

AN ABSTRACT OF THE THESIS OF

____ Conrad Feuches _____ for the M.S. in Industrial Arts

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Title THE TRAINING AND EXPERIENCE OF INDUSTRIAL ARTS _____

____ TEACHERS IN THE SAN JOAQUIN VALLEY _____

Abstract Approved _____
(Major Professor)

This study was undertaken to improve the Industrial Arts Teacher Education program at Fresno State College and hence for the area served by the school.

It was deemed timely and pertinent to learn of the conditions as they existed in the San Joaquin Valley, thereby furthering the guidance program from the standpoint of the prospective industrial arts student and the department as well.

The major coverage of this survey includes: (1) the formal education, (2) the California certificates held, (3) the teaching experience, (4) the trade and industrial experience, (5) the number and types of unit shops each is qualified to teach, and (6) the teaching combinations of subject areas.

The study was carried on in the public secondary schools in Merced, Mariposa, Madera, Fresno, Stanislaus, Kings, Tulare, and Kern Counties. All teachers who taught one or more classes of industrial arts subjects were contacted in person or through a questionnaire. All vocational classes and schools are excluded.

The following conclusions are based on the findings of the study:

1. Out of 138 participants, 118 received the bachelor's degree; sixteen the master's degree, and twenty have not completed college degree requirements.
2. California universities and colleges granted seventy of the bachelor's degrees and two of the master's degrees. Out-of-state universities and colleges granted forty-eight of the bachelor's degrees and fourteen of the master's degrees.
3. It is very apparent that California is not able to supply the demand for specifically trained industrial arts teachers when forty-four per cent of the bachelor's degree and eighty-six per cent of the master's degree holders are from out of state.
4. Sixteen teachers have master's degrees. However, seventy-eight have completed an average of twenty-eight semester units of graduate work. Twenty-four respondents are completing their first or second year of teaching so cannot show additional professional pursuit. This data would tend

to indicate there is a great deal of professional advancement even though the percentage of master's degrees is very small.

5. Thirty-two different subject fields were reported in which the respondents studied on a major or minor basis. Sixty of the 118, or forty-eight per cent of the degree holders, majored in industrial arts. Eleven per cent of the respondents minored in industrial arts.

6. Sixty-six per cent of the class assignments are within the major preparation area and twelve per cent are in the minor preparation area. Of the 653 classes being taught by the respondents, 139 or 21 per cent, are being conducted outside the instructor's major or minor field. This seems to indicate that little consideration is given by administrators to the teacher's preparation in relation to his class assignments.

7. Sixty-one of the 138 respondents, or 44 per cent, have special secondary industrial arts credentials; fifty, or 36 per cent have the general secondary; twenty-four, or 17 per cent, the junior high; nineteen, or 13 per cent, the emergency credential; twelve, or 8 per cent, trade and industrial (Smith-Hughes); seven, or 5 per cent, special secondary limited; six, or 4 per cent, farm shop (Smith-Hughes); and four, or 2 per cent, have the adult education credential. Thirty-four additional credentials not listed in the questionnaire were reported. Eleven of this group are in physical education, four in administration, and three in art.

8. Indications are that there is a trend, among the San Joaquin Valley industrial arts teachers, toward studying for the general secondary credential in lieu of a master's degree.

9. Emergency credentials were issued in nine fields. Eight of the nineteen emergency credentials are general secondaries and four are in industrial arts. One each of the following were also issued: administration, auto-mechanics, history and drawing, junior college, mathematics, photography and woodwork.

10. Unit industrial arts credentials were issued in thirteen fields. They are listed by rank as follows: wood, drawing, general metal, automotive, forging and welding, machine shop, sheet metal, electricity, handcraft, stagecraft, aircraft, printing, and photography.

11. Eighty-nine, or 64 per cent, of the respondents teach industrial arts subjects only. Thirty-three, or 23 per cent, teach in one additional field and sixteen, or 11 per cent, teach in two to four additional fields.

12. There is some phase of the industrial arts program being conducted in all the schools included in this study.

13. The 138 respondents are teaching 96 different class subjects for a total of 773 class hours. Two hundred ten classes, or 27 per cent, are in some phase of woodwork; one hundred twenty-three, or 15 per cent, in drawing; seventy, or 9 per cent, in auto mechanics. General shop classes comprise 6 per cent of the teachers' programs; general metal, 5 per cent, and machine shop 3 per cent.

14. The number of daily class periods varies among the schools. Six to eight class periods per day were reported but the six period day seemed to predominate in most cases.

15. The participants have an average of 13.67 years teaching experience. Of this average, 10.5 years have been in California. One hundred eleven instructors, or 80 per cent, have been teaching industrial arts on a full time basis for an average of 10.55 years. Forty-one taught industrial arts subjects on a part time basis for an average of 6.09 years. Teachers located in the three larger school groups have had approximately twice the experience as have the teachers in the very small schools.

16. Many and varied trade and industrial experiences were reported. Out of forty-eight areas, carpentry ranks first with fifty teachers reporting experience in that field. Eighteen had trade experience in auto mechanics; seventeen as machinists; sixteen as mill-cabinet workers; ten as draftsmen; eight as electricians; seven as welders; six as aircraft mechanics; six as painters and four as sheet metal workers. The remainder of the trade and industrial experiences were reported in diminishing numbers.

THE TRAINING AND EXPERIENCE OF
INDUSTRIAL ARTS TEACHERS
IN THE SAN JOAQUIN VALLEY

by

CONRAD FEUCHES

A THESIS

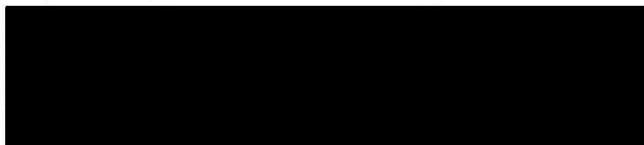
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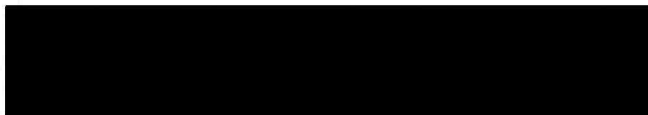
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THE TRAINING AND EXPERIENCE OF INDUSTRIAL ARTS TEACHERS
IN THE SAN JOAQUIN VALLEY

CHAPTER I
INTRODUCTION

The last few years have seen a great shifting of population to the western states. California's population increased forty-four per cent from 1940 to 1948, Oregon's forty-nine per cent, and Washington's forty-one per cent.¹ It is obvious that the school population also increased by huge amounts.

With this immigration came many local and state-wide problems. One of these is the securing of teachers to meet the school expansion program needed to educate this ever increasing population.

California schools have not been able to supply the demand for teachers in many levels of education. To help fulfill this shortage, teachers from other states have applied for and secured positions.

Industrial Arts Education is one phase of the education program that found itself with a teacher shortage. The reasons for this situation may be many. World War II

¹ Neuberger, Richard L. The Changing Face of the West.
The New York Times Magazine, Sep. 12, 1948, section
6. pp. 13-14.

was, no doubt, the greatest contributor to this shortage. Many potential graduates and undergraduates entered military service and a great number of industrial arts teachers left the teaching field for higher wages in industry.

Emergency certificates or credentials had to be issued to replace or supply credentialed instructors. The counties comprising the San Joaquin Valley have had to ask for over 2,000 emergency credentials to supply the necessary number of teachers.²

Teacher education institutions are increasing their efforts to alleviate and correct this shortage of teachers as rapidly as possible. Even with a greater emphasis and encouragement given young people to enter the teaching profession, the Teacher Supply and Demand Survey in California shows the 1949-50 school year will need 2,313 additional replacements.³

The writer became interested in learning of the formal education, certification, experience, subject combinations, and of the trade and industrial experience of teachers now teaching in the field of industrial arts throughout the San Joaquin Valley.

² Refer to Appendix - Letters from County Superintendents.

³ Sierra Educational News. Official Journal of California Teachers Association, Feb. 1949. p. 9.

It was deemed timely and feasible to make this study as it would serve as a guide in the preparation of future teachers for this area.

Statement of Problem

The study was planned to investigate the formal education, certification, and experience of industrial arts teachers throughout the San Joaquin Valley. To separate any one of these phases for intensive study appeared to be impractical as they are all so closely related.

The major coverage of this survey includes: (1) the formal education, (2) the California certificates held, (3) the teaching experience, (4) the trade and industrial experience, (5) the number and types of unit shops each is qualified to teach, and (6) the teaching combinations of subject areas.

The study was carried on in the public secondary schools of the San Joaquin Valley which is composed of Merced, Mariposa, Madera, Fresno, Stanislaus, Kings, Tulare, and Kern counties. All teachers who taught one or more classes of industrial arts subjects were contacted in person or through a mailed questionnaire.

It has been said that the use of questionnaires is not a very scientific way of finding facts. However,

Koos has this to say:

Its (the questionnaire's) use in ascertaining practice seems warrantable, even if for no other reason, by the need for knowing what practices are before attempting their evaluation.⁴

The general reactions to the study were highly satisfactory. Several teachers made notations on the response sheets. Some of them were: "This should prove very interesting", "I hope your study can be used to educate administrators to the fact that teachers need training in order to teach many of these specialized fields", and "Suggest undergraduates be allowed a freer choice of interest subjects rather than so many required subjects". One respondent laid the questionnaire aside for four weeks, then completed and returned it with this comment, "Sorry for not answering sooner for upon receiving questionnaire I thought 'I can't answer all those questions now'. But on second thought and reading I do not find them so exhausting."

Purpose of Study

(1) To assemble data which will be of value to students, educators, teachers, administrators, and the interested public, (2) to analyze the assembled data so that administrators and others may be better informed of

⁴ Koos, Leonard V. The Questionnaire in Education. p. 51.

the industrial arts program in the San Joaquin Valley, (3) to assist the teacher education institutions in re-evaluating and upgrading their in-service program, (4) to determine the type of industrial arts classes taught in the junior and senior high schools, (5) to determine the preparation and experience of industrial arts teachers, (6) to determine the number of persons teaching industrial arts subjects with minor preparation, major preparation, limited credentials and with emergency credentials, (7) to learn of situations that may lend to or cause poor teaching, and the possible correction, (8) to use the results of the study in guiding the preparation of future teachers in this area, are the major purposes of this study.

Need for the Study

One of the functions for which educational institutions are responsible is the preparation of persons for adequate leadership in a community. Periodical analyses and comparisons bring forth pertinent facts which need to be known to further this program.

Investigation has shown the lack of recent studies which would aid in guiding an industrial arts curriculum or an in-service training program for teacher education in the San Joaquin Valley. This need seems to warrant

the study, with the hope that information and facts gathered will be of some value to educational institutions, particularly to those in the area studied.

Scope and Limitations

It is recognized that current curricular practice in industrial arts education is not necessarily the best but does represent what has been considered best in the past and perhaps discloses the practice to be expected in the immediate future. Changes in school procedures come slowly and only through united effort. There develops upon an institution the primary responsibility to lead and set a pattern so that it meets the peculiar needs of the locality which it serves. These needs must be given consideration in the education of young teachers.

This survey is limited to the industrial arts field in the public secondary schools of the San Joaquin Valley. All vocational classes and schools are excluded.

Definition of Terms

It is well in any study that there be a careful definition of terms which might otherwise be misunderstood or misinterpreted. Definitions furnished herewith correspond to usage of these terms by writers in the field of Industrial Arts Education.

Manual Training - A term used for the type of shop work introduced from Russia by an exhibit at the Centennial Exposition at Philadelphia in 1876. It was used quite generally as a name for the shop and drawing work first introduced in American schools as a result of this exhibit and for the next thirty years thereafter. It yet remains the term applied to all shop and drawing work offered in the public schools in many places where the nomenclature has not kept up with the changing ideals. The type of work included in the course was largely bench woodwork and mechanical drawing, given for the purpose of developing "hand skill".

Manual Arts - A term introduced in 1894 with the idea that it should include not only manipulative training but also the ideas of utility and design of the "graphic, mechanic, plastic, textile, bookmaking and culinary arts".

Industrial Arts - In the early years of the twentieth century, this term was used to cover a still larger phase of the work being offered in the shop and laboratory. To the skill of the hand and the study of utility and beauty is added "the notion of industrial or economic and social

values". Such an idea has large influence on the type of courses offered and on the things emphasized in the courses. It brings in a study of all the problems which arise in the converting of raw materials into finished products.

Industrial Arts Education - This term is well defined by Warner, as follows:

Industrial Arts Education...refers particularly to the industrial arts program in the college or university. It suggests a professional or educational side that industrial arts may lack when used alone. In the preparation of teachers 'Industrial Arts Education' is applicable because it refers to professional, academic, and cultural courses or contacts as well as the more technical aspects of training.⁵

Industrial Education - Warner defines this by saying,

"Industrial Education is a more inclusive term which has been used to include all types of manual, industrial, and trade education. It is used to include courses offered under the Smith-Hughes Act as well as courses in Industrial Arts."⁶

Technical Program - Includes all the courses which are ordinarily offered in the shop or industrial

⁵ Warner, W. E. Policies in Industrial Arts Education. The Ohio State University Press. p. 6.

⁶ Ibid.

arts laboratory as well as those special methods or training courses offered particularly for industrial art teachers. In these may come supervised student-teaching in industrial arts or special research courses.

Vocational Education - Dr. H. A. Sotzin says, "Vocational education is a specific occupational training. The purpose of this program is to train pupils to earn a livelihood in a recognized occupational field."⁷

Semester Hour - This represents the satisfactory completion of the work of one recitation or lecture period a week for a semester. The length of the semester may vary with different educational institutions. It is most generally from eighteen to twenty weeks. A given number of sessions, as sixteen, may be required for earning a semester hour of college credit. Following this standard of measurement, a subject taken three times a week for a semester gives three semester hours of credit.

