

College and Location	Equivalent Full-time Faculty
San Bernadino Valley College, San Bernadino, California	96
Santa Rosa Junior College, Santa Rosa, California	94
Chicago City Junior College (Wright Branch), Chicago, Ill.	185
Henry Ford Community College, Dearborn, Michigan	103
New York City Community College of Applied Arts and Sciences, Brooklyn, New York	192
Arlington State College, Arlington, Texas	116
Del Mar College, Corpus Christi, Texas	97
Weber College, Ogden, Utah	106
Norfolk Division, College of William and Mary, Norfolk, Va.	101

APPENDIX B-1

LETTER TO ADMINISTRATORS

Dear Dr. _____:

Undoubtedly you are well aware of the current shortage of physical science teachers who are adequately prepared to teach in the junior college. Our universities are beginning to initiate programs which include some training specifically aimed at the junior college teaching field, but there is substantial disagreement and lack of knowledge as to what these programs should include.

The enclosed questionnaires are part of a research project, conducted under the auspices of the Department of Teacher Education, College of Education, Michigan State University. This project is an attempt to learn what would constitute the most appropriate professional preparation for junior college physical science teachers.

A survey of outstanding leaders in junior college education in various universities, state departments of public instruction and the U. S. Office of Education is also being conducted, but it is felt that two of the most important sources of information on this question are the junior college administrators and teachers. Thus we are asking your cooperation in distributing the questionnaires to the appropriate members of your staff. We would like the "Questionnaire for Administrators" to be completed by the person most intimately concerned with the supervision, promotion, and hiring of physical science teachers at your institution. We would also like to have a copy of the "Questionnaire for Teachers" distributed to each member of the staff who is principally (i.e., more than half-time) involved in the teaching of one or more of the physical sciences. If additional copies of this questionnaire are needed, they will be supplied upon request.

No one outside of those who are immediately concerned with the research will have access to the questionnaires. Neither participating institutions nor individuals will be identified in the findings. Each respondent who requests it will receive a digest of the final report.

Thank you for your cooperation.

Sincerely,

K. Scott Kinerson

QUESTIONNAIRE FOR ADMINISTRATORS

1. Name _____

2. Title of present position _____

3. Name and location of employing institution _____

_____

4. Number of teachers on the staff who are principally, (i.e., more than half-time) involved in the teaching of one or more of the physical sciences.

_____

5. In your opinion, what would be the most appropriate degree level for prospective junior college physical science teachers?

a) Bachelor's _____ c) Master's plus about 30 semester hours _____
b) Master's _____ d) Doctor's _____

6. Please indicate your views as to the approximate number of semester hours of college credit which would be most appropriate for prospective junior college physical science teachers in each of the following subject areas. (The numbers listed with the subjects show the range of credit which is commonly required in undergraduate teacher education programs designed for secondary school physical science teachers.)

Subject	Approx. No. of Semester Hrs. in each: Undergrad	Graduate
a) Subject major (24 - 36)	____	____
b) Subject minors (15 - 36) Indicate how many minors ____	____	____
c) Education courses (except practice teaching) (20 - 30)	____	____
d) Practice teaching (0 - 12)	____	____
e) Foreign languages (0 - 15)	____	____
f) Courses in the humanities (6 - 18)	____	____
g) Courses in the social sciences (6 - 12)	____	____
h) Research in the physical sciences (0 - 3)	____	____
i) Research in education (0 - 3).	____	____
j) Other (please specify)		
_____	____	____

7. If you feel that it would be desirable to require practice teaching in the training of these teachers, do you think it would be best if this teaching were done in:

a) A high school _____ d) either (a) or (b) _____
b) A junior college _____ e) either (b) or (c) _____
c) A senior college _____ f) any of the three _____

4. Please indi
for prospec
following t

a) Curricu
b) Guidanc
c) History
d) History
e) Junior
f) Psychol
g) Psychol
h) Technic
i) Testing
j) Other

Please indic
mathematics,
teacher can
in a junior

Current

Please check
teacher is e

5th

Would you co
assistance t
example: do
assign new s
of problems

8. Please indicate how many semester hours you would consider most appropriate for prospective junior college physical science teacher in each of the following types of education courses.

Courses	No. of Sem. Hrs.
a) Curriculum construction	_____
b) Guidance and counseling	_____
c) History and philosophy of education (general)	_____
d) History and philosophy of the junior college	_____
e) Junior college administration	_____
f) Psychology (general)	_____
g) Psychology of the late adolescent	_____
h) Techniques of teaching	_____
i) Testing, measurement, and general evaluation	_____
j) Other (please specify)	_____
_____	_____
_____	_____

9. Please indicate in how many subject matter areas, e.g., physics, mathematics, chemistry, general science, etc., you think a physical science teacher can reasonably be expected to be qualified if he desires to teach in a junior college of the size of your institution. _____

Comment

10. Please check each of the grade levels at which a typical physical science teacher is expected to teach at your institution.

9th___ 10th___ 11th___ 12th___ 13___ 14___

11. Would you comment briefly as to the type and extent of the teaching assistance that is given to beginning instructors at your institution. For example: does your institution hold pre-registration orientation sessions; assign new staff members to senior members for advice and counsel on teaching problems; schedule regular teaching seminars; etc.?

