

THE HISTORY AND STATUS OF INDUSTRIAL ARTS IN
NEW MEXICO SINCE STATEHOOD

THE HISTORY AND STATUS OF INDUSTRIAL ARTS IN
NEW MEXICO SINCE STATEHOOD

By

GRANVILLE BENNETT STRUNK
"

Bachelor of Science

Southeastern State Teachers College

Durant, Oklahoma

1933

Submitted to the Department of
Industrial Arts Education And Engineering Shopwork
Oklahoma Agricultural and Mechanical College
In Partial Fulfillment of the Requirements
For the Degree of
MASTER OF SCIENCE

1941

LIBRARY
OKLAHOMA AGRICULTURAL AND MECHANICAL COLLEGE
DURANT, OKLAHOMA

DELAWARE
AGRICULTURAL & MECHANICAL COLLEGE
LIBRARY
OCT 6 1941

iii

APPROVED BY:

Dwight Hunt

Chairman, Thesis Committee

C. L. Hill

Member of the Thesis Committee

Dwight Hunt

Head of the Department

D. G. M. Folsch

Dean, Graduate School

ACKNOWLEDGMENTS

The writer acknowledges with deep appreciation a debt of gratitude and obligation to his adviser, Doctor DeWitt T. Hunt, Head of the Department of Industrial Arts Education and Engineering Shopwork, Oklahoma A. and M. College, for untiring interest, guidance, and patience, throughout his graduate work and during the progress of this study. He is much indebted, too, to members of the New Mexico State Board of Public Instruction, Santa Fe, New Mexico, who were so helpful in giving access to their files and who gave freely of their time.

The author also wishes to express his thanks to the industrial arts teachers in New Mexico who cooperated in this study, to Mr. J. L. Burke, Superintendent of Schools, Jal, New Mexico, Mr. K. B. Walker, Principal of the High School, Jal, New Mexico, and to Doctor T. H. Schutte, Dean and Director of Professional Training, New Mexico Teachers College, for their willingness to assist in this study.

To the thesis and examining committee, Doctor DeWitt T. Hunt, Professors C. L. Hill, C. R. Wood, Henry P. Adams and Doctor Harold A. Huntington, his thanks for their sympathetic understanding.

And too, the library staff of Oklahoma A. and M. College for their splendid assistance and willingness to participate in the search for materials of primary source.

And last, the author would not forget his wife, Ora Frances Strunk, without whose cooperative spirit, encouraging words, constructive criticism, and assistance in typing, this study could not have been completed.

G. B. S.

TABLE OF CONTENTS

| CHAPTER | PAGE |
|---|------|
| I. HOW THE PROBLEM IS ORGANIZED | 1 |
| Purposes to be Realized by the Study | 2 |
| Definite Statement of the Problem | 2 |
| +Delimitations of the Study | 3 |
| Definition of Terms | 3 |
| Review of Previous Studies | 5 |
| Theses not Reviewed | 12 |
| The General Method of This Study | 12 |
| The Use of the Study | 13 |
| The Next Step in this Study | 14 |
| II. THE STATE OF NEW MEXICO AND ITS EDUCATIONAL PROGRAM | 15 |
| PART A HISTORICAL DATA | 15 |
| The New Country Named | 17 |
| Mexican Trails | 17 |
| New Mexico Under an Independent Mexico | 18 |
| Freedom from Mexico | 19 |
| New Mexico as a Territory | 20 |
| New Mexico and Statehood | 20 |
| PART B POPULATION, GEOGRAPHIC AND ECONOMIC STATUS | 21 |
| Population | 21 |
| The Geography of New Mexico | 23 |
| Economic Status | 24 |
| PART C THE DEVELOPMENT OF A STATE EDUCATIONAL PROGRAM | 29 |
| Missions | 30 |
| The Development of Public Schools | 30 |
| Size of Schools | 31 |
| Colleges and Universities in New Mexico | 34 |
| The Advent of "Manual Training" | 34 |
| Industrial Arts Developments | 35 |
| Early Salaries | 36 |
| III. INDUSTRIAL ARTS TEACHERS EDUCATION AND CERTIFICATION IN NEW MEXICO | 38 |
| PART A COLLEGES AND UNIVERSITIES IN NEW MEXICO | 38 |
| Eastern New Mexico College | 39 |
| New Mexico State Teachers College | 39 |
| New Mexico College of Agriculture and Mechanical Arts | 39 |
| New Mexico Normal University | 40 |
| The University of New Mexico | 40 |
| PART B CERTIFICATION OF TEACHERS | 41 |
| Industrial Arts Certificates | 44 |

TABLE OF CONTENTS (CONTINUED)

| CHAPTER | PAGE |
|--|------|
| III. | |
| PART C COURSES IN NEW MEXICO COLLEGES PRE- | |
| PARING INDUSTRIAL ARTS TEACHERS | 45 |
| The Eastern New Mexico College | 45 |
| The New Mexico College of Agricultural | |
| and Mechanical Arts | 45 |
| New Mexico Normal University | 45 |
| Teacher Trainers and Their Qualifi- | |
| cations | 46 |
| A Review and a Prognosis | 46 |
| IV. A DESCRIPTION OF THE QUESTIONNAIRE | 48 |
| PART A CRITERIA FOR MAKING A GOOD QUESTION- | |
| NAIRE | 48 |
| The Form of a Well-Designed Question- | |
| naire | 48 |
| Sponsorship of a Questionnaire | 49 |
| The Validation of a Questionnaire | 50 |
| PART B ARRANGEMENT OF QUESTIONNAIRE | 51 |
| Qualifications | 52 |
| The Shop and Equipment | 52 |
| The Curriculum | 52 |
| Historical Data | 52 |
| Extra-Curricular | 52 |
| V. A REPORT OF INQUIRY INTO THE STATUS OF INDUSTRIAL | |
| ARTS IN NEW MEXICO SCHOOLS | 53 |
| PART A TEACHERS OF INDUSTRIAL ARTS IN NEW | |
| MEXICO SCHOOLS | 53 |
| The Number of Industrial Arts Teachers | |
| in New Mexico | 53 |
| Qualifications of the Teachers | 54 |
| What College are the Degrees from? | 55 |
| Major Field | 56 |
| Attitude of Teachers Toward Self- | |
| Improvement | 58 |
| Salaries and Tenure | 60 |
| Other Personal Qualities | 64 |
| Visiting Other School Shops | 67 |
| PART B THE SHOP AND ITS EQUIPMENT | 68 |
| Laboratory Size | 70 |
| Location of Shop | 72 |
| In What Direction Does the Shop Face .. | 73 |
| Natural Light | 73 |
| Tool Rooms | 75 |
| Lecture Room | 76 |
| Types of Floors | 77 |
| Lockers | 78 |
| Doors | 79 |
| The Shop Library | 80 |

TABLE OF CONTENTS (CONTINUED)

| CHAPTER | | PAGE |
|---------|--|---------|
| V. | | |
| | The One Teacher Shop | 81 |
| | Teachers' Offices | 82 |
| | Machines in New Mexico School Shops ... | 83 |
| | Value of Electric Machines | 83 |
| PART C | INDUSTRIAL ARTS TEACHERS SPONSORING EXTRA-CURRICULAR ACTIVITIES | 84 |
| | Extra-Curricular Activities of Indus- trial Arts Teachers of New Mexico | 85 |
| | Additional Duties of Other Industrial Arts Teachers | 85 |
| VI. | SUMMATION OF DATA WITH RECOMMENDATIONS FOR THE STATE PROGRAM OF INDUSTRIAL ARTS | 86 |
| PART A | SUMMARY | 86 |
| | How the Problem is Organized | 86 |
| | The State of New Mexico and Its Educa- tional Program | 87 |
| | Industrial Arts Teacher Education and Certification in New Mexico | 88 |
| | A Description of the Questionnaire | 89 |
| | A Report of Inquiry into the Status of Industrial Arts in New Mexico Schools.. | 89 |
| PART B | RECOMMENDATIONS | 93 |
| | Twelve Months Employment | 94 |
| | A More Diversified Program | 94 |
| | Adults Encouraged to take Industrial Arts | 94 |
| | An Adequate Financial Record | 94 |
| | Group Meetings | 94 |
| | Self-Improvement | 94 |
| | State Objectives | 94 |
| | Improvement of Teaching | 95 |
| | Extension of Industrial Arts | 95 |
| | Certification | 95 |
| | Teacher Up-Grading | 95 |
| | Summer School Attendance | 95 |
| | Shop Planning | 95 |
| | Teacher's Salary | 96 |
| | Extension of Teacher Preparation | 96 |
| | State Support | 96 |
| | State Supervision | 96 |
| | A State Advisory Committee | 96 |
| | Further Studies | 97 |
| | BIBLIOGRAPHY | 98 |
| | APPENDICES | 101-110 |

LIST OF TABLES

| TABLE | DESCRIPTION | PAGE |
|-------|--|------|
| I | The Size of Schools by Enrollment | 32 |
| II | Salary Schedules of Industrial Arts Teachers in 1913-1924 | 37 |
| III | Standards for Certification of Teachers | 42 |
| IV | College Graduates | 54 |
| V | From What College Graduated | 56 |
| VI | Number of Semester Hours in Major Field | 57 |
| VII | Attitudes of Industrial Arts Teachers Toward Self-Improvement | 59 |
| VIII | The Salaries of Industrial Arts Teachers in New Mexico | 61 |
| IX | Tenure | 63 |
| X | Library | 64 |
| XI | Professional Magazines | 65 |
| XII | Spending Vacation | 66 |
| XIII | Teachers Visiting Schools and Using Checking Cards | 68 |
| XIV | Separate Shop Building | 70 |
| XV | Size of Shop Buildings in New Mexico High Schools | 71 |
| XVI | Location of School Shops in New Mexico High Schools | 72 |
| XVII | Direction the Shop Faces | 73 |
| XVIII | Number of Windows in Shop | 74 |
| XIX | Tool Rooms | 75 |
| XX | Lecture Rooms | 75 |
| XXI | Types of Floors | 77 |
| XXII | Shops Containing Lockers | 79 |
| XXIII | How Doors Open | 79 |
| XXIV | Shop Libraries | 80 |
| XXV | Windows in Partition of Walls | 82 |
| XXVI | Teachers' Offices | 82 |
| XXVII | Value of Machines and Hand Tools | 84 |

LIST OF MAPS

| MAP | PAGE |
|--|------|
| 1. The Number of Schools in Each County and Number of Industrial Arts Teachers in Each And Location of County Seat Towns | 26 |
| 2. Major Rivers of the State | 27 |
| 3. Mining Districts and Oil fields in State | 28 |

CHAPTER I

HOW THE PROBLEM IS ORGANIZED

The subject of the study was chosen because of the keen interest of the writer in industrial arts and his realization of a need in New Mexico for specific data and information concerning the industrial arts program in the public school systems of the state. It is hoped that the material will be presented in such a way as to show the present status of industrial arts; deficiencies in the present program; and some means of improving the present status.

With these points in mind the study has been organized by the use of an outline as a guide. Chapter I acquaints the reader with the origin and delimitations of the study and the professional terms used. Chapter II acquaints the reader with the educational program of the state of New Mexico. It includes a sketch of the state history, geography, economic conditions, and public school education. A knowledge of these will aid the reader in understanding the relation of the industrial arts program to the educational system. Chapter III consists of detailed tabulations dealing with the present status of industrial arts within the state. Chapter IV includes a summary of the preceding chapters and recommendations for improving the program in the schools already offering it, for introducing it into

other schools and for creating a student interest in the subject.

Purposes to be Realized by the Study. This survey will give a resume of what is being done in industrial arts in New Mexico, and how the program is being conducted. It is hoped that this study will diagnose the curriculum and that suggestions will be made to improve the course. It is also expected to see the program added to the curricula of other schools, more units added to the present curriculum of those schools already sponsoring some form of industrial arts, adequate equipment and supplies added for all school shops, and that teachers will be motivated to create new interest among students.

Definite Statement of the Problem. The survey of industrial arts in New Mexico included a study of twenty-five accredited public junior and senior high schools in which industrial arts courses are being offered.

In dealing with this subject the writer has attempted to show the extent of the industrial arts program in New Mexico schools as to (1) the schools in which it is taught, (2) the size of the schools, (3) the enrollment of the classes, (4) the percentage of total having a department, (5) professional terminology used to designate courses, (6) experience of teachers, (7) salary of teachers, (8) certification of teachers, (9) scholastic preparation of teachers,

(10) time given to classes, (11) number of full time industrial arts teachers, (12) attitude of teachers toward self improvement, (13) value of shop equipment, and (14) a description of the state of New Mexico.

Delimitations of the Study. The study is limited to industrial arts in New Mexico. This survey does not include vocational agriculture, home economics or trade classes. It is limited to industrial arts on the secondary educational level only, except in so far as certain movements on the elementary or higher education levels have exerted influences on secondary education practices. No attempt has been made in this study to compare the New Mexico industrial arts with programs in other states. Several theses in which state programs are described have been reviewed in this thesis.

Definitions of Terms. The following definitions are presented for the purpose of giving the reader a better understanding of this study. Adequate bibliographical reference is made where the definitions have been found in publications.