⁷ Sotzin, Heber A. A Comparison Between Industrial Arts and Vocational Education.

Quarter Hour - This represents the satisfactory completion of the work of one recitation or lecture period a week for a quarter of the entire school year. Thus, courses taken three times a week for a quarter are credited with three quarter hours of credit.

Major Field - A concentration of study in a given subject-matter field.

Minor Field - A lesser concentration of study in a given subject-matter field.

CHAPTER II

INDUSTRIAL ARTS TEACHER EDUCATION

An examination of the current literature dealing with education and industrial arts revealed that much has been written on various aspects of this study. It is the purpose of this chapter to supply opinions of authorities in the field of education, industrial education and related studies which will assist in developing a better understanding of the existing industrial arts program and its implications.

History reveals that in the beginning, all education was distinctly practical. Early learning was not through books but by the school of experience and hard knocks. The ability to reason and systematically plan has brought man to the level that is enjoyed today.

The development of crude tools in the early civilization of man was the first step taken to protect and aid in conquering the obstacles that hindered his continuous life. With the constant improvement of tools and weapons, we reached the age of gunpowder, firearms, steam engine, and the endless electrical inventions that furthered our present atomic world.

Much of our progress is so taken for granted that we lose sight of the fact that our present learning must still deal with material things and their practical application.

Indications are that industrial arts education, like all other phases of education, has been undergoing rapid changes during the past few years. However, industrial arts education in its various phases has been more subject to change and reorganization than others because, this being one of the relatively young fields, it has been bound the least by precedent and past practices. Hand work or shop work as an organized part of an educational program in the United States is still very young. It is but a few years since Swedish Sloyd and the formal exercise courses of the Russian system were the only types of shop courses offered in the United States. Today we find many course activities and the number is steadily increasing.

In a study by Warner⁸ (in Ohio, 1927-28), it was found that sixty-three course activities were reported by 294 shop and drawing teachers. Franklin's study⁹ (Oklahoma, 1931) brought out the fact that course activities had increased over 1927-28. In this present study, other course activities were reported for which the State of California as yet does not grant unit credentials. This seems to indicate a continuing growth and change in the field.

⁸ Warner, William E. Policies in Industrial Arts Education, The Ohio State University Press, 1928. pp. 20-22.

⁹ Franklin, Marion E. Survey of Industrial Arts in the State of Oklahoma As a Basis for Teacher Training Program. 1931.

Industrial arts is one of the fields in which many of the modifications need more study, due largely to the great speed-up and changes developed during World War II. A new upsurge of interest in science also carried an upsurge in manual skills. This would tend to indicate a greater need for expansion of the curriculum in our colleges and universities in all lines of practical arts, to meet the need for well educated teachers.

Some educational leaders believe all teachers should pursue a broad comprehensive education so they will be well fitted for a position. This same belief may hold true for teachers of industrial arts. Their training, too, should be comprehensive in the general field as well as in the industrial arts field. The need for well-qualified teachers is emphasized by Givens¹⁰ when he states, "The quality of the teaching staff is the most important factor in the quality of education that a school makes possible."

The question may be asked, "Are we preparing our young teachers for the type of society into which they are to enter?" Leevy wrote:

Our modern educational system has passed through the following stages of development: the subject matter centered school, stressing classical learning for formal discipline; the child centered school, emphasizing learning exercises for the child, based upon his mental capacity, which is the

¹⁰ Givens, Willard E. Teacher Personnel Procedures; Selection and Appointment, Nat. Edu. Assoc. Research Bul., vol. 20, 1942. p. 52.

intelligence testing period. Now we have reached the third stage of development of our modern educational system known as the community school.¹¹

If we are to accept the hypothesis proposed by Leevy, it will be apropos in setting up of educational facilities for the child in terms of his needs based upon the various cultural items, ideas, customs, and activities of the community. The training of teachers would, of necessity, need be along the same thought if we are to follow through to a successful conclusion.

As part of general education, industrial arts will aid in bringing the students in closer contact with some of the specific areas in which his community functions. The function and the place of industrial arts in fulfilling the community needs was expressed by Moore almost ten years ago when he said:

The subject of industrial arts, while encompassing all age and school levels, is justified in secondary school areas for development of avocational and vocational interests and aptitudes, specific manual abilities, desirable personal-social traits growing out of industrial experiences, ability to choose and use industrial products wisely--all coupled with the aesthetic relationships involved. In general, its purpose is educationally social rather than vocationally economic, although in the senior high school it may increasingly emphasize vocational objectives in a non-legal sense, for certain students.¹²

¹¹ Leevy, Roy J. It's Time to Revise Our Teacher Training, Nation's Schools, vol. 39, no. 2, Feb. 1947. pp. 47-50.

¹² Moore, Frank C. Trends in Industrial Arts Education, Ind. Arts and Voc. Edu., vol. 28, April 1939. p. 137.

Campion reflects his thought on the meaning and purpose of the industrial education program by the following:

The contribution of industrial education to the general educational program has been most marked during the past twenty years. Out of our belief in "learning by doing" has come much of that which has motivated the so-called progressive education movement. As has already been pointed out, real life situations for many of our people will occur mainly in the industrial and mechanical world. Any experience properly directed toward industrial intelligence will aid the boy or girl in later making adjustments to the world in which he lives. Industrial education, whether it be industrial arts, industrial pre-vocational education, preparatory training, or extension training, presents the opportunity of tackling actual jobs as nearly as possible under life conditions.¹³

Some educators and leaders within the industrial arts field have expressed their firm belief in this educational program. Moore presents a bit of optimism and a word of caution when he says:

Within the next ten years, we in the field of industrial arts will develop the greatest industrial arts program this country has ever seen or some other field will take up this development and do a type of work which we should be doing.¹⁴

With these words of caution, every person interested in the future of the industrial arts program and its purpose should take heed. This is especially true of the institutions wherein our young teachers are being prepared to meet these needs for the students and community.

¹³ Campion, Howard A. "Industrial Education a Vital Service to Youth", Ind. Edu., vol. 39, 11:234-235, 1937.

¹⁴ Moore, Frank. op. cit., p. 138.

Educational institutions must be cognizant of the fact that the teacher is an integral part of our educational program and, therefore, should prepare the future teachers with some program in mind. Certain criteria must be established whereby the quality of teachers can be determined and a methodical means be prepared to put these into a functional situation.

Wenger proposes such in his seven major responsibilities of an industrial-arts teacher-education program:

1. It must provide an effective organization of recruitment.
2. It must provide a forceful policy in regard to screening.
3. It must provide intensive training in industrial arts areas.
4. It must provide a broad background of general education.
5. It must provide opportunities for individual growth and development.
6. It must provide opportunity for student teaching.
7. It must provide facilities for placement and follow-up.¹⁵

Much has been said and written in regard to the apparent failure of many persons engaged in industrial arts teaching. In providing a forceful screening policy for all teacher-education schools, there are three distinct

¹⁵ Wenger, Paul N. Teacher Training in Industrial-Arts Education, Indus. Arts and Voc. Edu., vol. 37, Feb. 1948. p. 42.

but closely related accomplishments to be considered. These should be possessed by every shop teacher. Selvedge lists them as follows:

First, he should be able to do well the work he expects to teach.

Second, he should be able to take stock of his own knowledge and experience, in order to choose wisely, and organize and arrange effectively the things he wishes to teach.

Third, he should be able to teach these things well.¹⁶

While some of the causes of success or failure of industrial arts teachers may be due to individual differences, much can be done to minimize and perhaps eliminate these difficulties in our teacher-education institutions.

The curricular programs offered by the schools cover, in a general way, all the problems that usually beset a new teacher. But, of course, there are some phases of the work which are given more time and a greater emphasis by some schools than by others.

In a study conducted by Keller on "An Evaluation of the Adequacy of the Teacher Training Courses Offered by the State of California By Means of the Opinion of Beginning Industrial Arts Teachers and Their Principles",

¹⁶ Selvedge, R. A. and Verne C. Fryklund. Principles of Trade and Industrial Teaching, Peoria, Ill., The Manual Arts Press, 1930. pp. 16-17.

he proposes these recommendations:

1. More projects should be developed during teachers training, with special emphasis on the needs of the community where the prospective teacher expects to work.
2. Trade experience, or its equivalent, should be compulsory in the school program.
3. More emphasis should be given to the importance of classroom and administrative routine.
4. Shop practice should receive more emphasis than teaching theory.
5. The training institutions should devote more time to practice teaching and this subject be given in the sixth and seventh semesters.
6. The importance of correlating shop work with other educational subjects should be stressed.¹⁷

Actual trade experience on the part of industrial arts teachers is not a requirement for certification to teach in most states but its value cannot be doubted. In terms of semester hour credit, it is difficult to evaluate because of the difference in the richness of experience that may be gained in a given length of time under different conditions. A quotation from Strickler emphasizes

¹⁷ Keller, Adrian Deboe. An Evaluation of the Adequacy of the Teacher Training Courses Offered by the State of California By Means of the Opinions of Beginning Industrial Arts Teachers and Their Principals, June, 1932.

the value of practical experience:

It develops in a teacher an understanding of the origin of his subject, the relationship of his subject to every day life, and an over-learning of subject matter and technique that should free him to give the chief emphasis of his efforts to the study of the ways and means of furthering the educational growth of children who come to learn. Trade experience helps in the mastery of a subject and a certain amount of mastery is necessary for anyone who would teach.¹⁸

Bawden¹⁹ voices the same opinion by saying, "...to be fully competent, he must have wage earning experience in the activities he teaches."

Mays, in an article published in 1943, says in part:

...there will be a growing pressure upon high school industrial arts teachers to have trade experience as part of their preparation; and constant contact with industry will be imperative...this will not mean less college training, but more vacation periods spent in industrial employment by industrial arts teachers.²⁰

The certification requirements whereby teachers become licensed to carry on their profession are controlled by individual states. Educational institutions must meet the minimum regulations established by each state but may

¹⁸ Strickler, Fred. The Training and Experience of 480 Industrial Arts Teachers, Teacher College, Columbia University, 1927.

¹⁹ Bawden, William T. Industrial Arts in Modern Education, 1934. p. 157.

²⁰ Mays, Arthur B. A New Industrial Arts for a New Day, Ind. Arts and Voc. Edu., vol. 32, 1934. p. 402.

establish a curriculum to support the local thinking and needs of the community. There not only exists a great variance within local areas but in states as well.

A study by Benjamin Frazier, United States Office of Education, entitled "Development of State Programs for the Certification of Teachers", points out that:

An understanding characteristic of requirements for certification is the great diversity between states. Two states may grant the same certificate but have vastly different prerequisites for granting of this certificate.

Two certificates issued in different states, one may require prerequisite scholarship, no higher than elementary school graduation, the other may require a year of graduate work. One may cover a single subject, the other practically all the subjects taught in the public schools. If by any chance all requirements for both correspond, in all probability the names of the certificate will not be the same! ²¹

Bowers²² found the main requirement for industrial arts teaching in most states is a Bachelor of Arts Degree in education, with from fifteen to thirty semester hours of specialized training in industrial arts. In twenty of the states surveyed, the practice of granting emergency

²¹ Frazier, Benjamin. Development of State Programs for the Certification of Teachers, Bul. no. 12, Washington, D. C. Government Printing Office, 1938. p. 48.

²² Bowers, Harold J. Teacher Personnel Shortages in Industrial Arts, Ind. Arts and Voc. Edu., vol. 32, 1943. p. 244.

certificates, based more on work experience than on college training, seemed to predominate.

Allen points out:

Some states have as few as two requirements while others range up to as high as 37. ...such a lack of uniformity of hours and subjects was encountered as to make certification and curriculum comparisons extremely difficult...in no instance were two schools found wherein the extent and details of the offering for preparation of industrial arts teachers were the same, not even within a single state.²³

With the evidence sighted, it seems that much sincere thought, planning, cooperation, and standardization needs to be given to the problem of developing a teacher education program for those entering the industrial arts field. This, without question, should be approached on a broad base, at least statewide if not on a national scale.

²³ Allen, Alfred T. Interstate Certification of Industrial Arts Teachers, Ind. Arts & Voc. Edu., vol. 31, 1942. p. 49.

CHAPTER III

THE STUDY

Procedure

The study was divided into seven parts composed of (1) degrees held, (2) major and minor fields of preparation, (3) California credentials now held, (4) teaching experience, (5) trade and industrial experience, (6) number and kinds of California unit shop credentials completed, and (7) subjects and grade levels in which respondents are now teaching.