2. What is yo
academic
physical s

3. If you thi
as to the

4. Is there ar
science tea
which you

5. Do you wish

12. What is your opinion regarding the desirability of requiring some non-academic work experience in the training of prospective junior college physical science teachers?

13. If you think that such work experience should be required, would you comment as to the most appropriate type and duration.

14. Is there any phase of training for prospective junior college physical science teachers, that has not been mentioned in this questionnaire, which you feel should be stressed?

15. Do you wish to have a summary of the final report on this project?

Yes _____ No _____

APPENDIX B-3

FOLLOW-UP LETTER TO ADMINISTRATORS

Dear Dr. _____:

May I first express my appreciation for the promptness with which you completed and returned the questionnaire concerning the professional preparation of junior college physical science teachers. Your comments and suggestions were most helpful.

The teachers on your staff who are named below have also been most cooperative in that they have returned carefully completed questionnaires. To date I have not, however, had any response from the other _____ members of your staff for whom questionnaires were originally provided.

I would appreciate it very much if the enclosed note to the teachers who have not yet responded could be distributed to those teachers.

Additional copies of the questionnaires are still available if needed but are not included in this letter on the assumption that those who discarded the first copy would probably do likewise with the second.

Thank you again for your assistance.

Sincerely,

K. Scott Kinerson

Teachers from whom responses have been received were;

APPENDIX B - 4

FOLLOW-UP LETTER TO ADMINISTRATORS

Dear Dr. _____:

Questionnaires concerning the professional preparation of junior college physical science teachers were mailed to approximately two hundred junior colleges on March 18. A majority of those institutions have responded with very helpful comments and suggestions. However, according to my records, I have not as yet received any returns from your college.

If the findings of this study are not to be biased in favor of the viewpoints expressed by those most interested in surveys conducted by colleges of Education they should be based on responses obtained from as large a proportion of the original sample as it is possible to obtain.

To date the responses show considerable diversity of opinion. I am rather surprised to find that a large majority of those who have returned the questionnaire appear to favor considerable work in Education courses while a small minority feel that this is largely unnecessary. The question of whether this is truly representative of the opinion held by the majority of junior college administrators and teachers cannot be reliably answered on the basis of the returns received thus far.

If you cannot find the time, or are not willing, to answer all of the questions would you please complete as much of the questionnaire as possible.

Also, I would appreciate it very much if the enclosed note to the teachers who have not yet responded could be distributed to those teachers.

Returns received after June 15th cannot be included in the report.

Thank you,

K. Scott Kinerson

QUESTIONNAIRE FOR TEACHERS

This questionnaire is part of a research project, conducted under the auspices of the Department of Teacher Education, College of Education, Michigan State University. This project is an attempt to learn what would constitute the most appropriate professional preparation for junior college physical science teachers.

The success of this study is entirely dependent on the willingness of the respondents to supply the desired information and to contribute their ideas and opinions based on their individual knowledge and experience. In order to insure the respondent that his answers will remain confidential and anonymous, an individual stamped envelope has been provided for the return of each questionnaire. No one outside of those immediately concerned with the research will have access to the questionnaire, and neither participating institutions nor individuals will be identified in the findings. Each respondent who requests it will receive a summary of the final report.

Thank you for your cooperation.

K. Scott Kinerson
1204-C University Village
East Lansing, Michigan

1. Name_____

2. Title of present position_____

3. Total number of years of teaching experience in:

   a) Jr. college___ b) High school___ c) Senior college___

4. Name and location of employing institution.

   _____

5. Which of the following types of programs are available to students at this institution?

   a) Two-year terminal program leading toward an Associate in Arts, or Associate in Science Degree, or equivalent two-year program in general education. ___

   b) Two-year, or shorter, programs with principal emphasis on vocational training. ___

   c) Two-year program in college parallel work. ___

   d) College credit adult education program. ___

   e) Program of counseling and guidance available to all post-high school youth of the community. ___

6. Describe your academic preparation by completing the appropriate parts of the following tabulation. (Check the top of each column to show whether semester or quarter hours of credit are being reported.)

Fields of Study	Undergraduate Semester Hrs.___ or Quarter Hrs. ___	Graduate Semester Hrs.__ or Quarter Hrs. ___
Majors_____	____	____
_____	____	____
_____	____	____
Minors_____	____	____
_____	____	____
_____	____	____
_____	____	____
Education courses (except practice teaching)	____	____
Practice teaching	____	____
Foreign languages		
_____	____	____
_____	____	____
_____	____	____
Research		
In subject matter field	____	____
In education	____	____

7. If your training included any practice teaching, indicate the type and extent by filling in the appropriate spaces below. In the last column make an (O) if the time during practice teaching was mostly spent in observation of other teachers, a (T) if it was mostly spent in actual teaching, and a (D) if the time was about evenly divided between observation and actual teaching.