Manual Training was the original term under which the industrial activity work was introduced into this country following the Centennial Exposition at Philadelphia in 1876. (37, page 7) - "I believe that the term 'manual training' might be rightly applied to any exercise in which thought is expressed by means of the hand." (33, page 7)

Industrial Arts is a study of the changes made by man in the forms of materials to increase their values, and of the problems of life related to the changes. (3, page 5)

The term "Program" includes all of the various policies as they are developed into a curriculum, as well as the additional work that members of a department may render through professional service other than teaching. (33, page 7)

Industrial Arts in the Junior High School. Industrial arts in the junior high school level refers to all programs of shopwork, industrial drawing or arts-crafts activities offered for purposes of general education, exploration, orientation, and home mechanics training. (16, page 12)

Vocational Industrial Education is the name given to any shop work or industrial drawing courses given in high school classes for trade preparation. (20, page 13)

The term "Technical Courses" refers to the shop or laboratory offerings of a program. (33, page 7)

Shopwork includes the planning and production of changes in materials by the use of tools and machines. (15, page 19)

A Profession implies the application of free, resourceful, unhampered intelligence to the comprehension of problems. (2, page 30)

Curriculum as used in this study, refers to a planned sequence of courses and electives leading to a degree. (15, page 20)

A Course refers to a unit of instruction in a definite subject, lasting only one term or semester and assigned a definite credit value in the catalog. (15, page 20)

Mechanic Arts is a broad educational term, which includes engineering education as its higher or professional phase, trade school and short-course instruction as its collateral and extension phase and experimental and other technical investigation as its research phase. (32, page 798)

An area in a shop refers to that portion of the shop where the equipment and space are given over to a special type of work. (15, page 21)

Composite course usually refers to two or more of the conventional shop work subjects taught under the same catalog number. (15, page 21)

Skill is a thoroughly established habit of doing a thing in the most economical way. It must not be confused with accuracy. Accuracy should be the result of skill, but a piece of work may be done with a high degree of accuracy, and yet the process by which it was done may be laborious, crude, and unskillful. (29, page 180)

Smith-Hughes refers to an act of congress that was passed in 1917 for vocational aid and was named for Senator Hoke Smith and Representative Dudley Hughes both of Georgia, since they were the men who introduced the bill.

A Blue Print is one of the many methods of reproducing from a tracing (usually a mechanical drawing). It is the most common method known to the majority of people. The paper used for this method of production is a pale green on the side to be exposed and after a brief exposure turns blue, hence the name blue-print.

Industrial Training is a narrow form of vocational education for the industrial worker, training only in the manipulative skills of a mechanical vocation or a specialized industrial pursuit. (33, page 29)

Practical Arts education is a form of general or non-vocational education which aids or enriches every day living principally through purposive activity. Its method is typically doing things; that is, taking part in activity directed toward some present useful purpose... (33, page 30)

The term "Laboratory" is more appropriate when the offering is provided upon an experimental or developmental basis, as is commonly done in the junior high school; and the term shop may be more appropriate where the work is carried on rather upon the production or economic basis, as may be done in the senior high school. (33, page 27)

Art, n. Ar, to fit; ars, skill; old French art, skill; skill, method. Refers to skill and method in adaptation of process. Is a relative term of quality. Arts plural of art. (36, page 11)

Education, n. Educere, to bring or lead out; the result of leading or bringing out. (33, page 11)

Vocation, n. Vocare (atus), to call; vocation, an invitation; ion suffix denoting result of an act; the result of being called especially into a regular employment. (36, page 11)

✓ Review of Previous Studies. Titles of five similar and recent studies of this problem have been found. These are:

A Survey of Local Industrial Arts Units in a Representative

Number of Schools in Washington, by Myron, (21) conducted in 1937; Industrial Arts in the White Senior High Schools of West Virginia, Woodward, (39) 1937; Status of Industrial Arts in Oklahoma Schools in 1938 and Suggested Statements for Controlling Philosophy for Industrial Arts, Pope, (26) 1938; Status of Industrial Arts in Louisiana, Fife, (11) 1939; A Survey of Industrial Arts of North Dakota, Montague, (20) 1939. Reviews of these studies are given in the following paragraphs.

The first being reviewed is that by Myron, who in 1937, wrote a thesis entitled A Survey of Local Industrial Arts Units in a Representative Number of Schools in Washington, and submitted it to the University of Washington.

Chapter I, Schools Participating and Subjects Taught. This chapter, as was true of all those being reviewed with the exception of that of Pope (26, pages 1-59) used the footnotes in referring to source. In this chapter the author neglected to give discussions of the quotations which were used. However, the chapter does begin with a splendid introduction. The chapter contained seventeen pages in which he introduced and defined professional terms, and gave a history of industrial arts through its different stages.

Chapter II, General Questions for Administrators and Instructors. In this chapter the author did not refer to any source to verify his statements. He did use his questionnaire. The tables were not introduced, neither were they followed by a discussion.

Chapter III, Pupil Personnel. This chapter is similar to the preceding one. Both deal with the status of industrial arts in the state of Washington.

Chapter IV, Instruction. This and the following two chapters deal with the status as the previous two chapters have. The only place the author used any authentic source to prove or justify his statements was in the introductory chapter and it was a secondary source. He uses an excellent bibliography but he did not refer to it. Secondary source is not desirable. Crawford (8 , page 52) explains the source:

Original versus secondary sources. There are two general types of sources from which to write history. The first, and the most valuable, is the original, or primary source. It is the actual object, remains, records, or document, which have survived from the past. The other type is the secondary source, or account of the past written by someone who had some kind of access to the original source.

Secondary source should be traced back to the original.

Chapters V, VI, and VII are Physical Conditions, Evaluation of Work, and Summary respectively. The first two named deals with the status of industrial arts in the schools of Washington under slightly different headings from those already discussed.

In 1937, Woodward (43, pages 1-94) submitted to the University of Kentucky, a thesis entitled Industrial Arts in the White Senior High Schools of West Virginia.

Chapter I, Introduction. This chapter is only three pages long. In it he gives the statement of the problem,

reasons for choosing, value of the study, methods of securing information and work already completed on problem. Names and titles of work are all that he mentions. He used footnotes in referring to source.

Chapter II, Aims and Objectives of Industrial Arts. In this chapter he uses quotations without an introduction, and does not discuss these quotations after using them.

Chapter III, Nomenclature used in Designating Classes, and Chapter IV, Extent of Industrial Arts in West Virginia, could have been combined and called the Status of Industrial Arts in West Virginia, because both chapters deal with subjects under different headings.

Chapter V, Status of Teachers of Industrial Arts in West Virginia. This chapter gives qualifications of teachers, salaries, tenures, and schools from which the teachers were graduated. In this chapter the author has made adequate tables, but did not introduce or discuss them properly.

Chapter VI, Summary and Conclusions. The summary covers the content of the thesis competently.

Appendix. The appendix contains forty pages, which is nearly one half of the entire work. Appendix A consists of questionnaires sent to the administrators in the State of Washington, and Appendix B consists of copies of questionnaires sent to teachers in the same state.

In 1938, Pope (26, pages 1-59) submitted to the department of Industrial Arts Education and Engineering Shopwork,

Oklahoma Agricultural and Mechanical College, Stillwater, a thesis entitled Status of Industrial Arts in Oklahoma Schools in 1938 and Suggested Statements of Controlling Philosophy for Industrial Arts.

Chapter I, The Scope and Organization of the Study. In this chapter the author presents his reasons, the needs, and limitations of his problem. His method of writing seems more suitable than any of the five thesis being reviewed. The author presents his material in a manner that makes it enjoyable reading and at the same time presents quotations to verify his statements. This is done by giving the name of the author, title of book, and pages in a convenient style at the beginning of the single spaced quotation. This method is used throughout his thesis.

Chapter II, Proposed Statements of Controlling Philosophy for Industrial Arts in Oklahoma Schools. In this chapter it seems that the first two paragraph topics, namely: Origin of the Problem and Formation of the Statement should have been placed in chapter one. The controlling philosophy is fully sufficient here.

Chapter III, Findings for the Statements of Philosophies and Objectives. The philosophies are taken one at a time and discussed, then the objectives are discussed in like manner. Ample sources have been given to verify the statements. This chapter contains good authentic material.

Chapter IV, The Status of Industrial Arts in Junior

and Senior High Schools in Oklahoma. In this chapter, the school enrollment, the size of classes, the school plans, teachers' schedules by enrollment, and length of periods, etc. are shown by tables.

Chapter V, Summary, Conclusions and Recommendations.

In 1939, Fife (13, pages 1-64) submitted to the Louisiana State University and Agricultural and Mechanical College, a thesis entitled Status of Industrial Arts Teachers in Louisiana.

Chapter I, Introduction. The introduction is satisfactory. His method of referring to source is by the use of footnotes, quotations are introduced without proper discussion, no closing statements are found at the end of quotations, and no transition paragraphs are used between chapters.

Chapter II, Personnel Data and Training of the Industrial Arts Teachers. Chapters II, III, and IV are nothing more than the status of industrial arts in Louisiana. All of these chapters could have been combined.

Chapters V and VI are entitled Teaching Responsibilities and Suggestions Made by Industrial Arts Teachers respectively. Both are a discussion by the author, with one outside source cited in Chapter V and no outside source is quoted in Chapter VI.

Chapter VII, Conclusions and Recommendations. Seventy-one per cent of Louisiana teachers returned questionnaires and showed a willingness to cooperate in the program for

improvement of professional status of industrial arts teachers. Information obtained showed conclusive lack of specific professional training. Five industrial arts teachers in Louisiana have degrees in industrial arts education or industrial arts. Most of the teachers of industrial arts have majors in English. Most of the industrial arts teachers of Louisiana are married, receive an average annual salary of \$1,502.80 or about \$125 per month, which is very low compared with other professional men. The average age of teachers is 33.9 years. Only three have the Master of Science degree. Nine have no degree. Fifteen have read no professional books in the last two school years. Twenty-one have not attended any professional meetings.

It is recommended that school boards should contract industrial arts teachers for one month after the actual school year. Specific courses should be offered in industrial education by state school systems both in residence and by extension. Monthly regional conferences of industrial arts teachers should be held in a central location for professional discussions. Industrial arts teachers, as a group, should be continually alert and active in improvement of professional standards by working through professional organizations which should be organized in the near future.

In 1939, Montague (20, page 1-73) submitted to the University of North Dakota, a thesis entitled A Survey of the Industrial Arts of North Dakota.

Chapter I, Introduction. A brief discussion of the purpose of the study, source of data and terminology are the only topics included in the first chapter. The terminology is composed of only five definitions.

Chapter II, Growth and Decline of Industrial Arts in the Accredited High Schools. Chapter two, and also chapters three, four, and five contain nothing more than a discussion of the status of industrial arts in North Dakota.

Chapter VI, Conclusions and Recommendations. In this concluding chapter the author has summarized his thesis and made some recommendations for the betterment of industrial arts in his particular section.

Theses not Reviewed. Here is a list of four theses that the writer did not review:

Baxter, William Thomas, Status of Industrial Arts in Virginia in 1931, George Peabody College for Teachers, Nashville, Tennessee, 1931.

Pace, Carl, Status of Industrial Arts in Tennessee, George Peabody College for Teachers, Nashville, Tennessee, 1933.

Stansburry, E. B., Status of Industrial Arts in the Secondary Schools of Kentucky, George Peabody College for Teachers, Nashville, Tennessee, 1933.

Ackert, Hugh P., Status of Industrial Arts in the High Schools of South Dakota, Unpublished Master's Thesis, University of North Dakota, 1937.

The General Method of this Study. It was necessary for the writer to search the records in the New Mexico State Department of Education, and the Federal Library both of which are located at Santa Fe.

In developing this study the writer constructed a questionnaire, a copy of which may be found in Appendix B. This questionnaire was prepared with due consideration for the principles of questionnaire making.

The writer personally interviewed eight industrial arts teachers in the State of New Mexico. The writer has visited a majority of the shops in the state.

A copy of the listed industrial arts teachers in New Mexico was obtained from the State Department of Education through Mr. L. W. Clark, Director of Secondary Education. To these teachers, including the ones who were interviewed, a typed copy of the questionnaire was mailed seeking the desired information for the study. Of the thirty questionnaires that were sent out, a total of twenty-five were returned.

Figure I is a map of New Mexico showing the thirty-one counties within the state. The number printed in parenthesis within the county lines denotes the number of teachers in that particular county who teach industrial arts. The other number (not in parenthesis) denotes the number of municipal or independent schools in that particular county.

The Use of the Study. In this survey the writer proposes to identify certain major movements in industrial arts in New Mexico, and to show what influence, if any, they have had upon present theories and practices. He proposes to consider the standards which the schools maintain, the qualifications, tenure and experiences of teachers; various designs

and expedients which industrial arts teachers, in their years of experience in helping students to learn, have found useful for this purpose. In the consideration of these major movements attention will be given, in so far as possible, to theories, purposes, methods of instruction and organization, courses of study, time allotments, types of equipment and other distinguishing characteristics.

The Next Step in this Study. With the problem stated and its purposes delineated, it will be desirable to investigate the historical background of New Mexico as a state and the growth of its educational system. This topic of New Mexico's development will be the purpose of Chapter II.

CHAPTER II

THE STATE OF NEW MEXICO AND ITS EDUCATIONAL PROGRAM

The state of New Mexico is a part of the first territory in the United States to be explored and settled by European discoverers. The modern New Mexico has been four hundred years in the making, and today it represents a blend of three cultures: Indian, Spanish, and the so-called Anglo-American. Some of the strangest geological formations known to the world, as well as numerous ore deposits and varying geographical conditions combine with a strange blend of races of both ancient, and modern civilizations to form a land of enchantment. One of the few states of the Union to require its teachers to be trained in methods of bi-lingual teaching, New Mexico today holds a unique place in the field of education. The distribution of population, due to geographic conditions, some of the rather strange industries from which a large percentage of this population derives its livelihood, are all factors which are reflected in the organization and administration of the state educational system.

PART A

HISTORICAL DATA

Although the earliest part of what is now the United States to be explored after the discovery of America, New Mexico today is one of the last frontier states in this country. The brief sketch of New Mexican history which

follows will serve to acquaint the reader with the reasons for this seeming lack of progress, and aid in a better understanding of the status and problems of the schools.

The discovery of New Mexico was the result of stories told by an Indian slave, Tejo, to his master, Nuno de Gusman, governor of the Mexican territory then known as New Spain, in 1528, (37, page 64). Tejo told of going northward with his father to trade in seven towns so large that they could be compared with Mexico, now Mexico City, and its suburbs. These stories inspired Spanish adventurers of that time and, accordingly, parties were sent out to search for the cities of fabulous wealth. The first party did not find the coveted cities but they did establish Culican, near the northern border, which later became an outpost for other exploratory parties. Some of the later parties were led by friars, commissioned by the church, and, although they met with fierce resistance by the natives, a few were able to survive and establish missions in the newly discovered territory. In 1540, Coronado, following the route of Marcos and Estevan, from Culican up the west coast to the Sonora Valley, left on his search for the rich seven cities and, although the search of Coronado and his party was fruitless insofar as the rich seven cities were concerned, it did open up a way for settlers and about forty years later another expedition led by Augustin Rodriquez was undertaken for missionary purposes. The first attempt to

colonize New Mexico was made by one Gaspar Castano de Sosa (1590-91) when about 170 persons, including women and children, entered by way of the Pecos River. Other parties of settlers followed and for nearly a hundred years a battle between settlers and natives for possession of the land followed.

