AN ANALYSIS OF THE TEACHING PROBLEMS OF BEGINNING JUNIOR HIGH SCHOOL SCIENCE TEACHERS WITHIN THE LAMAR AREA SCHOOL STUDY COUNCIL

A Dissertation

Presented to

the Faculty of the College of Education

The University of Houston

In Partial Fulfillment

of the Requirements for the Degree

Doctor of Education

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by

Oran B. Bailey

June 1965

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ABSTRACT

AN ANALYSIS OF THE TEACHING PROBLEMS OF BEGINNING JUNIOR HIGH SCHOOL SCIENCE TEACHERS WITHIN THE LAMAR AREA SCHOOL STUDY COUNCIL

Purpose of the study. It was the purpose of this study to identify the teaching problems of beginning junior high school science teachers within the Lamar Area School Study Council.

Methods and procedures. The study sample consisted of ninety-two beginning junior high school science teachers who were teaching in forty-eight junior high schools located within the Lamar Area School Study Council. A beginning teacher was defined as any teacher who was teaching at least one course in science in either grade seven, eight, or nine and who, at the time of the study, had one to four years teaching experience.

The research procedure involved the use of the interview and questionnaire techniques. To eliminate the possibility of insufficient returns, seventy-eight of the beginning teachers were personally visited and asked to complete the questionnaire. The interview technique was used with the remaining twenty teachers. The questionnaire served as a guide for the interview.

Summary of the findings. The first part of the study was concerned with the adequacy of the preparation of the teachers and the nature of their teaching assignments.

Of the ninety-two teachers who participated in the study, approximately two-thirds majored or minored in subjects other than science. On the basis that eighteen semester hours constitutes a minor, over fifty per cent of the teachers were deficient in subject matter courses. Teachers of earth science were the most deficient. A large percentage of the teachers had not completed a science methods course, and only nine had done their practice teaching in junior high school science. Approximately thirty per cent of the teachers had as many as three or four preparations to make each day.

The second part of the study was utilized to determine if the beginning teachers had experienced difficulty in the use of printed materials and physical facilities.

A large percentage of the teachers felt that their textbooks were not current and that they did not have an ample supply of supplementary texts. Inadequate library facilities was a source of instructional difficulty to many of the teachers.

Information pertinent to problems related to physical facilities revealed that teachers of physical science had fewer problems than teachers of life and earth science.

Inappropriateness of classrooms caused the greatest number of problems. Lack of storage space, an insufficient number of gas and electrical outlets, and the lack of refrigeration caused instructional problems to approximately thirty-five per cent of the teachers.

The third part of the study dealt with teaching problems associated with pupil ability and audio-visual materials. The major problems encountered in the use of audio-visual materials were the inability to secure films from the library, lack of suitable films for junior high school science, and lack of a suitable place to preview and show films.

Many of the teachers had problems related to pupil ability. Problems that caused the greatest amount of difficulty were the students' inability to read and understand their science textbooks, and teachers' inability to provide for individual differences.

Problems associated with teaching methods and administrative help constituted the fourth part of the study. Providing modified work for slow and superior students, and utilization of textbooks, reference materials, and community resources were the techniques that caused the greatest number of problems.

The teachers indicated that administrative help was needed in many ways. The greatest needs were for released

time to visit other schools, establishment of a petty cash fund, help from the guidance department, and participation in the National Defense Education Act.

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CHAPTER I

THE PROBLEM AND ITS INVESTIGATION

With the advent of World War II and the expressed needs of the armed forces and industry for more and better trained people, science gained a new place of prominence in education. As a result of increased emphasis the National Science Foundation and the National Defense Education Act, working through professional societies and with research and educational specialists, have made significant contributions toward the growth of educational programs in science.[1] Curriculum revisions have been undertaken, new textbooks have been written, accreditation requirements have changed, and colleges have improved their teacher preparation programs. These, together with other developments, have increased the importance of the role of the science teacher.

I. THE PROBLEM

Statement of the problem. Those who have had experience as science teachers and who have had the responsibility for the improvement of science instruction have found that beginning junior high school science teachers have had

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[1]Abraham S. Fischer, "Junior High School Science," School Science and Mathematics, LXIV (January, 1964). p. 64.

difficulty with a variety of instructional problems.

If these problems were of such a nature that they could be identified, then it appeared feasible that the possibility for their solution would be greatly increased. Therefore, the purpose of this investigation was to identify the instructional problems that beginning junior high school science teachers were experiencing in the schools within the Lamar Area School Study Council and to obtain suggestions for possible solutions of these problems.

Significance of the problem. The expansion and development of science and technology in recent years has had a tremendous influence upon the lives of the American public. Scientific literacy has become almost as necessary for the welfare and progress of all children as the unquestioned need for literacy in other basic subjects. The following statements from some of the nation's leading educators serve to emphasize the importance of undertaking a study of this nature.

In 1963 Dr. Paul Hurd from Stanford University stated:

> . . . Today all over the world and among all peoples there is an awareness that scientific literacy is essential to an understanding of the nature and events of contemporary civilization.[2]

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[2]Paul DeHart Hurd, "Science Teaching For a Changing World," Monograph on Education Prepared by Scott, Foresman Company, 1963, p. 3.

Jacobson, of Columbia University, in an address before the Central Association of Science and Mathematics Teachers said:

> It is high time that scholars and research workers in the field of science education turn their attention to the problems involved in educating early adolescents in science and invest their energies in the task of developing science programs for all of our early adolescents and future citizens.[3]

The National Association of Secondary School Principals published a special bulletin for the purpose of emphasizing the need for quality science instruction.[4] In this bulletin Hale stated:

> In many instances, the junior high school years provide the last opportunity science teachers have to work with all the boys and girls in our schools. Regretfully, many students drop out at the end of the junior high school; others go into programs where they elect no more science. But for the most part, in at least the seventh and eighth years of school, there is a captive audience for the science program. This situation presents a clear responsibility to establish high quality science teaching in the junior high school.[5]

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[3]Willard J. Jacobson, "Science for the Early Adolescent," A Paper Delivered at the Meeting of the Central Association of Science and Mathematics Teachers in Chicago, Illinois, November 24, 1961.

[4]National Association of Secondary School Principals, Quality Science for Secondary Schools, a Special Report of the National Science Teachers Association, XLIV (December, 1960).

[5]Helen Hale, "Quality Science For the Junior High School," The Bulletin of the American Association of Secondary School Principals, XLIV (December, 1960), p. 36.

Panush, one of the co-authors of the Physical Science Study Commission's physics course developed at the Massachusetts Institute of Technology, made the following comment:

> There is a need in our society for scientific literacy, for science is a basic part of modern living. This literacy is essential in today's world in order to make effective decisions in personal, civic, national and international affairs.[6]

The organization of the Lamar Area School Study Council made the undertaking of this study important in another respect. The Council was formed in February, 1961, as a cooperative venture between Lamar State College of Technology and the public schools within the Lamar area. The primary objective of the Council was to study the educational problems common to the schools within the Lamar area and assist in the solution of these problems through the medium of area workshops.[7]

Discussions with the director of the Council and members of the board indicated that they were interested in this study and its possible implications. Indications were that if problems existed that were common among the junior high schools within the Lamar area, then the possibility of their solution would be explored by the Council.

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[6]Louis Panush, "Background of the PSSC Physics Course," Metropolitan Detroit Science Review, XXII (September, 1961), p. 15.

[7]History of the Lamar Area School Study Council, Mimeographed Report Prepared by the Staff of the Lamar Area School Study Council, 1964, p. 3.

II. LIMITATIONS OF THE PROBLEM

In the process of investigating the problem the following restrictions were observed:

1. Only those junior high schools located within the Lamar Area School Study Council were considered.
2. Only those teachers with one to four years teaching experience were considered.
3. A third limitation existed since only those instructional problems related to the following areas were considered.
   a. teacher preparation.
   b. teaching assignments.
   c. teaching materials.
   d. physical facilities.
   e. audio-visual materials.
   f. pupil attitudes.
   g. pupil abilities.
   h. teaching techniques.
   i. administrative interest and assistance.

III. DEFINITION OF TERMS USED

Instructional problem. Beginning teachers are sometimes confronted with problems not directly related to classroom procedures; however, for the purpose of this study a problem was defined as one directly related to the instructional procedures used within the classroom.

Beginning science teacher. This term was used to designate any teacher who was teaching at least one course in science in either grade seven, eight, or nine and who, at the time of the study, had one to four years' teaching experience.

Junior high school. For the purpose of this study "junior high school" was used to designate grades seven, eight, and nine which may or may not have been housed in a separate building.

IV. OVERVIEW OF THE STUDY

This chapter has presented the statement of the problem, the importance of the subject for investigation and its limitations, definition of terms, and organization of the report. A survey of the literature related to this study is reviewed in Chapter II.

Chapter III explains the design of the study, the selection of the sample, the instrument used in collecting the data, the organization of the data and the procedures used in presenting the data.

The data obtained from the interview and the questionnaire are analyzed and discussed in Chapters IV, V, and VI.

Chapter IV deals with the data which were related to the preparation and assignment of the beginning junior high

school science teacher.

The instructional problems associated with the printed materials and physical facilities are discussed in Chapter V.

Chapter VI explores problems related to audio-visual materials and pupil attitudes and abilities.

Problems involving teaching methods and administrative interest and assistance are discussed in Chapter VII.

Chapter VIII summarizes the findings of the study and their implications as conclusions and recommendations. A copy of the questionnaire and letters pertaining to the study have been placed in the appendix.

Chapter II will present the survey of the literature as related to this study.

CHAPTER II

REVIEW OF THE RELATED LITERATURE

The purpose of this chapter was to survey the literature for the following reasons:

1. To provide background information pertinent to the modern concept of teaching junior high school science.
2. To gather available data to be used in construction of the survey instrument,
3. To show what is being done to improve science teachers' qualifications.
4. To show the need for the study.
5. To review similar and related studies.

The material for this survey was obtained by searching indices of published literature and reviewing the abstracts of unpublished master's and doctor's theses. In reporting the findings the following outline was used.

1. Historical Development of the Junior High School Science Program.
2. Pre-service Training and Teaching Assignments.
3. Practices for Improving Teacher Qualifications.
4. Problems in Reading Science Materials.
5. Problems Related to Beginning Science Teachers.
6. Problems of a Miscellaneous Nature.

I. HISTORICAL DEVELOPMENT OF THE JUNIOR HIGH SCHOOL SCIENCE PROGRAM

At the turn of the century a great number of specialized science courses were offered in every grade in the secondary school.[1] It was not uncommon to find as many as twelve different science subjects taught in the high schools of a single state.[2] Of the twelve the most popular courses were physical geography, physiology, botany, zoology, chemistry, agricultural science, hygiene, and physics. All of these sciences were contending with one another for a place in the high school curriculum.

In 1910, the National Education Association appointed a committee to study the problem. The committee was composed of twelve members, one for each of the twelve sciences taught in the high schools.[3] The committee came to the conclusion that the first year science in the high school should be organized upon a broad basis, including the fundamental principles of the various sciences.[4]

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[1]John Richardson, Science in the Secondary Schools (Englewood Cliffs: Prentice Hall, Inc., 1937), p. 39.

[2]Ibid.

[3]Samuel R. Powers, "Organization of the Curriculum in Science," School Science and Mathematics, 45 (January, 1949), p. 65, citing United States Bureau of Education Bulletin, 41 (Washington, 1913), pp. 28-31.

[4]Ibid.

The committee agreed that physiology and hygiene should be composed of a combination of the biological sciences and be named general biology. The third and fourth years were to be composed of the physical sciences, chemistry, and physics.[5]

Based upon the National Education Association's recommendation, the high school science curriculum was complete. The introduction of general science at the ninth grade must replace some established subject. Which subject to be displaced was the problem. Physical geography (sometimes called physiography, still later earth science) had become well established as the first-year science in countless high schools. If general science was to be the introductory course, then physiography had to be replaced. This decision resulted in thrusts and counter-thrusts being delivered by both sides.

Dr. H. W. Fairbanks of the University of California stated:

> General science is sure to be poorly taught. It has no harmony or unity and is not adapted for immature minds as is physiography. No man in the University of California is capable of giving an all-round science course; could we expect to find such men in high schools?[6]

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[5] Ibid.

[6] H. W. Fairbanks, "Physical Geography Versus General Science," School Science and Mathematics, 10 (March, 1910), pp. 761-762.

Dr. Fairbank's statement was not without rebuttal. Dr. C. R. Mann of the University of Chicago wrote:

> . . . General science includes physical geography, but is not limited to it. Physical geography is actually a highly specialized science. There are countless matters of every day experience, none of which can by any stretch of elastic imagination be made a part of a course in physical geography. General science does not require teachers fully informed in all the sciences, but requires teachers who are broad minded, and who take delight in stimulating scientific imagination and ambition.[7]

There were other prominent educators and scientists who voiced their opinions. Against general science were the comments of John M. Coulter of the University of Chicago. He was of the opinion that teaching general science was like teaching five or six foreign languages to a child by picking out the most common words and phrases of each.[8]

E. E. Lewis, of the State University of Iowa, was of the opinion that general science teaches the pupil how to study a science and how to think in scientific terms. Special courses in science would not do this.[9]

With eminent people on both sides arguing for what

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[7]C. R. Mann, "Physical Geography Versus General Science," School Science and Mathematics, 12 (May, 1911), p. 211.

[8]John M. Coulter, "The Mission of Science in Education," School Review, 23 (October, 1915), pp. 1-8.

[9]E. E. Lewis, "General Science in Iowa High Schools," School Review, 24 (1916), pp. 426-435.

they considered to be a just cause, the contest became deadlocked. Then came an authoritative declaration on the entire matter. The National Education Association's Committee on the Reorganization of Secondary Education had reviewed the studies and writings of sixteen special committees, one on each of the high school subjects. Dr. Otis Caldwell served as chairman of the Science Committee which was representing all areas of the sciences. The sixty-two page report of this committee was confined to what they considered to be the proper sequence of the high school sciences. General science was assigned the first year.[10] Shortly after this bulletin, general science became entrenched as the ninth grade science course.

The success that general science experienced from 1912 to the early forties helped to lay the groundwork for the improvement of science teaching in the elementary schools.[11] Science became a regular part of the curriculum at each elementary grade.[12]

This improvement of science education at the elementary level, coupled with a rapid expansion of scientific

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[10]U. S. Bureau of Education, Reorganization of Science in the Secondary Schools (Bulletin No. 26, 1912).

[11]Richardson, loc. cit.

[12]Ibid.

knowledge, led to the belief that some curriculum changes had to be made in order to meet the needs of the students in grades seven and eight.

Yager was of the opinion that by the time a student finished the sixth grade he had developed a readiness for deeper instruction by a well trained teacher.[13] As early as 1931 Hunter in his writings stated:

> It might also seem possible that the dream of a sequential program might some day be realized, so that we will see a continuous course of science throughout the junior high school.[14]

The report of the Harvard Committee in 1945 made several suggestions regarding the sequence of science experiences beginning in grade seven:

> Education in science should begin early in the primary grades, surely not later than the seventh grade. It can approach familiar immediate aspects of the environment.[15]

Similar reports were soon forthcoming. Various committees issued reports on the teaching of science in the

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[13]Robert E. Yager, "A Junior High School Sequence in Science," School Science and Mathematics, 58 (December, 1963), p. 720.

[14]G. W. Hunter, "The Sequence of Science in the Junior and Senior High School," Science Education, 16 (December, 1931), p. 115.

[15]James B. Conant, General Education in a Free Society (Cambridge, Mass., Harvard University Press, 1945), pp. 156-157.

junior high school. Individuals of national prominence also set forth their ideas and recommendations.[16]

In 1956 a study of junior high science was begun at the State University of Iowa Laboratory School for junior high science. The seventh grade offering was drawn from the traditional sciences of astronomy and geology. The eighth year offering centered around the study of life, while the ninth grade content was composed of physics and chemistry.[17] One particular note of interest in this study was that earth science had found its way back into the curriculum.

The revival of earth science was due partially to such activities as the International Geophysical Year and Project MOHO.[18] In 1949 one New York school inaugrated a special earth-science course. The course was originally intended as a substitute for general science but the results were so satisfactory that the plan was adopted by several other schools.[19]

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[16]James B. Conant, The American High School Today (New York: McGraw Hill Book Co., 1959); Hyman Rickover, Education and Freedom (New York: E. P. Dutton and Co., 1959).