Type of School	Approximate number of: Months	Days per week	Hours per day	How was time spent?
Junior high	____	____	____	____
Senior high	____	____	____	____
Junior college	____	____	____	____
Senior college	____	____	____	____

. Degrees received

B.S.__B.A.__Date_____Institution_____

M.S.__M.A.__Date_____Institution_____

Ed.D.__Ph.D.__Date_____Institution_____

9. While practice teaching, did you have:

a) Considerable supervision? _____
b) A moderate amount or supervision? _____
c) Very little supervision? _____

). How do you feel about the value of your practice teaching experience?
a) Very valuable__ b) Of some value__ c) Of very little value__

1. Would you comment briefly as to why your practice teaching was of the value checked above and as to how it might have been altered to be of more value.

. Do you think that prospective junior college physical science teachers should be required to include some practice teaching in their training? Yes___ No___ Undecided___

. If your answer to No. 12 was yes, do you think it would be best if this teaching were done:

a) In a high school _____
b) In a junior college _____
c) In a senior college _____
d) Either (a) or (b) ____
e) Either (b) or (c) ____
f) Any of the three ____

. In how many of the following subject matter areas are you qualified to teach, and in how many of these areas are you expected to teach in your present position? Also please indicate the grade levels at which you teach each of these subjects.

Subject matter area	Qualified to teach	Expected to teach	Grade levels
Chemistry	____	____	____
General science	____	____	____
Mathematics	____	____	____
Physical science	____	____	____
Physics	____	____	____
Others_____	____	____	____
_____	____	____	____
_____	____	____	____

21. Please indicate how many semester hours you would consider most appropriate for prospective junior college physical science teachers in each of the following types of education courses.

Courses	No. of Sem. Hrs.
a) Curriculum construction	____
b) Guidance and counseling	____
c) History and philosophy of education (general)	____
d) History and philosophy of the junior college	____
e) Junior college administration	____
f) Psychology (general)	____
g) Psychology of the late adolescent	____
h) Techniques of teaching	____
i) Testing, measurement and general evaluation	____
j) Other (please specify)	____
_____	____
_____	____

22. In your opinion, what would be the most appropriate degree level for prospective junior college physical science teachers?

a) Bachelor's ____ c) Master's plus about 30 semester hours ____
b) Master's ____ d) Doctor's ____

23. Is there any phase of training for prospective junior college physical science teachers, that has not been mentioned in this questionnaire, which you feel should be stressed?

24. Do you wish to have a summary of the final report on this project

Yes ____ No____

APPENDIX C - 2

NOTE TO TEACHERS WHO HAVE NOT YET RETURNED THE QUESTIONNAIRE CONCERNING THE PROFESSIONAL PREPARATION OF JUNIOR COLLEGE PHYSICAL SCIENCE TEACHERS

Approximately one-third of the four hundred teachers to whom these questionnaires were directed in March have responded with very helpful suggestions.

If the findings of this study are not to be biased in favor of the viewpoints expressed by those most interested in surveys conducted by colleges of Education they should be based on responses obtained from as large a proportion of the original sample as it is possible to obtain.

To date the responses show considerable diversity of opinion and I am wondering if they truly represent the viewpoint of the majority of physical science teachers in junior colleges. A reliable answer to this question cannot be based on the number of returns received thus far.

If you have not found time to complete the questionnaire may I suggest that it should not take over twenty or thirty minutes to check off your answers to the questions.

If you cannot find the time, or are not willing, to answer all of the questions would you please complete as much of the questionnaire as possible.

Returns received after June 15th cannot be included in the report.

Thank you,

K. Scott Kinerson

APPENDIX D-1

LIST OF OUTSTANDING AUTHORITIES IN THE FIELD OF JUNIOR COLLEGE EDUCATION

Dr. Henry G. Badger, Educationalist, Research and Statistical Services Branch, United States Office of Education, Washington 25, D.C.

Dr. Roosevelt Basler, Professor of Education, George Peabody College for Teachers, Nashville 4, Tennessee.

Dr. C. W. Beese, Dean, Technical Extension Division, Purdue University, Lafayette, Indiana.

Mr. Ward N. Black, Assistant Superintendent of Public Instruction, Springfield, Illinois.

Dr. William A. Black, Professor of Education, State Teachers College, Pittsburgh, Kansas.

Dr. Jesse P. Bogue, Executive Secretary, American Association of Junior Colleges, 1785 Massachusetts Ave., N.W., Washington 6, D. C.

Mr. Loren N. Brown, Acting Director, Department of School and Community Services, University of Oklahoma, Norman, Oklahoma.

Mr. Albert L. Burgard, Assistant to the Superintendent, Office of the State Department of Public Instruction, Springfield, Illinois.

Mr. Merle E. Campbell, In Charge, Division of Center Administration, The Pennsylvania State University. State College, Pennsylvania.

Dr. C. C. Colvert, Professor of Junior College Education, University of Texas, Austin 12, Texas.

Dr. William H. Conley, Assistant to the President, Marquette University, Milwaukee 3, Wisconsin.

Mr. Ferris N. Crawford, Chief, Higher Education, State Department of Public Instruction, Lansing 2, Michigan.

Dr. William A. Crawford, Professor of Education, State College of Washington, Pullman, Washington.

Dr. Harl R. Douglass, Director of the College of Education, University of Colorado, Boulder, Colorado.