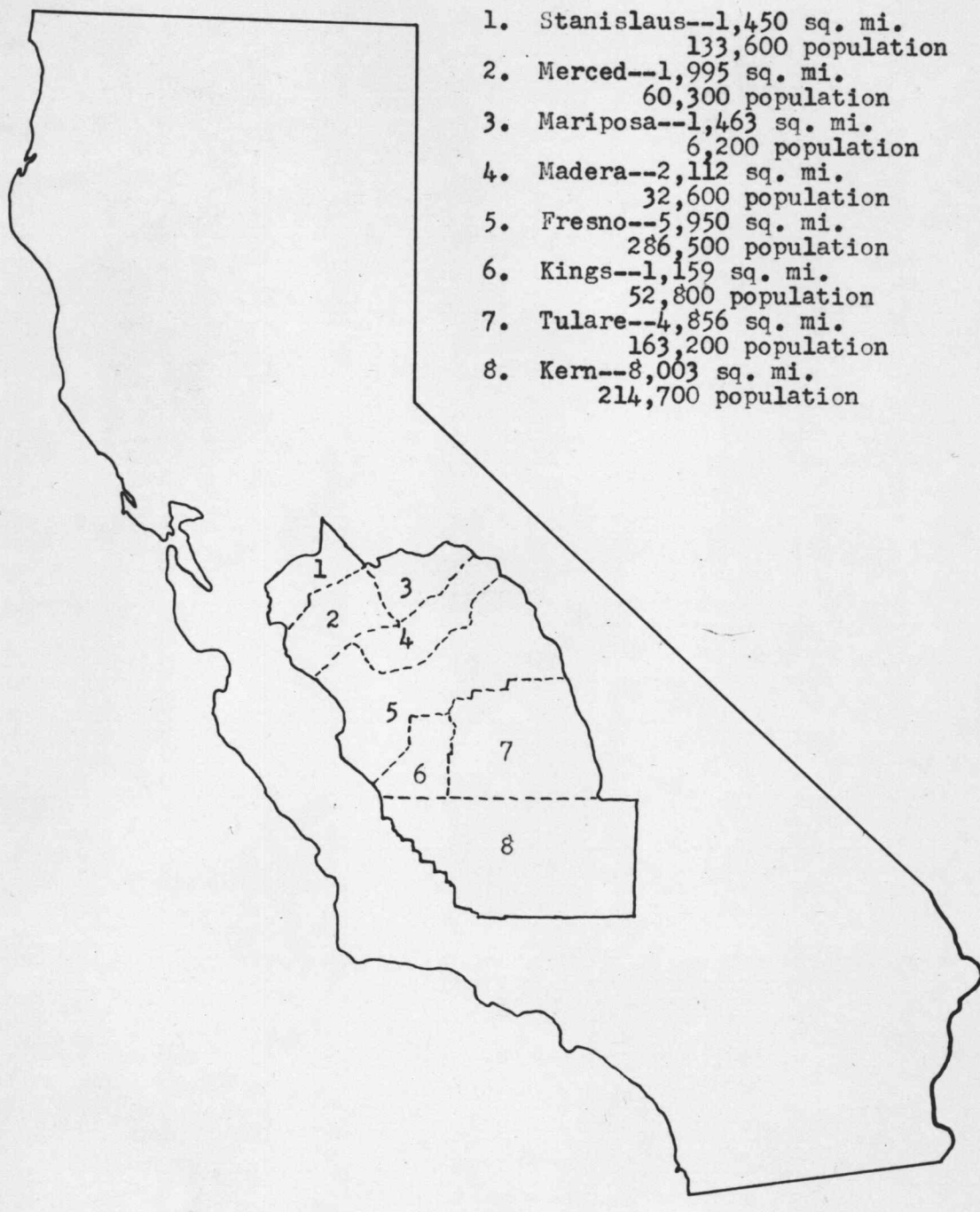
All public secondary schools listed in the county directories throughout the San Joaquin Valley, offering any subjects which could be classified under an industrial arts program, were included in the study.

The counties comprising this valley are Stanislaus, Merced, Mariposa, Madera, Fresno, Tulare, Kings, and Kern. Boundary lines of each are shown on the California map on page 23. The general location of the schools included is indicated on the San Joaquin Valley map on page 24.

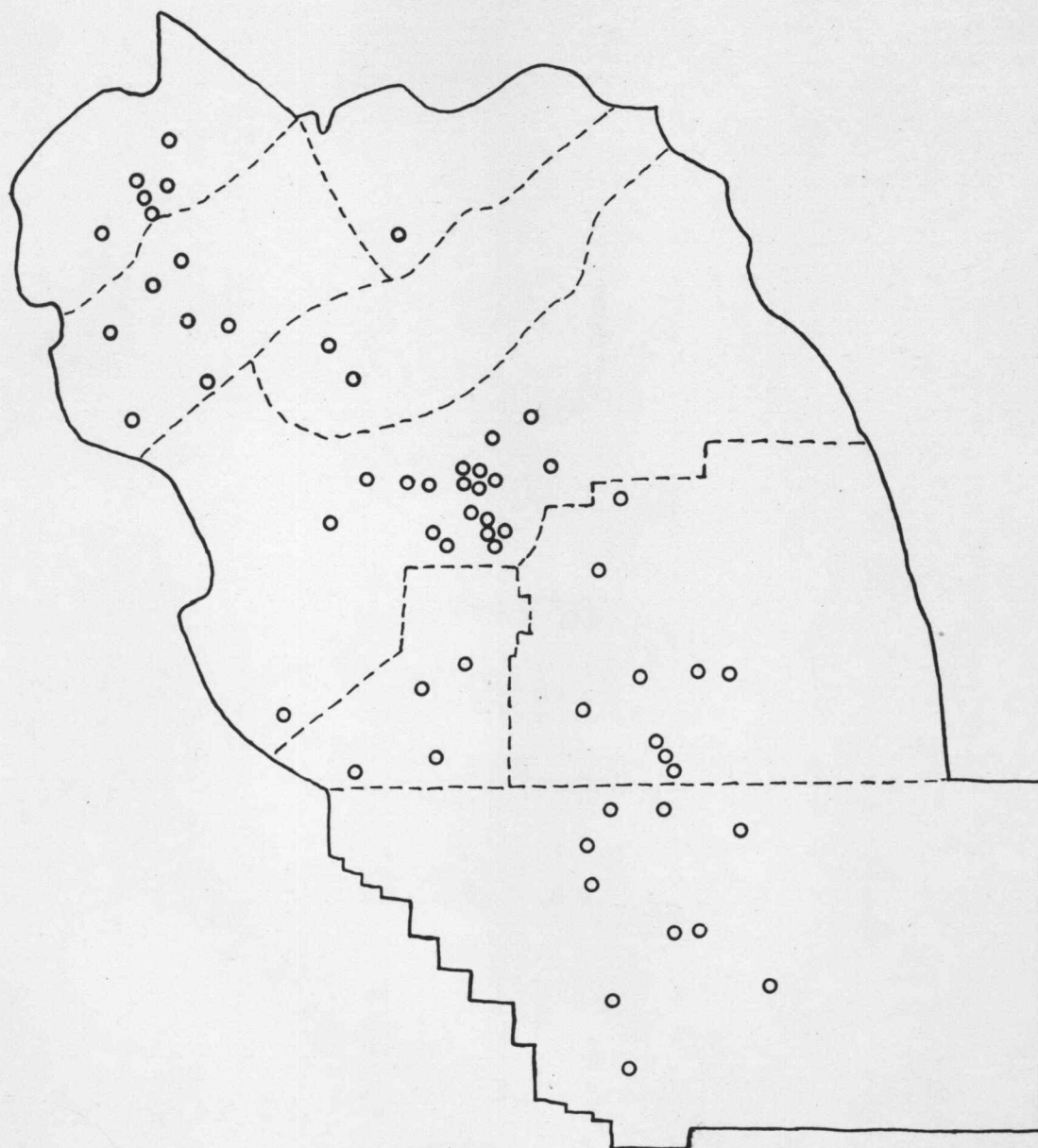
Since the area covered is made up of 26,988 square miles, it was necessary to resort to the questionnaire type of study so that data could be collected.

A preliminary check was made prior to sending out the questionnaires. Twenty-one personal interviews were made

STATE OF CALIFORNIA



SAN JOAQUIN VALLEY COUNTIES



Locations of Responding Schools

for the purpose of checking the clarity of the response form.

All schools were classified into four groups according to the size of the average daily attendance (A.D.A.). Table I shows the identification of school groups as to average daily attendance.

Table I

Identification of School Groups

Identifying Group	Average Daily Attendance
Group I	50 --- 300
Group II	301 --- 600
Group III	601 --- 1200
Group IV	1250 --- 4000

The first natural division for the grouping of schools came at 300 average daily attendance; the second at 600 average daily attendance; and the third at 1,200 average daily attendance. The fourth group is made up of schools whose average daily attendance is 1,250 to 4,000.

Table II on page 26 shows the number of responses to the questionnaire.

Table II

Data Concerning Responses to Questionnaire

	Number	Percent
Questionnaires mailed	206	--
Personal interviews	21	11
Replies received	104	50
Reminders sent out	94	--
	<hr/>	<hr/>
Total number of replies	138	66

A total of 206 questionnaires were mailed. Twenty-one, or eleven per cent, of the teachers were interviewed. It was necessary to send reminders to ninety-four persons of which thirty-four, or thirty-six per cent, then returned the response form. The final tabulation shows one hundred thirty-eight, or sixty-six per cent, responded to the study.

This survey indicates that the formal education of the participants was obtained in fifty different colleges and universities.

Table III on page 27 shows California universities and colleges from which respondents received degrees. Sixty-seven Bachelor of Arts degrees were reported, two Bachelor of Science, one Bachelor of Education, and two Master of Arts degrees.

From the total number of degrees offered, San Jose State College and Santa Barbara College, now a branch of

Table III

California Universities or Colleges
From Which Respondents Received Degrees

	AA	AB	BS	BEd.	MA	MS	MEd.
Santa Barbara College	-	18	-	-	-	-	-
San Jose State College	-	18	-	-	-	-	-
Fresno State College	-	13	-	-	-	-	-
University of California	-	3	1	-	-	-	-
Chico State College	-	3	-	-	-	-	-
San Francisco State College	-	2	-	-	-	-	-
Occidental College	-	2	-	-	-	-	-
Stanford University	-	2	-	-	1	-	-
Univ. of Calif. Los Angeles	-	2	1	1	-	-	-
San Diego State College	-	1	-	-	-	-	-
Pomona College	-	1	-	-	-	-	-
Whittier College	-	1	-	-	-	-	-
LaVerne College	-	1	-	-	-	-	-
College of the Pacific	-	1	-	-	-	-	-
Univ. of Southern Calif.	-	-	-	-	-	-	-
*Modesto Junior College	1	-	-	-	-	-	-
*Reedley Junior College	1	-	-	-	-	-	-
*Pasadena Junior College	1	-	-	-	-	-	-

NOTE: *The three Associate Arts degrees do not
represent the completion of formal education.

the University of California, each granted eighteen Bachelor of Arts degrees. Fresno State College granted thirteen, while the University of California at Berkeley, and Chico State College each granted three. San Francisco State College, Occidental, Stanford University, and University of California at Los Angeles each granted two Bachelor of Arts degrees. The remainder of the schools each granted one Bachelor of Arts degree.

Two teachers received Master of Arts degrees from California universities, one from Stanford and one from University of California.

Table IV on page 29 lists non-California universities and colleges from which the respondents received degrees. Approximately one-third of all the bachelor degrees received were from these schools. Ten persons received Bachelor of Arts degrees, thirty-three the Bachelor of Science, and one a Bachelor of Education degree; four the Master of Arts degree, eight the Master of Science degree, and one the Master of Education.

Five teachers, now teaching in California, received their Bachelor of Science degrees from Kansas State; four from Oregon State College; and three from the University of Minnesota. Stout Institute and State Industrial College of North Dakota each granted two with Bachelor of Science degrees.

Table IV

Out-of-State Universities or Colleges
From Which Respondents Received Degrees

	AB	BS	BEd.	MA	MS	MEd.
Kansas State College	-	5	-	-	1	-
Oregon State College	-	4	-	1	5	-
University of Minnesota	-	3	-	-	-	-
Stout Institute	-	2	-	-	1	-
No. Dak. State Indus. College	-	2	-	-	-	-
Colorado State A & M	1	1	-	-	-	-
East Central State, Oklahoma	-	1	-	-	-	-
Southern State, Oklahoma	-	1	-	-	-	-
Armour Institute	-	1	-	-	-	-
Western State, Michigan	-	1	-	-	-	-
University of Wyoming	-	1	-	-	-	-
Eastern State, South Dakota	-	1	-	-	-	-
Newark State, New Jersey	-	1	-	-	-	-
Miami University, Oklahoma	-	1	-	-	-	-
New Mexico A & M	-	1	-	-	-	-
Purdue	-	1	-	-	-	-
University of Wisconsin	-	1	-	-	-	-
Colorado State	2	-	-	1	-	-
Univ. of Rochester, New York	1	-	-	-	-	-
Washington State	1	-	-	-	-	-
Seattle Pacific, Washington	1	-	-	-	-	-
Iowa State	1	-	-	-	-	-
University of Michigan	1	-	-	-	-	-
Harvard University	1	-	-	-	-	-
Wisconsin State	-	-	1	-	-	-
University of Oregon	-	1	-	-	-	-
Kirksville State	-	1	-	-	-	-
Pennsylvania State	-	1	-	-	-	1
Michigan State Normal	-	1	-	-	-	-
University of Colorado	-	-	-	2	-	-
Oklahoma A & M	-	-	-	-	1	-
William Jewell, Missouri	1	-	-	-	-	-
Morning Side, Iowa						
*Marysville State, Missouri						
*Name of school not given	-	1	-	-	-	-

NOTE: *Two respondents listed the schools from which they graduated without listing the degrees granted. One person failed to identify his school but listed the degree he received.

Six teachers received their Master's degree from Oregon State College, one, the Master of Arts and five the Master of Science degrees. The University of Colorado granted two Master of Arts degrees. Four other schools each granted one Master's degree.

It is interesting to note that forty-four per cent of the Bachelor's degrees and eighty-six per cent of the Master's degrees were granted by universities or colleges outside the State of California.

Formal Education of Respondents

Data in Table V on page 31 show the formal education of the respondents according to degrees received. Of the 138 teachers participating in this study, 118 received the Bachelor's degree; sixteen, the Master's degree, and twenty have not completed degree requirements.