[17]Robert E. Yager, Secondary Science Curriculum (Iowa City, Iowa, University of Iowa Press, 1962).

[18]L. T. Caldwell, "The New Role of Earth Science in Emerging School Science Programs," Geological Times, 5 (March, 1961), pp. 26-28.

[19]Ibid.

Meanwhile other developments took place in Pennsylvania. During the fall of 1958, the Pennsylvania Department of Public Instruction developed a teaching guide for earth and space science courses.[20]

Junior high schools were not the only ones undergoing changes. In 1956 a committee was organized at the Massachusetts Institute of Technology for the purpose of developing a modern physics course for secondary schools. The result of this committee's work was the PSSC course in physics.[21]

The Biological Sciences Curriculum Study (BSCS) was established in 1959 by the American Institute of Biological Sciences for the purpose of improving biological education.[22] Also, in 1959 the Chemical Bond Approach Project (CBA) was started with an objective to improve the instruction of high school chemistry.[23]

Curriculum changes were also taking place in Texas. As early as 1949 the Texas Department of Education showed

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[20]J. E. Kosoloski, "The Pennsylvania Earth and Space Science Program," Geological Times, 7 (October, 1962), pp. 15-17.

[21]Dorothy M. Fraser, "Current Curriculum Studies in Academic Subjects," A Report Prepared for the Project on Instructional Program of the Public Schools (Washington: National Education Association, 1962), p. 7.

[22]Ibid., p. 10.

[23]Ibid., p. 12.

concern about the status of science at the junior high level. They had this to say:

> . . . Consideration should be given to the fact that nature study and/or science is planned as an offering for progressive development in science through the elementary grades. Therefore, general science, as such, should be a development of these experiences.[24]

In 1957, Shuford in her study of trends in the junior high schools of Texas reported that, "all junior high school youth need to learn about the natural and physical environment and its effects on life."[25]

On January 6, 1958, the Texas State Board of Education authorized the establishment of eleven curriculum commissions to make an intensive study of the public school instructional program in all areas, grades one through twelve. The commission on science was appointed in March, 1958. The twenty-one member commission included seven public school teachers, four college representatives, three superintendents, two principals, four supervisors and curriculum directors, and one school board member.[26]

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[24]Gordon Worley, "Standards and Activities of the Division of Supervision and Accreditation of School Systems," Report of the Division of Supervision (Austin: Texas Department of Education, 1949), p. 66.

[25]Iris L. Shuford, "Trends and Practices in the Junior High School," A Report Prepared for the Texas Study of Secondary Education (Austin: 1957), p. 6.

[26]Texas Curriculum Studies, A Report Prepared by the Commission on Science (Austin: Texas Education Agency, 1959), p. 2.

Upon conclusion of the study the commission presented its recommendation to the State Board of Education for final approval. Life science was assigned to the seventh grade and earth and physical science to grades eight and nine, respectively.[27]

II. PRE-SERVICE TRAINING AND TEACHING ASSIGNMENTS

Buck, Mallinson, and Griesen, in their study of pre-service training, revealed a severe lack of subject matter courses in the teachers' backgrounds. Findings indicated that one of the main reasons for this inadequacy was that most states require very few science courses for teacher certification.[28]

A more recent study by Rasmussen supports the findings of Buck, Mallinson, and Griesen. In his investigation of certification practices, a questionnaire was sent to the chief educational officers of the fifty states. The following results were obtained:

> In forty-nine states a senior high school science teacher may be certificated to teach in a junior high school. In two of these states a junior high school "endorsement" is needed.

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[27] Ibid., p. 5.

[28] Jacqueline Buck, V. Mallinson, and George Greisen, "Some Implications of Recent Research in the Teaching of Science," Science Education, XXXVIII (February, 1954), 81-101.

> In thirty-four states an elementary teacher may be certificated to teach in a junior high school. In two of these states a junior high school "endorsement" is needed.
>
> In five states a teacher may be certificated to teach in a junior high school either separately or jointly with the elementary or senior high school certification.
>
> In one state junior high school certification is entirely separate from the certification at other educational levels.[29]

In 1960 the Texas State Board of Education adopted a new certification program for the public schools of Texas. Under "Plan II" of this new program, a student in elementary education is permitted to take forty-eight semester hours in a composite field. Eighteen of these forty-eight hours must be in advanced courses. If a student desires, the eighteen hour block may be used for science courses. This will leave only an additional six hours needed for a major in science.[30]

In Ohio, Davis reported that for the state as a whole one teacher in fourteen had no science credit. One-third of the junior high science teachers had not had a physical science course in college and almost no one had

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[29]Glen R. Rasmussen, "The Junior High School--Weakest Rung in the Educational Ladder," Bulletin of the National Association of Secondary School Principals, XLVI (October, 1962), pp. 63-68.

[30]Texas Education Agency, Handbook For Secondary School Principals (Bulletin 639, Austin: 1963), p. 66.

studied earth science.[31]

In a survey made by Laux in New Jersey it was learned that among the ninety-nine earth science teachers who responded, only one-half of the teachers were properly qualified to teach earth science.

It was further learned that a little more than one-half of them had completed one or more courses in geology, that only about one-third had studied astronomy and meteorology and only ten per cent of the respondents had completed a course in oceanography.[32]

Investigating the teaching load of junior high school science teachers in Oregon, Thaw ascertained that science teachers have relatively little free time during the school day and spend up to twenty-one or more hours weekly on preparation for classwork and extra-curricula activities. The daily preparation for these teachers ranged from one to six preparations with the median between two and three preparations daily.[33]

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[31]Warren M. Davis, "Factors of Effectiveness in Science Teaching and Their Application to the Teaching of Science in Ohio's Public Schools," (unpublished Doctor's Dissertation, Ohio State University, Columbus, 1958).

[32]D. M. Laux, "Earth Science Courses in New Jersey and the Qualifications of Teachers," Geological Times, VII (October, 1962), pp. 17-19.

[33]Richard Franklin Thaw, "Teaching Load of Teachers of Science in Oregon," (unpublished Doctor's Dissertation, Oregon State College, Corvallis, 1958).

However, Douglas was not of the opinion that several preparations should be considered as problematic. He stated that from several surveys he had made many teachers had rather teach where several preparations are required than where only one preparation is required.[34]

Koelsche investigated the academic teachers in Ohio. He found that the typical science teacher had pursued some in-service work; had a four year provisional certificate and had eleven years of teaching experience.[35]

Beck concluded as the result of a questionnaire and personal interviews, that there should be more opportunities provided for student teachers in science to observe classroom and laboratory procedures during the period in which they are assigned to student teaching. In addition, opportunities should be provided for student teachers to participate in all of the professional experiences in which regularly employed teachers engage.[36]

Reed, Gawley, and Sutman conducted a survey of the

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[34]Harl R. Douglas, Modern Administration of Secondary Schools (New York: Ginn and Company, 1963), 96.

[35]Charles L. Koelsche, "The Academic and Teaching Backgrounds of Science Teachers in the State of Ohio," (paper prepared for the Research Foundation, University of Toledo, Toledo, Ohio, 1958).

[36]Ralph L. Beck, "Planning a Student Teaching Program for Prospective Science Teachers," Science Education XLV (March, 1961), 161-164.

range of subjects taught by science teachers in the state of New Jersey. The purpose of this study was to determine the nature or type of training program necessary for the preparation of science teachers. The conclusions were:

> The nature and type of science courses that the science teacher will teach during his total teaching experience must be considered when developing a pattern of training.
>
> There is no training in one science, or combination of two sciences that is adequate to prepare prospective teachers for any significant percentage of the positions they will be expected to fill.
>
> Indications were that the science teacher should have training in all major areas of science. If four years are insufficient for a program of this type then a fifth year should be added.[37]

III. PRACTICES FOR IMPROVING TEACHER QUALIFICATIONS

As a result of recent curriculum changes in junior high science, many teachers have found themselves to be unprepared and unqualified to teach junior high school science.

Florida State University, in an effort to help solve this problem, has conducted sixteen in-service institutes from 1959 to 1963. Teachers who participated in these institutes were chosen from one particular area from within

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[37]Rufus Reed, Irwin Gawley, and Frank Sutman, "A Survey of the Range of Subjects Taught by New Jersey Secondary School Science Teachers," Science Education, XLVI (March, 1961), 206-210.

the state of Florida. For each of the institutes a different area was selected. This they referred to as the "saturation effect."

The two main reasons for conducting the institutes in this manner were (1) since interest was being directed toward a specific area, the administrators within that area would be more cooperative; and (2) transportation for members of the institute had previously constituted a serious problem, but under the "saturated" plan rides could be shared.[38]

A study by Myers and Crall merits attention. This study dealt with recommendations of leading authorities for improving the training of "master teachers." The recommendations included additional training in methods, theories of learning, and additional courses in related sciences.[39]

In 1960, the University of Chicago conducted a study where comparisons were made of two situations in which the roles assumed by science consultants differed. In the first situation, the consultant worked directly with the teachers who in turn instructed the students. In the

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[38]Robert W. Heath, New Curricula (New York: Harper and Row, 1964), 133-134.

[39]Mauriel R. Myers and H. W. Crall, "How can the Curriculum for Biological Science Teachers be Improved?," Science Education, XLIII (March, 1959), 117.

second situation the consultants taught the students once a week and the teachers planned and taught follow-up sessions. The results of the study showed that achievement was significantly greater when the consultants worked only with the teachers than when they assumed the instructional role.[40]

In an evaluation study of the summer institutes attended by science teachers, Schenberg reported that the teachers found the institutes extremely valuable, interesting, and stimulating. On the other hand, the teachers indicated that the institutes covered too much ground, required too much homework, neglected the problem of articulating the work of the institute with science courses, and failed to provide adequate time for the exchange of ideas among the attending teachers.[41]

IV. PROBLEMS IN READING SCIENCE MATERIALS

A search was made through the literature to locate studies dealing with problems related to reading science materials.

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[40]Arlene Payne, "Achievement in Sixth Grade Science Associated With two Instructional Roles of Science Consultants," The Journal of Educational Research, LVII (March, 1964), 350-354.

[41]Samuel Schenberg, "An Evaluation of the 1958 Summer Institutes Attended by Science and Mathematics Teachers," School Science and Mathematics, LX (May, 1960), 364.

Curtis, in his monumental study, obtained data from one hundred Master's theses completed under his direction. Lists of words were obtained by examining the glossaries of science textbooks. The words were then submitted to qualified teachers in order to determine their values for inclusion in the respective courses. Curtis found that:

> Both the technical and the non-technical vocabularies of textbooks of science are too difficult for the pupils for whom the books are written.
>
> There is insufficient provision in such textbooks of science for repetition of difficult scientific terms and non-technical words.
>
> Too large a percentage of difficult words found in such textbooks of science are non-scientific or non-technical words.
>
> Not infrequently the definitions of scientific terms fail to appear in the textbooks until the terms have been used more or less extensively in earlier parts of the book.[42]

Approximately fourteen years after the study by Curtis, Mallinson conducted a series of studies in which he used techniques similar to those used by Curtis, the only difference being that he used a jury of forty-four persons all of whom had written textbooks, or articles on science, or who had helped develop courses of study in that area. The results of Mallinson's study were similar to those of

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[42]Francis D. Curtis, Investigations of Vocabulary in Textbooks of Science for Secondary Schools (Boston: Ginn and Company, 1938), 127.

Curtis. However, he was of the opinion that very little use had been made of the earlier study by improving the readability of textbooks in science.[43]

Tyer reported that the quantity of a student's reading gradually increases until he reaches a peak, usually during the junior high years. Then the student begins to read at a much slower pace. The reasons given for this were that a child's social life begins to expand, develops independence in plotting the use of time, friends demand more of his time and school work requires more concentration.[44]

V. PROBLEMS RELATED TO BEGINNING SCIENCE TEACHERS

Victor investigated the help and assistance beginning science teachers think they need by means of a questionnaire administered to two groups of randomly selected beginning science teachers in Massachusetts, one with and the other without adequate training in science. As a result of the study he listed twenty-one problems most commonly associated with beginning science teachers. He listed them in order of anticipated amount of help they would need.

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[43]George Mallinson, Harold Strum, and Lois Mallinson, "The Reading Difficulty of Textbooks for Junior High School Science," The School Review, L (December, 1950), 536-540.

[44]Travis Tyer, "Selling the Teenager," Library Journal, LXXXIX (April, 1964), 1816.

Learning about and locating demonstrations.

Learning about and locating class projects.

Identifying and encouraging science talent.

Learning about and locating community resources.

Helping pupils select projects for science fairs.

Using varied teaching techniques.

Planning long-term class work.

Learning about and locating models and specimens.

Constructing suitable tests.

Conducting or supervising a science club.

Integrating the work of the course.

Learning about and locating free materials.

Evaluating the science course as a whole.

Learning about and locating films.

Learning about and locating supplementary texts.

Evaluating pupil progress.

Planning daily class work.

Ordering apparatus and equipment.

Identifying apparatus and equipment.

Understanding the science content of the text.[45]

Shroder reported similar findings from a study of beginning science teachers in the Pacific Northwest. He

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[45]Edward Victor, "What Kind and Amount of Help Do Our Beginning Science Teachers Need?," School Science and Mathematics, LVIII (October, 1958), 550-553.

concluded that the major sources of problems were related to physical facilities, varied teaching assignments, pre-service training, lack of suitable textbooks, and teaching methods.[46]

In a bulletin published by the National Education Association, some of the most pertinent problems associated with beginning teachers were listed:

> Understanding and being able to use special school services
>
> Working with children in a group where individual differences are extreme
>
> Keeping and making out official records and reports
>
> Handling of unruly children
>
> How to effectively use a course of study[47]

Voss, in his comprehensive study of Iowa schools, found that the most common problems of science teachers were lack of facilities and equipment, time in which to prepare for laboratory experiences, and providing for individual differences among students. About forty per cent of

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[46]John Shroder, "Instructional Problems of Secondary School Science Teachers in the Pacific Northwest," (unpublished Doctor's Dissertation, University of Washington, Seattle, 1957).

[47]Research Division of the National Education Association, "First Year Teachers," National Education Research Bulletin, XXIV (February, 1956), 34-38.

the Iowa teachers had four or more preparations daily and most of them used a single textbook.[48]

Employing the use of a questionnaire, Benke studied the problems and issues involved in the teaching of science by comparing the opinions of a randomly selected group of science teachers with those of a selected group of prominent working scientists. Item analysis revealed marked differences between the teachers and scientists on many responses, especially those related to the nature of science and science teaching.[49]

Using questionnaires administered to science teachers and principals, Gruener found that major sources of problems of science teachers in the Philadelphia area were related to facilities, supplies and equipment, extra-classroom demands, working conditions, individual differences of pupils, and effective direction of learning.[50]

In a supplementary science edition of the Fifty-ninth

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[48]Burton E. Voss, "The Status of Science Education in Iowa High Schools," (unpublished Doctor's Dissertation, State University of Iowa, Iowa City, 1958).

[49]Francis L. Benke, "Opinions of a Selected Group of Science Teachers and Scientists on Issues Related to Science and Science Teaching," (unpublished Doctor's Dissertation, Columbia University, New York, 1959).

[50]Jay L. Gruener, "Sources of Problems of Secondary School Teachers," (unpublished Doctor's Dissertation, University of Pennsylvania, Philadelphia, 1959).

Yearbook of the National Society for the Study of Education, the authors stated that one of the major problems of science teachers was keeping abreast of current practices.[51]

Barnard, in discussing the administrator's role, said that beginning science teachers should not be left on their own to find the help they need. School administrators should assess their needs and work to provide the services necessary to the most efficient use of teacher talent.[52]

VI. PROBLEMS OF A MISCELLANEOUS NATURE

Pribnow, in his writings, suggested that the following procedure be used in science classes where note taking was a problem: ". . . . distribute a mimeographed sheet to each student outlining the material with ample space for each student to record his notes under each major topic." Pribnow felt that this provides the notetakers with a starting point and direction toward organizing the material.[53]

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[51]National Society For the Study of Education, Rethinking Science Education. (Fifty-ninth Yearbook Supplement, Chicago: University of Chicago Press, 1960), 248.

[52]Darrell J. Barnard, "Continuous Training, Supervision, and Utilization of Mathematics and Science Teachers," Mathematics and Science Education in United States Public Schools, 533 (United States Department of Health Education and Welfare, February, 1958), 11.