Dr. Ralph Fields, Professor of Education, Teachers College, Columbia University, New York 27, New York.

Dr. E. K. Fretwell, Jr., Assistant Commissioner for Higher Education, New York State Department of Education, Albany, New York.

Mr. B. H. Graeber, Supervisor of Junior Colleges, State Department of Public Instruction, Des Moines 19, Iowa.

Mr. W. M. Hanley, Director of the Freshman-Sophomore Center System, The University of Wisconsin, Madison 6, Wisconsin.

Dr. Algo D. Henderson, Professor of Higher Education, University of Michigan, Ann Arbor, Michigan.

Dr. Leon Henderson, Professor of Education, University of Florida, Gainesville, Florida.

Mr. F. Floyd Herr, Director, Certification and College Accreditation, State Department of Public Instruction, Topeka, Kansas.

Mr. B. L. Hill, Supervisor of Junior Colleges, State Department of Education, Jackson, Mississippi.

Dr. L. L. Jarvie, Executive Dean, Community College and Technical Institute, State University of New York, Albany 1, New York.

Dr. B. Lamar Johnson, Professor of Higher Education, Los Angeles Branch, University of California, Los Angeles 24, California.

Dr. Robert J. Keller, Professor of Education, University of Minnesota, Minneapolis 14, Minnesota.

Dr. Homer Kempfer, Director, National Home Study Council, 1420 New York Avenue, N. W., Washington 5, D. C.

Mr. Robert E. Kinsinger, Consultant for Junior Colleges, National League for Nursing, 2 Park Avenue, New York 16, New York.

Dr. William Kepley, Consultant for Junior Colleges, Los Angeles City Junior Colleges, Los Angeles, California.

Dr. E. A. Lichty, Professor of Education, Illinois State Normal University, Normal, Illinois.

Mr. Frank B. Lindsay, Chief, Bureau of Secondary Education, State Department of Education, Sacramento 14, California.

Dr. Leland L. Medsker, Consultant, Research Project in Higher Education, Haviland Hall, Berkeley 4, California.

Dr. Roy B. Minnis, Director, Adult and Junior College Education, Department of Education, Denver 2, Colorado.

Dr. D. Grant Morrison, Director of Junior Colleges, Office of the State Superintendent of Public Instruction, Olympia, Washington.

Mr. B. W. Musgraves, Executive Director, Texas Council of Public Junior Colleges, Texas Education Agency, Austin, Texas.

Dr. Alfred C. Nelson, Dean, University of Denver, Denver 2, Colorado

Dr. Hugh W. Norman, Dean, Division of Adult Education and Public Services, Indiana University, Bloomington, Indiana.

Mr. Hugh G. Price, Consultant for Junior Colleges, Bureau of Secondary Education, Department of Education, Sacramento 14, California.

Dr. Harold Reese, Supervisor, Business Management, State Teachers Colleges, State Department of Education, 2 West Redwood Street, Baltimore 1, Maryland.

Dr. James W. Reynolds, Professor of Junior College Education, University of Texas, Austin 12, Texas.

Dr. John Dale Russell, Chancellor and Executive Secretary, Board of Educational Finance, Box 1616, Santa Fe, New Mexico.

Dr. Galen Saylor, Professor of Secondary Education, Teachers College 317, University of Nebraska, Lincoln 8, Nebraska.

Dr. Walter E. Sindlinger, Assistant Professor of Higher Education, School of Education, University of Michigan, Ann Arbor, Michigan.

Dr. Max Smith, Assistant to the Vice President, Michigan State University, East Lansing, Michigan.

Mr. Earl M. Tapley, Director of Special Services, University of Chattanooga, Chattanooga 3, Tennessee.

Dr. Robert E. Troutman, Junior College Consultant, County of Los Angeles Schools, 808 North Spring Street, Los Angeles 12, California.

Dr. James L. Wattenbarger, Director, Community College Council, State Department of Education, Tallahassee, Florida.

Dr. Elmer M. Weltzin, Director of Junior Colleges, Department of Education, 301 State Office Building, St. Paul 1, Minnesota.

Dr. William R. Wood, Academic Vice President, University of Nevada, Reno, Nevada.

Dr. Raymond J. Young, Associate Professor of Education, College of Education, University of Illinois, Urbana, Illinois.

APPENDIX D -2

1204-C University Village
Michigan State University
East Lansing, Michigan

As you are well aware, many colleges and universities are either initiating or expanding program offerings that are specifically aimed at the junior college teaching field, and also there is considerable disagreement and lack of knowledge as to what these training programs should include. In an effort to investigate one phase of this problem I have undertaken a research project under the supices of the Department of Teacher Education, College of Education, Michigan State University. This project is an attempt to determine what would constitute the most appropriate professional preparation for junior college physical science teachers.

A questionnaire survey is being conducted among approximately two hundred administrators and about five hundred physical science teachers in a sampling of the junior colleges in the country.

The value of this project would be greatly enhanced by the opinions and viewpoints of a number of the outstanding leaders in the field of junior college education and coordination. The enclosed questionnaire is being sent to each of the men named by Dr. S. V. Martorana, or the U.S. Office of Education, in response to a request for a list of these leaders. It is hoped that you will consider the problem worthy of your attention ad that you will give the project the benefit of your wide experience and knowledge in junior college education.