Group I indicates ten teachers received Bachelor of Arts degrees, seven the Bachelor of Science, one the Master of Science, and one who did not receive a degree of any kind. In Group II, seventeen teachers received Bachelor of Arts degrees while eleven received the Bachelor of Science degrees. This same group reported three teachers with Master of Arts degrees and two with Master of Science. Two reported their formal education ended

Table V

Formal Education of Respondents
Arranged According to Degrees Received

	No. of Teachers	Bachelor's			Master's			Non-Degree	
		AB	BS	BEd.	MA	MS	MEd.	AA	No Degree
Group I	18	10	7	-	-	1	-	-	1
Group II	32	17	11	-	3	2	-	2	2
Group III	50	30	11	-	2	2	-	1	8
Group IV	38	23	8	1	1	4	1	-	6
Degree Totals	138	80	37	1	6	9	1	3	17
Group Totals	138	118			16			20	

with Associate Arts degrees. Two additional persons reported as not having any degree.

Group III has the largest number of degree holders. Out of fifty teachers, thirty now have Bachelor of Arts degrees, eleven the Bachelor of Science degrees, four completed all requirements for the Master's degree. These were equally divided between the Master of Science and the Master of Arts. One respondent received his Associate of Arts degree but has not continued his formal education beyond the junior college level. Eight of the fifty in this same group have no degrees.

Group IV, which is composed of the largest schools, reported twenty-three Bachelor of Arts degrees, eight Bachelor of Science, and one Bachelor of Education. One person has a Master of Arts degree while four have the Master of Science degree, and one the Master of Education. Six teachers of this group have not completed any degree requirements.

Non-degree holders arranged according to school groups appear in Table VI.

Table VI

Non-Degree Holders Arranged According to School Groups

	Total No. of Teachers	Non-Degree Holders	Per Cent not Holding Degrees
Group I	18	1	5
Group II	32	4	12
Group III	50	9	18
Group IV	38	6	15
Total	138	20	14

It is likely that the non-degree holders and Associate of Arts people (junior college graduates) are gradually diminishing in number. Many of the respondents in this group have had long teaching experience as well as trade and industrial experience.

One person, or five per cent, of Group I in Table VI has not completed college degree requirements. Group II reported a total of four persons, or twelve per cent, without degrees. Group III has nine, or eighteen per cent, of its group without degrees. Six, or fifteen per cent, of Group IV were also reported as not having completed the necessary requirements to obtain a degree.

Although Table VI shows fourteen per cent of the total respondents without degrees, many of this group began teaching long before degrees were a requirement. They have had many years of teaching as well as trade and industrial experience.

Indications are that there has been considerable professional advancement by the participants engaged in the field of industrial arts.

Table VII on page 34 shows seventy-eight teachers have earned a total of 2,249 semester units or an average of twenty-eight units per teacher above the bachelor degree. Twenty-four of the respondents have not continued their formal education. Nine of the twenty-four, or thirty-seven per cent, are in their first year of teaching so have not had the opportunity to show a continuation of professional advancement.

Table VII
Professional Advancement of Respondents

	No. of Teachers	Total Units Earned	Average
Graduate Semester Units	78	2,249	28
*No Graduate Work Above BA	*24		

NOTE: *Nine of the 24 respondents or 37 per cent without professional advancement are in their first year of teaching.

The comparisons of school groups, by continued professional advancement beyond the first degree, is given in Table VIII on page 35. Group I, composed of teachers in the small schools, has reported the lowest average semester units of graduate work.

Although this group is the lowest in number of graduate hours, they lack but an average of seven semester hours in completing the fifth year of study.

The remaining three groups have completed an average of thirty semester units.

It is interesting to note that, although there were comparatively few Master's degrees reported, many teachers have earned an equivalent number of units required for this degree.

Table VIII

Professional Advancement of Respondents
Arranged According to School Groups

	<u>No. of Teachers</u>	<u>Total Units</u>	<u>Average</u>
<u>Group I</u>			
Graduate Semester Units	12	281	23
No Graduate Study Above AB *(Two in their first year teaching)	*4		
<u>Group II</u>			
Graduate Semester Units	18	542	30
No Graduate Study Above AB *(Two in second year teaching)	*5		
<u>Group III</u>			
Graduate Semester Units	29	845	29
No Graduate Study Above AB *(One in second year teaching)	*8		
<u>Group IV</u>			
Graduate Semester Units	19	567	29
No Graduate Study Above AB *(Four in first year teaching)	*7		

Major and Minor Fields of Preparation

Examination of Teacher Education catalogs shows that, in most cases, formal education is segregated into major and minor fields of preparation. The number of units required may vary with different schools but each applicant, in order to fulfill degree requirements, must complete a given number of units in both a major and a minor field of study.

Table IX on page 37 presents the various subject areas in which the participants of the study indicated their preparation and the type of degree received.

Sixty teachers of 118 reporting degrees chose industrial arts as their major field of study for a bachelor's degree. Fifteen chose industrial arts as a minor. Nine chose to continue their study in industrial arts while earning a master's degree. Two used industrial arts as a graduate minor.

Education was chosen twelve times as a major and twelve times as a minor field of study by those earning a bachelor's degree.

Twelve teachers who are now teaching industrial arts on a full time basis gave their major attention to physical education, while ten did likewise on a minor program.

Table IX

Major and Minor Fields of Preparation

<u>Classes</u>	<u>Major</u>		<u>Minor</u>	
	Bachelor	Master	Bachelor	Master
Industrial Arts	60	9	15	2
Education	12	3	12	5
Physical Education	12	-	10	-
Art	5	2	4	1
Social Science	5	-	21	-
Natural Science	2	1	13	-
Mathematics	2	-	8	-
Elect. Engineering	2	-	-	-
Vocational Education	1	2	1	-
Administration	1	2	1	-
Political Science	1	-	2	1
Agriculture	1	-	1	-
Mech. Engineering	1	-	2	-
Music	1	-	1	-
Arts and Crafts	1	-	-	-
Foreign Languages	1	-	-	-
Engineering	1	-	-	-
Mech.-Elec. Engineering	1	-	-	-
Architecture	1	-	-	-
Electronics	1	-	-	-
English	-	-	7	-
Agronomy	-	-	2	-
Botany	-	-	1	-
Commercial	-	-	1	-
Biology	-	-	1	1
Sewing & Dressmaking	-	-	1	-
Voc. Agriculture	-	-	-	1
Vocational Arts	-	-	-	1
Mechanical Drawing	-	-	-	1
Sociology	-	-	-	1
Industrial Design	-	-	-	1
Guidance	-	-	-	1

Read: Industrial arts was selected as a major learning area by 60 persons while studying for a bachelor's degree and by nine for a master's degree.

Many minor areas of study are reported in Table IX. Social Science was reported twenty-one times, placing that subject area first as a minor.

Table X lists the major and minor fields of preparation of the responding teachers in Group I. Five persons majored in industrial arts and three minored to receive their bachelor's degrees; three selected the same field as a major for their master's degrees. Five teachers majored and one minored in physical education. Education, social science, electronics, agriculture and agronomy each had one respondent as a majoring student who studied for the bachelor's degree.

Table X
Major and Minor Fields of Preparation
of
Teachers in Group I

Classes	<u>Major</u>		<u>Minor</u>	
	Bachelor	Master	Bachelor	Master
Industrial Arts	5	3	3	-
Physical Education	5	-	1	-
Social Science	1	-	3	-
Agronomy	1	-	2	-
Education	1	-	-	1
Electronics	1	-	-	-
Agriculture	1	-	-	-
Natural Science	-	-	3	-
Administration	-	-	1	-
Mathematics	-	-	1	-
Vocational Arts	-	-	-	1
Mechanical Drawing	-	-	-	1

Table XI on page 40 shows data on the major and minor fields of preparation of teachers in Group II. Fifteen persons chose industrial arts as a major field of study for the bachelor's degree and one for the master's degree. Two persons minored in industrial arts, one for the bachelor's degree and one for the master's degree. Three teachers majored in the field of education for the Bachelor of Arts degree and three minored for the same degree. Two teachers majored and two minored in art for the bachelor's degree. Social science was used as a major field by one respondent while five minored for the bachelor's degree.

Data in Table XII on page 41 show that nineteen persons of Group III majored and eight minored in industrial arts for the bachelor's degree. One person majored and one minored in the same field for the master's degree. Five persons majored and seven minored for the bachelor's degree while one person majored and one minored for the master's degree. Four respondents chose to major and two to minor in physical education. Three chose social science as a major and nine as a minor for the bachelor's degree. It is interesting to note that vocational education was reported as a major field of study by one person for the bachelor's degree as well as for a master's degree. Nine other fields were reported as major study areas.

Table XI

Major and Minor Fields of Preparation
of
Teachers in Group II

Classes	<u>Major</u>		<u>Minor</u>	
	Bachelor	Master	Bachelor	Master
Industrial Arts	15	1	1	1
Education	3	1	3	1
Art	2	1	2	1
Administration, Edu.	1	2	-	-
Social Science	1	-	5	-
Mathematics	1	-	2	-
Physical Education	1	-	2	-
Elec. Engineering	1	-	-	-
Engineering	1	-	-	-
Foreign Language	1	-	-	-
Vocational Education	-	1	1	-
Natural Science	-	-	3	-
English	-	-	2	1
Agriculture	-	-	1	-
Biology	-	-	1	-
Botany	-	-	1	-
Commercial	-	-	1	-
Political Science	-	-	-	1
Sociology	-	-	-	1

Table XII

Major and Minor Fields of Preparation
of
Teachers in Group III

Classes	<u>Major</u>		<u>Minor</u>	
	Bachelor	Master	Bachelor	Master
Industrial Arts	19	1	8	1
Education	5	1	7	1
Physical Education	4	-	2	-
Social Science	3	-	9	-
Natural Science	1	1	2	-
Vocational Education	1	1	-	-
Mathematics	1	-	2	-
Mech. Engineering	1	-	2	-
Art	1	-	1	-
Music	1	-	1	-
Agriculture	1	-	-	-
Arts and Crafts	1	-	-	-
Community Mechanics	1	-	-	-
Elect. Engineering	1	-	-	-
English	-	-	2	-
Household Arts	-	-	1	-
Political Science	-	-	1	-
Sewing & Dressmaking	-	-	1	-
Vocational Agriculture	-	-	-	1

Table XIII shows data concerning the major and minor fields of preparation of teachers in Group IV. In this group, twenty-one teachers majored in industrial arts for the bachelor's degree while four used the same field for the master's degree. Three teachers reported a minor preparation for the bachelor's degree. The second highest major area was in education with three, and two as a minor for the bachelor's degree. Two teachers majored in physical education and five minored in this same field to earn the bachelor's degree. Architecture was reported by one person as his major field of study in receiving the bachelor's degree.

Table XIII

Major and Minor Fields of Preparation
of
Teachers in Group IV

Classes	<u>Major</u>		<u>Minor</u>	
	Bachelor	Master	Bachelor	Master
Industrial Arts	21	4	2	-
Education	3	1	2	2
Art	2	1	1	-
Physical Education	2	-	5	-
Natural Science	1	-	5	-
Political Science	1	-	1	-
Architecture	1	-	-	-
Mechanical Arts	1	-	-	-
Mech. and Elect. Engr.	1	-	-	-
Social Science	-	-	4	-
English	-	-	3	-
Mathematics	-	-	3	-
Biological Science	-	-	-	1
Guidance	-	-	-	1
Industrial Design	-	-	-	1

Table XIV shows data on industrial arts as a major preparation area as reported by the respondents. Twenty-nine per cent of the teachers in Group I chose industrial arts as a major study for the bachelor's degree; fifty-three per cent of Group II; forty-six per cent of Group III; and sixty-five per cent of Group IV. Only forty-eight per cent of the respondents, now engaged in teaching some phase of the industrial arts program throughout the San Joaquin Valley, had major preparation in this field.

Table XIV

Industrial Arts As A Major Preparation Area

	Number of Bachelor's Degree	Major in Industrial Arts	Per cent of Ind. Arts.Majors
Group I	17	5	29
Group II	28	15	53
Group III	41	19	46
Group IV	32	21	65
Totals	118	60	48 (Ave.)

Table XV shows data concerning industrial arts as a minor preparation area. Group I indicates that, out of seventeen persons securing the bachelor's degree, three or seventeen per cent minored in the field of industrial arts. Group II reported one person, or three per cent; Group III eight, or eighteen per cent; and Group IV three, or nine per cent, choosing industrial arts as a minor field of study for the bachelor's degree.

It is interesting to note that while Groups I and II ranked fourth and third respectively, on the percentage of industrial arts majors, they rank second and fourth in the percent of industrial arts minors.

Table XV

Industrial Arts As A Minor Preparation Area

	Number of Bachelor's Degrees	Minor in Industrial Arts	Per cent of Ind. Arts Minors
Group I	17	3	17
Group II	28	1	3
Group III	41	8	18
Group IV	32	3	9
Totals	118	15	11 (Ave.)

Table XVI on page 46 shows the credentials held by 138 respondents according to school groups. Group I reported the following California credentials: one general elementary; two junior high; one special secondary limited; three general secondaries; one farm shop (Smith-Hughes); five emergency credentials; eight special secondary industrial arts; and five persons reported additional credentials not listed.

In Group II, there are four teachers with general elementary credentials; two junior high; one special secondary; eighteen general secondaries; one farm shop (Smith-Hughes); two trade and Industry (Smith-Hughes); six emergency credentials; twelve special secondaries in industrial arts; and three additional credentials not listed.

Teachers in Group III reported seven of them holding general elementary credentials; nine junior high; four special secondary; one adult education; one farm shop (Smith-Hughes); three emergency; twenty-one special secondary; and sixteen reported additional credentials not listed.