[53]Jack R. Pribnow, "Teaching Notetaking in Science and Mathematics Classes," School Science and Mathematics LXIII (March, 1963), 178-180.

Rockwell, in his discussion of tort liability for science teachers, quoted several cases where both teacher and school had been held liable as a result of a laboratory accident due to negligence. He was of the opinion that maximum safety precautions should be taken and that science teachers should encourage their school boards to purchase liability insurance to protect teachers, the administration, and the board.[54]

Schreiber is of the opinion that there is probably no one area where there have been any fewer standards agreed upon than in the selection of audio-visual materials. He stated that there should be some kind of a practical appraisal for all kinds of audio-visual materials in the particular area where it will be used. Any material for school use must be made with the role of the teacher in mind and for the purpose it is to be used in the particular medium.[55]

In a report by Nelson and Kelley some of the problems associated with the use of audio-visual materials were listed:

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[54]Harold Rockwell, "A Discussion of Tort Liability For Science Teachers," School Science and Mathematics, LXIII (March, 1963), 257-260.

[55]Robert Schreiber, "More Effective Selection of Audio-Visual Materials," School Science and Mathematics, LV (June, 1959), 476.

1. Use of the tape recorder.
2. Availability of a dark room.
3. Use of sponsored materials.
4. Support coming from the PTA and service clubs, and not from the regular school budget.
5. Purchase of good film strips.
6. Storage space.[56]

Conant, in his book on the junior high school, showed concern about the exodus of good science teachers from grades seven, eight and nine to the senior high school. He remarked:

> Because of the transitional nature of these grades, teachers with an unusual combination of qualifications are needed. Satisfactory instruction requires mature teachers.[57]

Harvey was of the opinion that field trips are of the utmost importance in helping a student develop certain attitudes and an appreciation of his environment.[58]

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[56]Pearl A. Nelson, and Gaylen Kelley, "Some Common Problems in the use of Audio-Visual Material," Science Education, XLVIII (February, 1964), 37-41.

[57]James B. Conant, Education in the Junior High School Years, (Princeton: Educational Testing Service, 1959), 35.

[58]Helen W. Harvey, "An Experimental Study of the Effects of Field Trips Upon the Development of Scientific Attitudes in a Ninth Grade General Science Class," Science Education, XXXV (December, 1951), 242-248.

VII. SUMMARY

The literature revealed that prior to 1940 science in the junior high school was limited primarily to the teaching of general science in the ninth grade. With the advent of World War II, when new emphasis was placed upon the science curriculum, general science was dropped from the curriculum in favor of physical science. Life science and earth science became the seventh and eighth grade offerings.

Evidence was cited to indicate that a major source of the problems of junior high science teachers was their pre-service training. They were, in most instances, trained to become teachers of biology, chemistry, and physics. Indications were that certification requirements in most states are so non-restrictive that junior high science teachers can be lawfully certified to teach a certain subject without having had a course in that subject.

The literature indicated that many of the science teacher's problems were related to the inadequacy of state adopted textbooks. The vocabulary that was used was not in keeping with student's reading ability. A large percentage of words were non-technical and non-scientific.

Data from several sources indicated that a tremendous amount of money and effort has been spent to help improve the junior high science program. The National Science

Foundation has underwritten the expense of in-service institutes, summer institutes, and acedemic year programs. These programs have proven to be very helpful toward alleviating some of the problems associated with pre-service training.

Most of the studies that were specifically related to the problems of beginning science teachers indicated that the most pertinent problems teachers were concerned with had to do with facilities and equipment, too many preparations, and insufficient training.

Chapter III will discuss the procedures used in developing the survey instrument, gathering the data, and treatment of the data.

CHAPTER III

DESIGN OF THE STUDY

Most research methods are subject to inherent weaknesses. One weakness associated with descriptive-survey studies where the questionnaire is used as the major data-gathering instrument is the inability to secure a large percentage of returns.

Because of the limitations placed upon this study, no valid assessment of the situation could be made unless a high percentage of responses was obtained. To eliminate the possibility of insufficient returns seventy-two of the beginning junior high school science teachers were personally visited and asked to complete the questionnaire. The use of the interview technique with the remaining twenty beginning teachers helped insure a large percentage of returns.

The research design employed in this study will be treated under the following headings:

1. Setting for the study.
2. Development of the data collection instrument.
3. Gathering the data.
4. Treatment of the data.
5. Summary.

I. SETTING FOR THE STUDY

Lamar Area School Study Council. In February, 1961, a plan was submitted to the President of Lamar State College of Technology for a "Jefferson County-Orange County Cooperative School Research Center."[1]

After a series of conferences with the Lamar President to consider the needs of the area schools, the plan was presented to the area superintendents. Sixteen schools of the area agreed to join with Lamar to form the Lamar Area School Study Council. Since 1961 nine additional schools have joined the council, bringing the total to twenty-six member schools.[2] A list of the participating schools, their share of the budget, and their teacher quota is presented in Table I.

The operation of the council has been financed by the member schools in conjunction with Lamar State College of Technology. For the 1964-65 school year the cost per district was approximately eighteen cents per pupil in average daily attendance. The college provides space, secretarial assistance, and one-half of the director's salary, for which

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[1] History of the Lamar Area School Study Council, Mimeographed Report Prepared by the Staff of the Lamar Area School Study Council, 1964, p. 1.

[2] Ibid.

TABLE I

LAMAR AREA SCHOOL STUDY COUNCIL
MEMBERSHIP, COST, AND
TEACHER QUOTA
1964-65

District	1964-65 A.D.A	District Share of Budget	Teacher Quota
Port Arthur	14,697	2,571.98	162
Beaumont	14,134	2,473.45	157
South Park	11,013	1,927.28	121
Port Neches	5,848	1,023.40	63
Orange	4,735	828.63	53
Nederland	4,450	778.75	47
Vidor	4,045	707.88	44
Silsbee	3,351	586.43	36
Jasper	2,734	478.45	30
Liberty	2,229	390.08	24
Bridge City	2,095	366.63	23
West Orange	1,638	286.65	18
Hardin-Jefferson	1,505	263.38	16
Kirbyville	1,488	260.40	16
Woodville	1,406	246.05	15
Little Cypress	1,273	222.78	14
Buna	1,004	175.70	11
East Chambers	928	162.40	10
Hampshire-Fannett	888	155.40	10
Hull-Daisetta	794	138.95	9
Orangefield	750	131.25	8
Anahuac	703	123.03	8
Chance-Loeb	643	115.00	8
Warren	614	115.00	7
Evadale	288	115.00	6
Devers	168	115.00	6
Totals	83,421	$14,758.95	895

he teaches one class per semester in the education department. Local industry has expressed a willingness to cooperate by making sizable contributions to be used at the discretion of the council.[3]

Program planning for each year is done during the fall workshops. It is at this time that individual conferences are held for planning purposes with the curriculum directors of the area. The executive secretary prepares a list of what he believes to be the study areas needing the most emphasis. For the school year 1964-65, approximately nine hundred teachers will be involved in workshops and one thousand will be involved in each of the one-day conferences.[4]

II. DEVELOPMENT OF THE DATA COLLECTION INSTRUMENT

In order to construct a questionnaire that would elicit the desired information, it was necessary to determine the nature of the problems with which the junior high science teachers were confronted. The possibilities offered by a structured interview were considered and rejected on the grounds that they might not include some problems. The unstructured interview posed the problem that without some

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[3] Ibid., p. 3.

[4] Ibid., p. 4.

means of control the interview would involve problems unrelated to classroom instruction and would be time-consuming. In order to obtain the desired information, a modification of both techniques was used.

Interviews were conducted with fifteen beginning junior high school science teachers in five separate school districts belonging to the Lamar Area School Study Council. (See Table II). The first five interviews, which were unstructured, served to show the general nature of the problems and the area in which they were located. These were used as guides in conducting ten additional interviews. This procedure proved to be helpful in eliminating many responses and lengthy discussions unrelated to the problem. The data obtained from the preliminary interviews were used to formulate the questionnaire. The survey instrument was developed as follows:

1. Reviews were made of research books with respect to the construction and administering of questionnaires.
2. Questionnaires used in other studies were reviewed.

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[5]Waldon D. Hardesty, "Dean of Men in Texas State Senior Colleges and Universities as Reported by the Incumbent," (unpublished Doctor's Dissertation, University of Houston, Houston, 1964).

TABLE II

DISTRIBUTION OF THE TEACHERS, YEARS TEACHING EXPERIENCE, AREA OF ASSIGNMENT, INVOLVED IN FORMULATION OF QUESTIONNAIRE

School Districts Involved	Number of Teacher Interviews	Area of *Assignment	Years Teaching Experience
Port Neches	1	B	3
	1	B	2
	1	C	4
	1	A	2
Port Arthur	1	A	1
	1	A	2
	1	B	2
Beaumont	1	A	1
	1	C	3
	1	C	4
Nederland	1	B	2
	1	C	1
	1	C	3
Bridge City	1	C	4
	1	A	3
Total	15		

*A = Life Science
*B = Earth Science
*C = Physical Science

3. Each of the instructional problems obtained in the preliminary interviews was classified in a particular area.
4. Carefully worded questions pertinent to each area were formulated.
5. The organized questionnaire was presented to the members of the graduate committee. Their timely suggestions were incorporated into the instrument.
6. Pre-testing of the instrument was accomplished by presenting it to ten people, five of whom were beginning junior high school science teachers and the remaining five, administrators who at one time had taught science in the junior high school. Only a few revisions resulted from the pre-testing.

The final draft of the questionnaire contained four major divisions, which included a total of seventy-nine questions. Space was provided for teachers' comments.

III. GATHERING THE DATA

A list of the junior high schools was obtained from the Lamar Area School Study Council (see Table III). Prior to the use of the questionnaires, each principal or the chairman of the science department was contacted either by

TABLE III

JUNIOR HIGH SCHOOLS WITHIN THE LAMAR AREA SCHOOL STUDY COUNCIL

School District	Name of Junior High School	School District	Name of Junior High School
Port Arthur	Edison	Vidor	Greer
	Woodrow Wilson		Vidor Grammar
	Franklin	Little Cyprus	Little Cyprus
	Lincoln	Silsbee	Silsbee
	Stephen F. Austin		Waldo Matthews
Beaumont	Dick Dowling		
	James Bowie		
	Stephen F. Austin	Liberty	Liberty
	David Crockett		Liberty Training
	Lincoln	Woodville	Wheat
	Dunbar		Scott
South Park	Geo. Marshall	Hardin-Jefferson	Hardin
	MacArthur		J. H. Henderson
	Hebert	Anahuac	Anahuac
Port Neches	Groves		C. W. Carver
	Woodlawn	Hampshire-Fannett	Hampshire-Fannett
	Port Neches		
Nederland	C. O. Wilson	East Chambers	East Chambers
Orange	Carr	Hull-Daisetta	Hull-Daisetta
	Wallace		Woodson
Orangefield	Orangefield	Buna	Buna
Jasper	Jasper	Chance-Loeb	Chance-Loeb
	J. H. Rowe	Evadale	Evadale
West Orange	West Orange	Kirbyville	Kirbyville
Bridge City	Bridge City	Warren	Warren
Totals	25		

telephone or letter (see Appendix) and informed of the study and asked if his school would participate. In addition he was asked to supply the number of science teachers in his building who had either one, two, three, or four years teaching experience. A specially prepared post card was enclosed for his convenience. (See Appendix). From the telephone calls and post cards it was ascertained that there were approximately one hundred beginning junior high school science teachers within the Lamar Area School Study Council.

The structured interview technique was used with twenty of the beginning science teachers. The questionnaire served as a guide for the interview. The remaining teachers were contacted personally and asked to complete the questionnaire.

The interview. The times and places for the interviews were arranged in advance. The twenty interviews were conducted at the schools after school hours or during the preparation periods of the teachers. Each of the interviews lasted approximately one hour. A special effort was made to relieve tensions and to gain the teacher's cooperation before the structured questions were asked. The purpose of the study was explained, and each teacher was assured that his responses would be held in strict confidence.

The interview guide was followed carefully. Questions were asked in the order in which they appeared in the questionnaire. In all cases where there was doubt about the the teacher's meaning, he was asked to elaborate further.

At the end of the interview each teacher was thanked for his cooperation and informed that when the study was completed he would receive a copy of the results.

Direct visitation. This method was used with seventy-eight of the beginning teachers. The approval of the principal or the chairman of the science department was obtained before the teachers were contacted. In most instances the building principal was present when the science teacher was contacted. The teacher was informed of the purpose of the visit, and his cooperation in completing the questionnaire was requested. A stamped envelope was provided for the return of the completed questionnaire.

Ninety-eight teachers were contacted. Questionnaires were received from ninety-two, or ninety-three per cent, of the teachers.

IV. TREATMENT OF THE DATA

In order to facilitate analysis of the data, an IBM 1440 data-processing system was used. Most of the responses were recorded on IBM cards; however, the additional comments

made by the respondents were treated individually and incorporated into the report. The data obtained for each of the major parts of the questionnaire were treated according to the following pattern:

1. Purpose.
2. Processing of the data.
3. Presentation of the findings.
4. Interpretation of the findings.

Teacher Preparation and Assignment

Purpose. The purposes for this section of the instrument were to determine the adequacy of the preparation of beginning teachers and to ascertain the nature of the teaching assignments as they relate to the number of daily preparations, conference periods, class sizes, and subjects taught.

Processing the data. The data were processed by determining the total number of responses to each question. Some of the responses had to be categorized before they were totaled.

Presentation of the findings. The findings for this section were presented in textual and table form. In the text, numbers only were used; but in the tables both numbers and percentage figures were used in presenting the data.

Interpretation of the findings. The findings were utilized to show the adequacy of the training of the beginning teachers in the areas to which they had been assigned. The findings were further utilized to determine the nature of the teaching assignments as related to daily preparations, conference periods, class sizes, and subjects taught.

Instructional Problems Related to Printed Materials and Physical Facilities

Purpose. This portion of the questionnaire was designed to determine if instructional problems had been encountered in the use of printed materials and physical facilities. If problems had been encountered, then an additional purpose of this section was to obtain suggestions from the teachers about how they thought the problems might be solved.

Processing the data. The data received were processed by ascertaining the total number of responses to each question. The open-end questions were treated separately. Similar responses were categorized and totaled.

Presentation of the findings. The findings were presented in textual and table form. Comparisons were made of the responses of the teachers who taught only one science with those who had multiple assignments.

Interpretation of findings. The responses which were listed most frequently as sources of difficulty were interpreted as the instructional problems most commonly associated with the use of printed materials and physical facilities.

Instructional Problems Related to Audio-Visual Materials and Pupil Attitudes and Abilities

Purpose. The audio-visual section of the survey instrument was utilized to determine if instructional problems had been encountered in the operation of the Jefferson County Film Library and the showing of films. The second part of the instrument was designed to determine the extent to which problems related to pupil attitudes and abilities had been encountered. An additional purpose was to obtain suggestions from the teachers about how they thought the problems might be solved.

Processing the data. In the first part the total number of responses to each question was determined. The open-end questions were treated separately by ascertaining the total number of similar responses. In the second part the total number of responses to each division of the continuum was determined.

Presentation of findings. Comparisons were made of

the findings, and these were presented in textual and table form. Both numbers and percentages were used in presenting the data.

Interpretation of the findings. The findings from this section were used to answer the purpose of this section of the study which was to determine if instructional problems related to audio-visual materials and pupil attitudes and abilities had been encountered.

Instructional Problems Related to Teaching Methods and Administrative Interest and Assistance

Purpose. The final section of the instrument was utilized to determine if problems had been encountered in the use of teaching methods commonly associated with classroom instruction. It was further utilized to determine the extent that administrative interest and assistance had been provided.

Processing the data. The total number of responses to each question was determined. The open-end questions were treated separately by ascertaining the total number of similar responses.

Presentation of findings. Comparisons were made of the responses of the teachers who taught only one science

with those who had multiple assignments. Numbers, percentages and averages were used in presenting the data.

Interpretation of findings. The findings were used to show which teaching techniques were causing the most problems and how the teachers thought the problems could be eliminated. The findings were further utilized to determine the extent of administrative interest and assistance.

V. SUMMARY

The purpose of this chapter has been to describe the setting for the study and the research procedures that were used in conducting the study.