The New Country Named. The name "New Mexico", the oldest state name in the union, except Florida, is thought to have been first applied by Francisco de Ibarra in 1565, who called the land north of the Mexican provinces Nuevo Mejico. Beginning in 1581-82 the name was used permanently. It appeared frequently in accounts by Gallegos and Espejo, of expeditions undertaken up to that time, which were made to the Viceroy. (37, page 63) The area was claimed by Mexico and the first capital was established in 1598 on the west bank of the Rio Grande by Onate, who christened it San Juan in memory of the martyred priests who first tried to establish missions in the territory. The capital was moved to Santa Fe in the winter of 1609-10 by Peralta. In 1680 Santa Fe was the only incorporated town within New Mexican borders, although many Spanish settlements were to be found within its boundaries.

Mexican Trails. After the founding of San Antonio in 1718, in the Mexican province of Texas, the Spaniards needed a direct route of communication between San Antonio and Santa Fe. In 1787 a French frontiersman, Pedro Vial, was employed by Spanish officials to trace such a route. (37, page 70)

This he did by going north to the region of Wichita Falls, up the Red and Canadian rivers and on to Santa Fe. Routes to the east were later opened, but Vial and two companions left Santa Fe with orders from the governor to find a direct route to St. Louis in French controlled Louisiana. This they did, thus making the first complete journey over the famous Santa Fe trail.

After the Louisiana Purchase by the United States in 1803, (37, page 70), and the subsequent westward migration by the Americans, Spanish authorities became alarmed lest these adventurers overrun Texas and New Mexico. Consequently, when news reached Governor Alencastre of Santa Fe, that Lieutenant Pike had raised the American flag five miles up the Rio Conejos in Colorado on the west side of the Rio Grande, he ordered the arrest of the Americans. They were brought to Santa Fe on March 3, 1807, later sent to Chihuahua under guard, and finally escorted to the Louisiana frontier. Pike's report of this adventure furnished the United States with the first authentic information about the Spanish southwest. Alencastre instituted stern measures to prevent additional American influences from entering New Mexico. (37, page 70) It was not until after Spain was overrun by Napoleon in 1810 that she allowed her American colonies representation in the Cortes of Spain.

New Mexico Under an Independent Mexico. As soon as Mexico became independent of Spain, in 1821, the new republic prepared to establish relations with the other independent nations. This policy had an important effect on New Mexico.

William Becknell of Missouri was the first American to take advantage of the change. In 1822 he came into New Mexico along the Santa Fe Trail and established a fur trade. For a number of years following his advent the fur trade in New Mexico was very profitable. A treaty regarding boundaries between Mexican territorial possessions and the United States was signed by both governments in 1819, and ratified by the Republic of Mexico in 1828. Gold was discovered in 1833 and the lead and silver mines were further developed. The first newspaper in New Mexico was published in 1834 by Antonio Barreirio on the first press in New Mexican territory. The paper "El Crepusculo de la Libertad" was published in Spanish. Dissatisfaction with the revised Mexican constitution, centralization of power, and imposition of heretofore unaccustomed taxes caused an uprising on August 3, 1837, in which the territorial governor was assassinated. Texas, which was then a Mexican province, wanted some of the trade going into New Mexico and continued the agitation among the rebels until events led to the declaration of war on Mexico by the United States in 1846. (37, pages 71-72)

Freedom from Mexico. Gen. Stephen W. Kearny, commanding the army of the west, reached Las Vegas on August 15, 1846, and absolved the people from allegiance to Mexico and proclaimed himself governor. The construction of Fort Marcy, the first American fort in New Mexico was begun August 23,

1846. Hastening to organize a new government for New Mexico as a territory of the United States, Gen Kearny appointed officials on September 22. The first newspaper printed in English was published at Santa Fe September 4, 1847. As early as October 10, 1848, Congress was petitioned by a convention for territorial government, but nothing came of this request.

New Mexico as a Territory. The first constitutional convention for the "state" of New Mexico met in Santa Fe in May of 1850, framed a constitution which was promptly ratified by the people, and submitted to Congress. This effort to secure statehood failed, and instead, Congress passed the Organic Act of the Territory of New Mexico. There followed a period of much legislation concerning the status of New Mexico in the conflict between slave and free states, making treaties with and caring for the Indians, settlement of bloody disputes between the cattle barons and the settlers, surveying of railway right of ways, and advancement of education by establishing the land grant college and the university.

New Mexico and Statehood. In 1910 Congress passed the Enabling Act and the long struggle for statehood was ended. The state constitution was completed November 21, 1910, but fell short of the federal requirements. Certain changes were made, and on January 6, 1912, New Mexico was admitted to the Union as the 47th state.

William C. McDonald was inaugurated first governor of

the state on January 15, 1912. Since then New Mexico has taken her place with the other states in assuming her share of the responsibilities of the nation. After the entrance of the United States in the first World War in 1917, New Mexico provided for defense of the state and assistance to the federal government by creating the State Council of Defense, made provision for food conservation, and appropriated \$75,000 for war purposes. New Mexico's contribution to all branches of the service totaled 17,156 men, larger in proportion to population than the average for the whole country. In the last two decades the state has sponsored the development of oil fields, the survey of the Carlsbad Caverns and its creation as a national park, the setting aside of seven national forests, the Pueblo Indian Lands Board, flood control, erosion control, the New Mexico and Security Authority and others along with routine matters of government.

PART B

POPULATION, GEOGRAPHIC AND ECONOMIC STATUS

In order to fully comprehend the educational situation, a brief review of the population, geographical, and economic data is given here.

Population. New Mexico ranks forty-first in population, the 1940 census showing a total of 528,678 (34, pages 3-7), a 24.9 percent increase during the last ten years. The District of Columbia and Florida are the only districts showing a larger increase during this period. In 1850 there was

only one person for every three square miles. There has been a steady increase, and in 1930, eighty years later there were seven people for every two square miles. Now there are nine people for every two square miles.

A list of towns and cities having a population of 1,000 and above is included in this paragraph. In the list of towns and cities, names of county seat towns are underscored, and towns in which are located schools sponsoring Industrial Arts programs are indicated by asterisks.

| | | | |
|----------------------------|--------|----------------------------|--------|
| Acoma | 1,000 | Cuba | 1,051 |
| * <u>Alamogordo</u> | 3,950 | *Dawson | 1,800 |
| * <u>Albuquerque</u> | 35,449 | * <u>Deming</u> | 3,608 |
| Anthony | 1,300 | *Dexter | 1,000 |
| * <u>Artesia</u> | 4,071 | *Endee | 1,000 |
| * <u>Aztec</u> | 1,000 | *Eunice | 1,227 |
| *Belen | 3,038 | Farmington | 2,161 |
| <u>Bernalillo</u> | 3,000 | * <u>Ft. Sumner</u> | 1,669 |
| Canjilon | 1,000 | <u>Gallup</u> | 7,041 |
| Capitan | 1,000 | Grants | 1,500 |
| * <u>Carlsbad</u> | 7,116 | *Hobbs | 10,619 |
| * <u>Carrizozo</u> | 1,457 | <u>Hot Springs</u> | 1,336 |
| Central | 1,800 | Hope | 1,289 |
| Chama | 1,000 | *Hurley | 3,800 |
| * <u>Clayton</u> | 3,188 | Isleta | 1,200 |
| * <u>Clovis</u> | 10,065 | *Jal | 3,000 |
| * <u>Las Cruces</u> | 8,385 | Jarales | 1,756 |
| * <u>Las Vegas</u> | 5,941 | San Ildefonso | 1,000 |
| <u>Lordsburg</u> | 3,101 | San Rafael | 2,000 |
| Los Lunas | 1,000 | * <u>Santa Fe</u> | 20,325 |
| <u>Lovington</u> | 1,916 | Santa Rita | 2,600 |
| Madrid | 1,052 | <u>Santa Rosa</u> | 2,310 |
| Magdalena ,..... | 1,323 | * <u>Silver City</u> | 5,044 |
| Mesilla | 1,000 | * <u>Socorro</u> | 3,712 |
| *Monument | 1,000 | Springer | 1,314 |
| Mountainair | 1,477 | Talpa | 1,000 |
| Pecos | 1,500 | Taos | 1,000 |
| * <u>Portales</u> | 5,104 | * <u>Tucumari</u> | 6,194 |
| * <u>Raton</u> | 7,607 | Tularosa | 1,446 |
| * <u>Roswell</u> | 13,482 | *Vaughn | 1,331 |
| Roy | 1,138 | Zuni | 2,200 |

There are approximately 500 communities in the state large enough to have a postoffice. Of these 500, sixty are towns with a population of 1,000 or more. Albuquerque is the largest city, it has a population of 35,449. Santa Fe, the capital, is second largest with 20,325 people. Roswell, in the heart of the agricultural section, ranks third with a population of 13,482. The map on page 26 shows the location of all county seat towns. There should be at least seventy-five teachers of industrial arts in the public schools of New Mexico, or twice as many as there are now.

The Geography of New Mexico. New Mexico is the southeastern state of the mountain group, bounded on the north by Colorado, on the east by Texas and Oklahoma, on the south by Texas and Mexico, and on the west by Arizona. The northwestern corner of the state, joining Arizona, Utah, and Colorado in a common corner, is the only place in the United States where four states meet. In size New Mexico is the fourth largest of the forty-eight states, its area embracing 122,503 square miles of land ranging in elevation from lofty mountains to low arid plains and deserts. (34, page 1)

The major streams in the state are the Rio Grande, the Pecos, and the Gila Rivers. The Rio Grande is very small where it enters the north central part of the state at an altitude of 7,000 feet. It flows southward a little to the east and flows through the entire length of the state

becoming its largest river near the south side of the state where the altitude is less than 3,000 feet. In the southwestern part of the state the Gila river flows southwestward out of the state. (See map 3, page 28) The continental divide is along the western side of the state. The Pecos river flows through the southeastern part of the state. Of these three rivers, the valleys of the latter are cultivated most extensively. The greatest portion of the land is broken or mountainous, especially is this true of the north central part. Generally speaking, the rainfall is very light.

Some farming is done in the valleys of the Pecos and Rio Grande rivers, the Artesian Basin, and in the shallow water sections of the eastern side of the state, but the greatest part of the land is used chiefly for grazing.

Veins of metals and coal are found in the following counties: copper, gold, silver, iron, and lead in Grant county; gold and zinc in San Migal; iron, manganese in Luna; silver in Catron; gold in Sierra; zinc in Socorro; molybdenum in Taos county; coal in Santa Fe county. Oil and natural gas are found in Lea and Eddy counties. Map 2 on page 27 shows the location of mining districts and oil fields.

Economic Status. The prosperity of any state depends upon its commerce, ranching, agriculture, and other resources. New Mexico is fortunate in having a variety of natural resources, from which to draw income and in addition derives a great amount of income from the tourist trade.

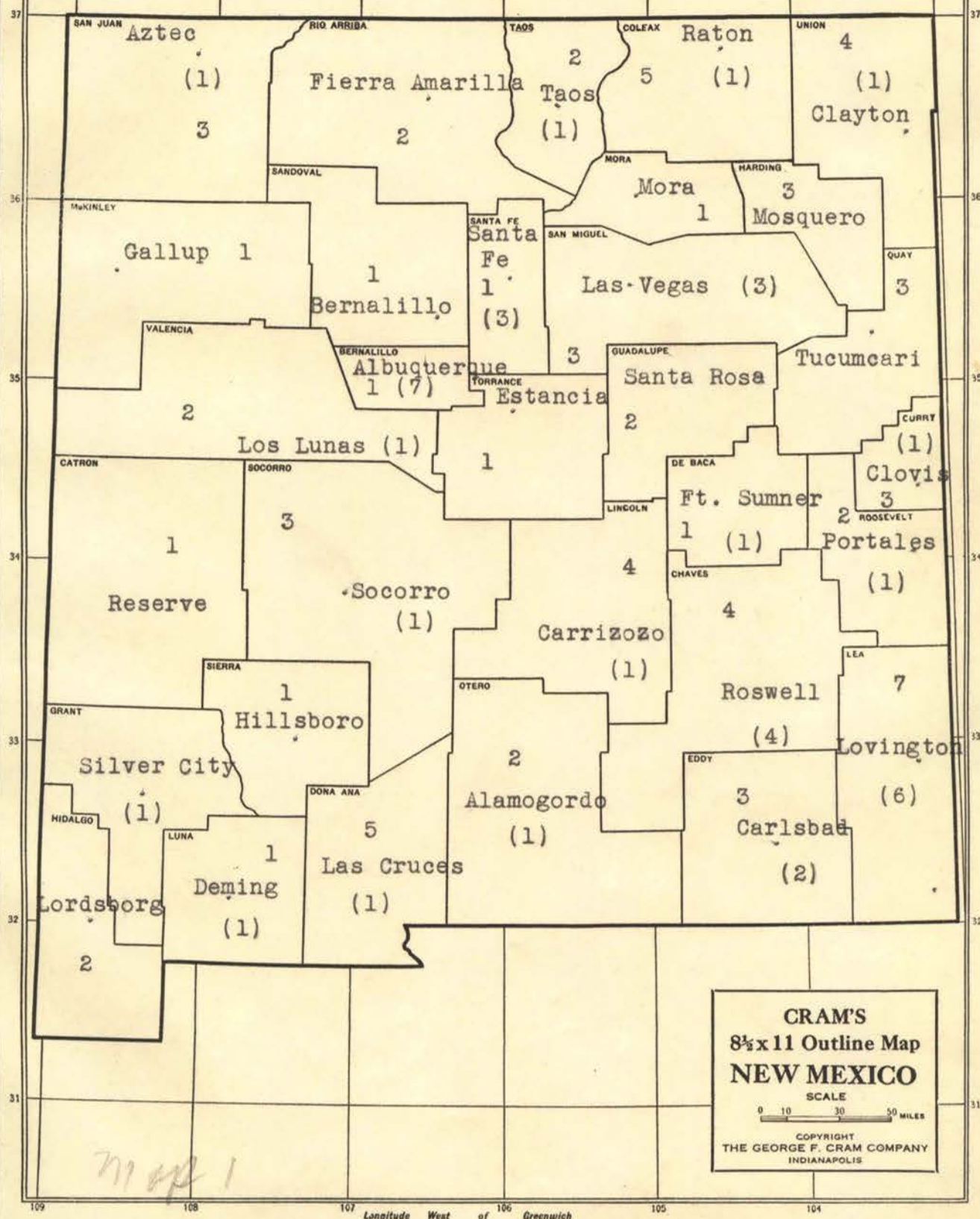
In 1915 gold from New Mexico was valued at \$1,461,000, a figure which has never been reached since that time. It has ranged up and down ever since. In 1936 it amounted to \$1,156,295. About thirty-five per cent of the gold represented in the last figure was produced at the Pecos mines in San Miguel county.