Respondents comprising Group IV have the following credentials; four general elementary; eleven junior high; one special secondary limited; twelve general secondary; three adult education; three farm shop (Smith-Hughes);

Table XVI

Credentials Held By 138 Respondents
According to School Groups

Type of Credential	Group I	Group II	Group III	Group IV	Total	Per cent Holding Credential
General Elementary	1	4	7	4	16	11
Junior High	2	2	9	11	24	17
Special Secondary Limited	1	1	4	1	7	5
General Secondary	3	18	17	12	50	36
Adult Education-		-	1	3	4	2
Farm Shop (Smith-Hughes)1		1	1	3	6	4
Trade & Indus. (Smith-Hughes)-		2	7	3	12	8
Emergency	5	6	3	5	19	13
Special Secondary Ind. Arts	8	12	21	20	61	44
Other Credentials	5	3	16	11	35	25

three trade and industry (Smith-Hughes); five emergency; twenty special secondary industrial arts; and eleven additional credentials not listed.

Of the total number of credentials reported, sixteen, or eleven per cent are general elementary; twenty-four, or seventeen per cent, are junior high; seven, or five per cent, general secondary; four, or two per cent, adult education; six, or four per cent, farm shop (Smith-Hughes); nineteen, or thirteen per cent, emergency; sixty-one, or forty-four per cent, special secondary industrial arts; and thirty-five, or twenty-five per cent, reported additional credentials not listed.

Table XVII on page 48 lists the emergency credentials held by teachers participating in this study. Of the total number, eight were general secondaries; one auto mechanics; one woodwork; four industrial arts; one administration; one junior college; one photography; one mathematics; and one history and mechanical drawing combined.

The California Administrative Code, Title 5, Education, Article 4, specifically states that the special secondary credential in industrial arts education is not to be issued on an emergency basis. This would indicate that four emergency industrial arts credentials were issued in direct violation of the education code.

Table XVII

Emergency Credentials

	Group I	Group II	Group III	Group IV	Total
Administration	-	1	-	-	1
Auto Mechanics	-	-	-	1	1
General Secondary	2	-	2	4	8
History & Mech. Drawing	1	-	-	-	1
Industrial Arts	1	2	1	-	4
Junior College	-	1	-	-	1
Mathematics	1	-	-	-	1
Photography	-	1	-	-	1
Woodwork	-	-	1	-	1
Totals	5	5	3	5	19

Table XVIII

Additional Credentials Held By Respondents

	Group I	Group II	Group III	Group IV	Total
Administration	-	-	3	1	4
Administration, Elementary	-	-	1	-	1
Agriculture, Vocational	-	-	1	-	1
Arts, Fine	-	-	1	-	1
Art, Special Secondary	1	-	1	1	3
Arts, Vocational	1	-	-	-	1
Arts and Crafts	-	-	-	1	1
College, Junior	-	-	-	1	1
Crafts	-	-	1	-	1
Drafting	-	-	1	-	1
Drafting (Smith-Hughes)	-	-	-	1	1
Education, Coordinating Vocational	-	-	1	-	1
Electrical Engineering	-	1	-	-	1
Physical Education	2	1	4	4	11
Machine Shop, Special Secondary	-	-	-	1	1
Machine Shop (Smith-Hughes)	-	-	-	1	1
Mechanics, Community	-	-	1	-	1
Mechanical Drawing, Special Secondary	-	-	1	-	1
Mechanical Engineering, Special Secondary	1	-	-	-	1
Vocations Class D	-	1	-	-	1
Totals	5	2	17	11	35

The returns from the questionnaire show there were twenty additional credentials, held by the respondents, which were not mentioned in the questionnaire.

Table XVIII lists these extra credentials.

Group I reported five additional credentials;
Group II, two; Group III, seventeen; and Group IV, eleven.

From the thirty-five extra credentials four are in Administration, three in Special Secondary in Art, and eleven in Physical Education.

Unit Shop Credentials

The California State Department of Education²⁴ has set the following minimum semester or quarter hours of training necessary to receive a unit shop certificate.

	<u>Units or Semester Hours</u>	<u>Units or Quarter Hours</u>
a. Aircraft	15	24
b. Automotive	10	15
c. Electricity	9	11
d. Forging-Welding	4	9
e. General Metal	12	18
f. Handicraft	6	9
g. Machine Shop	12	15
h. Photography	9	11
i. Sheet Metal	6	9
j. Stage Craft	6	9
k. Woodwork	12	18
l. Printing	12	12
m. Drawing	10	15

All participants in this study, excluding general secondary certificate holders, were asked to check those unit shop credentials for which the necessary university or college education was completed.

Table XIX on page 52 lists the various unit shop credentials reported by seventy-two teachers of industrial

²⁴ Fresno State College General Catalog, 1948-49. p. 138.

arts employed throughout the San Joaquin Valley. There were 301 unit credentials reported ranging from one to ten per teacher or an average of four.

Group I indicated that of the seven men reporting, all completed unit shop credentials in wood and five in drawing, general metal, and electricity. Three respondents completed a unit in sheet metal and three in forging and welding.

In Group II thirteen of the fifteen reporting chose wood and nine chose drawing as unit areas. Eight selected general metal; seven, forging and welding; and six machine shop and sheet metal for unit credentials.

Twenty-eight respondents of Group III reported twenty-one unit shop credentials in wood; seventeen in drawing; sixteen in automotive; thirteen in forging and welding; and twelve in general metal. Approximately fifty per cent of all automotive unit shop credentials reported are located in schools comprising Group III.

Group IV reported the largest number of unit credentials in drawing with seventeen in that field. Credentials in wood were reported thirteen times and auto shop eleven. Photography credentials were reported twice.

Table XIX

Unit Shop Credentials Held by Respondents
According to School Groups

Unit Shop Credential	Group I	Group II	Group III	Group IV	Total
Aircraft	-	3	2	1	6
Automotive	2	3	16	11	31
Drawing	5	9	17	17	48
Electricity	5	4	7	7	22
Forging and Welding	3	7	13	7	30
General Metal	5	8	12	7	32
Handcraft	2	3	3	4	12
Machine Shop	2	6	9	9	26
Photography	-	-	-	2	2
Printing	-	3	1	2	6
Sheet Metal	3	6	7	8	24
Stage Craft	1	1	1	5	8
Woodwork	7	13	21	13	54
Total number of credentials					301
Total number of Persons	7	15	28	22	

Table XX ranks the unit shop credentials as reported throughout the San Joaquin Valley.

Unit shop credentials in the wood area are held by fifty-four teachers to rank it in first place. Drawing, second with forty-eight; general metal third with thirty-two; automotive fourth with thirty-one; forging and welding fifth with thirty; machine shop sixth with twenty-six; and sheet metal is seventh with twenty-four unit shop credentials.

Table XX

Rank of Unit Shop Credentials		
Rank	Credential	Number Reported
1	Wood	54
2	Drawing	48
3	General Metal	32
4	Automotive	31
5	Forging and Welding	30
6	Machine Shop	26
7	Sheet Metal	24

Table XXI shows the alphabetical list of classes being taught according to school groups.

Duties such as cafe supervision, study hall, office, shop counselling, etc., assigned to the teachers are omitted from the list since they do not represent dissemination of knowledge in the form of organized classroom work. It should be pointed out, though, that students entering teacher education must be prepared to offer such services with some degree of competence.

Ninety-six distinct class offerings are being conducted by the 138 respondents for a total of 773 class hours. The daily class schedules vary from six to eight periods per day with the majority being six periods.

Table XXI

Alphabetical List of Classes Conducted by Respondents
According to School Groups.

Classes	Group I	Group II	Group III	Group IV	Total
Aeronautics	-	-	1	-	1
Agriculture Mechanics	-	4	-	-	4
Algebra	-	-	4	-	4
Architectural Drawing	1	-	-	-	1
Arithmetic	-	1	3	-	4
Arts and Crafts	-	4	-	-	4
Art	-	2	-	-	2
Art Metal	-	1	1	-	2
Assorted Home Crafts	-	-	1	-	1
Auto Shop	12	8	24	26	70
Aviation Education	-	-	-	1	1
Aviation Science	-	2	-	-	2
Basic Aviation	-	-	2	-	2
Basic Tools	-	-	-	1	1
Beginning Carpentry	-	1	-	-	1
Bench Metal	-	-	-	2	2
Bookbinding	-	-	1	-	1
Business Mathematics	-	1	-	-	1
Bus Mechanics	-	1	-	-	1
Blue Print Reading	-	-	-	1	1
Cabinet Making	-	-	2	-	2
Cadets	-	1	-	1	2
Carpentry	-	-	6	-	6
Chemistry	-	-	-	2	2
Chorus	1	-	-	-	1
Civil Engineering	-	-	-	-	-
Crwg., Desc. Geometry	-	-	-	1	1
Coaching	3	-	3	-	6
Commercial Mathematics	1	-	-	-	1
Counselling	2	-	2	1	5
Counselling Arch. Drwg.	-	1	-	-	1
Dramatics	1	-	-	-	1
Driver Education	1	-	2	-	3

Table XXI
(continued)

Classes	Group I	Group II	Group III	Group IV	Total
Electricity	-	-	3	-	3
Electric Shop and Radio	-	-	4	-	4
Elementary Metal	-	-	5	-	5
Engineering Drawing	-	-	1	-	1
English	-	1	-	-	1
Farm Agri. Shop	1	-	-	-	1
General Mathematics	5	-	3	-	8
General Metal	2	-	27	11	40
General Science	-	2	1	2	5
General Shop	5	20	18	5	48
General Shop Drawing	-	-	-	2	2
Geometry	1	-	-	1	2
German	-	1	-	-	1
Girls' Shop	-	2	-	-	2
Handcrafts	-	-	4	-	4
History	-	-	-	2	2
History, U. S.	2	-	-	-	2
History, World	1	-	-	-	1
Household Mechanics	-	-	1	-	1
Journalism and Publications	-	1	-	-	1
Leathercraft	-	-	1	-	1
Library	1	-	-	-	1
Machine and Architectural Drawing	-	-	1	-	1
Machine Shop	2	-	4	18	24
Mechanical and Architec- tural Drawing	-	3	3	-	6
Mechanical Drawing	13	20	38	52	123
Metal Craft	-	-	2	-	2
Metal and Electricity	-	-	-	6	6
Metal and Jewelry	-	-	1	-	1
Metal and Plastics (Girls)	1	-	-	-	1
Metal Shop	7	-	-	-	7
Music Appreciation	1	-	-	-	1

Table XXI
(continued)

Classes	Group I	Group II	Group III	Group IV	Total
Penmanship	-	1	-	-	1
Photography	-	3	-	-	3
Physical Education	5	6	2	2	15
Physics	-	-	1	1	2
Plastics	1	-	4	6	11
Practical Science	-	-	3	-	3
Printing	-	3	2	5	10
Radio and Electric Shop	-	-	4	-	4
Radio Electronics	1	-	-	-	1
Radio	-	-	1	-	1
Refrigeration	-	-	-	2	2
Science, 8th Grade	1	-	-	-	1
Sheet Metal	1	-	4	4	9
Spanish	-	1	-	-	1
Special Problems (Annuals, Posters)	1	-	-	-	1
Shop Craft	-	-	-	3	3
Shop Mathematics	1	-	1	-	2
Stage Craft	1	1	-	-	2
Stage Design	-	-	-	1	1
Trade Drawing, Arch.	-	-	-	1	1
Transportation	-	-	6	-	6
Visual Aids	1	-	1	-	2
Vocational Agri. Mechanics	-	-	5	-	5
Vocational Auto Shop	4	-	-	3	7
Vocational Carpentry	-	-	-	2	2
Vocational Machine Shop	-	-	-	3	3
Voice	1	-	-	-	1
Welding	-	-	7	2	9
Wood and Cabinet	-	1	-	-	1
Wood and Drawing	5	1	-	-	6
Wood and Metal	-	6	-	-	6
Wood	38	57	70	45	210

Table XXII presents the six highest ranking industrial arts subjects. The study shows classes in hand or machine woodwork rank first with 210 classes offered or twenty-seven per cent of the program. Mechanical drawing ranks second with 123 classes or fifteen per cent of the program. Auto shop ranks third with 70 classes or nine per cent. General shop ranks fourth with 48 classes or six per cent of the total while general metal ranks a close fifth or five per cent. Machine shop ranks sixth by being listed 24 times or three per cent.

Table XXII

Distribution of Industrial Arts Subjects by Rank

Rank	Subject	No. of Classes	Per Cent
1	Wood	210	27
2	Mechanical Drawing	123	15
3	Auto Shop	70	9
4	General Shop	48	6
5	General Metal	40	5
6	Machine Shop	24	3

Read: Woodworking ranks first with 210 classes offered or twenty-seven per cent of the entire program.

On the basis of the above data, it would seem that the San Joaquin Valley schools are following the traditional pattern developed during the "manual training movement" long ago. Woodworking and drawing classes

comprised the largest portion of training at that time and the same is true in this area now.

Table XXIII shows the subject field combinations of 138 teachers. Eighty-nine, or sixty-four per cent, of the respondents teach industrial arts subjects only, while thirty-three, or twenty-three per cent, are teaching in one other field in addition to industrial arts. Seven, or five per cent, are teaching industrial arts classes as well as two additional fields. Two teachers stated their schedules included industrial arts subjects along with four other fields.