The setting was the forty-eight junior high schools within the Lamar Area School Study Council. The research procedure involved the use of the interview and questionnaire techniques. The development of the questionnaire and its use involved the following procedures:

1. Preliminary interviews to determine the problems.
2. Construction of the questionnaire.
3. Pre-testing of the instrument.
4. Collection of the data.
5. Treatment of the data.

Chapter IV will present the data as it relates to the preparation and assignments of the beginning teachers.

CHAPTER IV

THE PREPARATION AND ASSIGNMENT OF BEGINNING JUNIOR HIGH SCHOOL SCIENCE TEACHERS WITHIN THE LAMAR AREA SCHOOL STUDY COUNCIL

The pre-service training of junior high school science teachers has been frequently discussed by writers in education. The recommendations of science educators have contended that the training of junior high school science teachers should be given the same status as the training of teachers in other divisions of the school system. Conant was concerned about this when he stated:

> It has been generally recognized that most teachers of junior high school science have not been trained specifically for their task, but intended to become teachers of biology, chemistry, physics, or some other subject.[1]

I. PRE-SERVICE TRAINING

Degrees earned by the science teachers. All of the ninety-two beginning science teachers who cooperated in this study had earned a bachelor's degree. Eighty-four of the teachers had earned a bachelor of science degree, eight had earned a bachelor of arts degree, and eighteen had

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[1]James B. Conant, Education in the Junior High School Years (Princeton: Educational Testing Service, 1959), 35.

completed the requirements for a master's degree. (See Table IV).

Major and minor areas of study. Of the ninety-two beginning science teachers who had completed the requirements for the bachelor's degree, twenty majored in biology, six in chemistry, and one in earth science. Sixty-five of the teachers majored in subjects other than science. Of the twenty-seven teachers who majored in science, fifteen also minored in science. Of the sixty-five teachers who did not major in science, twenty-seven minored in science. Thirty-eight of the teachers did not major or minor in any field of science. This is reported in Table V.

Fourteen of the eighteen teachers who had completed the requirements for a master's degree majored in education. Four majored in other areas.

Credits earned. A compilation was made of the areas of concentration of the science teachers regarding science training. It was noted that of the fifty-five science teachers who taught life science, two had not earned credits in biology; thirteen had earned between three and ten credits; thirteen between eleven and seventeen; and twenty-seven had either majored or minored in biology.

Sixty-five of the beginning teachers taught earth science. Twenty-five of this number had not earned credits

TABLE IV

DISTRIBUTION OF BEGINNING SCIENCE TEACHERS IN RELATION TO EARNED ACADEMIC DEGREES

Degrees Held by Teachers	Male	Female	Total	Percentage
Bachelor of Science	55	29	84	91.3
Bachelor of Arts	1	7	8	8.8
Master of Education	12	2	14	15.2
Master of Arts	1	3	4	4.3

TABLE V

DISTRIBUTION OF THE NINETY-TWO BEGINNING JUNIOR HIGH SCIENCE TEACHERS IN RELATION TO MAJOR AND MINOR AREAS OF STUDY

	Major		Minor	
	Frequency	Percentage	Frequency	Percentage
Biology	20	21.7	23	25.0
Physical Education	14	15.2	2	2.1
Mathematics	10	10.8	10	10.8
Social Studies	9	9.7	17	18.3
Home Economics	9	9.7	--	----
Chemistry	6	6.5	19	20.6
Agriculture	6	6.5	--	----
English	4	4.3	8	8.8
Business Administration	3	3.2	1	1.1
Education	3	3.2	5	5.4
Sociqlogy	2	2.1	2	2.1
Foreign Language	2	2.1	3	3.2
Industrial Arts	1	1.1	--	----
Speech	1	1.1	1	1.1
Geology	1	1.1	--	----
Art	1	1.1	--	----
Bible	--	----	1	1.1
Total	92	99.4	92	99.6

in the earth sciences; twenty-eight had completed between three and ten credits; eight had completed between eleven and seventeen; and only one teacher had completed more than eighteen hours of earth science.

Of the fifty-eight teachers who taught physical science, three had not earned credits in physical science; twenty-six had completed between three and ten credits; ten had completed between eleven and seventeen; and nineteen had either majored or minored in the physical sciences. The number of credits in science completed by the ninety-two teachers is indicated in Table VI.

Twenty-two of the teachers had completed a science methods course and twenty-three had attended a summer institute sponsored by the National Science Foundation. Several had attended more than one institute.

Student teaching. In the analysis of the data it was found that thirteen of the teachers had not had student-teaching. Of the seventy-nine who had, fifty did their student teaching in the high school, twenty-four in the junior high school, and five in the elementary school. It was of particular interest to note that only twenty-five teachers did their student-teaching in science--sixteen in the high school and nine in the junior high school. These data are reported in Table VII.

TABLE VI

CREDITS COMPLETED IN SUBJECTS BEING TAUGHT BY THE NINETY-TWO BEGINNING JUNIOR HIGH SCIENCE TEACHERS

Subjects Taught	Number of Teachers	Credits Completed			
		0	3-10	11-17	18 +
Life Science	55	2	13	13	27
Earth Science	62	25	28	8	1
Physical Science	58	3	26	10	19
Total*		30	67	31	47
Per Cent		32.6	72.8	33.7	51.0

*This table contains multiple responses, therefore, the total number of teachers will be greater than ninety-two and the per cent columns will total more than one hundred per cent.

TABLE VII

NUMBER OF BEGINNING JUNIOR HIGH SCIENCE TEACHERS GROUPED BY THE DIVISION OF THE SCHOOL SYSTEM WHERE STUDENT-TEACHING WAS DONE

Division	Frequency	Percentage
High School Science	16	20.0
High School but not in Science	34	43.0
Junior High Science	9	11.4
Junior High but not in Science	15	19.0
Elementary	5	6.3
Total*	79	99.7

*Thirteen of the beginning teachers did not have student-teaching.

II. TEACHING ASSIGNMENTS

In the process of conducting the fifteen preliminary interviews it was found that the size of classes and multiple assignments were factors that had contributed to instructional difficulties. Therefore, specific questions were placed in the questionnaire that would provide information relative to these factors.

Teaching experience and assignment. Thirty-six of the ninety-two beginning science teachers were women and fifty-six were men. Twenty-three were first year teachers, twenty-one were second year teachers, twenty-four were third year teachers, and twenty-four were fourth year teachers. These data are presented in Table VIII.

An interpretation of the data pertinent to teacher assignment revealed that twenty-nine of the teachers had only one preparation to make. Thirty-three had two preparations to make; twenty-three had three; and seven of the teachers had as many as four preparations to make each day.

School enrollment. Forty-six of the teachers were teaching in junior high schools with an enrollment above five hundred. Ten were teaching in schools with an enrollment between four and five hundred, seven in schools with an enrollment between three and four hundred, thirteen

TABLE VIII

NUMBER OF BEGINNING JUNIOR HIGH SCIENCE TEACHERS GROUPED BY YEARS OF TEACHING EXPERIENCE

Number of Teachers	Years of Experience	Percentage
23	1	25.0
21	2	22.8
24	3	26.0
24	4	26.0
Total 92	*	99.8

*The average number of years teaching experience was 2.53.

in schools with between two and three hundred students, and sixteen teachers were teaching in junior high schools with less than two hundred enrollment.

Teachers who were teaching in junior high schools with an enrollment of less than two hundred had the greatest number of daily preparations. In most instances, as the size of the school increased the number of daily preparations became fewer. There was some indication that the size of the junior high school had an effect upon the size of classes. As the size of the school increased, the classes became somewhat smaller. The average size of the science classes was twenty-nine students per class. Data pertaining to the number of daily preparations and class sizes are shown in Table IX.

The data pertaining to conference periods revealed that eighty-four of the ninety-two teachers had a conference period. Of the eighty-four teachers, twenty-nine reported that they had been asked to use their conference period for duties unrelated to classroom instruction. Forty of the teachers stated that their science room was in use during their conference period. (See Table X).

Fifty-six of the teachers reported that they did not sponsor or supervise a club or activity related to science, and sixty-three teachers said that the school in which they taught encouraged student participation in science fairs.

TABLE IX

NUMBER OF DAILY PREPARATIONS AND AVERAGE CLASS SIZE OF THE NINETY-TWO BEGINNING JUNIOR HIGH SCIENCE TEACHERS GROUPED BY SCHOOL ENROLLMENT

Number of Daily Preparations	Below 200	Between 200-300	Between 300-400	Between 400-500	Above 500	Total	Per Cent
1	0	0	1	7	21	29	31.5
2	5	2	3	2	21	33	35.8
3	6	9	3	1	4	23	25.0
4	5	2	0	0	0	7	7.6
5	0	0	0	0	0	0	0
Total	16	13	7	10	46	92	
Per Cent	17.3	14.1	7.6	10.8	50.0		99.9
Average Class Size	33	29	28	27	28	Average	29

TABLE X

RESPONSES OF THE NINETY-TWO BEGINNING JUNIOR HIGH SCIENCE TEACHERS TO QUESTIONS RELATED TO CONFERENCE PERIODS AND ACTIVITIES

Questions	Responses			
	Yes	Percentage	No	Percentage
Do you have a conference period during the day?	84	91.3	8	8.7
Is your science room used during your conference period?	40	43.4	52	56.5
Are you ever asked to use your conference period for duties not related to classroom instruction?	29	31.5	63	68.4
Do you sponsor or supervise a club or activity related to science?	36	39.1	56	60.8

III. SUMMARY

The purpose of this section of the study was concerned primarily with the pre-service training and teaching assignments of the beginning junior high school science teachers within the Lamar Area School Study Council.

An analysis of the data pertinent to the nature of the degrees and credits that had been earned revealed a deficiency of subject matter courses in the teachers' pre-service training. Many of the teachers had been assigned to teach science courses for which they had little training.

The average age of the teachers was 27.4, and the average number of years of teaching experience was 2.53. All of the science teachers had earned a bachelor's degree, but only a small percentage had earned a master's degree.

A large percentage of the teachers had not completed a methods course in science teaching, and only nine had done their practice teaching in junior high school science. Almost all the teachers had a conference period, and many indicated that they were frequently called upon to use their conference period for duties unrelated to science instruction.

The beginning science teacher had a variety of teaching assignments. Approximately thirty per cent of the teachers reported that they had as many as three or four

preparations to make each day.

Chapter V will be concerned with the nature of the instructional problems encountered by the junior high school science teachers relative to the use of printed materials and the adequacy of physical facilities.

CHAPTER V

INSTRUCTIONAL PROBLEMS RELATED TO PRINTED MATERIALS AND PHYSICAL FACILITIES

Seventeen questions commonly associated with problems in the areas of printed materials and physical facilities were presented to the teachers. Each teacher was asked to answer "yes" or "no" to the question on the existence of problematic conditions. An additional space was provided for the teachers to indicate if these conditions were causing instructional problems. If problems were being encountered, then each teacher was asked to make suggestions about what could be done to eliminate the problems. A check list containing several suggestions was provided. Additional space was allowed for other suggestions from the teachers. (See Appendix).

I. DIFFICULTIES RELATED TO PRINTED MATERIALS

Textbooks. The adequacy of textbooks was frequently mentioned in the literature as a source of instructional problems. Table XI revealed that, in response to the question "Is your science textbook current?" forty-four teachers said "yes" and forty-eight said "no."

Of the eleven teachers who taught only life science,

TABLE XI

A COMPARISON OF THE RESPONSES OF THE BEGINNING JUNIOR HIGH SCIENCE TEACHERS TO THE QUESTION: "IS YOUR SCIENCE TEXTBOOK CURRENT?"

Subject Taught	Number	Responses				Number of Teachers Reporting that Deficiences Caused Problems	
		Yes	Per Cent	No	Per Cent	Number	Per Cent
Physical Science	9	5	5.4	4	4.3	2	2.1
Earth Science	9	6	6.5	3	3.2	1	1.1
Life Science	11	4	4.3	7	7.6	5	5.4
Multiple Assignments	63	29	31.5	34	35.9	23	25.0
Total	92	44	47.7	48	52.0	31	33.6

seven indicated that their textbook was not current. Three of the nine earth science teachers, four of the nine physical science teachers, and thirty-four of the sixty-three teachers with multiple assignments likewise indicated that their textbooks were not current. Thirty-one of the ninety-two teachers said that this deficiency had caused problems.

The most frequent suggestions about how the instructional problem could be eliminated were the adoption of a more current textbook and the purchase of additional books.

Supplementary texts. The preliminary interviews reflected that some schools did not use a single text. Rather, a variety of textbooks from different publishers and of differing grade levels was available in each classroom. In other schools a single textbook was used by all students. It appeared that the two methods were equally popular.

Table XII showed that of the ninety-two beginning junior high science teachers, forty-four were of the opinion that their supply of supplementary texts was not adequate. Thirty-four teachers believed that this deficiency had caused instructional difficulties.

When they were asked to suggest a possible solution to the problem, most of the teachers responded by saying the situation could be improved by the purchase of

TABLE XII

A COMPARISON OF THE RESPONSES OF THE NINETY-TWO BEGINNING JUNIOR HIGH SCIENCE TEACHERS TO THE QUESTION: "DO YOU HAVE AN AMPLE SUPPLY OF SUPPLEMENTARY TEXTS?"

Subjects Taught	Number	Responses				Number of Teachers Reporting that Deficiences Caused Problems	
		Yes	Per Cent	No	Per Cent	Number	Per Cent
Physical Science	9	5	5.4	4	4.3	2	2.1
Earth Science	9	4	4.3	5	5.4	3	3.3
Life Science	11	7	7.6	4	4.3	2	2.1
Multiple Assignments	63	32	34.7	31	33.7	27	29.3
Total	92	48	52.0	44	47.7	34	36.8

additional supplementary texts. It was also suggested that the books remain within the classroom. In addition to these suggestions, several teachers felt that a partial solution could be accomplished by better cooperation between members of the science department and the library personnel.

Reference books and courses of study. Instructional difficulties were noted in the answers given to the question concerning the availability of reference books. Thirty-three of the ninety-two teachers said that reference books were not readily available. Twenty-four teachers reported this inadequacy as a source of instructional difficulties.

Suggestions for solving the problem included the sharing of books among teachers and the purchase of additional books. One teacher said that large quantities of reference materials could be obtained free of charge from various publishing companies. The data pertinent to reference books are reported in Table XIII.

Twenty-five per cent of the teachers reported that the school libraries did not have enough science books to meet the needs of their students. Fifteen per cent said that this caused problems.

In response to the question concerning a course of study for each science course they taught, forty of the teachers responded by saying they did not have a recently

TABLE XIII

A COMPARISON OF THE RESPONSES OF THE NINETY-TWO BEGINNING JUNIOR HIGH SCIENCE TEACHERS TO THE QUESTION: "DO YOU HAVE REFERENCE BOOKS THAT ARE EASILY AVAILABLE TO YOUR STUDENTS?"

Subjects Taught	Number	Responses				Number of Teachers Reporting that Deficiences Caused Problems	
		Yes	Per Cent	No	Per Cent	Number	Per Cent
Physical Science	9	6	6.5	3	3.2	3	3.2
Earth Science	9	7	7.6	2	2.1	2	2.1
Life Science	11	7	7.6	4	4.3	2	2.1
Multiple Assignments	63	39	42.3	24	26.0	17	18.4
Total	92	59	64.0	33	35.6	24	25.8

revised course of study. Twenty-four teachers, or twenty-six per cent, believed that this deficiency was a source of problems. (See Table XIV).

Several of the teachers suggested that, in addition to writing a new course of study, it would be more practical if it were developed by teachers rather than by supervisors.

II. DIFFICULTIES RELATED TO PHYSICAL FACILITIES

Permanent facilities. The inadequacies of classrooms were frequently mentioned in the preliminary interviews as a source of instructional problems. In response to the question concerning the appropriateness of the rooms in which they taught science, thirty-two of the sixty-three teachers with multiple assignments reported that the rooms in which they taught were inappropriate for science instruction. Twenty-six of these thirty-two teachers believed that this deficiency caused problems. Nine of the remaining science teachers felt that their rooms were inadequate for science instruction and, of this number, six reported this inadequacy as causing problems. These data are presented in Table XV.

Suggestions for improving the conditions included better lighting for the classrooms, removal of extra-curricula activities from the immediate area, and confining teaching assignments to one classroom.