No individual will be quoted or identified in the findings unless specific permission is subsequently requested and granted.

Thank you for your assistance.

Sincerely,

K. Scott Kinerson

QUESTIONNAIRE ON THE PROFESSIONAL PREPARATION of JUNIOR COLLEGE PHYSICAL SCIENCE TEACHERS

1. Name _____

2. Title of present position _____

_____

3. Please indicate your views as to the approximate number of semester hours of college credit which would be most appropriate for prospective junior college physical science teachers in each of the following subject areas. (The numbers listed with the subjects show the range of credit which is commonly required in undergraduate teacher education programs designed for secondary school physical science teachers.)

Subject	Approx. No. of Sem. Hours in each: Undergrad	Graduate
a) Subject major (24 - 36).	_____	_____
b) Subject minors (15 - 36)		
(Indicate how many minors) _____	_____	_____
c) Education courses (20 - 30)		
(Except practice teaching)	_____	_____
d) Practice teaching (0 - 15)	_____	_____
e) Foreign languages (0 - 12)	_____	_____
f) Courses in the humanities (6 - 18)	_____	_____
g) Courses in the social sciences (6 - 12).	_____	_____
h) Research in the physical sciences (0 - 3). . . .	_____	_____
i) Research in education (0 - 3).	_____	_____
j) Other (please specify)		
_____	_____	_____
_____ _____	_____	_____

4. Please indicate how many semester hours you would consider most appropriate for prospective junior college physical science teachers in each of the following types of education courses.

Courses	No. of Sem. Hrs.
a) Curriculum construction	_____
b) Guidance and counseling	_____
c) History and philosophy of education (general)	_____
d) History and philosophy of the junior college.	_____
e) Junior college administration	_____
f) Psychology (general)	_____
g) Psychology of the late adolescent	_____
h) Techniques of teaching.	_____
i) Testing, measurement, and general evaluation	_____
j) Other (please specify) _____	_____
_____	_____

5. In your opinion, what would be the most appropriate degree level for prospective junior college physical science teachers?

a) Bachelor's _____ c) Master's plus about 30 semester hours _____
b) Master's _____ d) Doctor's _____

Comment

6. If you feel that it would be desirable to require practice teaching in the training of these teachers, do you think it would be best if this teaching were done in:

a) a high school _____ d) either (a) or (b) _____
b) a junior college _____ e) either (b) or (c) _____
c) a senior college _____ f) any of the three _____

7. In how many subject matter areas, e.g., physics, chemistry, mathematics, general science, etc., do you think a physical science teacher can reasonably be expected to be qualified? _____

Comment

8. What is your opinion regarding the desirability of requiring some non-academic work experience in the training of prospective junior college physical science teachers?

9. If you feel that such work experience should be required, would you comment as to the most appropriate type and duration?

10. Is there any phase of training for prospective junior college physical science teachers, that has not been mentioned in this questionnaire, which you feel should be stresses?

11. Do you wish to have a summary of the final report on this project?

Yes _____ No _____

APPENDIX D - 4

FOLLOW-UP LETTER TO EXPERTS

Dear Dr. _____:

Copies of the attached letter and questionnaire were mailed to you on March 18. A majority of the outstanding leaders mentioned in the letter have returned the questionnaire with very helpful comments and suggestions. However, the project would be of much greater value if all who were originally named by Dr. Martorana would give the study the benefit of their experience and knowledge in this field.

If your response is not already in the mail it is hoped that you will soon find the time to complete the questionnaire.

Thank you,

K. Scott Kinerson

APPENDIX E

NUMBER OF YEARS OF PREVIOUS TEACHING EXPERIENCE IN HIGH SCHOOL, JUNIOR COLLEGE, AND SENIOR COLLEGE AS REPORTED BY 185 TEACHERS

Number of years experience	Number of Private College Teachers			Number of Small Public College Teachers			Number of Medium Public College Teachers			Number of Large Public College Teachers			All Teachers		
	H.S.	J.C.	S.C.	H.S.	J.C.	S.C.	H.S.	J.C.	S.C.	H.S.	J.C.	S.C.	H.S.	J.C.	S.C.
1 or less	2	6	2	2	5	2	6	1	6	5	2	5	15	14	15
2-5	5	11	7	12	12	5	11	21	11	15	15	11	43	59	34
6-10	4	2	2	13	15	4	6	5	4	5	21	5	28	43	15
11-20	6	9	0	6	8	1	12	15	0	5	14	1	29	45	2
over 20	2	3	1	4	6	0	1	10	0	1	5	0	8	24	1
Number reporting experience	19	30	12	37	46	12	36	52	21	31	57	22	123	185	67
Per Cent reporting experience	63.3	100	40.0	80.4	100	26.6	69.2	100	40.4	53.4	100	37.9	66.5	100	36.2
Median No. of years	8.6	4.8	3.8	6.2	7.5	3.9	6.3	9.5	3.1	4.3	8.2	3.7	6.1	7.8	3.7