Table XXIII

Subject Field Combinations of 138 Teachers

	Group I	Group II	Group III	Group IV	Total	Per Cent
Industrial Arts only	5	17	36	31	89	64
One other field	8	10	10	5	33	23
Two other fields	3	2	2	-	7	5
Three other fields	-	3	1	3	7	5
Four other fields	2	-	-	-	2	1
			Total	-	138	

Table XXIV presents data in which subject fields are compared with formal education. The following were not included in this table to prevent misunderstanding or wrong interpretation: (1) classes taught by non-degree holders, (2) incomplete returns on the questionnaire, (3) duties such as study hall, cafe supervision, etc.

Table XXIV

Teaching Subject Field in Relation to Formal Education

	Group I	Group II	Group III	Group IV	Total Classes	Per Cent
No. of classes taught in major field	49	94	143	147	433	66
No. of classes taught in minor field	19	12	34	16	81	12
No. of classes taught out of major or minor field	22	35	51	31	139	21
Totals	90	141	228	194	653	100

Data in this table show sixty-six per cent of the classes being taught are in the area for which the respondent had major preparation. Twelve per cent of the classes have a direct relationship to the minor field of preparation.

It is interesting to note that 139 classes out of 653, or twenty-one per cent, were being taught by an instructor for which he neither had major or minor preparation.

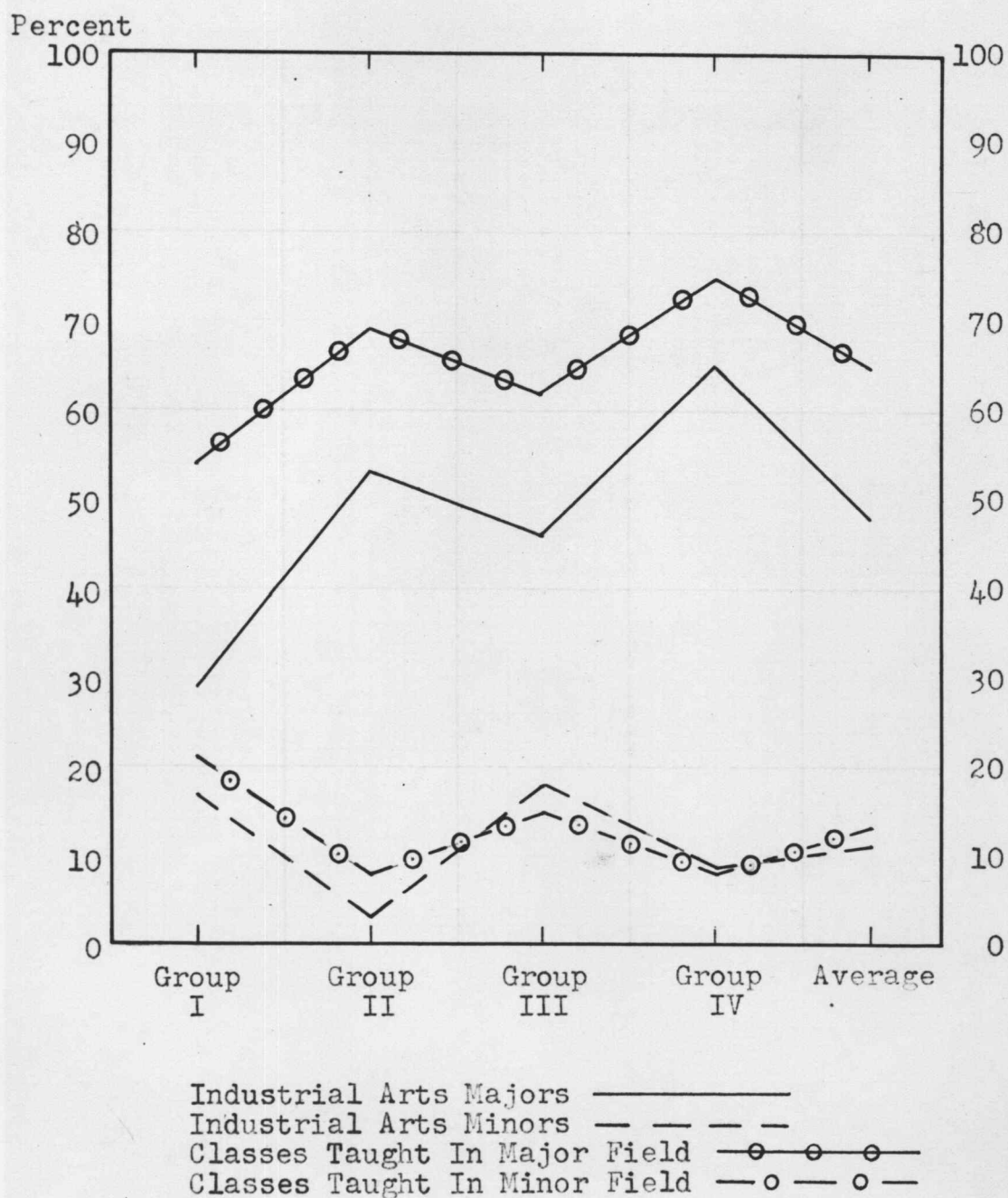
A graphical comparison of major and minor field preparations in industrial arts with classroom assignments shows there is a close parallel in the percentage of classes taught in relation to percentage of majors. The same is true in the minor preparation area, especially in the smaller schools.

Indications are that, although the percentage of industrial arts trained teachers is very low, class assignments to some degree are parallel to the training. Data would seem to indicate that with an increase of trained teachers, there would also be an increase in the per cent of class assignments within the teacher's major preparation area.

Table XXV on page 63 shows the teaching experience of the 138 respondents. The total number of years devoted to teaching school was reported to be 1,886, or an average of 13.67 years per teacher. This experience ranges from one year through thirty-four years.

One hundred eleven of the 138 teachers have taught industrial arts subjects on a full time basis for a total

GRAPHICAL COMPARISON OF MAJOR AND MINOR FIELDS OF PREPARATION WITH TEACHING ASSIGNMENTS



of 1,172 years or an average of 10.55 years per teacher. Forty-one have taught a total of 250 years or 6.09 years per teacher in the industrial arts field on a part time basis.

Of the average 13.67 years teaching experience reported, approximately $10\frac{1}{2}$ years have been in California schools.

Table XXV

Teaching Experience of 138 Respondents

	Number of Teachers	Number of Years	Average
Total teaching experience	138	1,886	13.67
Full time industrial arts	111	1,172	10.55
Part time industrial arts	41	250	6.09
Years in California	138	1,451	10.51

NOTE: Range was 1 to 34 years of teaching experience.

Read: One hundred thirty-eight teachers have had 1,886 total number of years in teaching or an average of 13.67 years per teacher.

Teaching Experience According to School Groups

Table XXVI on page 66 shows the distribution of teaching experience in the various groups. The total years of teaching experience of eighteen teachers in Group I is 134 years or an average of 7.44 years per teacher. Four teachers taught industrial arts subjects part time for a total of thirteen years or an average of 3.22 years per teacher. Eighteen respondents had 134 years of experience of which eighty-seven years or an average of 4.83 years were in California schools.

Thirty-two teachers in Group II have a total of 516 years experience or an average of 16.12 years per teacher. This is slightly less than twice the average teaching experience of Group I. Twenty-seven full time industrial arts teachers have indicated a total of 250 years teaching for an average of 9.25 years per teacher. Thirteen part time industrial arts teachers in this group have an average of 6.46 years of teaching. The total number of years in California teaching for this group of thirty-two respondents is 8.47 years.

Compilation of returns for Group III shows a much larger total average teaching experience. The table indicated this to be 15.64 years for the fifty-one respondents in this group. Forty-four teachers have a total

average of 11.57 years in full time industrial arts teaching while fifteen in this group have had 6.86 years part time industrial arts teaching. The fifty-one respondents of Group III have an average of 13.90 years teaching in California schools out of their 15.64 average total years of experience.

Full time teaching industrial arts in Group IV averages 10.90 or about one-half year less than Group III but well above the smaller schools. Part time industrial arts teaching in larger schools gradually becomes less for an average of 6.31 years per teacher. The total California teaching experience of this group averages 10.37 years.

Table XXVI on page 66 shows the total teaching experience is less in smaller schools while there is a decided increase in the larger ones.

Table XXVI

Teaching Experience Arranged According to School Groups

	No. of Teachers	No. of Years	Average No. Years
<u>Group I</u>			
Total teaching experience	18	134	7.44
Full-time industrial arts	10	76	7.60
Part-time industrial arts	4	13	3.22
No. of years in California	18	87	4.83
<u>Group II</u>			
Total teaching experience	32	516	16.12
Full-time industrial arts	27	250	9.25
Part-time industrial arts	13	84	6.46
No. of years in California	32	271	8.46
<u>Group III</u>			
Total teaching experience	51	798	15.64
Full-time industrial arts	44	519	11.57
Part-time industrial arts	15	103	6.86
No. of years in California	51	709	13.90
<u>Group IV</u>			
Total teaching experience	37	438	11.81
Full-time industrial arts	30	327	10.9
Part-time industrial arts	9	57	6.31
No. of years in California	37	384	10.37

Table XXVII indicates the various grade levels in which the respondents taught.

Ten, or nine per cent, of the teachers indicated they taught on a junior high school level. Ninety-two, or seventy-one per cent, of the reporting teachers taught senior high school classes only; nine respondents, or six per cent, had to share their time with junior and senior high school students; three, or two per cent, said they taught all levels of the secondary grades. A total of twelve persons, or nine per cent, instructs in both the senior high school and the junior college. Only two persons, or one per cent, taught junior college students on a full time basis.

Table XXVII

Grade Levels in Which Respondents Taught

	Grades 7-8-9	Grades 9-12	Grades 7-12	Grades 7-14	Grades 9-14	Grades 13-14
Group I	-	14	3	-	-	-
Group II	3	24	3	-	-	-
Group III	5	30	3	2	5	-
Group IV	2	24	-	1	7	2
Totals	10	92	9	3	12	2
Per cents	9	71	6	2	9	1

Trade Experience

Many and varied trade experiences were reported by the participants. Some teachers stated that much of the trade experience was gained during the summer months. Indications are that other respondents must have had trade experience some time prior to entering the teaching profession.

Table XXVIII on pages 69 and 70 shows these trade and industrial experiences. Fifty teachers have had experience as carpenters; eighteen as auto mechanics; seventeen as machinists; sixteen in mill and cabinet making; ten in drafting; eight in electricity; and seven in welding. Forty additional industrial experience areas were reported in diminishing numbers.

The average months of experience in this study were reduced to years for the purpose of comparisons with studies conducted in other parts of the nation. The average years of trade experience of 107 respondents in the San Joaquin Valley is 5.26 years. A study conducted by Stahl²⁵ in 1939 showed the trade experience of 95 teachers

²⁵ Stahl, Glenn W. The Professional Preparation and Status of the Teacher of Industrial Education in North Carolina, 1939 M.A.

Table XXVIII

Trade and Industrial Experience of Respondents

	No. of Teachers	No. of Months	Average No. of Months
Carpentry	50	1174	21.48
Auto Mechanics	18	685	38
Machinists	17	712	41.88
Mill Cabinet	16	1088	68
Draftsman	10	275	27.5
Electrician	8	196	24
Welding	7	320	45
Aircraft Mechanics	6	99	16
Painting	6	266	44.33
Sheet Metal	4	61	15
Pattern Making	3	88	29
Steel Worker	3	56	18
Aircraft Sheetmetal	2	21	10
Blacksmith	2	62	31
Printing	2	276	138
Plumbing	2	48	24
Assistant Master Mechanic	1	18	18
Architectural Drafting	1	72	72
Aircraft Hydraulics	1	48	48
Auto and Aviation Mechanics	1	96	96
Construction Engineer	1	18	18
Construction Foreman	1	42	42
Concrete Work	1	12	12
Efficiency Engineering	1	18	18
Electronics	1	87	87
Furniture	1	36	36

Table XXVIII
(continued)

	No. of Teachers	No. of Months	Average No. of Months
Gas and Diesel Engines	1	48	48
Layout and Inspection	1	12	12
Locomotive Service, Railroad	1	51	51
Loft Scheduling	1	24	24
Lumber Production	1	17	17
Millwright	1	6	6
Model Building	1	36	36
Naval Sheetmetal	1	6	6
Operating Transi	1	120	120
Parchment Lamp Shade Painting	1	18	18
Radio Service	1	23	23
Refrigeration	1	24	24
Signalman	1	3	3
Surveying	1	36	36
Shoe Repairing	1	18	18
Small Boat Building	1	2	2
Super. of Mining Co.	1	78	78
Training and Personnel	1	60	60
Tool and Die	1	12	12
Tool Design	1	12	12
Tool and Cutter Grinding	1	3	3
Welding and Machine Work	1	150	150

averaged 3.7 years. Blasdell²⁶ found that Colorado teachers in 1939 averaged 2.96 years of trade experience. In studying a report by Harrison²⁷ in 1931, northern Illinois, we find a total average of 2.2 years experience.

Fryklund's²⁸ summary of a study in 1940 shows that 329 instructors represented 1,218 years of trade and industrial experience with an average of 3.7 years per man. The average based on 247 instructors is, practically, five years.

Accurate comparison between this study and those above cannot be made due to possible varying conditions and the many years separating the studies. It can be assumed, though, that teachers of the San Joaquin Valley are as well informed in trade and industrial practice as are teachers in other parts of the country.

Various trade and industrial experiences, rated according to the number of respondents, is shown in Table XXIX on page 72.

²⁶ Blasdell, J. R. Status of the Industrial Arts Teachers in Colorado, 1939.

²⁷ Harrison, P. E. Survey of Industrial Arts Work in the Schools of Northern Illinois, 1931.

²⁸ Fryklund, Verne C. Industrial Arts Teachers Education in the United States, Bulletin No. 2, 1941.