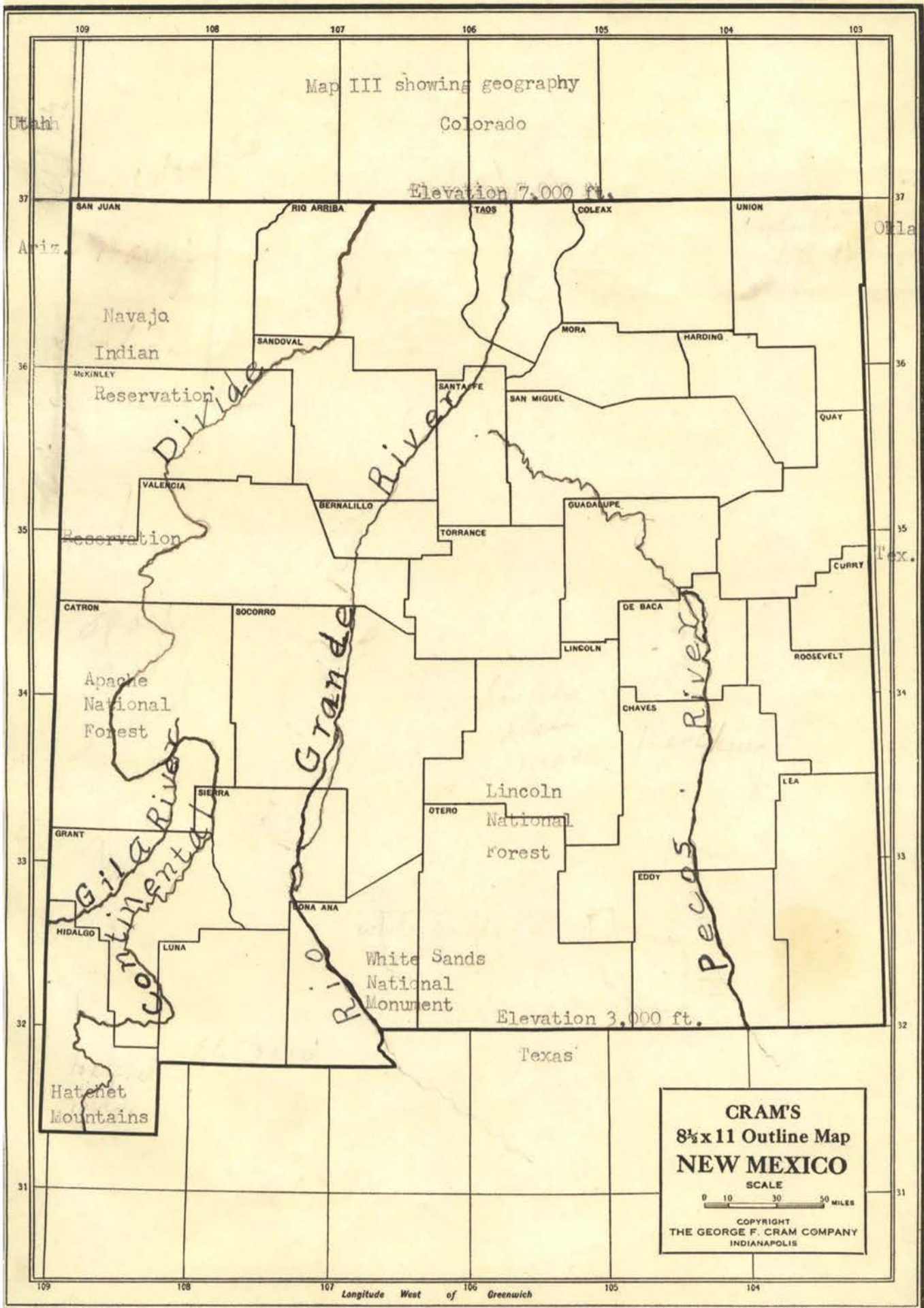
Silver production has about equaled that of gold. It reached a peak of 1,162,208 pounds in 1916. In 1936 silver production was valued at \$900,941. Over fifty per cent of the recoverable silver output in 1935 was from the Pecos mine in San Miguel county. (38, ⁷ page 88) The output of silver practically parallels that of gold, a large portion of recoverable silver coming also from the Pecos mine. Other silver producing districts are the central, Steeple Rock, and Pinos Altos districts in Grant county, and the Mogollon district in Catron county.

Copper reached its maximum output in 1917 with 105,568,000 pounds valued at \$28,820,064. In 1936 it amounted to \$582,544. Most of the 1936 output was from Grant county (37, page 88). Copper formerly led the state's total mineral output in value. It is found in the central district, the Santa Rita, Tyrone, Ground Hog, and San Jose mines, Grant county; and the Pecos mine in San Miguel county.

Like copper, lead is produced chiefly from complex ores such as that worked at the Ground Hog mines.

Map 1 showing county seat towns





Zinc, the ranking metal since 1933, is found in Grant and Socorro counties. It reached its high point in 1929 with \$4,548,060. Since 1933 more zinc is mined than any other metal. It is found chiefly in Socorro and Grant counties.

Limestone, lime, and lithium minerals are found in unusually large deposits near Dixon, Taos county. Magnesite, meerschaut, and mica are mined near Las Tablas and Petaca in Rio Arriba county and near Ojo Caliente, Taos county.

Ranching and farming are also major industries in the state, the income from ranching alone in 1938 was more than \$61,000,000. Farm lands are valued at more than \$170,150,410. At the end of the fiscal year 1938-1939, the gross sales tax amounted to \$3,465,484.78. Industrial Arts teachers of New Mexico have a wealth of materials that are native, which if used by their classes, ought to make their projects of more value. Thousands of people come to this state every year. During their visit, millions of dollars are spent and a large percent of this money is spent for industrial arts projects for souvenirs.

PART C

THE DEVELOPMENT OF A STATE EDUCATIONAL PROGRAM

Art in industry was practiced by the inhabitants of the territory which is now New Mexico before the coming of the Spanish conquerors in the early sixteenth century. Evidence of this is found in present day museums within the state,

in the preserved pieces of pottery, drawings found on bits of dried mud, and in the household and hunting equipment, which consists of an assortment of knives, mallets, and cooking utensils hewn from stone and bone.

Missions. With the coming of the white conquerors, missions and schools were established. Written records of the early schools are practically non-existent due, probably, to the long periods of uprising and revolts among the conquered peoples, when as much evidence as possible of the hated white men was destroyed. Although written records of the curricula in these early schools do not exist, there is a wealth of industrial art work done in these early schools preserved in institutions throughout the state. Bits of wood carving, figures of the various saints of the Catholic church executed in wood and clay and colored with native dyes, bits of leather work, fragments of basketry, textiles richly ornamented with embroidery, and pottery vessels used in the church services can all be seen today in the museum at Santa Fe. Some of this work can be seen in its original setting if one is fortunate enough to visit some of the oldest missions. History (37, page 67) gives this one substantiating statement:

Don Diego de Pensalosa, who succeeded Mendizabel as governor from 1661-64, forbade exploitation of Indians by friars in "spinning and weaving mantas".

The Development of Public Schools. In August of 1721 public schools were established by royal decree. The schools

closed shortly due to lack of funds. (37, page 126). In 1822 another law was passed to establish public schools but after ten years of effort, only six schools had been established. When the United States annexed the territory, the people were generally illiterate. Until 1846 education was a private endeavor. Archbishop Lamy established a parochial school at Santa Fe in 1851, the first English school in the territory. (37, page 126) Other private schools were established shortly afterward. In 1889 there was not a public high school or college in the entire territory. The first public school law of any consequence was enacted in 1891, with Amado Chavez as superintendent of public instruction; and under his leadership definite progress was made. Hiran Hadley, serving in this post from 1905 to 1907, is credited with having inaugurated the present system of education. In 1934 there were 1,229 public schools with 100,000 in daily average attendance. New Mexico is one of the twenty-seven states providing junior colleges.

Size of Schools. To give the reader an idea as to the size of schools in New Mexico, the writer believes it will be necessary to give the total enrollment in the schools of the state. Information in Table I is taken from the Biennial Report. (4, pages 82-83)

Table I shows the size of schools by enrollment, total enrollment and high school enrollment both being given.

TABLE I
THE SIZE OF SCHOOLS BY ENROLLMENT

| Schools | High School Enrollment | Total Enrollment |
|-----------------|------------------------|------------------|
| Alamogordo | 294 | 1,292 |
| Albuquerque | 2,897 | 8,623 |
| Anthony | | 187 |
| Artesia | 319 | 1,428 |
| Aztec | 158 | 522 |
| Belen | 354 | 1,500 |
| Capitan | --- | 138 |
| Carlsbad | 513 | 2,195 |
| Carrizozo | 120 | 417 |
| Central | 82 | 261 |
| Cimarron | 76 | 384 |
| Clayton | 400 | 1,138 |
| Clovis | 703 | 2,439 |
| Corona | 62 | 312 |
| Dawson | 193 | 550 |
| Deming | 310 | 1,395 |
| Des Moines | 59 | 192 |
| Dexter | 108 | 788 |
| Elida | 102 | 314 |
| Encino | 68 | 281 |
| Eunice | 300 | 750 |
| Espanola | 157 | 537 |
| Estancia | 134 | 449 |
| Farmington | 258 | 948 |
| Folsom | 29 | 148 |
| Ft. Sumner | 178 | 757 |
| Gallup | 425 | 1,540 |
| Grants | --- | 233 |
| Grenville | 63 | 193 |
| Hagerman | 93 | 665 |
| Hatch U.H.S. | 181 | --- |
| Hatch Gr. | --- | 501 |
| Hope | 53 | 168 |
| Hot Springs | 218 | 1,425 |
| Hobbs | 506 | 2,645 |
| Hondo | 106 | 245 |
| Murley | 268 | 877 |
| Jal | 200 | 700 |
| La Joya | 66 | 211 |
| Lake Arthur | 71 | 357 |
| Las Cruces Gr. | --- | 1,738 |
| Las Cruces H.S. | 686 | --- |
| Las Vegas City | 353 | 1,482 |
| Las Vegas Town | --- | 891 |
| Lordsburg | 153 | 1,060 |
| Lovington | 178 | 814 |
| Magdalena | 102 | 484 |

AMERICAN LIBRARY
 OCT 6 1941
 33

TABLE I CONTINUED

| Schools | High School Enrollment | Total Enrollment |
|---|------------------------|------------------|
| Maxwell | 74 | 303 |
| Melrose | 147 | 531 |
| Mills | 34 | 109 |
| Mosquero | 40 | 296 |
| Monument | 100 | 300 |
| Mountainair | 178 | 710 |
| Pecos | 60 | 292 |
| Penasco | 79 | 352 |
| Portales | 562 | 2,305 |
| Raton | 492 | 1,626 |
| Reserve | 79 | 120 |
| Roswell | 886 | 3,630 |
| Roy | 118 | 333 |
| Santa Fe | 769 | 3,147 |
| Santa Rita | --- | 658 |
| Santa Rosa | 222 | 807 |
| Silver City | --- | 1,298 |
| Socorro | 240 | 907 |
| Springer | 147 | 497 |
| Taos | 287 | 757 |
| Tatum | 91 | 329 |
| Texico | 77 | 291 |
| Tucumcari | 387 | 1,378 |
| Tularosa | 156 | 625 |
| Vaughn | 72 | 443 |
| Virden | 62 | 259 |
| Wagon Mound | 86 | 425 |
| Willard | 51 | 233 |
| New Mexico Normal Univ. H.S. | 145 | 265 |
| New Mexico State Teachers College H.S. | 433 | 433 |
| Los Lunas Union H.S. | 273 | 273 |
| Los Lunas Grade | | 243 |

Table I shows the high school enrollment and the total school enrollment for seventy-seven municipal and independent schools. The number of schools and the ratio of high school to total enrollment is smaller than the number of schools and the ratio of corresponding enrollments in Oklahoma, West Virginia, North Dakota, Louisiana, and Washington. It is reasonable to expect that the per capita cost is higher in New Mexico.

Colleges and Universities in New Mexico. In 1889 a bill was passed providing for a university to be located at Albuquerque, a school of mines at Socorro, and an agricultural college at Las Cruces. In 1898 the New Mexico Military Institute was opened at Roswell. One hundred and fifty thousand acres of land were allotted to the military institute by Congress. Today, in addition to those already named, there are the New Mexico Normal University, Las Vegas; New Mexico State Teachers College, Silver City; Spanish-American Normal School, El Rito; Eastern New Mexico College at Portales. These are all high ranking institutions. New Mexico ranks thirty-third in education in the United States today. (14, page 27)

The Advent of "Manual Training". The minutes of the State Board of Education and Superintendents of Public Instruction date as far back as June 16, 1891. The only record found pertaining to industrial arts in the minutes of the meetings was in 1916 (19) and is as follows:

A manual training textbook was adopted on Wednesday during the afternoon session, March 29, 1916.