APPENDIX F

NUMBER OF TEACHING AREAS IN WHICH TEACHERS ARE QUALIFIED TO TEACH, EXPECTED TO TEACH, AND RECOMMENDED FOR PROSPECTIVE TEACHERS

Respondents with number answering the question	Number of teaching areas											
	one area		two areas		three areas		four areas		five areas		six or more	
	number	per cent	number	per cent	number	per cent	number	per cent	number	per cent	number	per cent
Private College teachers												
Qualified (29)	0	0.0	6	20.7	11	38.0	4	13.8	7	24.1	1	3.4
Expected (27)	7	26.0	11	40.7	8	29.6	0	0.0	1	3.6	0	0.0
Recommended (30)	3	10.0	19	63.3	6	20.0	1	3.3	1	3.3	0	0.0
Small Public college teachers												
Qualified (44)	3	6.8	3	6.8	5	11.4	11	25.0	17	38.6	5	11.4
Expected (43)	11	25.6	15	34.9	10	23.2	4	9.3	2	4.5	1	2.3
Recommended (44)	5	11.4	26	59.2	10	22.7	3	6.8	0	0.0	0	0.0
Medium Public college teachers												
Qualified (51)	5	9.8	10	19.6	6	11.8	7	13.7	11	21.6	12	23.6
Expected (45)	22	48.9	13	28.9	3	6.7	5	11.1	0	0.0	2	4.4
Recommended (49)	12	24.5	22	44.9	11	22.5	1	2.4	2	4.1	1	2.4
Large Public college teachers												
Qualified (58)	4	6.9	8	13.8	10	17.2	11	19.0	17	29.3	8	13.8
Expected (53)	27	50.9	14	26.4	8	15.1	1	1.9	3	5.7	0	0.0
Recommended (57)	8	14.0	31	54.4	9	15.8	6	10.5	2	3.5	1	1.8

APPENDIX F (continued)

Respondents with number answering the question	Number of teaching areas											
	one area		two areas		three areas		four areas		five areas		six or more	
	number	per cent	number	per cent	number	per cent	number	per cent	number	per cent	number	per cent
All teachers												
Qualified (182)	12	6.6	27	14.8	32	17.6	33	18.1	52	28.6	26	14.3
Expected (168)	67	39.9	53	31.5	29	17.3	10	5.9	6	3.6	3	1.8
Recommended (180)	28	15.6	98	54.5	36	20.0	11	6.1	5	2.8	2	1.1

MEDIAN NUMBERS OF TEACHING AREAS

	Private College Teachers	Small Public College Teachers	Medium Public College Teachers	Large Public College Teachers	All Teachers
Qualified	3.2	4.0	4.1	4.1	4.1
Expected	2.1	2.2	1.5	1.5	1.8
Recommended	2.1	2.2	2.1	2.2	2.2

APPENDIX G

REPORTED PREPARATION IN MINOR AREAS

Credit Per Minor	Number of Minors Reported by Teachers: Private	Small Public	Medium Public	Large Public	All Teachers
UNDERGRADUATE					
0-6	0	4	0	2	6
7-12	13	9	22	11	55
13-18	14	22	36	33	105
17-24	14	25	18	20	77
25-30	2	18	12	12	44
over 30	3	4	5	6	18
Total Minors	46	82	93	84	305
Number of Teachers Reporting	23	41	47	46	157
Mean Number of Minors Per Teacher	2.0	2.0	2.0	1.8	1.9
Median Credits Per Minor	16.8	17.9	16.6	17.8	17.7
GRADUATE					
0-6	14	14	9	15	52
7-12	9	12	18	15	54
13-18	5	5	8	12	30
19-24	1	0	5	3	9
25-30	2	4	0	1	7
over 30	0	0	2	1	3
Total Minors	31	35	42	47	155
Number of Teachers Reporting	19	26	32	34	111
Mean Number of Minors Per Teacher	1.6	1.3	1.3	1.4	1.4
Median Credits Per Minor	7.5	8.3	10.5	9.9	9.3

APPENDIX H

DISTRIBUTION OF RECOMMENDED SEMESTER HOURS IN THE GRADUATE MAJOR

Number of Hours Recommended	Number of Teachers	Number of Administrators	Number of Experts
6	6	0	1
8	3	2	1
9	2	1	0
10	8	3	3
12	23	10	9
14	1	1	0
15	15	10	3
16	1	3	4
18	10	8	5
20	26	20	5
22	2	1	0
24	17	13	2
25	2	1	0
26	2	0	0
28	1	0	0
30	15	13	3
32	3	0	0
34	0	1	0
36	7	5	0
38	0	0	0
40	3	3	0
45	2	0	0
50	1	1	0
60	1	0	0
Totals	151	96	36
Per Cent Answering Question	81.2	92.3	94.8
Median Number of Hours	20.3	20.0	15.8