TABLE XIV

A COMPARISON OF THE RESPONSES OF THE NINETY-TWO BEGINNING JUNIOR HIGH SCIENCE TEACHERS TO THE QUESTION: "IS AN UP-TO-DATE COURSE OF STUDY PROVIDED FOR EACH SCIENCE COURSE YOU TEACH?"

Subjects Taught	Number	Responses				Number of Teachers Reporting that Deficiences Caused Problems	
		Yes	Per Cent	No	Per Cent	Number	Per Cent
Physical Science	9	6	6.5	3	3.2	3	3.2
Earth Science	9	7	7.6	2	2.1	2	2.1
Life Science	11	4	4.3	7	7.6	4	4.3
Multiple Assignments	63	35	38.0	28	30.4	15	16.3
Total	92	52	56.4	40	43.3	24	25.9

TABLE XV

A COMPARISON OF THE RESPONSES OF THE NINETY-TWO BEGINNING JUNIOR HIGH SCIENCE TEACHERS TO THE QUESTION: "IS THE SCIENCE ROOM IN WHICH YOU TEACH APPROPRIATE FOR THE TEACHING OF SCIENCE?"

Subjects Taught	Number	Responses				Number of Teachers Reporting that Deficiences Caused Problems	
		Yes	Per Cent	No	Per Cent	Number	Per Cent
Physical Science	9	6	6.5	3	3.2	1	1.1
Earth Science	9	7	7.6	2	2.1	2	2.1
Life Science	11	7	7.6	4	4.3	3	3.2
Multiple Assignments	63	31	33.7	32	34.7	26	28.2
Total	92	51	55.4	41	44.3	32	34.6

Many varieties of storage spaces are needed by the junior high science teacher, some of which should be provided in the classrooms. New methods of instruction including team teaching, visual-aids, and the increasing emphasis on individual projects have all served to increase the need for additional space.

In response to the question regarding the adequacy of storage space, forty-two of the ninety-two teachers stated that they did not have adequate storage space, twenty-one of the teachers reported that this deficiency was a source of instructional problems. Teachers with multiple assignments comprised the major portion of those having difficulties. (See Table XVI).

Some suggestions by the teachers for improving the conditions included the construction of shelves and closets where chemicals and delicate instruments could be stored. Other suggestions included the construction of a green house, animal cages, and book shelves.

It was of particular interest to note the responses of the teachers to the question "Do your facilities include both hot and cold running water?" Eighty of the teachers, or eighty-six per cent, reported that this provision was lacking. Two physical science teachers, one earth science teacher, three life science and ten teachers with multiple assignments reported that this deficiency had caused problems.

TABLE XVI

A COMPARISON OF THE RESPONSES OF THE NINETY-TWO BEGINNING JUNIOR HIGH SCIENCE TEACHERS TO THE QUESTION: "DO YOU HAVE ADEQUATE STORAGE SPACE?"

Subjects Taught	Number	Yes	Per Cent	No	Per Cent	Number of Teachers Reporting that Deficiences Caused Problems	
						Number	Per Cent
Physical Science	9	8	8.7	1	1.1	1	1.1
Earth Science	9	5	5.4	4	4.3	2	2.1
Life Science	11	9	9.7	2	2.1	1	1.1
Multiple Assignments	63	28	30.4	35	38.0	17	18.4
Total	92	50	54.2	42	45.5	21	22.7

Inquiry was made regarding the number of electrical and gas outlets and the number of sinks in each classroom. Thirty-three of the ninety-two teachers stated that they did not have a sink in the classroom where they taught science. Thirty-nine teachers reported that they had only one sink. (See Table XVII).

Three of the teachers pointed out that they did not have a single electrical outlet that could be used for instructional purposes; forty-one teachers said that the classrooms in which they taught had fewer than four electrical outlets; thirty indicated that they had between four and ten; and eighteen of the teachers said that the classrooms in which they taught had more than ten electrical outlets. (See Table XVII).

Suggestions for improvement included adding more outlets and purchasing a converter so that an alternating current could be changed to a direct current.

Approximately thirty-six per cent of the beginning science teachers reported that a gas outlet was not available in their classroom. Eighteen of the classrooms had only one gas outlet; fourteen had two outlets; eleven had between four and ten; and seventeen of the teachers stated that their classrooms had eleven or more gas outlets. Information pertinent to these data is reported in Table XVII.

Moveable facilities. An instrument that has come to

TABLE XVII

RESPONSES OF THE NINETY-TWO BEGINNING SCIENCE TEACHERS TO QUESTIONS RELATED TO SINKS, GAS AND ELECTRICAL OUTLETS

Questions	Frequency of Responses						
	0	1	2	3-5	6-10	11+	Total
How many electrical outlets are there in each room where you teach science?	3	14	15	22	21	17	92
How many gas outlets are there in each room where you teach science?	32	18	14	10	2	16	92
How many sinks are there in each room where you teach science?	33	39	6	2	10	2	92

be regarded as highly useful in the teaching of junior high science is the microscope. An analysis of the data revealed that twenty-four of the beginning science teachers did not have an available microscope for classroom instruction; thirty-two of the teachers indicated that they had between one and five miscroscopes that were usable; ten of the teachers stated that they had between eleven and fifteen; and fifteen of the beginning teachers reported that they had sixteen or more usable microscopes that were available for classroom instruction. Sixty of the ninety-two teachers said that they had encountered instructional difficulties as the result of an inadequate supply of usable microscopes. (See Table XVIII).

Suggestions by the teachers for solving the problem involved increased expenditures. The suggestions included repairing broken microscopes and purchasing micro-projectors.

Few problems were cited with respect to the availability of a fire extinguisher, although approximately fifty per cent of the teachers noted this deficiency. Only three of the ninety-two science teachers reported that problems had been encountered as a result of this deficiency.

Thirty-six of the ninety-two respondents said that a first aid kit was not available in the room where they taught science. Of this number, eleven stated that problems had been encountered. It was pointed out that, in

TABLE XVIII

A COMPARISON OF THE RESPONSES OF THE NINETY-TWO JUNIOR HIGH SCIENCE TEACHERS TO THE QUESTION: "HOW MANY USABLE MICROSCOPES DO YOU HAVE AVAILABLE?"

Subjects Taught	None	1-5	6-10	11-15	16+	Total	Number of Teachers Reporting that Deficiences Caused Problems	
							Number	Per Cent
Physical Science	2	4	0	1	2	9	6	6.5
Earth Science	3	2	0	3	1	9	7	7.6
Life Science	2	5	3	0	1	11	8	8.7
Multiple Assignments	17	21	7	7	11	63	39	42.3
Total	24	32	10	11	15	92	60	
Percentage	26.0	34.7	10.8	11.9	16.3	99.7		65.1

some schools, only one first aid kit in the central office was available for the entire school. The suggestion was made that additional kits and fire extinguishers should be provided for the various departments. (See Table XIX).

Inquiry was made regarding the adequacy of chalk and bulletin board. Thirty of the ninety-two teachers thought that these facilities were inadequate, and twenty-one teachers stated that these deficiences caused problems. These data are shown in Table XIX).

An interpretation of the data pertinent to the use of a refrigerator for the storage of materials disclosed that seven physical science teachers, eight earth science teachers, nine life science teachers, and fifty-one multiple science teachers did not have access to a refrigerator for the storage of materials. Of the seventy-five teachers who reported this inadequacy, only twelve stated that instructional difficulties had been encountered. (See Table XIX).

One teacher suggested that the problem could be solved by acquiring a used refrigerator from the home economics department. This department is usually furnished a new refrigerator every three or four years free of charge. The old refrigerator can be purchased for a reduced price, especially if it is to be used for school purposes.

Approximately fifty per cent of the teachers stated that they did not have enough equipment for laboratory use

TABLE XIX

RESPONSES OF THE NINETY-TWO BEGINNING JUNIOR HIGH SCIENCE TEACHERS TO QUESTIONS RELATED TO PHYSICAL FACILITIES

Questions	Yes	Per Cent	No	Per Cent	Responses of the Teachers When Asked if the Deficiency Caused Problems: Yes	Per Cent	No	Per Cent
Is a first aid kit available?	56	60.8	36	39.0	11	11.9	81	88.0
Do your facilities include both hot and cold running water?	12	13.0	80	86.9	16	17.3	76	82.6
Is a fire extinguisher available in the room where you teach science?	49	53.2	43	46.7	3	3.2	89	96.7
Do you have a refrigerator available for the storage of specimens?	17	18.4	75	81.5	12	13.0	80	86.9
Do you have adequate chalk and bulletin boards?	62	67.6	30	32.6	21	22.7	71	77.1
Do you have enough equipment for laboratory use and for lecture demonstrations?	45	48.9	47	51.0	27	29.3	65	70.6

and lecture demonstrations. When asked if this caused problems, thirty per cent of the teachers said "yes." This information is reported in Table XIX.

SUMMARY

The data indicated that beginning junior high science teachers were experiencing a variety of instructional problems related to printed materials and physical facilities. A large percentage of the teachers felt that their textbooks were not current, and many were of the opinion that their supply of supplementary texts was inadequate. Several of the teachers stated that some of the instructional problems they had encountered were associated with the dearth of library facilities.

Information pertinent to problems related to physical facilities pointed out that teachers of physical science had fewer problems than teachers of other science subjects. The inappropriateness of the classrooms for science instruction caused the largest percentage of problems. Many of the teachers declared that the lack of storage space, chalk and bulletin boards, and usable microscopes were sources of many of their instructional problems. The facility that was most lacking was the refrigerator; however, only twelve of the ninety-two teachers reported this as being a source of

problems. Approximately thirty-five per cent of the classrooms did not have sinks, gas and electrical outlets. Suggestions for solving the problems included:

1. Purchase of additional equipment.
2. Construction of a greenhouse, book shelves, and animal cages.
3. Additional lighting facilities.
4. Repairing broken microscopes.
5. Confining teaching assignments to one room.

Chapter VI will be concerned with whether the beginning science teachers have encountered instructional problems related to audio-visual materials and pupil attitudes and abilities.

CHAPTER VI

INSTRUCTIONAL PROBLEMS RELATED TO AUDIO-VISUAL MATERIALS AND PUPIL ATTITUDES AND ABILITIES

This part of the study was concerned with whether the beginning teachers had encountered instructional problems associated with audio-visual facilities and pupil attitudes and abilities.

Six questions were placed in the survey instrument to ascertain if the beginning teacher had encountered problems associated with audio-visual material. Four of the questions pertained to the operation of the Jefferson County Film Library, and the remaining two were concerned with whether the teachers had experienced difficulties related to the use of audio-visual materials.

I. DIFFICULTIES RELATED TO AUDIO-VISUAL MATERIALS

Film library. In response to the first question "Does your school maintain membership in the Jefferson County Film Library?" fifty-four of the ninety-two teachers said "yes." Of the thirty-eight teachers who stated that their schools were not members of the film library, nine expressed the belief that this had caused instructional difficulties.

Beginning science teachers in the member school districts were asked if they had experienced difficulty in

securing films when they were needed. Sixteen of the fifty-four teachers said "yes."

Nineteen teachers, in contrast to thirty-five, expressed an opinion that the film library did not have suitable films for the science courses they taught. Eighteen of the nineteen teachers believed that this deficiency had caused instructional problems.

Use of audio-visual materials. The preliminary interviews reflected that some teachers were not cognizant of the grade level for which certain films were designed. Consequently, many of the students have been allowed to view films that were not appropriate for their grade level. Twenty-one of the ninety-two teachers cited this as a source of problems.

Eighteen of the teachers reported that they had encountered difficulty in securing a projector and twenty-three teachers indicated that they did not have a suitable place to preview and show films. The responses of the teachers to questions pertaining to audio-visual materials were tabulated and recorded in Table XX.

To solve the problems most of the teachers suggested the purchase of additional equipment. Other suggestions included obtaining membership in the film library, better distribution of the materials, and equal representation of departments in the purchasing of films.

TABLE XX

RESPONSES OF THE NINETY-TWO BEGINNING SCIENCE TEACHERS TO QUESTIONS RELATED TO AUDIO-VISUAL MATERIALS

Questions	Yes	Per Cent	No.	Per Cent	Number of Teachers Reporting that Deficiences Caused Problems	
					Number	Per Cent
Does your school maintain membership in the Jefferson County Film Library?	54	58.7	38	41.3	9	23.6*
If the answer to the question is "yes" do you have any difficulty in securing film when you need it?	16	17.3	38	41.3	14	25.9**
Does your film library have suitable science films for each science course you teach?	35	38.0	19	20.6	18	33.3**
Do you have a suitable place to preview and show film?	56	60.8	36	39.0	23	25.0
Do the teachers in grade levels below you show films that should be reserved for your grade level?	23	25.0	69	75.0	4	4.3
Do you have trouble in securing a projector when you need one?	26	28.2	66	71.7	18	19.5

*Only those schools that were not members of the film library were used in arriving at this percentage.

**The number of participating schools in the film library was used to arrive at this percentage.

II. PUPIL ATTITUDES AND ABILITIES

The preliminary interviews showed that many of the teachers had experienced problems related to pupil attitudes and abilities. Since not all the teachers were equally concerned about each particular problem, questions with structured responses were used. The responses were designed to represent a continuum between two extremes. (See Appendix).

Pupil attitudes. The data presented in Table XXI showed that forty-five per cent of the teachers were having difficulty with students breaking equipment or failing to return borrowed materials. Seven of the teachers reported this as being a severe problem; twenty-six said it was a small problem; and nine stated that it was a problem which caused only moderate concern.

An examination of the data disclosed that a majority of the teachers experienced no particular difficulty with failure of the students to turn in their homework assignments. However, thirteen of the ninety-two beginning science teachers said that this was a severe problem and twenty-two teachers reported it as a moderate problem. (See Table XXII).

In recent years science fairs have become popular. Each year regional and state fairs are conducted throughout the country to determine who will represent the various

TABLE XXI

A COMPARISON OF THE STRUCTURED RESPONSES OF THE NINETY-TWO BEGINNING JUNIOR HIGH SCIENCE TEACHERS ON THE SEVERITY OF THE PROBLEM RELATED TO LOSS OF EQUIPMENT DUE TO BREAKAGE AND FAILURE TO RETURN BORROWED EQUIPMENT

Structured Responses	Frequency	Percentage
Severe Problem	7	7.6
Moderate Problem	9	9.7
Small Problem	26	28.2
No Particular Problem	50	54.2
Total	92	99.7

TABLE XXII

A COMPARISON OF THE STRUCTURED RESPONSES OF THE NINETY-TWO BEGINNING JUNIOR HIGH SCIENCE TEACHERS ON THE SEVERITY OF THE PROBLEM RELATED TO THE FAILURE OF STUDENTS TO TURN IN THEIR HOMEWORK ASSIGNMENTS

Structured Responses	Frequency	Percentage
Severe Problem	13	14.1
Moderate Problem	22	23.9
Small Problem	33	35.8
No Particular Problem	24	26.0
Total	92	99.8

states in the national science fair. Lamar State College of Technology has served as coordinator for the Sabine area for the past eight years.

Students often lose interest in their science projects and depend upon their parents for help. When the teachers were asked to indicate to what degree they were experiencing problems, seven said it was a severe problem. Thirty of the teachers said it was no particular problem, and fifty-five of the teachers reported that it was either a moderate or small problem. (See Table XXIII).

Pupil abilities. A search was made through professional literature to locate research studies dealing with problems related to reading science textbooks. While a great deal of research has been done in the area of reading in general, few studies dealing specifically with problems in reading science textbooks have been undertaken.

Mallinson and Strum found that many textbooks in all areas of science were too advanced for the students who used them and that there was a wide variation in the reading difficulty of the textbooks at different grade levels.[1]

The data presented in Table XXIV revealed that only

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[1]George Mallinson, Harold Strum, and Lois Mallinson, "The Reading Difficulty of Textbooks in Junior High School Science," The School Review, L (December, 1950), 536-540.