The book was Manual Training, by Paul William Fox. (It was published by the Prang Company of New York in 1914 and contained 144 pages.) This would indicate that a number of schools were participating in a program of industrial arts. For further data, the files of the New Mexico Educational Directories were searched. These bulletins are published irregularly, and so it is not to be assumed that a program was introduced in a school for the

first time in the year it is first mentioned in the publications. The New Mexico Educational Directory for 1913-1914 gives the first record of industrial arts in the state of New Mexico. (23) The following public schools offered what was termed "manual training" for the first time during the school year of 1913-1914, (23): Albuquerque, Raton, Roswell, East Las Vegas, New Mexico Normal School, Silver City, New Mexico Military Institute, Roswell. The directory (23) shows where Santa Fe and Tucumcari introduced the program in 1914. The school term of 1915-1916 was the year Clovis introduced the program. (23) Carlsbad started the program in 1918, (23) Artesia offered it in 1920, (23). Aztec, Deming, Lordsburg, and Dawson Public Schools started the program in 1924. (23)

Industrial Arts Developments. In some of the schools the programs were discontinued. The respondent of the Clovis Public Schools said in the questionnaire that industrial arts was organized in 1936. The Educational Directory (23) shows that it was taught as far back as 1915, by Mr. A. R. Sedar who was also high school principal at that time, however, the directory used the term "manual training."

The high school at Silver City, New Mexico, is under the administration of the New Mexico Teachers College, and has been for a long period of time. The respondent from there said shop courses were organized in 1920, and it was taught by Mr. Ed Winterbourne, who was not a college graduate.

The Educational Directory (23) shows that it was taught as far back as 1913 by Mr. J. E. Brownlee. General shop was organized there the summer of 1939 and the following winter session, then was abandoned in the spring of 1940 because the budget did not provide for it.

At this period of the industrial arts program, the directories (23) show that the Santa Fe schools paid their teachers the lowest salaries. The teachers of the Raton schools received the highest salaries until 1920. The Educational Directory (23) showed that from 1920-1927 the Roswell teachers received the highest salaries.

The Educational Directories (23) showed the average tenure to be two years.

Early Salaries. It is interesting to know what the salaries were. The teachers were better paid in proportion qualifications than they are now. Table 2 shows the salaries of these teachers.

The mean salary during the period 1913-1924 was \$1,214.70, ranging from \$450, the lowest to \$2200.00 the highest.

TABLE II
SALARY SCHEDULES OF INDUSTRIAL ARTS TEACHERS
IN 1913-1924

| Intervals | Mid-point | f |
|-----------|-----------|----|
| 2200-2300 | 2250 | 1 |
| 2100-2200 | 2150 | 0 |
| 2000-2100 | 2050 | 0 |
| 1900-2000 | 1950 | 0 |
| 1800-1900 | 1850 | 1 |
| 1700-1800 | 1750 | 1 |
| 1600-1700 | 1650 | 0 |
| 1500-1600 | 1550 | 4 |
| 1400-1500 | 1450 | 1 |
| 1300-1400 | 1350 | 3 |
| 1200-1300 | 1250 | 8 |
| 1100-1200 | 1150 | 1 |
| 1000-1100 | 1050 | 5 |
| 900-1000 | 950 | 3 |
| 800-900 | 850 | 3 |
| 700-800 | 750 | 2 |
| 600-700 | 650 | 0 |
| 500-600 | 550 | 0 |
| 400-500 | 450 | 1 |
| Total - | | 34 |

This chapter reviews the historical background, the educational development and the current economic status of New Mexico. Chapter III is concerned with the ability of New Mexico colleges and universities to train industrial arts teachers and certification requirements for these teachers.

CHAPTER III

INDUSTRIAL ARTS TEACHERS EDUCATION AND CERTIFICATION IN NEW MEXICO

The status of industrial arts teachers depends in a great measure upon the teacher training institutions responsible for their preparation. Teacher education facilities in New Mexico are reviewed in this chapter. By preparing this review, the writer was able to compare the training of teachers holding degrees from schools in New Mexico with the training of those from colleges in other states. A perusal of the descriptions of the colleges and universities found in this chapter will acquaint the reader with advantages and limitations to be found in New Mexico institutions, and will perhaps suggest to him some improvements which might be made in industrial arts teacher training curriculum and facilities in New Mexico.

PART A

COLLEGES AND UNIVERSITIES IN NEW MEXICO

New Mexico as a territory and later as a state has contributed liberally to the support of teacher training institutions. High standards have been maintained from the beginning and the teacher training colleges and the departments of education in the universities rank favorably with those of any other section of the country. At present there

are five institutions within the state offering curricula leading to teaching certificates. In the following paragraphs a brief description of each of these five institutions is given.

TEACHER EDUCATION PROGRAM IN NEW MEXICO

Eastern New Mexico College opened its doors for the first time June 1, 1934, to less than 200 students. This college is located at Portales, county seat for Roosevelt county. Portales has an altitude of 4,000 feet and had a population, according to the 1940 census, of 5,211, better than 100 per cent increase over 1930. This is a senior college of education for teachers. It was located in Portales to accommodate students of southeastern New Mexico, which is its most populous area.

New Mexico State Teachers College is located at Silver City, the county seat of Grant county. It was founded by an act of the legislature passed in February, 1893, as the New Mexico Normal School. In February, 1923, the state legislature changed the name to New Mexico State Teachers College. The college is a fully accredited member of the American Association of Teachers Colleges. Four years of the highest quality work are offered, and degrees of Bachelor of Science and Bachelor of Arts are granted. No graduate work is offered.

The New Mexico College of Agricultural and Mechanical Arts, located at College Station, New Mexico, between Mesilla

Park and Las Cruces, is one of about fifty land grant colleges provided for under the Morrill Act of 1862, and created by an act of the territorial legislature in 1892. The college maintains a very efficient school of education, offering courses to meet requirements for all teaching certificates in New Mexico. This school also offers a curriculum leading to the Master of Education degree.

New Mexico Normal University. In 1893, a statute was drafted in territorial legislature creating the New Mexico Normal School at Las Vegas, established to provide training for public school teachers in both elementary and secondary schools. Its purpose is to extend its services also to those persons seeking a liberal education for its own sake. In 1899, the Normal School, by special statute was renamed New Mexico Normal University, and its powers enlarged to enable it to exercise the functions of a college of education. The university has perfected and enlarged its curriculum to its present status, that of a four-year college awarding the bachelor of arts degree.

The University of New Mexico, located in Albuquerque, was one of the first institutions of higher learning to be founded in New Mexico, having been created in 1889 by an act of territorial legislation. It has been a member of the North Central Association of Colleges and Secondary Schools since 1922. The curricula of the school of education at the

university are based upon the assumption that the teacher or supervisory officer should have a broad and liberal education; and that his training should be supplemented by professional education designed to give a knowledge of the pupils to be taught, the problems to be met in teaching, and the new meaning of the subjects of instruction. Graduation from the college of education meets the requirements of the New Mexico State Board of Education for certification of high school and elementary teachers, and the recommendations of the North Central Association of Colleges and Secondary Schools, and the proper subject matter courses for purposes of high school teaching. This university also offers advanced work toward the completion of the Doctor of Philosophy degree.

PART B

CERTIFICATION OF TEACHERS

In the state of New Mexico, industrial arts is considered a part of the general academic curriculum, as English, mathematics, and science. Therefore, the industrial arts teachers must meet the same requirements as the regular academic teachers. Teachers teaching in the secondary schools for the first time in New Mexico, who are from colleges or universities in other states, are given temporary certificates, regardless of qualification. A higher certificate can be secured by attending a college or university in New Mexico.

A person who has not been trained in a New Mexico college or university cannot become a superintendent or principal in the New Mexico secondary schools, without first starting out as a classroom teacher for a year, regardless of the size of school in which experience as a supervisory officer was obtained.

These measures were enacted for the protection of the native teacher, but since becoming effective, the requirements for certification have been raised until graduation from a four-year college is required for all types of certification. Teachers are realizing that if their qualifications are not raised to higher standards, they will be replaced by those who have reached higher goals of attainment.

The list of requirements which must be met in New Mexico for all teachers in the public schools is included as Table III. These data are taken from the Biennial Report (4, pages 26-29). Katherine M. Jennings is director of certification. These certification regulations have been in effect since July 1, 1938.

TABLE III

STANDARDS FOR CERTIFICATION OF TEACHERS

| Type | Requirements | Valid | Renewals |
|-----------------------|--|---|---|
| 3 year High School | Graduation from a four year accredited high school, 155 term hours college, 15 term hours in education, one-third of which must be in secondary education. | 2 yrs. This type not valid after Sept. 1, 1940 | Renewable 1 yr. on 8 semes- ter or 12 term hrs. |

TABLE III CONTINUED

| Type | Requirements | Valid | Renewals |
|-------------------------------|---|--------|---|
| Master's Elementary | Graduation from a four year accredited high school and graduation from a four year approved normal, college or university, with 120 semester hours or 180 term hours of college credit, 51 semester or 78 term hours of which shall be prescribed. | 5 yrs. | Indefinite renewals of 3 years on 8 semester or 12 term hours each. |
| 5 yr. high school (new) | Graduation from an approved normal, college, or university with a minimum of 120 semester or 180 term hours of credit, 15 semester hours or 22½ term hours of professional credits shall be prescribed. Academic credits shall consist of a major (24 semester) and a minor (15 semester) in subjects usually taught in high schools, or two minors of 15 semester hours each, in subjects usually taught in high schools. | 5 yrs. | 3 year renewals on 8 semester or 12 term hours each. |
| Administrative | Graduation from an approved four year normal, college or university. A minimum of three years of successful teaching experience which must include 2 years in New Mexico. Qualifies for the Master Teacher's Elementary certificate or a Five Year High School certificate. Master's degree or 30 semester hours graduate work. Fifteen semester hours in education pertaining to organization, administration and supervision. | 5 yrs. | 5 year renewals on 8 semester or 12 term hours, or 2 years successful administration and 5 semester hours. For holders of a master's degree evidence of 4 years successful administration during the life of the certificate. |
| Provisional Administrative | High school graduation-- Bachelor's degree -- five years teaching experience in New Mexico immediately preceding the issuance of the certificate. | 1 yr. | Extensible on earning 6 semester hours during the life of the certificate. |

TABLE III CONTINUED

| Type | Requirements | Valid | Renewals |
|--|--|-------|----------|
| Master Teacher's Elementary Life | qualified for the Master Teacher's Elementary certificate, and, in addition thereto, evidence of 90 months of successful teaching experience in elementary schools, 45 months of which must have been in the schools of New Mexico | | |
| High School Life (new) | Qualified for the five-year high school certificate, and, in addition thereto, evidence of 90 months of successful teaching experience in high schools, 45 months of which must have been in the schools of New Mexico. | | |

Industrial Arts Certificates. In New Mexico, the industrial arts teacher is required to be a graduate of a standard four year college, unless teachers without the bachelor's degree were employed in a school in New Mexico before the ruling was passed. Teachers holding the latter type of certificate find it almost impossible to transfer from one school to another, as superintendents almost without exception require the Bachelor's Degree. Trade and industrial teachers are certified according to trade experience and a written examination. Industrial arts teachers must have an industrial arts major with fifteen semester hours or twenty-two and one-half term hours of industrial arts credits, and

fifteen semester hours of professional credits which are defined as credits in education and psychology, for the new five-year high school certificate. In all cases, teachers in New Mexico are required to be certified by the state department of public instruction before they can receive compensation for their work.

PART C

COURSES IN NEW MEXICO COLLEGES PREPARING INDUSTRIAL ARTS TEACHERS

The New Mexico College of Agriculture and Mechanical Arts, commonly known as the New Mexico A. and M. College, and the State University do not sponsor programs in industrial arts, but they do have engineering courses which include drawing, machine shop, foundry practice, and pattern making.

The New Mexico School of Mines does not have a program of industrial arts, but it does have courses in metallurgy and heat treatment.

The Eastern New Mexico College offers a certificate in industrial arts, (5, page 33). On page 68 of the same catalogue is given the description of the courses. The following courses are listed: woodwork, advanced woodwork, wood and metal finishing.

At the time of the writing of this thesis, New Mexico Normal University had the leading industrial arts program of all institutions of higher learning in the state. The following courses are listed in the catalogue for 1939-1940,

(6, pages 59-63): mechanical drawing, bookbinding, architectural drawing, elementary electricity, general metal work, woodworking, machine woodworking, wood turning, wood finishing, foundations of industrial arts, teaching methods in industrial arts, current problems in industrial arts, shop mathematics, problems in woodworking, the general shop, and seminar.

Teacher Trainers and their Qualifications. James Richard Van Dyke, associate professor in engineering at the Eastern New Mexico College, is the instructor in the department of engineering, and is the only instructor who teaches industrial arts subjects. He received his Bachelor of Science degree and the degree of Master in Engineering from Pennsylvania State College. Mr. Van Dyke has done advanced study at the University of Colorado, University of California, Los Angeles, and at the New Mexico Normal University. (5, page 11)

Harold K. Brandt is the only instructor of industrial arts at the New Mexico Normal University. He received his Bachelor of Arts degree and Master of Arts degree from the Colorado State College of Education in 1926 and 1935, respectively. Mr. Brandt did advanced study at Columbia University in 1936. Since 1938 he has studied at the New Mexico Normal University. (6, page 12)

A Review and A Prognosis. At the present time, New Mexico maintains five higher institutions of learning, where teacher training is a part or all of their functions, and

one metallurgical school. Two of these institutions have engineering courses. One college and the New Mexico Normal University have departments of industrial arts education. Certifications of high school teachers have been discussed and the qualifications of industrial arts teachers of the institutions of higher learning have been reviewed.

To obtain facts for this study, the questionnaire technique was employed. In Chapter IV the criteria for the questionnaire technique are given, and in Part B of the same chapter a description of the questionnaire used in this study is made.