APPENDIX I

DISTRIBUTION OF RECOMMENDED TOTAL SEMESTER HOURS IN UNDERGRADUATE MINORS

Number of Credits Recommended	Number of Teachers	Number of Administrators	Number of Experts
10	2	0	0
12	0	2	1
14	0	0	0
15	11	8	1
16	5	4	2
18	19	10	10
20	46	22	9
22	2	1	0
24	16	12	4
25	10	8	2
26	1	1	0
28	3	1	0
30	18	16	4
32	2	0	0
34	0	0	0
36	10	4	1
38	0	0	0
40	4	3	0
42	1	0	0
45	5	1	0
50	1	0	0
52	1	0	0
60	1	0	0
Totals	158	93	34
Per Cent Answering Question	84.8	89.4	89.5
Median Number of Hours	20.4	21.0	19.8

APPENDIX J

DISTRIBUTION OF RECOMMENDED TOTAL SEMESTER HOURS IN THE GRADUATE MINOR

Number of Credits Recommended	Number of Teachers	Number of Administrators	Number of Experts
3	4	1	1
4	4	1	1
5	13	1	1
6	13	8	7
8	8	6	3
9	3	0	2
10	27	23	7
12	19	14	6
14	0	2	0
15	9	7	3
16	1	1	0
18	2	4	1
20	4	3	0
22	0	0	0
24	1	2	0
26	0	0	0
28	1	0	0
30	4	2	1
36	1	2	0
40	1	0	0
50	1	0	0
Totals	116	77	33
Per Cent Answering Question	62.3	74.1	86.6
Median Number of Hours	10.0	10.4	9.7

APPENDIX K

CHI SQUARE TEST FOR SIGNIFICANT DIFFERENCES BETWEEN DEGREE OF SUPERVISION AND VALUE OF PRACTICE TEACHING

Value Ratings	Degree of Supervision Ratings						Totals
	"Considerable"		"Moderate"		"Very Little"		
	f_o	f_e	f_o	f_e	f_o	f_e	f_o
"Very Valuable"	32	23.2	21	24.2	5	9.7	58
"Or Some" and "Or Very Little Value"	16	24.8	29	25.8	17	11.4	62
Totals	48		50		22		120

$$\sum \frac{f_o^2}{f_e} = 133.3$$

$$x^2 = \sum \frac{f_o^2}{f_e} - N = 133.3 - 120 = 13.3$$

For $n = 2$, $P < .01$

COEFFICIENT OF CORRELATION

$$C = \sqrt{\frac{x^2}{N + x^2}} = \sqrt{\frac{13.3}{120 + 13.3}} = .32$$

APPENDIX L

PRACTICE TEACHING LOCATIONS AS RECOMMENDED BY 186 TEACHERS

Recommended Location	Private		Small Public		Medium Public		Large Public		All Teachers	
	No.	%	No.	%	No.	%	No.	%	No.	%
High School	1	3.3	2	4.3	2	3.8	3	5.2	8	4.3
Junior College	4	13.3	3	6.5	14	26.9	17	29.3	38	20.3
Senior College	0	0.0	1	2.2	2	3.8	0	0.0	3	1.6
High School or Junior College	5	16.7	24	52.2	9	17.3	11	19.0	49	26.4
Junior College or Senior College	5	16.7	4	8.7	5	9.6	5	8.6	19	10.2
High School, Junior College, or Senior College	14	46.7	2	4.3	5	9.6	2	3.4	23	12.4
High School and Junior College	0	0.0	2	4.3	1	1.9	0	0.0	3	1.6
No Recommendation	1	3.3	8	17.4	14	26.9	20	34.5	43	23.2
Totals	30	16.1	46	24.8	52	27.9	58	31.2	186	100.0

APPENDIX M - 1

SUMMARY OF GENERAL COMMENTS BY TEACHERS

(Numbers following each statement indicate the number of times each comment was noted.)

1. General criticism of Education courses. These comments criticised courses for lack of content, repetitiveness, and lack of stimulation. One teacher described these as courses designed for "the mentally retarded and mathematically incompetent." (17)

2. Comments regarding order of importance. These teachers insisted that subject matter courses should come first and teaching methods second. (6)

3. They should take a course, or courses, in the technique of demonstration, and in creating experiments and demonstrations that will more closely relate subject matter to student experiences. (3)

4. They should be trained in the use and maintenance of audio-visual equipment. (3)

5. They need training in the care and maintenance of laboratory apparatus. (2)

6. One minor must be mathematics. (2)

7. During their graduate study period they should attend monthly seminars in which <u>experienced</u> junior college teachers discuss <u>practical</u>, not "etherial" textbook problems. (1)

8. They should take refresher courses at least every three years. (1)

9. They should take courses in all the physical sciences including geology, astronomy, and meteorology as well as physics, chemistry, and mathematics. (1)

10. Teachers should concentrate on a single field. Courses in "physical science" should then be taught by committees of specialists. (1)

11. Emphasize the importance of individual laboratory work. (1)

12. They need training in hobby, play activities, and club work. (1)

13. They need course work that attempts to integrate the physical sciences. (1)

14. They need to study the function of the various types of committees that teachers must serve on. (1)

15. They should have two years of carefully supervised teaching experience while on their first teaching appointment. This should be followed with two years of part-time duty as a counselor. (1)