TABLE XXIII

A COMPARISON OF THE STRUCTURED RESPONSES OF THE NINETY-TWO BEGINNING JUNIOR HIGH SCIENCE TEACHERS ON THE SEVERITY OF THE PROBLEM RELATED TO PARENTS' ASSISTANCE IN THE CONSTRUCTION OF SCIENCE PROJECTS

Structured Responses	Frequency	Percentage
Severe Problem	7	7.6
Moderate Problem	31	33.7
Small Problem	24	26.0
No Particular Problem	30	32.6
Total	92	99.9

TABLE XXIV

A COMPARISON OF THE STRUCTURED RESPONSES OF THE NINETY-TWO BEGINNING JUNIOR HIGH SCIENCE TEACHERS ON THE SEVERITY OF THE PROBLEM RELATED TO STUDENTS' ABILITY TO READ AND UNDERSTAND THEIR SCIENCE TEXTBOOKS

Structured Responses	Physical Science		Earth Science		Life Science		Multiple Assignments		Total	Per Cent
	No.	Per Cent	No.	Per Cent	No.	Per Cent	No.	Per Cent		
Severe Problem	1	11.1	2	22.2	6	54.5	17	26.9	26	28.2
Moderate Problem	5	55.5	5	55.5	2	18.1	27	42.8	39	42.3
Small Problem	3	33.3	2	22.2	0	----	14	22.2	19	20.6
No Particular Problem	0	----	0	----	3	27.2	5	7.9	8	8.7
Total	9		9		11		63		92	
Percentage		99.9		99.9		99.8		99.8		99.8

*Percentages were based upon the number of teachers in each assignment with the exception of the last column which was based upon ninety-two.

eight teachers had not experienced difficulty with students' inability to read and understand their science textbooks. Twenty-seven per cent of the teachers reported that the students' inability to read and understand their science textbooks was a severe problem. Forty-three per cent of the teachers said it was a moderate problem, and twenty per cent reported it was a small problem.

A larger percentage of the life science teachers gave evidence of having problems of a severe nature than did the earth and physical science teachers. Fifty-six per cent of the physical science teachers, forty-three per cent of the teachers with multiple assignments, eighteen per cent of the life science teachers, and fifty-six per cent of the teachers of earth science reported that the students' inability to read and understand their textbook was a moderate problem.

Of the ninety-two beginning teachers fifteen said that the students' inability to understand diagrams, drawings and sketches was a severe problem; and twenty-three teachers, or approximately twenty-five per cent, stated that this was no particular problem. Twenty-nine of the teachers said it was a moderate problem, and twenty-five reported that it was a small problem. The responses of the teachers to this question are recorded in Table XXV.

Approximately fifteen per cent of the teachers

TABLE XXV

A COMPARISON OF THE STRUCTURED RESPONSES OF THE NINETY-TWO BEGINNING JUNIOR HIGH SCIENCE TEACHERS ON THE SEVERITY OF THE PROBLEM RELATED TO THE STUDENTS' INABILITY TO UNDERSTAND DIAGRAMS, DRAWINGS, AND SKETCHES

Structured Responses	Frequency	Percentage
Severe Problem	15	16.3
Moderate Problem	29	31.5
Small Problem	25	27.1
No Particular Problem	23	25.0
Total	92	99.9

reported that they had experienced severe problems in attempting to provide enrichment experiences for their students. Twenty-two teachers stated that they had experienced no particular problem and fifty-six teachers said that providing enrichment experiences was a moderate or small problem.

Numerous suggestions were made concerning the solution of the problems related to pupil attitudes and abilities. Some of the suggestions included conferences with the parents, remedial reading classes, and ability grouping.

SUMMARY

The data in Table XX revealed that approximately forty per cent of the junior high schools within the Lamar Area School Study Council were not members of the Jefferson County Film Library. The major source of problems related to the film library was the inability to secure films when they were needed and the lack of suitable films for the various junior high sciences.

Twenty-five per cent of the teachers said that they had encountered problems in not having a suitable place to preview and show films. Twenty per cent had experienced difficulty in obtaining a projector when it was needed.

Many of the teachers had problems related to pupil

attitudes and abilities. The problem that caused the greatest amount of difficulty was the inability of students to read and understand their science textbooks. Twenty-eight per cent of the teachers reported that this was a severe problem and forty-three per cent said it was a moderate problem.

The failure of students to do their homework assignments was a source of difficulty to many of the teachers. Fourteen per cent said it was a severe problem and approximately sixty per cent reported it as being either a moderate or small problem.

Approximately fifty per cent of the teachers had experienced problems due to loss of equipment and parents becoming too engrossed with their children's science projects. The inability to provide enrichment experiences was a source of difficulty to a large percentage of the teachers.

Several suggestions were offered as solutions to these problems. These included obtaining membership in the Jefferson County Film Library, better distribution of films, and equal representation of departments in the purchasing of films. Other suggestions included ability grouping, remedial reading classes, and parent-teacher conferences.

Chapter VII will present the findings of the study

as it relates to instructional problems associated with teaching methods and techniques and the extent that administrative interest and assistance has been provided.

CHAPTER VII

INSTRUCTIONAL PROBLEMS RELATED TO TEACHING METHODS AND ADMINISTRATIVE INTEREST AND ASSISTANCE

The preliminary interviews revealed that the beginning junior high school science teachers have experienced a variety of instructional problems related to teaching methods and administrative interest and assistance. Consequently, questions were placed in the survey instrument that would provide information pertinent to these areas.

I. DIFFICULTIES RELATED TO TEACHING METHODS

Difficulties encountered by life science teachers. Analysis of the data pertinent to the number of problems encountered revealed that the life science teachers had experienced a total of two hundred fifty-eight problems for an average of 4.6 problems per teacher.

Table XXVI showed that providing modified work for slow students and using the textbook as the principal guide were the two techniques that caused the greatest number of problems. Between thirty and forty-five per cent of the teachers had experienced problems in planning and using suitable demonstrations, using community resources, providing modified work for superior students, using local resource persons, and using reference materials. Holding

TABLE XXVI

A COMPARISON OF THE RESPONSES OF THE BEGINNING JUNIOR HIGH SCIENCE TEACHERS WHO HAD EXPERIENCED DIFFICULTIES IN THE USE OF INSTRUCTIONAL ACTIVITIES RELATED TO TEACHING METHODS

	No. and percentage of teachers who encountered problems					
	Life Science		Earth Science		Physical Science	
Instructional Activities	No.	%	No.	%	No.	%
Holding recitations and stimulating discussions	16	29.0	22	35.3	9	15.5
Planning the semester's or year's work	10	18.1	13	20.9	22	37.9
Planning and using community resources	18	32.7	26	41.9	16	27.5
Using the textbook as a principal guide	45	81.8	47	75.8	27	46.5
Using teacher-pupil planning	10	18.1	16	25.8	9	15.5
Planning effective assignments	10	18.1	17	27.4	5	8.6
Planning and using suitable demonstrations	25	45.4	38	61.2	19	32.7
Planning modified work for superior students	22	40.0	22	35.3	19	32.7
Planning modified work for slow students	32	58.1	35	56.4	29	50.0
Using supervised study	10	18.1	9	14.5	4	6.8
Using local resource people	22	40.0	12	19.3	15	25.8
Planning effective tests	4	7.2	12	19.3	3	5.1
Using panels and committees	7	12.7	16	25.8	6	10.3
Using reference work	21	38.1	11	17.7	9	15.5
Developing a satisfactory grading system	6	10.9	13	20.9	6	10.3
Total number of problems	258	*	309	*	198	*
Average number per teacher	4.6		4.9		3.4	

*This table contains multiple responses; therefore, the percentage column will total more than one hundred per cent.

recitations and stimulating discussions was a source of difficulty to twenty-nine per cent of the teachers. Eighteen per cent of the teachers encountered difficulty in planning the semester's or year's work, in using teacher-pupil planning, in planning effective assignments, and in using supervised study. Less than thirteen per cent of the teachers had experienced difficulties in planning effective tests, in using panels and committees, and in developing a satisfactory grading system.

Many suggestions were offered as solutions to the problems. Several teachers suggested in-service training with emphasis on methodology. Further college training in science teaching methods was selected by a number of teachers. Other suggestions that appeared frequently were increased expenditures for equipment, books, and materials; participation in area workshops; opportunity to visit and observe other science teachers; and improved supervision and assistance.

Difficulties encountered by earth science teachers. Teachers of earth science encountered slightly more problems with their teaching methods than did teachers of life science. The sixty-two earth science teachers checked a total of three hundred and nine problems for an average of 4.9 problems per teacher as compared to 4.6 per life science

teacher. (See Table XXVI).

Table XXVI revealed that the percentage of earth science teachers who had experienced difficulties in providing modified work for slow students and in using the textbook as the principal guide did not deviate appreciably from the corresponding percentage of life science teachers. Sixty-one per cent of the teachers had difficulty in planning and using suitable demonstrations; and between thirty-five and forty-five per cent stated that holding recitations and stimulating discussions, planning modified work for superior students, and using community resources were teaching techniques that had caused problems.

Twenty per cent or more of the teachers stated they had encountered difficulties with other types of planning. These included planning effective assignments, using teacher-pupil planning, planning effective tests, and planning the semester's or year's work. Fourteen to twenty per cent of the teachers cited other instructional activities as sources of problems. These included developing a satisfactory system of grading, using reference work, and using supervised study and local resource people.

Several solutions to the problems were suggested. The most frequent suggestion included additional training, either from in-service meetings or from college method-courses.

Difficulties encountered by physical science teachers. The number of problems experienced by the physical science teachers was considerably less than those experienced by the life and earth science teachers. The fifty-eight teachers had encountered a total of one hundred ninety-eight problems for an average of 3.4 problems per teacher. A comparison of the other two junior high sciences with physical science showed approximately twenty-five per cent less problems per teacher in physical science. (See Table XXVI).

Further analysis of the data revealed that, similar to the experiences of the teachers of the other two sciences, the two instructional techniques that caused the greatest amount of difficulty in physical science were using the textbook as a principal guide and providing modified work for slow students. It was of particular interest to note that the percentage of teachers having difficulty in providing for the slow students was approximately the same in all three sciences. On the other hand, the percentage of physical science teachers who had trouble in using the textbook as a principal guide was considerably less than the other two sciences.

The one technique that caused more problems among physical science teachers was planning the semester's or

year's work. Thirty-four per cent of the physical science teachers, compared to approximately twenty per cent of the life and earth science teachers, cited this technique as causing difficulties. The instructional techniques that were fourth in order of causing problems were planning modified work for superior students and providing suitable demonstrations. Thirty-two per cent of the teachers reported that these two techniques were sources of difficulty.

Between fifteen and twenty-seven per cent of the teachers stated that holding recitations and stimulating discussions, planning and using community resources, using reference work, and using local resource persons were instructional activities with which they had experienced difficulty. Planning effective tests and assignments, using supervised study, using panels and committees, and developing a satisfactory grading system were instructional activities that caused problems to ten per cent, or less, of the teachers.

The suggestions most frequently given for solving the problems were further training in college, in-service training, and improved supervision and assistance. One of the respondents stated that she was unfamiliar with some of the equipment required in her work. She stated that if she could get help in learning how to use the equipment, most of her problems would be solved.

II. ADMINISTRATIVE INTEREST AND ASSISTANCE

The purpose of this section of the study was to determine to what degree administrative interest and assistance had been provided for the beginning science teachers. A list of seventeen statements related to provisionary procedures was placed in the questionnaire. Each statement limited the teachers' response to the selection of one of five structured responses. Meaning was added to the structured responses by identifying them with verbal terms expressing varying degrees of assistance.

Administrative interest and assistance related to teacher improvement. Seven of the seventeen statements sought information pertinent to teacher improvement. When the teachers were asked if they were provided with released time to visit other schools, thirty-two per cent said that the provision was missing but needed; thirty-three teachers, or thirty-five per cent, said it was limited; five per cent said provision was made extensively; and fifteen per cent said the provision did not apply, or that it was not desirable.

Forty-five per cent of the teachers said that they were encouraged to attend science institutes and summer workshops, while thirty-one per cent stated that administrative interest in this category was limited. Ten per cent

said that the provision was missing but needed.

Forty-six per cent of the respondents said that provision for pre-school orientations was made extensively; twenty per cent said it was limited; and twenty-six per cent stated that it was missing but needed.

Thirty-nine per cent of the teachers stated that extensive preparation had been made for the teachers to work together to achieve coordination. Forty per cent said that this provision was limited; ten per cent said it was missing but needed; and nine per cent stated that it was not desirable, or that it did not apply.

When the teachers were asked if arrangements had been made for them to work together to achieve uniformity in reporting to parents, thirty-eight per cent said that extensive arrangements had been made; twenty per cent said the arrangements were limited; twenty per cent said they were missing but needed; and seven per cent stated that the condition was not desirable, or that it did not apply.

Forty-six per cent of the beginning junior high science teachers were of the opinion that adequate help had been received from the guidance department in administering and interpreting tests. Eight per cent stated that this help was limited, while twenty-eight per cent said it was missing but needed. One per cent reported that help was not desirable, and eleven per cent stated that it did not apply.

Forty-seven per cent of the teachers reported that a written policy for procedure in case of a laboratory accident was missing but needed. Fifteen per cent said that it was limited; and fourteen per cent reported that the provision was not applicable nor desirable.

The responses of the teachers to statements pertaining to administrative interest and assistance as related to teacher improvement are presented in Table XXVII.

Administrative interest and assistance related to facilities. Five of the seventeen statements were concerned with the extent to which administrative assistance had been provided in areas related to facilities.

The first question had a dual purpose. Not only would information be provided concerning the amount of administrative assistance received, but also the number of junior high schools participating in the National Defense Education Act could be ascertained. Forty-two of the ninety-two beginning science teachers reported that arrangements had been made for them to acquire additional equipment through the National Defense Act. Of this number, sixteen said arrangements were limited; and twenty-six stated that arrangements had been made. It was of particular interest to note the responses of the fifty teachers whose schools were not participating in the program. Twenty-seven of the

TABLE XXVII

RESPONSES OF THE NINETY-TWO BEGINNING SCIENCE TEACHERS TO STATEMENTS PERTAINING TO ADMINISTRATIVE INTEREST AND ASSISTANCE RELATED TO TEACHER IMPROVEMENT

	Responses											
	Does not apply		Is not desirable		Missing but needed		Is limited		Is made extensively		Total*	
Statements	No.	%	No.	%	No.	%	No	%	No.	%	No.	%
Teachers are provided released time to visit other schools.	6	6.5	9	9.7	30	32.6	33	35.8	5	5.4	83	90.2
Teachers are encouraged to attend institutes and summer workshops.	7	7.6	1	1.0	10	10.8	29	31.5	42	45.7	89	96.7
Provision is made for the orientation of new teachers.	2	2.1	2	1.7	24	26.0	19	20.6	43	46.7	90	97.8
Provision is made for teachers to work together to achieve coordination.	1	1.0	8	8.6	10	10.8	37	40.2	36	39.1	92	100.0
Provision is made for teachers to work together for uniformity in reporting to parents.	3	3.2	4	4.3	19	20.6	19	20.6	35	38.0	80	86.9
Adequate help is received from the guidance department in administering and interpreting of tests.	11	11.9	1	1.0	26	28.2	8	8.6	43	46.7	89	96.7
Constructive supervision and assistance is provided.	1	1.0	8	8.6	16	17.3	29	31.5	33	35.8	87	94.5

*Several respondents did not check every statement; therefore, the total will not always be ninety-two.

fifty teachers said that this provision was missing, but needed; and nine reported that it was not desirable. Seven stated the provision did not apply.

A publication prepared and circulated by the American Association for the Advancement of Science, the American Association of School Administrators, the National Association of Secondary School Principals, and the Scientific Manpower Commission in cooperation with the United States Office of Education recommends that each science teacher receive a petty cash allotment of fifty dollars per year.[1]

Forty-two per cent of the teachers stated that the provision of a petty cash fund was missing but needed. Twenty per cent said that it was limited, and fifteen per cent reported that the provision had been made extensively. Fourteen per cent stated that it was either undesirable or did not apply.

In response to the statement concerning whether or not teachers' suggestions were considered in the selection of science texts, thirteen per cent reported that this condition was missing but needed; thirty per cent reported that it was limited; thirty-nine per cent said that it was made extensively; and five per cent reported that the

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[1]Helen Hale, "Quality Science For the Junior High School," The Bulletin of the American Association of Secondary School Principals, XLIV (December, 1960), p. 54.

condition was not applicable nor desirable.

Forty per cent of the beginning teachers were of the opinion that extensive arrangements had been made to supply them with state, regional, and national publications. Thirty-five per cent reported that arrangements had been made on a limited basis. Thirteen per cent of the teachers stated that such an arrangement was missing, but needed; and only five of the ninety-two teachers stated that this was not desirable, or that it did not apply.