CHAPTER IV

A DESCRIPTION OF THE QUESTIONNAIRE

In order for one to carry on a survey of this nature it becomes necessary to delve into the present conditions of the Industrial Arts programs in New Mexico. The questionnaire technique was one of the major sources used to assemble the statistical information for the study of industrial arts in New Mexico schools. A brief summary of the questionnaire technique is given here.

PART A

CRITERIA FOR MAKING A GOOD QUESTIONNAIRE

Respondents very often ask these questions about the research worker who sponsors a questionnaire:

Where is he located?
What is his title?
Is he dependable?
Is he qualified to carry on this study?
What school is sponsoring this study?
What faculty is sponsoring this study?

If the respondent can answer these questions satisfactorily for himself, a higher percentage of returns will be received by the writer.

The Form of a Well-Designed Questionnaire. In the beginning of a questionnaire, lines should be provided for the respondent's name, his address, and a line for his position. The title possessed by the one answering adds prestige to his questionnaire. Without this information much of the value of the questionnaire is lost. Each set should be fastened

together. Questions should not be asked in a questionnaire if the answers could be found elsewhere. The purpose of this type of research is to collect information which can only be secured from those to whom the questionnaires are addressed.

The problem should be studied in advance to insure ample knowledge as to what questions should be asked. This will enable one to refrain from asking questions that are not needed to complete the study. Many inquiry forms are not returned because they are too long and the respondent feels that the value in return does not justify the time that must be given to answer the questions. It is Koos' (18, page 166) opinion that:

The questionnaire should be kept as short as possible.

A research worker can always insure a higher percentage of returns by being considerate of the other person, by not asking that he give too much of his time to answering the questions.

Sponsorship of a Questionnaire. A letter should be enclosed with the questionnaire explaining the needs and importance of such a study. That the letter and the questionnaire should be correct in sentence structure, rhetoric, composition and spelling goes without saying, as one must try to impress the prospective respondents that he is able to carry on the study intelligently. It is sometimes necessary

to send a letter of inquiry in advance asking the addressee in a courteous way for a few minutes of his time to answer the questions. A self-addressed, stamped return envelope should be enclosed to minimize time and expense, and for convenience to the respondent. Sometimes a follow-up letter or card is necessary for a speedy response. If such follow-up material is used, it must always be tactfully worded.

The Validation of a Questionnaire. The respondents should be qualified to answer the questions that are being sent him. For example, a teacher should know his qualifications, salary, tenure, experience, value of tools, size of shop, type of floors, and many other facts. No one would dispute the honesty of a teacher in his answers. This is what Koos (18, page 167) has to say about these statements:

The prospective respondents to whom the questionnaires go should, as far as possible, be those in the best position to make reliable answers.....
It would be highly beneficial to the use of the questionnaire as an instrument of research if all those who use it would assume some responsibility for its validation.

These methods, if practiced, would reduce severe criticism on the questionnaire technique of uncovering the truth.

Two questionnaires should be sent to each respondent so that he may have a record for himself of what is being sent out. Some respondents will not answer these questions when only one set is received.

The respondents should be given a summary of the findings in consideration of time spent in answering the questions.

It is important that they be informed of this when the first inquiry is made. This will induce them to take part more readily. Koos (18, page 128) makes this statement:

Another frequently helpful element in the approach is the promise to supply a summary of the findings to such of the respondents as indicate a desire for it.....
If this practice of supplying a summary of findings were fairly consistently followed, it should accomplish a great deal in reducing the resentment against the questionnaire procedure.

If sending summaries, as promised, became a general practice, it might be found that the percentage of response would be greatly increased over the seventy percent which is now considered a good average.

PART B

ARRANGEMENT OF QUESTIONNAIRE

Questionnaires, like any other composition, should have an orderly arrangement. Questions concerning a given topic should all be grouped under that heading. For example: A question about qualifications should not be found among questions asking about shop equipment listed under the heading of equipment, but should come under the heading of qualifications where it duly belongs.

The questionnaire used in this study is found in Appendix B. The questionnaire which was used in this survey is divided into five parts: (1) Qualifications; (2) the shop and equipment; (3) the curriculum; (4) historical data; and (5) extra-curricular. Each part will be described under the

paragraph head listed here.

Qualifications. These questions are concerned with the preparation of Industrial Arts teachers for teaching industrial arts courses in New Mexico. They are numbered from one to thirty.

The Shop and Equipment. These are concerned with the condition of the shops. Questions are asked from one to sixteen. A checking table of machines was used for the convenience of respondents. Only twenty-five percent checked this table.

The Curriculum. The teaching schedule should have been placed under this heading instead of over it. These questions concerning the curriculum are numbered from one to four.

Historical Data. These questions would give the early history of industrial arts if they were properly answered. Less than ten percent gave this information.

Extra-Curricular. Under this heading the questions are numbered from one to seven. A table was used to check the units being taught in New Mexico and again only a small percent gave this information.

All questions were not answered. The questions that were answered were tabulated and studied and the results of this inquiry form the following chapter.

CHAPTER V

A REPORT OF INQUIRY INTO THE STATUS OF INDUSTRIAL ARTS IN NEW MEXICO SCHOOLS

In this chapter the qualifications, experience, tenure, and salaries of teachers are considered. Location and description of shops are pictured in detailed form by means of tables, and statements are verified by quoting primary sources. Equipment and furnishing of shops are also described. These items appear in the three parts of this chapter in the order listed here.

PART A

TEACHERS OF INDUSTRIAL ARTS IN NEW MEXICO SCHOOLS

Teachers of industrial arts in New Mexico have a wonderful opportunity to develop a unique program of industrial arts within the state. The tourist demand for souvenirs made of native materials is great and interest is keen among youths and adults alike to gain skill in this type of work. The modern educational program of industrial arts is comparatively new in the state and the opportunity to perfect and advance such a program offers a challenge to every person interested in industrial arts.

The Number of Industrial Arts Teachers in New Mexico.

There are forty industrial arts teachers in this state who are holding positions in accredited high schools located in towns and cities having a population of a thousand and above.

Map 1 shows the towns in New Mexico having programs

of industrial arts. A questionnaire was sent to these thirty schools. Twenty-five replies were received in good order.

Qualifications of the Teachers. Answers to questions one to thirty under the topic qualifications will be discussed under the headings as follows: (1) qualifications of teachers, (2) attitude of teachers toward self-improvement, (3) other professional qualities, (4) salaries and tenure.

The following four paragraphs will be devoted to the four subjects just listed. By qualifications is meant the college baccalaureate degree with emphasis on major, minor, and advanced degrees. Table IV answers the question, "What portion of New Mexico Industrial Arts teachers have degrees?"

TABLE IV
COLLEGE GRADUATES

| Teacher Number | Are you a Graduate? | : | Teacher Number | Are you a Graduate? |
|-------------------|------------------------|---|-------------------|------------------------|
| 1 | Yes | : | 14 | Yes |
| 2 | Yes | : | 15 | Yes |
| 3 | Yes | : | 16 | Yes |
| 4 | Yes | : | 17 | Yes |
| 5 | Yes | : | 18 | Yes |
| 6 | Yes | : | 19 | Yes |
| 7 | Yes | : | 20 | No |
| 8 | Yes | : | 21 | Yes |
| 9 | Yes | : | 22 | No |
| 10 | Yes | : | 23 | Yes |
| 11 | Yes | : | 24 | Yes |
| 12 | Yes | : | 25 | No |
| 13 | Yes | : | | |

As to college baccalaureate degrees, twenty-two teachers of the twenty-five being studied have either the Bachelor of Science or Bachelor of Arts degree. No one reported having a Master's degree. The other three are not college graduates. This compares favorably with the results determined by Woodward, (38, page 44), for the state of West Virginia. He found that five or 4.6 per cent of the industrial arts teachers had Master of Arts degrees and twenty-nine or 22.3 per cent did not have a degree. Seventy-three, or 67.6 per cent have bachelors degrees.

What College Are the Degrees from? The type of college attended affects the type of preparation, due to the fact that better plant equipment and better trained instructors are found in some than in others.

Table V shows where these teachers were graduated. Six of the teachers are graduates of Oklahoma colleges. Five are graduates of Colorado colleges. Four are graduates of Texas colleges. Only three of the teachers are graduates of New Mexico colleges. Seven are graduates of other state colleges.

In 1937, Woodward, (39, page 4) found in his study of West Virginia that:

Forty-five of the eighty-four teachers of industrial arts in West Virginia received their degrees from colleges within the state, while thirty-eight received degrees from colleges in other states.

TABLE V
FROM WHAT COLLEGE GRADUATED

| Teacher Number | Name of College | Location |
|-------------------|-------------------------------------|--------------|
| 1 | Colorado State College of Education | Colorado |
| 2 | Iowa State Teachers College | Iowa |
| 3 | West Texas State Teachers College | Texas |
| 4 | Texas Technological College | Texas |
| 5 | Colorado State College of Education | Colorado |
| 6 | East Central State Teachers College | Oklahoma |
| 7 | Northeastern State Teachers College | Oklahoma |
| 8 | Southeastern State Teachers College | Oklahoma |
| 9 | Kearney State Teachers College | Nebraska |
| 10 | West Texas State Teachers College | Texas |
| 11 | East Central State Teachers College | Oklahoma |
| 12 | Colorado State College of Education | Colorado |
| 13 | New Mexico Normal University | New Mexico |
| 14 | State Normal and Industrial College | North Dakota |
| 15 | New Mexico Normal University | New Mexico |
| 16 | New Mexico Normal University | New Mexico |
| 17 | Southeastern State Teachers College | Oklahoma |
| 18 | East Texas State College | Texas |
| 19 | Northeastern State Teachers College | Oklahoma |
| 20 | Not a graduate | |
| 21 | Colorado Agricultural College | Colorado |
| 22 | Not a graduate | |
| 23 | Colorado Agricultural College | Colorado |
| 24 | Kansas State Teachers College | Kansas |
| 25 | Not a graduate | |

Major Field. Majors in the department of industrial arts should be larger than majors in other fields due to the many shop subjects the teacher may be required to teach. Several semester hours of work should be required in the subjects the prospective teacher plans to prepare himself to teach. When one thinks of fifteen or twenty shop subjects often included in this type of program, it can be seen that twenty-four semester hours does not qualify one very well to

teach a broad offering of industrial arts subjects. The writer believes that not less than forty semester hours in shopwork and industrial drawing courses should be required for a high school teacher.

Table VI answers the following questions: "What is your major field? How many undergraduate semester hours have you earned in your major field?"

TABLE VI
NUMBER OF SEMESTER HOURS IN MAJOR FIELD

| Teacher Number | Major | Number of Semester Hours |
|-------------------|--------------------------|-----------------------------|
| 1 | Industrial Arts | 40 |
| 2 | Industrial Arts | 38 |
| 3 | Industrial Arts | 30 |
| 4 | Industrial Arts | 12 |
| 5 | Industrial Arts | 46 |
| 6 | Science | 36 (Home Arts 10) |
| 7 | Industrial Arts | 52 |
| 8 | Industrial Arts | 36 |
| 9 | Industrial Arts | 30 |
| 10 | Administrative Education | 30 (Minor in IAE) |
| 11 | Industrial Arts | 42 |
| 12 | Commerce | 20 (Minor in IAE) |
| 13 | Social Science | 36 |
| 14 | Industrial Arts | 33 |
| 15 | Industrial Arts | 32 |
| 16 | Mathematics | 40 |
| 17 | Industrial Arts | 50 |
| 18 | ----- | -- |
| 19 | Industrial Arts | 32 |
| 20 | Industrial Arts | -- |
| 21 | Industrial Arts | -- |
| 22 | ----- | -- |
| 23 | Industrial Arts | -- |
| 24 | Industrial Arts | 70 |
| 25 | Industrial Arts | 20 |

The average number of semester hours of the industrial arts majors is thirty-four plus. Five or twenty per cent of industrial arts teachers have their majors in another field.

A small high school principal is teaching industrial arts on a weak minor of ten semester hours in home arts. A superintendent of a small high school teaches industrial arts, and his questionnaire showed that neither his major nor minor was in industrial arts. One industrial arts teacher is teaching on a minor of eighteen semester hours and another teaching on a minor with as few as twelve semester hours. The following quotation is from Selvidge and Fryklund (29, pages 16-17):

There are three distinct, but closely related accomplishments which should be possessed by every shop teacher: First, he should be able to do well the thing 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.

Judging from the above, it is easy to see why some industrial arts programs in New Mexico have not made favorable impressions on the public. It would appear from the evidence presented in Table VI that at least six of the twenty-three teachers whose qualifications were given in the returned questionnaires are not adequately prepared to teach industrial arts in the New Mexico schools. A reasonable requirement should be made in a new certificate regulation so that upgrading of teachers could be begun.

Attitude of Teachers Toward Self-Improvement. A teacher's qualification can be determined to some extent by the way his summer is spent. A teacher can spend his summer

vacation in a number of ways and still be qualifying himself to better do the job he is going to do anyway, and, at the same time, be earning a small salary, all of which will be just as resting and enjoyable as fishing and playing ball. Here are some of them: Attending summer school, teaching a

TABLE VII
ATTITUDES OF INDUSTRIAL ARTS TEACHERS TOWARD
SELF-IMPROVEMENT

| Teacher Number | Every Summer | Every Other Summer | Every Third Summer |
|----------------|--------------|--------------------|--------------------|
| 1 | No | No | No |
| 2 | No | No | No |
| 3 | Yes | Yes | Yes |
| 4 | No | No | Yes |
| 5 | -- | -- | -- |
| 6 | No | Yes | -- |
| 7 | No | -- | Yes |
| 8 | No | Yes | Yes |
| 9 | No | Some cases | -- |
| 10 | Yes | Yes | Yes |
| 11 | No | No | No |
| 12 | No | No | No |
| 13 | No | Yes | -- |
| 14 | No | Not certain | -- |
| 15 | No | No | Not certain |
| 16 | Not certain | -- | -- |
| 17 | No | -- | -- |
| 18 | No | No | Yes |
| 19 | Yes | -- | -- |
| 20 | No | No | No |
| 21 | No | No | No |
| 22 | -- | Yes | -- |
| 23 | -- | -- | -- |
| 24 | -- | -- | -- |
| 25 | -- | -- | -- |

summer school in another school or college, working in some industry which is closely related to the teaching profession, and inspection trips.