16. Careful supervision by a good teacher for at least two years. (1)

17. A five-year engineering degree at the bachelor's level seen as desirable training for these teachers. (1)

18. Take field trips to local industries. (1)

19. We need to stop the fight between the science people and the Education people, and turn out people who have something to teach and then know how to teach what they teach. (1)

20. Good teachers are born, not made. (1)

21. There is only one way to learn to teach; that is to stand in the classroom and teach. (1)

22. Have fewer Education courses so as not to bar university teachers, who are otherwise well qualified, from this teaching field. (1)

23. They need training in the use of non-technical scientific literature. (1)

24. The "mechanics" of good teaching need more attention. (1)

25. The courses recommended included the following:
    a. Philosophy pertaining to the role of physical science in today's world.(1)
    b. Applications of mathematics in physical sciences (1)
    c. The Problems of Philosophy. (1)
    d. History of Philosophy. (1)
    e. History of Chemistry. (1)
    f. History of Science. (1)

APPENDIX M - 2

SUMMARY OF GENERAL COMMENTS MADE BY ADMINISTRATORS

(Numbers following each statement indicate the number of times each comment was noted.)

1. They need training in the use and maintenance of laboratory equipment. (3)

2. One of the first things I look for in the junior college physical science teacher is interest in young people, and primarily interest in teaching as opposed to research. (3)

3. They need training in the use of audio-visual equipment. (2)

4. More emphasis should be placed on subject matter than on Education courses. (2)

5. They should keep up with advances in their subject matter fields through refresher courses, summer seminars, etc. (2)

6. They need training in demonstration techniques. (1)

7. What he (the junior college teacher) knows about subject matter will be only a part of what it takes to make him successful in junior college. He needs to be a good group worker because of his necessary participation in extra-curricular activities. (2)

8. Our physical science teachers are completely helpless in the presence of the idea of a general education course in the physical sciences. They either don't know what one is talking about, or don't believe in attempting it, or believe but don't know how to attack the problem. The physical science teacher for the junior college ought not to get out of graduate school, at the least, without being favorably oriented toward this idea, and without some notion of how to attack the problem. (2)

9. They need training in machine shop work, particularly the physics teacher. (1)

10. I think a teaching degree above the master's level, <u>without</u> the time being spent in a <u>thesis</u>, or <u>one-half of it in Education</u>, is a must if at all possible. There is enough research in a good master's thesis to give a person experience. The broad background which he needs in P. S. should be the goal, not research. (1)

11. Our experience seems to indicate that many courses in Education contribute very little to making a successful teacher. (1)

12. More subject matter training in field teacher wishes to teach and less of the Education courses such as required by teacher's colleges. (1)

13. Develop scientific method of thinking. (1)

14. Perhaps the techniques of teaching need more attention than they now receive, especially with reference to junior college classes.

15. I would like to see junior college teachers have a course in "human relations." (1)

16. Stress more general liberal education and less methodology.(1)

17. Until junior colleges provide facilities for research, at least of a limited nature, it is going to be difficult to interest young people in the field. (1)

18. I am very glad to see some interest being shown, by at least one university, in preparing instructors for junior college work. (1)

19. If something could be done to develop personality and a good command of English, much would be done to improve teaching. (1)

APPENDIX M - 3

SUMMARY OF GENERAL COMMENTS MADE BY EXPERTS

1. Teachers should be well grounded in the fundamentals of a continuous public relations program, not the B-B program (budgets and bonds) but the planned program of continuous community cooperation in the CCC program.

2. They need to know how to work with colleagues, administrative superiors, and students.

3. An opportunity for an instructor to interview employers of physical science majors regarding the strengths and weaknesses of their employees should be afforded.

4. A follow-up project on recent graduates, both in transfer institutions and on the job, should broaden the instructor's understanding of his objectives.

5. Both physics and chemistry teachers (particularly the latter) need real training in laboratory supervision and methods, ordering, storing, cleaning, preparing, inventorying equipment, preparing solutions, safety procedures, etc.

6. Watch danger of requiring too many courses in Education. I say this as a professor of higher education. Some are highly desirable and can be required. Additional courses can be recommended but not required. It's essential that the student be thoroughly grounded in his teaching subject.

7. Special attention to college general education programs; adult education programs in order to broaden the vision and the service of the "specialist" in a physical science.

8. The liberal arts areas outside the sciences should be of a comprehensive nature rather than segments of a departmental nature.

9. Emphasis should be place on the curriculum for training <u>technicians</u> as well as <u>graduate engineers</u>.

10. There should be some work which will help them understand the purposes of general education.

11. Let's not set a structure which will lead to certification requirements. I would prefer to see a single course covering objectives, curriculum construction, teaching techniques, and student evaluation (4 - 6 credits). I would also like to see them have one course in the history and philosophy of the junior college.

12. I would like to stress the philosophy of the community-centered, community college education, and the semester of internship in a community college under a faculty member who wasn't only a master teacher in his subject matter field, but also a master understander and trainer of the teaching processes.

13. They need a background in the contributions of physical science to general education, and they should have work in the philosophy and history of science.

14. Military service before he starts teaching.

15. They should have a strong major in one of the specific fields, e.g., chemistry, physics, mathematics, etc., in contrast to a weak major in several fields.

Sep 29 58