Preliminary interviews revealed that there was concern among the science teachers pertaining to liability of torts. Analysis of the data revealed that forty-seven per cent of the teachers taught in schools which had no written policy concerning the procedure to follow in case of an accident. Seven per cent of the teachers said that this provision was limited, and fifteen per cent stated that the provision was made extensively.

The responses of the ninety-two teachers to statements pertaining to facilities are reported in Table XXVIII.

Administrative interest and assistance related to pupil personnel. An interpretation of data pertinent to field trips taken by students and teachers during the school day revealed that in ten per cent of the responses this provision had been made extensively; with forty-seven

TABLE XXVIII

RESPONSES OF THE NINETY-TWO BEGINNING SCIENCE TEACHERS TO STATEMENTS PERTAINING TO ADMINISTRATIVE INTEREST AND ASSISTANCE RELATED TO FACILITIES

	Responses											
	Does not apply		Is not desirable		Missing but needed		Is limited		Is made extensively		Total*	
Statements	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Provision is made for science teachers to acquire additional equipment by participation in the National Defense Education Act.	7	7.6	9	9.7	27	29.3	16	17.3	26	28.2	85	92.3
A petty cash fund is provided for science expenses incurred during the school year	12	13.0	1	1.0	39	42.3	19	20.6	14	15.2	85	92.3
Suggestions of teachers are considered in selection of science texts.	4	4.3	2	2.1	12	13.0	28	30.4	36	39.1	82	89.1
Publications by state, regional and national organizations are provided for the teachers.	2	2.1	3	3.2	12	13.0	33	35.8	37	40.2	87	94.5
There is a written policy instructing the teacher about the procedure to follow in case of laboratory accident.	11	11.9	3	3.2	44	47.8	7	7.6	14	15.2	78	84.7

*Several respondents did not check every statement; therefore, the total will not always be ninety-two.

per cent the provision was limited; and twenty per cent indicated that the provision was missing but needed. Five per cent said it was desirable, and seven per cent reported that it did not apply.

Twenty-three per cent of the beginning teachers stated that provisions had been made for individual differences within their schools; forty-one per cent reported that limited provisions had been made; and seventeen per cent said that no provision had been made, but that it was needed. Five per cent of the teachers said that the provision was not desirable, or that it did not apply.

Table XXIX showed that of the ninety-two teachers thirty-nine, or forty-two per cent, stated that students' schedules were so arranged that they did not have ample time for library use. Twenty-five per cent said that limited arrangements had been made for class schedules not to interfere with use of the library, and twenty-one per cent stated that extensive arrangements had been made for library use. Seven of the ninety-two teachers reported that this did not apply, or that it was not desirable.

Forty-six per cent of the teachers said that extensive provision had been made through administrative assistance for the discouragement of taking students out of class without a justifiable reason.

Fifteen per cent reported that this condition was

TABLE XXIX

RESPONSES OF THE NINETY-TWO BEGINNING SCIENCE TEACHERS TO STATEMENTS PERTAINING TO ADMINISTRATIVE INTEREST AND ASSISTANCE RELATED TO PUPIL LEARNING SITUATIONS

	Responses											
	Does not apply		Is not desirable		Missing but needed		Is limited		Is made extensively		Total	
Statements	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Teachers and students are permitted to take field trips during the school day.	7	7.6	5	5.4	21	23.9	47	51.0	10	10.8	90	97.8
Provisions are made for individual differences.	4	4.3	1	1.0	16	17.3	38	41.3	22	23.9	81	88.0
Students' schedules are so arranged that they have ample time in which to use the library.	4	4.3	3	3.2	39	42.3	23	25.0	20	21.7	89	96.7
Taking a student out of class without a justifiable reason is discouraged.	1	1.0	11	11.9	19	20.6	14	15.2	43	46.7	88	95.6
There is on file a list of qualified substitute teachers who are available.	4	4.3	2	2.1	24	26.0	12	13.0	40	43.4	82	89.1

*Several respondents did not check every statement; therefore, the total will not always be ninety-two.

limited, and twenty per cent said that the condition was missing but needed. Eleven per cent said the condition was not desirable, and one of the teachers stated that it did not apply.

The data revealed that the schools in which forty-three per cent of the teachers taught had on file a list of qualified substitute teachers. Twenty-six per cent said that such a list was missing but needed, and thirteen per cent stated that this provision was limited. Six of the teachers reported that in their schools this provision did not apply, or that it was not desirable.

III. SUMMARY

Teachers of all three junior high school sciences indicated that they had encountered a variety of instructional problems related to teaching methods and techniques. The average number of problems encountered by life and earth science teachers was greater than the average number encountered by the physical science teachers.

Providing modified work for slow students and using the textbook as the principal guide were the two techniques that caused the greatest number of problems. Other techniques which caused considerable difficulty were planning and using community resources, planning the semester's work, planning suitable demonstrations,

providing modified work for superior students, using local resource persons, and using reference work.

To solve the problems related to teaching methods or techniques, many of the teachers suggested in-service training, further college training, participation in area workshops, and improved supervision.

The data disclosed that administrative interest and assistance were needed by the teachers in many ways. Relating to teacher improvement the greatest needs were for released time to visit other schools, adequate help from the guidance department, orientation of new teachers prior to the opening of school, and uniformity in reporting to parents.

The greatest needs related to facilities were the establishment of a petty cash fund for expenses incurred during the school year, a written policy instructing the teacher about the procedure to follow in case of a laboratory accident, and participation in the National Defense Act.

Pertaining to pupil personnel, administrative interest and assistance were most needed in providing time for the students to use the library, permitting teachers and students to take field trips, and providing for individual differences.

Chapter VIII will summarize the findings of the study and their implications as conclusions and recommendations.

CHAPTER VIII

SUMMARY, FINDINGS, CONCLUSIONS, AND RECOMMENDATIONS

I. SUMMARY

The purpose of this study was to identify the instructional problems that beginning junior high school science teachers had experienced in the schools within the Lamar Area School Study Council.

The study was conducted during the fall semester of the 1964-65 school year. The study sample was composed of junior high school science teachers who were teaching at least one science course in grades seven, eight, and nine, and who, at the time of the study, had four years or less teaching experience.

Summary of related literature. Science in the junior high school has been in a state of metamorphosis since the junior high school movement began during the early part of the twentieth century. There had been very little uniformity in science courses offered by the high schools; consequently, it was not uncommon to find as many as twelve different science courses being taught in the high schools of a single state.

After careful study on which courses should be deleted and which should be retained in the school's curriculum,

general science became entrenched as the ninth grade science course, a position it held until the early forties.

The rapid expansion of scientific knowledge and the improvement of science education at the elementary level led to the belief that instruction in science was needed in grades seven and eight. Committees were appointed to study the problem and to make recommendations pertaining to the nature and sequence of the science courses that should be offered.

In Texas, as in other states, the recommended sequence of science courses to be offered in the junior high school included life science in the seventh grade, earth science in the eighth grade, and physical science at the ninth grade level.

As the junior high schools began to make the transition, instructional problems were encountered. The literature revealed that the most frequently mentioned problems were associated with pre-service training, assignments, methods and techniques of teaching, materials, teacher-pupil relationships, and administrative assistance.

Review of research procedures. The study techniques used consisted of an interview and a survey instrument. Fifteen beginning junior high science teachers were interviewed to determine the general nature of the instructional

problems. The data obtained from these preliminary interviews were used to formulate the survey instrument. The final draft of the questionnaire contained four major divisions, which included seventy-nine questions. In addition, suggestions for possible solutions to the problems were placed in the questionnaire, with space provided for teachers to make suggestions of their own.

The questions were designed to elicit responses relevant to the following areas:

1. Teacher preparation and assignments.
2. Printed materials and physical facilities.
3. Audio-visual materials and pupil attitudes and abilities.
4. Teaching methods and administrative interest and assistance.

The interview technique was used with twenty of the ninety-eight beginning teachers. The questionnaire served as a guide for the interview. The remaining seventy-eight teachers were personally asked to complete the questionnaire.

Upon receipt of the data, the responses were recorded on IBM cards; but the open-end suggestions were treated separately. The results of the study were ascertained by utilization of the following:

1. Number and per cent of responses.
2. Mean percentages.

3. Comparison of responses.

4. Averages.

Summary of the findings of the study. The analysis of the data obtained from this study revealed a number of specific facts which are associated with the objectives of the study. These findings are summarized below in the order in which they appeared in the questionnaire.

All of the beginning teachers had earned a bachelor's degree, and eighteen had completed the requirements for a master's degree. The teachers were equally dispersed relative to the number of years teaching experience. Approximately fifty per cent were teaching in junior high schools with an enrollemnt above four hundred.

A small percentage of the teachers had not done student teaching; however, of the seventy-nine who had, only twenty-four did their student teaching in the junior high school. Of this number, only nine did their student teaching in junior high school science.

Approximately one-fourth of the teachers majored or minored in science. Earth science teachers were the most deficient in subject matter courses. Only one of the sixty-five earth science teachers had more than eighteen semester hours credit in earth science. Twenty-two of the teachers had completed a science methods course, and twenty-three had

attended summer institutes sponsored by the National Science Foundation.

Most of the beginning science teachers had a variety of teaching assignments. Approximately thirty per cent had as many as three or four preparations to make each day. Nearly all had a conference period; however, a large percentage used their conference period for duties unrelated to classroom instruction. Many of the teachers' classrooms were in use during their conference periods.

Over one-half of the teachers did not sponsor an activity related to science, and approximately sixty per cent said that participation in science fairs was not encouraged.

The inadequacy of printed materials caused instructional problems to many of the teachers. Suggestions for solving the problems included the adoption of a more current textbook, purchase of additional supplementary books, and writing a new course of study.

Inappropriate classrooms and lack of storage space were sources of difficulty to a large percentage of the teachers, especially those with multiple assignments. Better lighting and construction of storage shelves were among the suggestions received for alleviating the problems.

The lack of available miscroscopes, bulletin boards, refrigerators, hot and cold running water, and a sufficient

number of electrical and gas outlets were sources of instructional problems. Most of the suggestions for solving the problems involved increased expenditures.

Forty-one per cent of the junior high schools within the Lamar Area School Study Council were not members of the Jefferson County Film Library. Twenty-three per cent expressed the belief that this had caused instructional problems. The major sources of problems related to the film library were the inability to secure films when they were needed and the lack of suitable science films.

A large percentage of the teachers indicated that a projector was not available when needed and that a suitable place was not provided to preview and show films. Suggestions offered as solutions to these problems included membership in the film library, better distribution of films, and purchase of additional equipment.

Many of the teachers had problems related to pupil attitudes and abilities. The problem that caused the greatest amount of difficulty was the inability of students to read and understand their science textbooks. Additional problems included the failure of students to do their homework, loss of equipment, and inability to provide enrichment experiences. Several suggestions were offered as possible solutions to the problems. These included parent-teacher conferences, ability grouping, and remedial

reading classes.

Most of the teachers had encountered problems related to teaching methods and techniques. The average number of problems encountered by physical science teachers was slightly less than the average number encountered by life and earth science teachers. Providing modified work for the slow students and using the textbook as the principal guide were the two techniques that caused the greatest number of problems. Suggestions for solving the problems included in-service training, increased expenditures for books, opportunity to visit and observe other science teachers, further college preparation, participation in area workshops, and improved supervision.

The extent of administrative interest and assistance needed by the teachers varied in relation to teacher improvement. The greatest needs were for released time to visit other schools, orientation of new teachers, and help from the guidance department.

Participation in the National Defense Act, a petty cash fund, and procedures to follow in case of a laboratory accident were the greatest needs related to facilities.

In regard to pupil-learning situations, administrative interest and assistance was most needed in providing for individual differences, and in allowing adequate time for students to use the library.

II. FINDINGS OF THE STUDY

Teacher preparation and assignments. The analysis of data relevant to this part of the study revealed the following:

1. Sixty per cent of the beginning science teachers were men.
2. The average number of years teaching experience was 2.53 years.
3. All of the teachers had earned a bachelor's degree, and twenty per cent had completed the requirements for a master's degree.
4. Assuming that eighteen semester hours constitute a minor in a particular subject, fifty per cent of the life science teachers were deficient in this respect. Ninety-eight per cent of the earth science teachers, and sixty-nine per cent of the physical science teachers were also deficient in subject matter courses. Twenty-three per cent had completed a science methods course and twenty-four per cent had attended a summer institute sponsored by the National Science Foundation,
5. Eleven per cent of the teachers did their student teaching in junior high school science.

6. Thirty-two per cent of the teachers had three or more preparations to make each day.
7. Teachers who were teaching in junior high schools with an enrollment of less than two hundred had the greatest number of daily preparations.
8. Forty-three per cent of the teachers were unable to use their classrooms during their conference periods.
9. Sixty per cent of the teachers did not sponsor or supervise a science club or activity.
10. Sixty-four per cent of the teachers taught in schools where student participation in science fairs had not been encouraged.

Printed materials and physical facilities. The second part of the questionnaire was concerned with whether the beginning science teachers had experienced instructional problems related to printed materials and physical facilities. The findings for this part of the study are as follows:

11. Teachers with multiple assignments encountered the largest percentage of problems.
12. Textbooks were a source of problems to thirty-three per cent of the teachers.
13. An insufficient number of supplementary texts

was a source of difficulty to thirty-six per cent of the teachers.

14. Inadequate library facilities had caused instructional problems to twenty-five per cent of the teachers.
15. Twenty-six per cent of the beginning science teachers had encountered difficulties because reference books were not readily available.
16. The lack of a recently revised course of study was a source of instructional problems to twenty-six per cent of the teachers.
17. Thirty-four per cent of the science teachers did not have appropriate classrooms for science instruction.
18. Lack of storage space presented a problem to twenty-two per cent of the teachers.
19. An insufficient number of usable microscopes was a source of instructional problems to sixty-five per cent of the teachers.
20. Even though a large percentage of the classrooms did not have hot and cold running water, first aid kits, fire extinguishers, and refrigerators, very few problems had been encountered as a consequence.
21. Between twenty and thirty per cent of the

respondents did not have adequate chalk and bulletin boards or laboratory equipment.

Instructional problems related to audio-visual materials and pupil attitudes and abilities. The data for this section of the study revealed the following findings:

22. Forty-one per cent of the junior high schools were not members of the Jefferson County Film Library.
23. Twenty-five per cent of the beginning science teachers in districts which participated in use of the film library had experienced difficulty in securing films when they were needed.
24. Twenty-three per cent of the thirty-eight teachers in districts which did not participate in the film library had encountered problems due to non-participation.
25. The premature viewing of films in previous grades had caused problems to only a few of the teachers.
26. Twenty-five per cent of the teachers had no suitable place to preview and show films.
27. Nineteen per cent of the respondents had difficulty in securing a projector at the time it was needed.
28. Loss of equipment through breakage and failure

to return borrowed equipment presented no particular problem to fifty-four per cent of the teachers; however, it was a severe problem to nine per cent of the teachers.

29. Failure on the part of students to turn in their homework was a severe problem to fourteen per cent of the teachers while it was only a moderate problem to twenty-three per cent of the science teachers.

30. Ninety-one per cent of the ninety-two beginning science teachers had encountered difficulty in students' inability to read and understand their textbooks. The students' inability to read was a severe problem for twenty-seven per cent of the teachers.

31. Parents' assistance in the construction of science projects caused severe problems to seven per cent of the teachers. This was a moderate problem for thirty-three per cent of the teachers.

32. Students' inability to understand diagrams, drawings, and sketches was either a severe or moderate problem for forty-seven per cent of the respondents.

33. Fifteen per cent of the beginning teachers had

experienced severe problems in attempting to provide enrichment experiences for their students.

Teaching methods and administrative assistance. This part of the study was utilized to determine the nature of the instructional problems related to teaching methods and the extent of the need of the beginning teachers for administrative assistance as it pertained to teacher-improvement, facilities, and pupil-personnel. The findings are:

34. Physical science teachers had encountered fewer problems than the life and earth science teachers.
35. Providing modified work for slow students and using the textbook as the principal guide were the two techniques that caused the greatest number of problems.
36. The following instructional activities caused problems to more life science teachers than to earth and physical science teachers:
    a. Using the textbook as a principal guide.
    b. Planning modified work for superior students.
    c. Planning modified work for slow students.
    d. Using supervised study.
    e. Using local resource persons.

f. Using reference work.