Carpentry is first with fifty teachers averaging 21.48 months experience per teacher; auto mechanics second with eighteen respondents averaging 38.00 months; the machinists trade was third with seventeen persons reporting for an average of 41.88 months. Sixteen respondents have an average of 68.00 months practical experience in mill-cabinet work to rank that trade in fourth place. Ten draftsmen with averages of 27.5 months drafting experience places that trade in fifth place. Trade experiences of electricians, welders, aircraft mechanics, painting, and sheet metal follow in diminishing numbers.

Table XXIX

Rank of Trade or Industrial Experience
According to Number of Respondents

Rank	Trade and Industry	Number of Respondents	Average Months Experience
1	Carpentry	50	21.48
2	Auto Mechanics	18	38.00
3	Machinist	17	41.88
4	Mill-Cabinet	16	68.00
5	Draftsman	10	27.50
6	Electrician	8	24.00
7	Welding	7	45.00
8	Aircraft Mechanics	6	16.00
9	Painting	6	44.33
10	Sheet Metal	4	15.00

Table XXX on page 74 is a comparison by rank of unit shop credentials, classes taught, and trade and industrial experience.

The wood area ranked first in all cases. The area of drawing and drafting was second in both the number of unit shop credentials and classes taught but fourth in trade and industrial experience. General metal, as a unit shop credential, was third, dropped to fifth place in the number of classes taught, and was unidentifiable in the trade and industrial experience.

It is interesting to note that auto mechanics is fourth in unit shop credentials, third in classes taught, and second in trade and industrial experience.

The combination of forging and welding ranks fifth in number of unit shop credentials held. The respondents indicated that forging and welding were not taught as such. Welding as a separate trade and industrial experience ranked sixth.

Although machine shop ranked in sixth place in both the unit shop credentials and classes taught, trade and industrial experiences placed this field third.

The seventh ranking unit shop credential is sheet metal. The number of classes taught as such is very small throughout the San Joaquin Valley. This is also true in the trade and industrial experience as sheet metal ranks ninth.

Table XXX

Comparison By Rank of Unit Shop Credentials,
Classes Taught, and Trade and Industrial Experience

Rank	Unit Shop	Classes Taught	Trade and Industrial Experience
1	Wood	Wood	Wood-Carpentry
2	Drawing	Drawing	Auto Mechanics
3	Gen. Metal	Auto Shop	Machinists
4	Auto Mech.	Gen. Shop	Drafting
5	Forg.-Weld.	Gen. Metal	Electricians
6	Mach. Shop	Mach. Shop	Welding
7	Sheet Metal		Air Craft Mech. Painting Sheet Metal

CHAPTER IV

SUMMARY AND CONCLUSIONS

Summary

Industry has, indeed, been progressive from its early beginnings to the present time. The development of crude tools into scientific instruments has shared a large part in bringing civilization up to the level we enjoy today. The continuous enjoyment, now and in the future, is largely dependent upon the type of teachers prepared in the universities and colleges.

Industrial arts, if it is to fulfill its purpose as a field related to industry, must take a greater part in this program. The preparation of future industrial arts teachers needs be given much thought and consideration. Although studies show that there is no general agreement between states, universities, and colleges as to credential requirements, there is a strong feeling that the preparation of quality teachers is very important.

The analysis of the past and present teacher preparation, classroom assignments, and practical experience may be of great value in predicting and guiding the future of teachers. It is with a better guidance program in mind, for industrial arts teachers of this area, that this study was undertaken.

Careful study and research shows the following

conditions exist in the public secondary schools located in the San Joaquin Valley.

Conclusions

1. Out of 138 participants, 118 received the bachelor's degree, 16 the master's degree, and 20 have not completed college degree requirements.

2. California universities and colleges granted 70 of the bachelor's degrees and two of the master's degrees. Out-of-state universities and colleges granted 48 of the bachelor's degrees and 14 of the master's degrees.

3. It is very apparent that California is not able to supply the demand for specifically trained industrial arts teachers when 44 per cent of the bachelor's degree and 86 per cent of the master's degree holders are from out of state.

4. Sixteen teachers have master's degrees. However, seventy-eight have completed an average of twenty-eight semester units of graduate work. Twenty-four respondents are completing their first or second year of teaching so cannot show additional professional pursuit. This data would tend to indicate that there is a great deal of professional advancement even though the percentage of master's degrees is very small.

5. Thirty-two different subject fields were reported in which the respondents studied on a major or minor basis.

Sixty of the 118, or 48 per cent, of the degree holders majored in industrial arts. Eleven per cent of the respondents minored in industrial arts.

6. Sixty-six per cent of the class assignments are within the major preparation area and 12 per cent are in the minor preparation area. Of the 653 classes being taught by the respondents, 139, or 21 per cent, are being conducted outside the instructor's major or minor field. This seems to indicate that little consideration is given by administrators to the teacher's preparation in relation to his class assignments.

7. Sixty-one of the 138 respondents, or 44 per cent, have special secondary industrial arts credentials; fifty, or 36 per cent, have general secondary; twenty-four, or 17 per cent, junior high; nineteen, or 13 per cent, emergency credential; twelve, or 8 per cent, trade and industrial (Smith-Hughes); seven, or 5 per cent, special secondary limited; six, or 4 per cent, farm shop (Smith-Hughes); and four, or 2 per cent, have the adult education credential. Thirty-four additional credentials not listed in the questionnaire were reported. Eleven of this group are in physical education, four in administration, and three in art.

8. Indications are that there is a trend, among the San Joaquin Valley industrial arts teachers, toward studying for the general secondary credential in lieu of a master's degree.

9. Emergency credentials were issued in nine fields. Eight of the nineteen emergency credentials are general secondaries and four are industrial arts. One each of the following were also issued: administration, auto-mechanics, history and drawing, junior college, mathematics, photography, and woodwork. It is interesting to note that four emergency industrial arts credentials were issued in violation of the California School Code.

10. Unit industrial arts credentials were issued in thirteen fields. They are listed by rank as follows: wood, drawing, general metal, automotive, forging and welding, machine shop, sheet metal, electricity, handcraft, stagecraft, aircraft, printing, and photography.

11. Eighty-nine, or 64 per cent, of the respondents teach industrial arts subjects only. Thirty-three, or 23 per cent, teach in one additional field, and sixteen, or 11 per cent, teach in two to four additional fields.

12. There is some phase of the industrial arts program being conducted in all the schools included in this study.

13. The 138 respondents are teaching 96 different class subjects for a total of 773 class hours. Two hundred ten classes, or 27 per cent, are in some phase of woodwork; one hundred twenty-three, or 15 per cent, in drawing; seventy, or 9 per cent, in auto mechanics. General shop classes comprise 6 per cent of the teachers' programs;

general metal 5 per cent, and machine shop 3 per cent.

14. The number of daily class periods varies among the schools. Six to eight class periods per day were reported but the six-period day seemed to predominate in most cases.

15. The participants have an average of 13.67 years teaching experience. Of this average, 10.5 years have been in California. One hundred eleven instructors, or 80 per cent, have been teaching industrial arts on a full time basis for an average of 10.55 years. Forty-one taught industrial arts subjects on a part time basis for an average of 6.09 years. Teachers located in the three larger school groups have had approximately twice the experience as have the teachers in the very small schools.

16. Many and varied trade and industrial experiences were reported. Out of forty-eight areas, carpentry ranks first with fifty teachers reporting experience in that field. Eighteen had trade experience in auto mechanics; seventeen as machinists; sixteen as mill-cabinet workers; ten as draftsmen; eight as electricians; seven as welders; six as aircraft mechanics; six as painters, and four as sheet metal workers. The remainder of the trade and industrial experiences were reported in diminishing numbers.

Recommendations

The following recommendations are based on the

findings of this study:

1. Administrators should give greater consideration to the teacher's preparation before hiring. Hiring of specific credentialed personnel should be considered over general credentials, in the industrial arts field.

2. The teacher's major and minor fields of preparation should receive greater attention by the administrators when class assignments are made.

3. A greater emphasis should be placed on unit shop credentials for industrial arts teachers, by both the educational institutions and the employer.

4. Emergency general secondary credentials should be discontinued.

5. A California graduate school should provide courses leading to a master's degree in industrial arts education.

6. A recruitment program should be developed whereby future industrial arts teachers may be discovered and encouraged.

7. Prospective industrial arts teachers should be encouraged to gain practical trade and industrial experiences during the summer months.

8. Similar studies should be conducted throughout the State of California with a compilation of all findings.

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2. Bawden, William T. Industrial Arts in Modern Education. Peoria: Manual Arts Press, 1934. 168 p.
3. Bawden, William T. Teacher Training After the War. Ind. Arts and Voc. Edu., vol. 32, Dec. 1943.
4. Blasdell, J. R. Status of Industrial Arts Teachers in Colorado. Unpublished master's thesis, 1939.
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APPENDIX

Materials Used in Study

Fresno, Calif.
November 6, 1948

Mr. Harry L. Anderson,
Caruthers Union High School,
Caruthers, California

Dear Mr. Anderson:

One of the many functions for which educational institutions are responsible is the education of efficient teachers. At times it is necessary to make analyses and comparisons to bring out many pertinent facts that need to be known whereby better guidance may be extended to our prospective teachers.

The Industrial Arts Department of Fresno State College is in need of statistics which will greatly aid in improving its program for student teachers.

You are asked to participate in this study so that a better cross section of training, experience or teaching situation may be presented.

The sharing of your time in filling out the enclosed questionnaire is greatly appreciated. Thank you for giving this your prompt attention.

Sincerely,

/s/ Conrad Feuches
Instructor,
Industrial Arts Dept.,
Fresno State College

CF/d

_____ (name) _____ (name of school)

1. Please name the college or university from which you received your degree or degrees.

AB _____ BS _____

MA _____ MS _____

PhD _____ Others _____

2. What was your major field of study for your AB or BS? _____
3. What was your minor field of study for your AB or BS? _____
4. What was your major field of study for your MA or MS? _____
5. What was your minor field of study for your MA or MS? _____
6. List any other major or minor you have earned in college.

Major _____ Minor _____

Major _____ Minor _____

Comments _____

7. When did you complete your initial undergraduate training? _____
8. How many semester or quarter hours of graduate work do you have beyond your highest degree? (quarter hrs. _____)(Semester hrs. _____)
9. Please check (✓) the California certificates you now hold.

- () General Elementary
- () Junior High
- () Special Secondary in Industrial Arts
- () Special Secondary Limited (Class _____)
- () General Secondary
- () Adult Education
- () Farm Shop (Smith-Hughes)
- () Trade and Industrial Education (Smith-Hughes)
- () Emergency -- in what field? _____
- () Others _____

NOTE: The Industrial Arts Department will be very glad to answer any questions that pertain to meeting requirements for a Special Industrial Arts or General Secondary certificate.

10. How many years of teaching experience have you had? _____
11. How many years of full time teaching in industrial arts? _____
12. How many years of part time teaching in industrial arts? _____
13. How many years of teaching have you done in California? _____
14. Indicate any trade experience

<u>Trade</u>	<u>Months of Exper.</u>
a. _____	_____
b. _____	_____
c. _____	_____
Comments _____	

15. The State Department of Education has set the following minimum semester or quarter hours necessary to hold a unit shop certificate. Please check (✓) the units which you have completed.

NOTE: Holders of General Secondary Credentials need not answer this question.
Holders of Special Secondary Credentials may refer to the reverse side of their credential if necessary.

	<u>Unit or Semester Hours</u>	<u>Units or Quarter Hours</u>	<u>Check</u>
a. Aircraft	15	24	()
b. Automotive	10	15	()
c. Electricity	9	11	()
d. Forging Welding	4	9	()
e. General Metal	12	18	()
f. Handicraft	6	9	()
g. Machine Shop	12	15	()
h. Photography	9	11	()
i. Sheet Metal	6	9	()
j. Stage Craft	6	9	()
k. Woodwork	12	18	()
l. Printing	12	12	()
m. Drawing	10	15	()

16. What is the approximate enrollment of your school? _____
17. () Please check if you desire a summary copy of this study when completed.

18. Please give your daily class schedule by grade level and by correct subject name.

NOTE: Do not list subject as shop I or lab., but as wood shop, sheetmetal, general shop, algebra, mechanical drawing, etc.

SAMPLE SCHEDULE

Grade level	Period I	Period II	Period III	Period IV	Period V	Period VI	Period VII
Jr. High 7-8-9	Sheet Metal	Mechanical drawing	Free				
Sr. High 9-12				Arch. drawing	Mechanical drawing	Shop math	Algebra
Jr. College 13-14							

DAILY CLASS SCHEDULE

Grade level	Period I	Period II	Period III	Period IV	Period V	Period VI	Period VII
Jr. High 7-8-9							
Sr. High 9-12							
Jr. College 13-14							

COPY OF CARD REMINDER

Please check one of the following.

- () I have completed and returned questionnaire.
- () I will complete questionnaire soon.
- () The questionnaire was misplaced. Please send me another copy.

FRESNO STATE COLLEGE
Fresno 4, California

Department of
Industrial Education

December 28, 1948

Mr. Jesse Stockton,
County Superintendent of Schools,
Kern County,
Bakersfield, Calif.

Dear Mr. Stockton:

Would it be possible to have a directory of your secondary school teachers? A study is being made of the industrial arts in the schools of the San Joaquin Valley and a directory of your county would aid us greatly.

If there is any expense attached to getting one, please let me know.

Thank you, I am

Sincerely,

/s/ Conrad Feuches
Instructor

CF/d

Copies sent to:

Mrs. Margaret Annear,
Super. of Schools,
Stanislaus County,
Modesto, Calif.