Table VII answers the following questions concerning the attitude of industrial arts teachers toward self-improvement.

"Are you working on a higher degree?" "Do you believe it is desirable for the industrial arts teacher to go to college every summer?" "Every other summer?" "Every third summer?"

In summarizing Table VII, it is found that in reply to the question about the advisability of attending school every summer, sixteen or sixty-four per cent of these teachers said no. Three, or twelve per cent, said yes to this question, and five, or twenty-five per cent, did not answer this question. One teacher said he was not certain that he would attend college every summer. In replying to the question, of every other summer, nine or thirty-six per cent of the teachers, said no to the question. Six, or twenty-four per cent, said yes. Eight, or thirty-two per cent did not answer this question. One said he was not certain and another said he would in some cases. Answering every third summer, six, or twenty-four per cent, said no to this question. Six, or twenty-four per cent said yes. Twelve, or forty-eight per cent did not answer this question. Only one teacher was not certain.

Salaries and Tenure. Salaries and tenure are major items to be considered in maintaining a good school. In order to maintain a good school, one must have trained teachers, in order to get trained teachers, the salaries must be attractive and teachers must have reasonable assurance of some permanence to their employment. A high rating

school cannot be maintained by changing the faculty annually, but it is accomplished by keeping a staff of efficient instructors over the maximum period of time. Table VIII shows the present salaries of New Mexico industrial arts teachers in junior and senior high schools. It will be noted that five teachers failed to report their salaries.

TABLE VIII
THE SALARIES OF INDUSTRIAL ARTS TEACHERS
IN NEW MEXICO

| Intervals | Mid-Point | Frequency |
|-----------|-----------|-----------|
| 2350-2450 | 2400 | 1 |
| 2250-2350 | 2300 | 0 |
| 2150-2250 | 2200 | 0 |
| 2050-2150 | 2100 | 0 |
| 1950-2050 | 2000 | 0 |
| 1850-1950 | 1900 | 0 |
| 1750-1850 | 1800 | 3 |
| 1650-1750 | 1700 | 1 |
| 1550-1650 | 1600 | 2 |
| 1450-1550 | 1500 | 3 |
| 1350-1450 | 1400 | 2 |
| 1250-1350 | 1300 | 4 |
| 1150-1250 | 1200 | 2 |
| 950-1050 | 1000 | 1 |
| | Total | 20 |

The average salary of New Mexico teachers of industrial arts is \$1597. These salaries range from \$1000 to \$2400, with a median of \$1650 per year. Woodward (39, page 55) reported the salaries of West Virginia as follows:

The mode salary was \$1050 per year, the median, \$1079.55.

DeWitt Hunt, in a paper read before the members of the Northern Oklahoma Educational Association (17, page 8) reported the salaries in Oklahoma to be as follows:

2 shop teachers earn more than \$2600.00
 33 shop teachers earn more than \$2000.00
 80 shop teachers earn more than \$1500.00
 52 shop teachers earn less than \$1000.00
 9 shop teachers earn less than \$ 800.00
 The average for M.S. Degree is \$1824.56
 The average for B.S. Degree is \$1359.88
 The average for 240 teachers is \$1496.11

Note: There are 40 men in teaching or supervisory positions in state departments and schools. Here the salaries range from \$2000.00 to \$4000.00. There are at least four city supervisors whose salaries will range from \$2500.00 to \$4000.00

The salaries of industrial arts teachers in the junior and senior high schools of New Mexico are fairly adequate in comparison with salaries found in other states. The median salary of industrial arts teachers in New Mexico is \$1650. For the teachers in Oklahoma with similar qualifications (the Bachelor of Science Degree) the average salary is \$1359.88. In West Virginia the median salary is \$1079.55.

Table IX shows the average tenure of the New Mexico industrial arts teachers. This table shows the average teaching experience of New Mexico industrial arts teachers to be 10.04 years, and their average tenure to be 5.4 years. Woodward (39, page 55) found the tenure of West Virginia and calculated it this way:

The mode number of experience was five, while the median was eight and one-tenth.

Newkirk and Greene (22, pages 193-196) speak of mode and define median:

Three measures of central tendency are commonly used in the interpretation of educational tests. These are: The arithmetic mean, the median, and the mode. In general, these measures are named in

the order of their use in present day test interpretation. As a matter of fact, the mode is considered to be such an unreliable measure that it is rarely used in educational measurements... The median is defined as a point on the scale such that exactly fifty per cent of the cases are below it. The median is always computed from grouped data. The mid-measure is a counting median from ungrouped data.....

TABLE IX

TENURE

| Teacher Number | Years In Present Position | Teaching Experience | Coach | Prin. | Supt. |
|----------------|---------------------------|---------------------|-------|-------|-------|
| 1 | 4 | 4 | | | |
| 2 | 3 | 4 | | | |
| 3 | 4 | 5 | X | | |
| 4 | 1 | 5 | X | | |
| 5 | 12 | 20 | | | |
| 6 | 4 | 15 | | X | |
| 7 | 5 | 1 | | | |
| 8 | 1 | 3 | | | |
| 9 | 4 | 10 | | | |
| 10 | 4 | 11 | | | |
| 11 | 11 | 13 | | | |
| 12 | 8 | 10 | | X | |
| 13 | 1 | 10 | | | X |
| 14 | 8 | 17 | | | |
| 15 | 1 | 7 | | | |
| 16 | 9 | 12 | | X | |
| 17 | 3 | 8 | | | |
| 18 | 9 | 16 | | | |
| 19 | 3 | 3 | | | |
| 20 | 1 | 2 | | | |
| 21 | 15 | 15 | | | |
| 22 | 5 | 5 | | | |
| 23 | 14 | 20 | | | |
| 24 | 4 | 31 | | | |
| 25 | 1 | 4 | | | |
| Average | 5.4 | 10.4 | | | |

By definition the mid-measure is the score of the middlepaper when the number of test papers is odd, and the average of the two scored nearest the middle when the number is even, assuming that the test papers are arranged in definite order of magnitude.

The median is the middle measure in a series and is found by arranging the scores of a series in order of size of magnitude. Space does not permit a long topic on the true mode,

but the crude mode is the frequent score. In some cases it may be thought of as the most frequent value in a series.

The term mode is just another way of saying average.

Other Personal Qualities. A teacher who has the ability to teach other people should be studious if for no other

TABLE X

LIBRARY

| Teacher Number | Number of Books In School Library | Number of Books In Personal Library |
|-------------------|--------------------------------------|--|
| 1 | 2 | None |
| 2 | 50 | 26 |
| 3 | 25 | None |
| 4 | 15 | 18 |
| 5 | 125 | 50 |
| 6 | 40 | 12 |
| 7 | 12 | 18 |
| 8 | 20 | 15 |
| 9 | 30 | None |
| 10 | 60 | 60 |
| 11 | 35 | 20 |
| 12 | 5 | 25 |
| 13 | 40 | None |
| 14 | 100 | 60 |
| 15 | 15 | 10 |
| 16 | 60 | None |
| 17 | 156 | 1011 |
| 18 | 6 | 8 |
| 19 | 60 | 16 |
| 20 | 50 | No |
| 21 | 20 | 25 |
| 22 | -- | -- |
| 23 | -- | -- |
| 24 | -- | -- |
| 25 | -- | -- |
| Average | 29 | 89 |

reason than to practice what he teaches. A student is probably motivated more by what his teacher is and does than by the advice given in teaching. The most convenient way a teacher has for self-improvement is by the use of his personal library and professional magazines. Carlyle said:

"The true university is a collection of books."

Usually a teacher has access to his school library, so it has been included here. According to Table X, the average number of books found in the New Mexico school industrial arts department is twenty-nine, and the average for personal libraries is eighty-nine volumes. Likewise, the

TABLE XI
PROFESSIONAL MAGAZINES

| Teacher Number | Professional Magazines | New Mexico School Review |
|----------------|------------------------|--------------------------|
| 1 | No | Yes |
| 2 | 2 | --- |
| 3 | 2 | --- |
| 4 | 2 | --- |
| 5 | 2 | Yes |
| 6 | 4 | Yes |
| 7 | 3 | --- |
| 8 | 2 | --- |
| 9 | -- | --- |
| 10 | -- | --- |
| 11 | 2 | --- |
| 12 | 2 | --- |
| 13 | 4 | --- |
| 14 | 3 | Yes |
| 15 | 2 | --- |
| 16 | 2 | --- |
| 17 | 10 | --- |
| 18 | 3 | --- |
| 19 | 4 | --- |
| 20 | 3 | Yes |
| 21 | 2 | Yes |
| 22 | 2 | Yes |
| 23 | 3 | Yes |
| 24 | 3 | Yes |
| 25 | 3 | Yes |
| Average | 3 | |

magazines read by a teacher indicate his professional ideals. Unfortunately, the questionnaire did not list the names of magazines read. Table XI gives information concerning professional magazines.

The average number of professional magazines subscribed to by the New Mexico industrial arts teachers is three. One teacher reported that he did not subscribe to any professional magazines. Two of the teachers did not give this information.

TABLE XII
SPENDING VACATION

| Teacher Number | How is your Vacation Spent? | Inspection Trips |
|----------------|-----------------------------|------------------|
| 1 | Travel and work | 1 |
| 2 | Keeping up with industry | 8 |
| 3 | Work and rest | --- |
| 4 | Cabinet making | 4 |
| 5 | Cabinet making | 4 |
| 6 | Rest and work | 2 |
| 7 | Visit shops | 9 |
| 8 | Fishing and shopwork | None |
| 9 | Summer school | --- |
| 10 | Visit shops | 40 |
| 11 | Working | 3 |
| 12 | School and travel | None |
| 13 | School and travel | 2 |
| 14 | Farm work | 1 |
| 15 | ----- | 4 |
| 16 | Farming | --- |
| 17 | Summer school | No |
| 18 | Boy scout camp director | 1 |
| 19 | Working | 5 |
| 20 | In school | 3 |
| 21 | ----- | 3 |
| 22 | ----- | --- |
| 23 | ----- | --- |
| 24 | ----- | --- |
| 25 | ----- | --- |

The New Mexico School Review is a professional magazine sent to New Mexico teachers free upon receipt of full paid membership fee in the New Mexico Educational Association. Ten teachers receive it, and the other fifteen, or sixty per cent did not send this information.

Fife, (11, page 39) makes this statement concerning Louisiana teachers of industrial arts:

It was reported that all industrial arts teachers read some professional magazines regularly.

In Table XII, one can see how the summers of a majority of the industrial arts teachers are spent. Four usually attend college every summer. Approximately twelve usually work. Six respondents did not supply the information for the middle column. Seven did not give this information for the last column. An average of six inspection trips for each teacher are made. Three teachers indicated that they had made no inspection trips.

Visiting Other School Shops. To insure remembrance of the advantages and disadvantages observed in a shop, a brief checking card is convenient. One needs to know what to look for when visiting a shop. The checking can be done after one has left the shop. Table XIII shows the per cent of teachers who like to visit other school shops and the number using a checking card.

One hundred per cent like to visit other school shops. Eighty per cent do not use checking cards, the other twenty per cent do use checking cards. These teachers like to visit for ideas and information.

TABLE XIII
TEACHERS VISITING SCHOOLS AND USING CHECK CARDS

| Teacher Number | Visit School Shops? | Why | Checking Card |
|-------------------|------------------------|---------------------------------------|------------------|
| 1 | Yes | Get new ideas | No |
| 2 | Yes | To find ideas | No |
| 3 | Yes | Learn different methods | No |
| 4 | Yes | Get new ideas | Yes |
| 5 | Yes | Information | No |
| 6 | Yes | Self-improvement | Yes |
| 7 | Yes | To get new ideas | No |
| 8 | Yes | Pick up ideas | Yes |
| 9 | Yes | To improve | No |
| 10 | Yes | For inspiration | No |
| 11 | Yes | To get new ideas | No |
| 12 | Yes | For inspiration | No |
| 13 | Yes | Observation | No |
| 14 | Yes | New ideas | No |
| 15 | Yes | Get information | No |
| 16 | Yes | Ideas | No |
| 17 | Yes | Educational progress | Yes |
| 18 | Yes | New ideas | No |
| 19 | Yes | New ideas | Yes |
| 20 | Yes | To compare my progress with others | No |
| 21 | Yes | To get projects | No |
| 22 | Yes | To get projects | No |
| 23 | Yes | To get projects | No |
| 24 | Yes | To get projects | No |
| 25 | Yes | To get projects | No |

PART B

THE SHOP AND ITS EQUIPMENT

Thinking in terms of a school shop with its equipment, one is lead to include hand tools, power tools, tool room, individual lockers, bulletin boards, types of doors, area in square feet, plan of the shop, and many other items that combine to make a satisfactory place to teach industrial arts as it should be taught. Each part of the shop will be

considered and discussed separately.

The Shop and Its Equipment. The shop with its equipment is just as essential in teaching industrial arts as the blackboard, chalk and eraser are essential in the teaching of mathematics. The tools needed will depend on the number of shop subjects in an industrial arts program. The more subjects that are added, the greater the variety of tools that will be needed. More tools and units are needed to supply the present and coming demand as well as to create and hold student interest. In this type of program, the instructor can better organize his teaching materials, and manage his classes more successfully. Struck (31, page 44) says:

A series of single activities or unit shops through which the students may rotate is very desirable, but a single one activity shop is too restricted to meet modern demands.

Many of our fathers used kerosene lamps to supply their light. Now we use electricity practically everywhere since the coming of rural electrification. Automobiles have taken the places of the horse and buggy for local transportation. It is useless for the writer to list other examples, but one can see that the school child of today not only needs general information about these things he uses every day, but is demanding them.

Table XIV shows the number of schools that maintain a separate shop building.

Thirty-two per cent of the industrial arts shops have a separate building, the remaining sixty-eight per cent do not have a separate building. One is prone to think the administration was not interested and did not give much thought to the program due to the fact that it did not get enough attention to merit a separate building.