37. The following instructional activities caused problems to more earth science teachers than to life and physical science teachers:

a. Holding recitations and stimulating discussions.

b. Planning and using community resources.

c. Using teacher-pupil planning.

d. Planning effective assignments.

e. Planning and using suitable demonstrations.

f. Planning effective tests.

g. Developing a satisfactory grading system.

h. Using panels and committees.

38. Planning the semester's or year's work was the one instructional activity that caused problems to more physical science teachers than to earth and life science teachers.

39. The greatest needs of the beginning teachers related to teacher improvement were:

a. Released time to visit other schools.

b. Adequate help from the guidance department.

c. Uniformity in reporting to parents.

d. Orientation prior to the opening of school.

40. The greatest needs related to facilities were:

a. Establishment of a petty cash fund.

b. A written policy instructing the teacher about the procedure to follow in case of a laboratory accident.

c. Participation in the National Education Defense Act.

41. Associated with pupil-learning situations, the greatest assistance was needed in:

a. Arranging students' schedules for library use.

b. Permitting teachers and students to take field trips.

c. Providing for individual differences.

III. CONCLUSIONS

1. A majority of the beginning junior high school science teachers were not adequately prepared to teach the courses to which they had been assigned.

2. Teacher effectiveness was hindered in many of the schools because of the multiplicity of assignments and the lack of administrative interest and assistance.

3. An adequate number of supplementary texts, periodicals, and reference materials were not

available to a large percentage of the teachers.

4. A majority of the science teachers had not been provided with the necessary facilities and equipment to teach junior high school science.
5. Inadequate facilities for the presentation of audio-visual materials was a hindrance to teacher effectiveness in many of the schools.
6. Most beginning junior high school science teachers were deficient in the specialized skills necessary in providing for individual differences.

IV. RECOMMENDATIONS

1. It is recommended that state agencies and teacher-training institutions re-evaluate their requirements and make them more consistent with the requirements of other teaching areas. Required college courses and certification requirements do not necessarily provide an adequate background for the teaching of junior high school science.
2. It is recommended that school administrators, in working on schedules for science teachers, eliminate multiple assignments and duties not related to science instruction and arrange schedules so that teaching assignments are confined to only

one classroom.

3. It is suggested that the Lamar Area School Study Council conduct workshops, in-service institutes, and summer institutes for those teachers who are deficient in subject matter and method courses. The summer institutes should be of a sequential nature with priority being given to those teachers who are the most deficient.
4. Accrediting agencies should become more cognizant of physical facilities necessary for the teaching of science at the junior high school level. If, for financial reasons, a school is unable to meet the required standards, then it is recommended that the school participate in the National Education Defense Act.
5. It is recommended that junior high school principals help their teachers become more proficient and creative in their work by furnishing them with encouragement and appreciation for their efforts. The quality of the junior high school science program is closely related to the interest and leadership of the building principal. The number of improvements and the quality of these improvements may be encouraged or discouraged by the attitude and understanding of the junior high

school principal.

6. It is recommended that the science teachers be consulted concerning their suggestions for solutions to the problems. These suggestions are listed in order of importance as noted by the number of science teachers who indicated similar solutions.

   a. Suggestions associated with printed materials:

      1. Adoption of a more current textbook.
      2. Purchase of additional supplementary texts.
      3. Purchase of additional science books for library use.
      4. Books be permitted to remain within the classrooms.
      5. Better cooperation between members of the science department and library personnel.
      6. Sharing of books among teachers.
      7. Writing a new course of study with teacher's help.
      8. Obtaining free material.

   b. Suggestions pertaining to physical facilities:

1. Purchase of additional laboratory equipment.
2. Construction of shelves and closets.
3. Adding more gas and electrical outlets.
4. Better lighting for the classrooms.
5. Confining teaching assignments to one classroom.
6. Purchasing of micro projectors.
7. Construction of a green house and animal cages.
8. Removal of extra-curricula activities from the immediate area.
9. Repairing broken microscopes.
10. Purchasing of first aid kits and fire extinguishers.
11. Purchasing of a refrigerator from the home economics department.

c. Recommendations related to audio-visual materials:
   1. Purchasing of additional equipment.
   2. Obtaining membership in the film library.
   3. Better distribution and scheduling of materials.

d. Recommendations related to ability grouping:
   1. Remedial reading classes.

2. Increased expenditures for books and materials.
3. Opportunity to visit and observe other science teachers.
4. Participation in area workshops.
5. Further college preparation.
6. Independent study.
7. Improved supervision and assistance.
8. More experience.
9. Assistance in learning to use equipment.

IV. RECOMMENDATIONS FOR FURTHER STUDY

1. It was noted that a teacher who had a major in a particular science area was often teaching in a small school situation where, at the very most, he had only two sections in his major field, and possibly just one. It is most likely that he spent the rest of the day teaching in areas outside his major field. This indicates that something might be gained by establishing a pilot program where an itinerant teacher could serve two or three junior high schools.
2. A study parallel to this study should be conducted wherein teachers with more experience are questioned.

3. It is recommended that a study be made of minimum requirements for certification to teach junior high school science in the fifty states.

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APPENDIX

Dear Sir:

I am in the process of making preparation for a rather intensive study involving the beginning junior high school teachers within the Lamar area. Only those junior high schools that are in school districts belonging to the Lamar Area School Study Council will be used in the study.

This study will be an effort to identify the problems our beginning junior high science teachers are experiencing and to what extent they are occurring. Once this is accomplished then we can take the necessary steps to eliminate the causes. We are well aware that as long as these problems remain unsolved, teachers cannot do their best work.

I would like to solicit your help by asking you to fill out the enclosed card. This will tell me how many questionnaires I will need to prepare.

When the study is completed, I will send you a copy of the results.

Respectfully,

Oran Bailey

OB:dw
Enclosure

COPY OF THE POST CARD FOR PRINCIPALS' USE

Please check one of the following:

We will participate. ____

We will not participate. ____

In our junior high there are ____ science teachers with less than five years teaching experience including the present year.

Signed

Dear Science Teacher:

Do school administrators, school boards, and college teachers really understand the instructional problems that junior high school science teachers are experiencing?

Would you like a chance to tell a large number of them about some of the problems you have encountered?

This study will do just that. To prepare the presentation, we need your answers to the enclosed questions.

We make no pretense of saying that you can finish in three minutes flat. What we do say is that here is a real opportunity to help your profession and we hope the importance of what you say will repay you for the time you invest.

This questionnaire is being presented to a carefully selected sample of junior high school science teachers. We need an answer from each of you.

Will you help us this week, please?

Sincerely,

Oran Bailey

QUESTIONNAIRE

The first part of this questionnaire seeks background information relative to teacher preparation and assignment. Please read and answer each question carefully.

PART I

SECTION I - PERSONAL

1.	What is your sex and age?	Male ..... ____ Female ..... ____ Age ..... ____
2.	How many years of teaching experience do you have? (Do not include present year.)	Year/s ..... ____
3.	What kind of degree or degrees do you have and what are your major and minor areas of study?	Bachelor ..... ____ Major ..... ____ Minor ..... ____ Masters ..... ____ Major ..... ____ Minor ..... ____
4.	How many semester hours do you have in science?	Biological Sciences ____ Earth Sciences ..... ____ Physical Sciences ____
5.	Did you complete a course in science teaching methods in college?	Yes ..... ____ No ..... ____
6.	Did you do student teaching?	Yes ..... ____ No ..... ____
7.	If the answer to question 6 is "yes" in which area did you do your student teaching?	High school science ____ Junior high science ____ High school but not in science ..... ____ Junior high but not in science ..... ____ Elementary ..... ____
8.	Have you ever attended a summer institute sponsored by the National Science Foundation? If your answer is "yes", how many have you attended?	Yes ..... ____ No ..... ____ 1 2 3

PART II

Beginning teachers are sometimes confronted with problems not directly related to classroom procedures; however, for the purpose of this study a problem was defined as one directly related to the instructional procedures used within the classroom.

The following questions are composed of two parts. The first part requests that you check either "yes" or "no". The second part asks that you place a check only if difficulties are being encountered.

SECTION I - TEACHING MATERIALS

			1st	2nd
1.	Is your science textbook adequate?	Yes No	____ ____	____
2.	Do you have an ample supply of supplementary texts?	Yes No	____ ____	____
3.	Do you have an adequate amount of equipment for laboratory use and for lecture demonstration?	Yes No	____ ____	____
4.	Are your science library facilities adequate?	Yes No	____ ____	____
5.	Do you have reference books that are easily available to your students?	Yes No	____ ____	____
6.	Is an up-to-date course of study provided for each science course you teach?	Yes No	____ ____	____

SECTION II - TEACHING ASSIGNMENT

1.	How many students are there in your junior high school?	Below 200 200 - 300 300 - 400 400 - 500 Above 500	____ ____ ____ ____ ____
2.	What are the sizes of your science classes?	Largest Smallest Average	____ ____ ____
3.	Check the grade level (levels) you are now teaching.	7th ..... 8th 9th	____ ____ ____
4.	Do you teach subjects other than science?	Yes ..... No	____ ____
5.	If the answer to question 4 is "yes" how many preparations do you have to make each day?	1 2 3 4	
6.	Do you have a conference period during the school day?	Yes ..... No	____ ____
7.	Is your science room used during your conference period?	Yes ..... No	____ ____
8.	Are you ever asked to use your conference period for duties not related to your classroom instruction?	Yes ..... No	____ ____
9.	Do you sponsor or supervise a club or activity related to science?	Yes ..... No	____ ____
10.	Does your school encourage student participation in science fairs?	Yes ..... No	____ ____

Considering only those items causing instructional difficulties; what are your suggestions for solving the problems? Check one or more and add any you feel should be included.

1. Adoption of a more adequate textbook. ____

2. Purchase of additional supplementary texts and reference books to be kept within the classroom. ____

3. Purchase of additional science books for library use. ____

4. Purchase of additional laboratory equipment. ____

_____

_____

_____

_____

_____

_____

_____

SECTION II - PHYSICAL FACILITIES

In the first column, check the appropriate answer. In the second column, check those features so deficient as to cause instructional difficulties.

		1st	2nd
1.	Is the science room in which you teach appropriate for the teaching of science?	Yes ____ No ____	____
2.	Do you have adequate storage space?	Yes ____ No ____	____

3.	Do your facilities include both hot and cold running water?	Yes No	____ ____	____
4.	Is a fire extinguisher available in the room where you teach science?	Yes No	____ ____	____
5.	Is a first aid kit available?	Yes No	____ ____	____
6.	Do you have adequate chalk and bulletin boards?	Yes No	____ ____	____
7.	Do you have a refrigerator available for the storage of specimens?	Yes No	____ ____	____
8.	How many usable microscopes do you have available?	No.	____	____
9.	How many electrical outlets are there in each room where you teach science?	Life Science Earth Science Physical Science		____ ____ ____
10.	How many gas outlets are there in each room where you teach science?	Life Science Earth Science Physical Science		____ ____ ____
11.	How many sinks are there in each room where you teach science?	Life Science Earth Science Physical Science		____ ____ ____

Considering only those items in section II causing instructional difficulties, what are your suggestions for solving the problems? Place the number of the item preceeding your suggestion for improvement.

_____

_____

_____

_____

_____

_____

SECTION III - AUDIO-VISUAL MATERIALS

In the first column, check the appropriate answer. In the second column, check if the deficiency causes instructional difficulties. Refer to key, page three.

		1st	2nd
1.	Does your school maintain membership in the Jefferson County Film Library?	Yes ____ No ____	____
2.	If the answer to question 1 is "yes" do you have any difficulty in securing film when you need it?	Yes ____ No ____	____
3.	Does the film library have suitable science films for each science course you teach?	Yes ____ No ____	____
4.	Do you have a suitable place to preview and show films?	Yes ____ No ____	____
5.	Do the teachers in grade levels below you show films that should be reserved for your grade level?	Yes ____ No ____	____
6.	Do you have trouble in securing a projector when you need one?	Yes ____ No ____	____

Considering only those items causing instructional difficulties, what are your suggestions for solving the problems? Check one or more and add any you feel should be included.

1. Purchase of needed equipment by the school district. ____
2. Knowledge of additional sources of audio-visual materials. ____
3. Improved distribution with regard to audio-visual materials. ____
4. Better scheduling for the use of existing materials and equipment in the building. ____

5. Exchange with teacher whose room is equipped to use audio-visual materials and equipment. ____

6. _____

_____

7. _____

_____

8. _____

_____

SECTION IV - PUPIL ATTITUDES AND ABILITIES

Which of the following problems related to your science teaching do you consider to be (1) a severe problem, (2) moderate problem, (3) small problem, (4) no particular problem. Circle the appropriate answer and add any you feel should be included.

1. Loss of equipment due to breakage or failure to return that which was borrowed. 1 2 3 4

2. Failure on the part of the students to turn in their homework assignments. 1 2 3 4

3. Parents assist in the construction of science projects. 1 2 3 4

4. Pupils are unable to read and understand their science textbooks. 1 2 3 4

5. Students have difficulty in understanding diagrams, drawings and sketches. 1 2 3 4

6. Providing enrichment experiences for students. 1 2 3 4

7. _____

_____

8. _____

_____

9. _____

_____

PART III

SECTION I

Following is a list of instructional activities related to teaching methods or techniques. Check for each science you are teaching the ones with which you are experiencing difficulties.

	Life	Earth	Physical
1. Holding recitations and stimulating discussions.			
2. Planning the semester's or year's work.			
3. Planning and using community resources.			
4. Using the textbook as a principal guide.			
5. Using teacher-pupil planning.			
6. Planning effective assignments.			
7. Planning and using suitable demonstrations.			
8. Providing modified work for superior students.			
9. Providing modified work for slow students.			
10. Using supervised study.			
11. Using local resource persons.			
12. Planning effective tests.			
13. Using panels and committees.			
14. Using reference work.			
15. Developing a satisfactory system of grading.			

SECTION II

Considering only those methods or techniques with which you are experiencing difficulties, what are your suggestions for solving the problems? Check one or more and add any you wish.

1. In service training with regard to science teaching methods and curriculum. ____

2. Further training at college with regard to science teaching methods and curriculum. ____

3. Increased expenditures for equipment, books, and materials. ____

4. Improved supervision and assistance. ____

5. More experience; no additional training. ____

6. Opportunity to visit and observe other science teachers. ____

7. Participation in area workshops in science. ____

8. Independent study. ____

9. _____

_____

10. _____

_____

11. _____

_____

12. _____

_____

13. _____

_____

PART IV

The following list consists of provisions, conditions, or characteristics found in junior high school. All of them may not be necessary or even applicable, in every school. Please circle one of the numbers to indicate the degree to which your school is involved according to the following scale:

1. Does not apply.
2. Provision or condition is not desirable.
3. Provision or condition is missing but needed.
4. Provision or condition is limited.
5. Provision or condition is made extensively.

ADMINISTRATIVE INTEREST AND ASSISTANCE

1.	Teachers are provided with released time to visit other schools.	1	2	3	4	5
2.	Teachers and students are permitted to take field trips during the school day.	1	2	3	4	5
3.	Teachers are encouraged to attend institutes and summer workshops in science	1	2	3	4	5
4.	Provision is made for science teachers to acquire additional equipment by the schools participation in the National Defense Education Act.	1	2	3	4	5
5.	A petty cash fund is provided for science expenses incurred during the school year.	1	2	3	4	5
6.	Suggestions of teachers are considered in selection of science texts.	1	2	3	4	5
7.	There is a written policy instructing the teacher about the procedure to follow in case of a laboratory accident.	1	2	3	4	5
8.	Provision is made for the orientation of new teachers prior to the opening of school.	1	2	3	4	5

9.	Provisions are made for individual differences.	1	2	3	4	5
10.	Provision is made for teachers to work together to achieve coordination.	1	2	3	4	5
11.	Publications by state, regional, and national organizations are provided for the teachers.	1	2	3	4	5
12.	Constructive supervision and assistance is provided.	1	2	3	4	5
13.	Provision is made for teachers to work together to achieve uniformity in reporting to parents.	1	2	3	4	5
14.	Students' schedules are so arranged that they have ample time in which to use the library.	1	2	3	4	5
15.	There is on file a list of qualified substitute teachers who are available.	1	2	3	4	5
16.	Taking a student out of class without a justifiable reason is discouraged.	1	2	3	4	5
17.	Adequate help is received from the guidance department in the administering and interpreting of tests.	1	2	3	4	5

Return to:

Oran B. Bailey

Port Neches, Texas