Miss Agnes M. Buttle,
Super. of Schools,
Merced County,
Merced, Calif.

Fresno, Calif.
February 24, 1949

Mrs. Margaret Annear,
Superintendent of Schools,
Stanislaus County,
Modesto, Calif.

Dear Mrs. Annear:

Would it be possible to obtain from you the number and the kinds of emergency credentials issued in your county for this 1948-49 school year?

This is to be included in a study I am making for our department and I'll appreciate any help you can give me on this question.

Thank you, I am

Sincerely,

/s/ Conrad Feuches
Instructor,
Industrial Arts Dept.,
Fresno State College

CF/d

MERCED COUNTY SCHOOLS
Office of Superintendent

County Courthouse
Merced, California
March 1, 1949

Mr. Conrad Feuches, Instructor,
Fresno State College
Dept. of Industrial Education
Fresno, California

Dear Mr. Feuches:

This is in reply to your letter of February 24, 1949, requesting the number and kinds of emergency credentials issued in Merced County for the 1948-49 school year.

The above information, as taken from the County Superintendent's Report of Number and Type of Credentials in Force, as of October 31, 1948, is as follows:

Administration	1
Adult Education	1
General Elementary	130
General Secondary	24
Health and Development	8
Special Secondary	
Art	2
Music	3
Physical Education	1
Total	<u>170</u>

Yours very truly,

AGNES M. BUTTLE
County Supt. of Schools

By Ruby Gimblin, Deputy

AMB:rg

STANISLAUS COUNTY SCHOOLS

Mrs. Margaret L. Annear
Superintendent

MODESTO, CALIFORNIA

March 2, 1949

Mr. Conrad Feuches, Instructor
Department of Industrial Education
Fresno State College
Fresno 4, California

Dear Mr. Feuches:

Below is a tabulation of the emergency credentials
in our county for this school year, 1948-49:

General Elementary	197
General Secondary.	33
Special Secondary.	4
Elementary Administration.	5
Secondary Administration	1
Special Subject Supervision.	1
Kindergarten-Primary	4
Adult Education.	3
Health and Development	8
Mentally Retarded.	1
	<u>257</u>

Sincerely,

/s/

Margaret L. Annear
County Superintendent of Schools

:AS

COUNTY OF TULARE
State of California

Theo. R. Nickel
County Superintendent of Schools
VISALIA, CALIFORNIA

March 3, 1949

Mr. Conrad Feuches
Fresno State College
Fresno 4, California

Dear Mr. Feuches:

Pursuant to your letter of February 24, we are submitting the following figures for use in your compilation.

Emergency credentials filed in Tulare County from May 1, 1948 through March 3, 1949 are as follows:

Emergency General Administrative	11
" School Supervision-Elementary	2
" Special Subject Supervision-Art.	1
" General Elementary	509
" General Secondary	59
" Special Secondary	1
" Kindergarten-Primary	2
" Health & Development	15
" Special Secondary-Music	5
" Adult Education in Designated Sub.	8
" Special Secondary in Vocational Agriculture	1
" General Junior High School	2
" Child Welfare & Attendance	1
" Special Secondary in Business Education	1
" Special Secondary in Homemaking.	1
" School Psychologist.	1
" Special Secondary for Teaching the Deaf	1
" Special Secondary for Teaching the Mentally Retarded.	2
	<u>623</u>

Sincerely yours,

THEO. R. NICKEL, SUPERINTENDENT
Tulare County Schools
By: /s/ Eileen R. Rounsavell,
Deputy, Certification Department

COUNTY OF KERN

State of California

Jesse D. Stockton
Superintendent of Schools
Rooms 117-119

Court House

Bakersfield

March 5, 1949

Mr. Conrad Feuches, Instructor
Fresno State College
Fresno 4, California

Dear Mr. Feuches:

Enclosed is a report of the number and type of emergency credentials in force in Kern County as of October 31, 1948. The Special Secondary credentials which are on file are of the following type:

Agriculture	1
Homemaking	1
Librarianship	1
Mentally Retarded	11
Music	5
	<u>19</u> as shown on report

I trust that this information is specific enough to help you in your department study.

Sincerely,

Jesse D. Stockton, County
Superintendent of Schools

/s/ Nina Leckliter, Deputy
Certification Department

/NL

WALTER G. MARTIN
Superintendent of Schools

COUNTY OF FRESNO
Fresno, California

May 2, 1949

Mr. Conrad Feuches
Rt. 12, Box 110
Fresno, Calif.

Dear Mr. Feuches:

The following figures are from a survey of credentials in
Fresno County as of November 1948.

Administration	6	emergency	credentials
Adult Education	28	"	"
General Elementary	381	"	"
General Secondary	54	"	"
Health & Development	3	"	"
Kindergarten-Primary	4	"	"
Special in Art	1	"	"
Business Education	1	"	"
Homemaking	4	"	"
Industrial Arts	2	"	"
Mentally Retarded	2	"	"
Music	5	"	"
Total	<u>491</u>	"	"

Very truly yours,

/s/ Gladys L. Long

Chief Deputy
Fresno County Schools

GLL

CREDENTIALS FOR PUBLIC SCHOOL SERVICE
IN CALIFORNIA

Junior High School Credential: ... minimum requirements;

- (a) A four year college course with a bachelor's degree.
- (b) Eighteen semester hours of professional work in education including:
 - (1) A course dealing with the aims, scope and desirable outcomes of the elementary or secondary schools or both.
 - (2) Directed teaching, four semester hours.
- (c) A major and a minor in subjects taught in high school, or a major in education and two minors in high school subjects.
- (d) The completion of a course or the passing of an examination on the provisions and principles of the Constitution of the United States.

Authorization for Service. The junior high school credential authorizes the holder to serve as a teacher in grades seven, eight and nine of any elementary or secondary school.¹

General Secondary School Credential... minimum requirements:

- (a) A four-year college course with a bachelor's degree.
- (b) One full year of graduate work of not less than twenty-four semester hours, including at least six semester hours of professional work in education.
- (c) Eighteen semester hours of professional work in education including:

¹ California Administrative Code, Title 5, Education, Article 5, p. 52.

- (1) A course dealing with the aims, scope, and desirable outcomes of the secondary school.
 - (2) Directed teaching, four semester hours.
 - (3) Other appropriate professional courses.
- (d) The completion of a course or the passing of an examination on the provisions and principles of the Constitution of the United States.
 - (e) One major and one minor in high school subjects or a major in a field not commonly accepted for high school graduation and two minors in high school subjects.

Authorization for Service. The general secondary school credential authorizes the holder to serve as a teacher in secondary schools and in grades seven and eight of any elementary school.²

Adult Education Credential... minimum requirements:

- (a) A program of study designed to develop the applicant into a broadly cultured person and to equip him with the professional education appropriate for a teacher of adults.
- (b) One hundred and forty-four clock hours of successful teaching of adult classes in the public schools of California.
- (c) Four years of college or university work, or the equivalent including:
 - (1) Twelve semester hours, or the equivalent, with emphasis upon the problems, principles, and philosophy of adult education; curriculum methods and class organization in adult education; vocational education; educational and vocational guidance of adults.
 - (2) Twenty semester hours, or the equivalent, in one of the following subject groups: agriculture, arts and crafts, business education, family life education, industrial arts, language and speech arts, mathematics, music, physical and health education, science,

² California Administrative Code, Title 5, Education, Article 6, p. 52.

social-civic education including Americanization, trade and industry, provided that the applicant shall show skills appropriate to and adequate in the respective fields for successful teaching in these subjects.

Authorization for Service. The adult education credential authorizes the holder to teach the subjects to be named in the credential in classes for adults.³

Special Secondary Credential in Industrial Arts Education... minimum requirements:

- (a) A four-year college course with a bachelor's degree.
- (b) Sixteen semester hours of work in the subject groups of English, science, social studies, and physical education.
- (c) Fifteen semester hours of professional work in education including:
 - (1) A course dealing with the aims, scope, and desirable outcomes of the elementary and secondary school.
 - (2) Directed teaching in industrial arts, six semester hours.
 - (3) Methods courses in industrial arts.
 - (4) Other courses in education organized for the training of public school teachers.
- (d) Forty semester hours of special technical training suited to the needs of teachers of junior and senior high school students, distributed approximately as follows:

<u>Subject group</u>	<u>Semester hours</u>
(1) Automobile and transportation	3
(2) Woodwork	3
(3) Drawing	3
(4) Electricity and radio	3
(5) Metal work	3
Total	15
Additional courses	25

³ California Administrative Code, Title 5, Article 34, p. 77.

The twenty-five semester hours of shop electives shall be made up of additional courses in the subjects listed in the above required group, or selected from the following or similar subjects:

- (1) Battery construction and repair
- (2) Vulcanizing and tire repair
- (3) Home mechanics and general shop
- (4) Forging and welding
- (5) Wood finishing and painting
- (6) Leather work
- (7) Upholstery and canning
- (8) Construction work for elementary grades
- (9) Art metal work
- (10) Pattern making and foundry work
- (11) Pumps and irrigation equipment
- (12) General Shop
- (13) Printing including a minimum of eight semester hours of college work plus not less than 416 clock hours of practical experience in commercial shop is required for certification in printing.
- (14) Aircraft mechanics and allied courses

Authorization for Service. The special secondary credential in industrial arts education authorizes the holder to teach the industrial arts subjects to be named in the credential in elementary and secondary schools.⁴

Special Secondary Limited Credential in Industrial Arts Education... minimum requirements:

(a) The Practical Craftsman

- (1) Graduation from a four-year school or the equivalent.
- (2) Five years of acceptable trade experience in an approved trade or trade field, and the passing of the approved trade tests.

⁴ California Administrative Code, Title 5, Education Article 18, pp. 62-63.

- (3) Sixty semester hours of teacher training, distributed as follows:

<u>Subject group</u>	<u>Semester hours</u>
English	6
Social Studies	9
Mathematics	3
Science	6
Education	15
Practice teaching	6
Physical education	2
Hygiene	2
Related technical subjects	<u>11</u>
Total	60

- (b) The Holder of a Vocational Credential.

- (1) Graduation from a four-year high school or equivalent.
- (2) Twenty-two semester hours of work in vocational teacher training.
- (3) Forty-four semester hours of work selected by the evaluating institution from sub-section (a), (3) above after credit has been granted for sixteen semester hours of the work completed in vocational teacher training.

- (c) Postponement of requirements.

- (1) In the event that no applicant who qualified under (a) or (b) above is available, specific requirements may be postponed upon the recommendation of the evaluating institution on the basis of a specific request by a superintendent of schools or a high school principal.

Authorization for Service. The special secondary limited credential in industrial arts education authorizes the holder to teach the subjects to be named in the credential in an industrial arts program in elementary and secondary schools.⁵

⁵ California Administrative Code, Title 5, Education Article 19, pp. 64-65.

Special Secondary Vocational Class A Credential in Trade and Industrial and Public Service Education...
minimum requirements:

- (a) Graduation from a secondary school.
- (b) Successfully passed an examination in oral and written English, civic and general information, and in the trade or industrial occupation for which the credential is sought.
- (c) Three years experience as a journeyman worker based upon apprenticeship training or its equivalent in the trade or industrial or public service occupation to be named in the credential.
- (d) One year of the required journeyman experience during the preceding three years in the trade or industrial or public service occupation to be named in the credential.
- (e) Twenty-two semester hours of professional courses offered by the University of California, Division of Vocational Education, in the vocational teacher training curriculum for the preparation of trade and industrial and public service teachers. The work should be distributed as follows and shall include the completion of a trade or occupational analysis. The completed trade analysis shall be submitted to the University of California Division of Vocational Education upon the completion of twelve semester hours.

	<u>Subject group</u>	<u>Semester hours</u>
(1)	Occupational analysis	2
(2)	Techniques of Vocational Instruction	2
(3)	Organization and Management Instruction	2
(4)	Preparation of Instruction Sheets	2
(5)	Construction of Vocational Curricula	2
(6)	Occupational Tests and Measurements	2
(7)	Principles and Practices of Vocational Education	2
(8)	Vocational Guidance	2
(9)	Civic and Employment Relations	2
(10)	Secondary Education	2
(11)	Observation and Directed Teaching	2

(f) Postponement of Requirements. A credential valid for one year may be issued to an applicant who has not completed the required training, provided:

- (1) A definite vacancy exists for which there is no legally qualified applicant available.
- (2) A request for the granting of a credential is made to the Commission of Credentials by the employing authority stating intention to employ the applicant.

NOTE: The applicant receiving the credential under these conditions must complete the required teacher education as indicated in the credential before a five-year renewal is granted.

Authorization for Service. The special secondary vocational Class A credential in trade and industrial and public service education authorizes the holder to teach the trade, industrial, or public service occupation to be named in the credential and the trade and related technical subjects related and limited to the occupation to be named in the credential in all schools and classes meeting the requirements of the California Plan for Trade and Industrial and Public Service Education, for which reimbursement is approved under the Federal and State Vocational Education Acts.⁶

General Elementary Credential... minimum requirements:

- (a) A four-year college course, with a bachelor's degree.
- (b) Twenty-four semester hours of professional work in education, including eight semester hours of directed teaching, adequate preparation for teaching the statutory elementary school subjects and the subjects in which the applicant is required by law to be proficient.
- (c) The completion of a course or the passing of an examination on the provisions and principles of the Constitution of the United States as prescribed in Section 201.

⁶ California Administrative Code, Title 5, Education Article 30, pp. 72-73.

Authorization for Service. The general elementary credential authorizes the holder to serve as a teacher in any elementary school, in grades seven and eight of any junior high school, and as principal of any junior high school.⁸

⁷ Ibid. General Elementary Credential, Article 4, p. 51.