The shape of the laboratory is important. It should, in general, be rectangular and have a proportion of 1 to $1\frac{1}{2}$

TABLE XIV

SEPARATE SHOP BUILDING

| Teacher Number | Separate Shop Building | : | Teacher Number | Separate Shop Building |
|----------------|------------------------|---|----------------|------------------------|
| 1 | No | : | 14 | No |
| 2 | No | : | 15 | No |
| 3 | Yes | : | 16 | No |
| 4 | Yes | : | 17 | Yes |
| 5 | No | : | 18 | Yes |
| 6 | No | : | 19 | Yes |
| 7 | Yes | : | 20 | Yes |
| 8 | No | : | 21 | No |
| 9 | No | : | 22 | No |
| 10 | No | : | 23 | No |
| 11 | No | : | 24 | No |
| 12 | No | : | 25 | No |
| 13 | Yes | : | | |

or 1 to 2. Irregularly shaped laboratories such as "U" and "L" are undesirable.

Laboratory Size. Table XV shows the width, length and area of the shop building. Forty per cent of the respondents did not send data concerning the area in their shops. The average area for those who did send this data was 1583 square feet. One teacher failed to give the ceiling height.

Of those reporting, the average ceiling height was 11 feet.

Space Required Per Pupil. (24, page 141)

Thirty square feet of floor space per pupil should be considered the irreducible minimum in all new buildings constructed for use as industrial arts shops. This figure does not include storage space, tool room, finishing room, dark room, or planning room; and is based upon shops and laboratories planned to accommodate thirty pupils or more. In a small room the machines and furniture take up a great proportion of the total space.

TABLE XV

SIZE OF SHOP BUILDINGS IN NEW MEXICO HIGH SCHOOLS

| Teacher Number | Height | Width | Length | Area |
|-------------------|--------|-------|--------|--------------|
| 1 | 12' | 35' | 75' | 2625 sq. ft. |
| 2 | 11' | 21' | 33' | 680 sq. ft. |
| 3 | 12' | 30' | 60' | 1800 sq. ft. |
| 4 | 8' | 25' | 80' | 2000 sq. ft. |
| 5 | 14' | -- | -- | ---- |
| 6 | 12' | -- | -- | ---- |
| 7 | 13' | 35' | 60' | 2100 sq. ft. |
| 8 | 9' | 40' | 60' | 2400 sq. ft. |
| 9 | 13' | -- | -- | ---- |
| 10 | 12' | 17' | 63' | 1200 sq. ft. |
| 11 | 12' | -- | -- | ---- |
| 12 | 8½' | -- | -- | ---- |
| 13 | 11' | 25' | 25' | 625 sq. ft. |
| 14 | 12' | -- | -- | ---- |
| 15 | 12' | 40' | 60' | 2400 sq. ft. |
| 16 | 10' | 24' | 30' | 720 sq. ft. |
| 17 | 10' | 50' | 50' | 2500 sq. ft. |
| 18 | 10' | 30' | 70' | 2100 sq. ft. |
| 19 | 10' | 40' | 50' | 2000 sq. ft. |
| 20 | 8' | 20' | 40' | 800 sq. ft. |
| 21 | 14' | -- | -- | ---- |
| 22 | 8' | -- | -- | ---- |
| 23 | 20' | -- | -- | ---- |
| 24 | 16' | -- | -- | ---- |
| 25 | -- | -- | -- | ---- |

Struck (31, page 461) says:

Current practice allows about 25 square feet of floor space per pupil for classroom instruction. For shop instruction, the allowance should be between 50 and 100 square feet per pupil.

Location of Shop. Table XVI shows the location of the school shops. Shops may be located in the basement, on the first or second floor or in a separate building constructed on the school ground close by the regular high school.

TABLE XVI

LOCATION OF SCHOOL SHOPS IN NEW MEXICO HIGH SCHOOLS

| Teacher Number | First Floor | Second Floor | Basement |
|----------------|---------------|--------------|----------|
| 1 | X | | |
| 2 | X | | |
| 3 | Did not reply | | |
| 4 | Did not reply | | |
| 5 | Did not reply | | |
| 6 | | | X |
| 7 | Did not reply | | |
| 8 | X | | |
| 9 | X | | |
| 10 | | | X |
| 11 | | | X |
| 12 | Did not reply | | |
| 13 | Did not reply | | |
| 14 | | | X |
| 15 | X | | |
| 16 | X | | |
| 17 | X | | |
| 18 | Did not reply | | |
| 19 | Did not reply | | |
| 20 | Did not reply | | |
| 21 | X | | |
| 22 | | | X |
| 23 | X | | |
| 24 | X | | |
| 25 | | | X |

Nearly thirty-six per cent of the respondents did not give this information. Forty per cent have their shops on the first floor, the others, twenty-four per cent, in the basement. No one reported having a shop located on the second floor.

In What Direction Does the Shop Face? Table XVII shows the general directions in which the shops face.

Only two of the respondents failed to answer this question. Two of these shops face south, four face north, seven face east, and ten face west.

TABLE XVII
DIRECTION THE SHOP FACES

| Teacher Number | South | North | East | West |
|----------------|----------|-------|------|------|
| 1 | | | X | |
| 2 | | | | X |
| 3 | | | | X |
| 4 | X | | | |
| 5 | | | X | |
| 6 | | X | | |
| 7 | No reply | | | |
| 8 | | | X | |
| 9 | | | | X |
| 10 | | | X | |
| 11 | | | X | |
| 12 | | X | | |
| 13 | | X | | |
| 14 | | X | | |
| 15 | No reply | | | |
| 16 | | | | X |
| 17 | | | | X |
| 18 | | | | X |
| 19 | X | | | |
| 20 | | | X | |
| 21 | | | | X |
| 22 | | | | X |
| 23 | | | | X |
| 24 | | | X | |
| 25 | | | | X |

Natural Light. Table XVIII shows the amount of natural light the shop receives. Natural light is much better and much more economical than artificial light.

The average number of windows in the shops of those reporting is twelve. One of the respondents did not report

the number of windows. Another reported factory light.

Natural light is desirable and has an advantage in efficiency and economy over artificial lighting. Precision equipment such as machine lathes, milling machines, drill presses, circular saws, jointers, jig saws, wood lathes,

TABLE XVIII
NUMBER OF WINDOWS IN SHOP

| Teacher Number | Number of Windows in Shop |
|-------------------|---------------------------|
| 1 | No reply |
| 2 | 9 |
| 3 | 12 |
| 4 | 12 |
| 5 | 3 |
| 6 | 9 |
| 7 | 20 |
| 8 | 7 |
| 9 | 5 |
| 10 | 12 |
| 11 | 16 |
| 12 | 8 |
| 13 | 16 |
| 14 | 4 |
| 15 | 18 |
| 16 | 7 |
| 17 | 21 |
| 18 | 12 |
| 19 | 22 |
| 20 | 9 |
| 21 | 18 |
| 22 | 6 |
| 23 | Factory Light |
| 24 | 12 |
| 25 | 7 |

grinders, and drawing tables should be given preference in location with reference to natural light. Certain operations such as clay modeling, woodcarving and finishing are more effectively carried on under natural light because of the need for sensitive light and shade definition and delicate color discrimination.

Tool Rooms. Table XIX gives the number of shops maintaining a separate tool room.

TABLE XIX

TOOL ROOMS

| Teacher Number | Tool Rooms | : | Teacher Number | Tool Rooms |
|-------------------|------------|---|-------------------|------------|
| 1 | Yes | : | 14 | No |
| 2 | No | : | 15 | Yes |
| 3 | Yes | : | 16 | Yes |
| 4 | No | : | 17 | Yes |
| 5 | -- | : | 18 | Yes |
| 6 | No | : | 19 | Yes |
| 7 | No | : | 20 | No |
| 8 | Yes | : | 21 | Yes |
| 9 | Yes | : | 22 | No |
| 10 | Yes | : | 23 | Yes |
| 11 | Yes | : | 24 | Yes |
| 12 | No | : | 25 | -- |
| 13 | Yes | : | | |

Two of the questionnaires did not provide this information. Of the twenty-five teachers being studied, sixty per cent have special tool rooms. The remainder do not have a tool room.

TABLE XX

LECTURE ROOMS

| Teacher Number | Lecture Room | : | Teacher Number | Lecture Room |
|-------------------|-----------------|---|-------------------|-----------------|
| 1 | No | : | 14 | No |
| 2 | No | : | 15 | No |
| 3 | No | : | 16 | No |
| 4 | Yes | : | 17 | Yes |
| 5 | -- | : | 18 | No |
| 6 | Yes | : | 19 | No |
| 7 | No | : | 20 | No |
| 8 | Yes | : | 21 | No |
| 9 | Yes | : | 22 | No |
| 10 | No | : | 23 | Yes |
| 11 | Yes | : | 24 | No |
| 12 | Yes | : | 25 | -- |
| 13 | No | : | | |

Lecture Room. A shop is not complete without a convenient room where classes can be taken for periods of drill, for lectures, and to explain and demonstrate to them facts about the course. Table XX shows the shops that have been provided with such a room. Sixty per cent of the shops being studied do not have a lecture room. Nearly one-third of the shops have a lecture room. Two of the questionnaires did not give this information.

Any form of shop training may be divided into two divisions. The first should be devoted to information about joints, finishes, names, uses of tools, related drawing, science, mathematics, and methods of gluing. The second part should be shop practice to learn the correct use of tools and to be skillful in tool operations. Quoting Newkirk and Greene (22, page 61):

Tests of the industrial education field are broadly divided into (1) tests of information and (2) tests of performance.

It can be seen from the above quotation that it is common practice to divide industrial education into two parts.

Students must be drilled often if they learn fast.

From Selvidge and Fryklund (29, page 254) this is quoted:

The Law of Exercise functions immediately with the repetition of experience. A habit cannot be formed without repetition. The more intense, the more recent, and the more frequent the satisfactory experience, the more certain will the habit be formed.

Information is necessary to be successful in shop performance, and it should precede each new unit in industrial education. Many small schools are attempting to teach

industrial arts without the use of tools. If teachers are to drill the students as they should be drilled, a convenient place such as a lecture room must be provided, else there will be a tendency to slight this part of the course.

Types of Floors. Wood floors are satisfactory for light work. Such work as welding, forge, foundry, and machine shop

TABLE XXI
TYPES OF FLOORS

| Teacher Number | Wood | Concrete |
|-------------------|---------------|----------|
| 1 | X | |
| 2 | X | |
| 3 | | Both |
| 4 | X | |
| 5 | | X |
| 6 | | X |
| 7 | X | |
| 8 | X | |
| 9 | Did not reply | |
| 10 | | X |
| 11 | | X |
| 12 | | X |
| 13 | | Both |
| 14 | X | |
| 15 | | X |
| 16 | X | |
| 17 | X | |
| 18 | X | |
| 19 | X | |
| 20 | | X |
| 21 | | X |
| 22 | | X |
| 23 | | X |
| 24 | | X |
| 25 | Did not reply | |

practice should have a concrete floor.

In studying Ohio high school standards (24, page 142) it was found that:

Floor materials should be suitable to the area in which they are used. Wooden floors, either maple or paraffin-impregnated, end-grain, are deemed most suitable for all areas except those dealing with hot metals. Here the floor should be concrete, flush with the wooden floor or consist of a wooden floor covered with rough-surfaced steel plate. Rubber mat, rubberoid roofing or other suitable non-skid materials should be used as a safety precaution where machine operators stand on smooth and slippery floors.

Table XXI shows the type of floors used in the twenty-five shops in New Mexico being studied in this survey. The combination floor should be used for all around purposes. This table shows that forty per cent of the shops studied have wood floors. Forty-four per cent have concrete floors. Two shops were reported as having both types of floors, while two questionnaires did not give this information.

Lockers. In order to do the maximum teaching, one must have all aids to and conveniences for successful teaching. A supply of lockers placed near the shop is convenient, and provides a safe place for personal property. This helps in preventing losses of property and small personal items being left over the shop. Assignment of private lockers will assist in holding student interest. Table XXII shows what the percentage of shops having lockers is.

Sixty-four per cent of the shops being studied do not have separate lockers for their shop students. About thirty-two per cent have lockers. Only one teacher did not reply to this question.

Teachers would be more successful in reaching their objectives if more lockers were installed. Individual

lockers minimize discipline problems and increase student interest.

TABLE XXII
SHOPS CONTAINING LOCKERS

| Teacher Number | Private Student Lockers | : | Teacher Number | Private Student Lockers |
|-------------------|----------------------------|---|-------------------|----------------------------|
| 1 | No | : | 14 | No |
| 2 | Yes | : | 15 | Yes |
| 3 | No | : | 16 | No |
| 4 | Yes | : | 17 | Yes |
| 5 | Yes | : | 18 | No |
| 6 | No | : | 19 | No |
| 7 | No | : | 20 | No |
| 8 | No | : | 21 | No |
| 9 | No | : | 22 | No |
| 10 | No | : | 23 | Yes |
| 11 | Yes | : | 24 | Yes |
| 12 | No | : | 25 | No reply |
| 13 | No | : | | |

Doors. The type of door the shop has and the way it opens is very important. The entrance door should be double

TABLE XXIII
HOW DOORS OPEN

| Teacher Number | Inside | Outside | : | Teacher Number | Inside | Outside |
|-------------------|----------|---------|---|-------------------|----------|---------|
| 1 | | X | : | 14 | | X |
| 2 | X | | : | 15 | X | |
| 3 | | X | : | 16 | | X |
| 4 | | X | : | 17 | | X |
| 5 | | X | : | 18 | | X |
| 6 | | X | : | 19 | | X |
| 7 | | X | : | 20 | No reply | |
| 8 | | X | : | 21 | | X |
| 9 | | X | : | 22 | | X |
| 10 | | X | : | 23 | | X |
| 11 | | X | : | 24 | | X |
| 12 | | X | : | 25 | No reply | |
| 13 | No reply | | : | | | |

and should open toward the outside if for no other reason than a safety measure. Doors opening outside provide more

room in the shop. Table XXIII gives this information about shops being studied in New Mexico.

Eighty per cent of the shops being studied open their doors outside. Three or twelve per cent of the questionnaires did not provide this information. Two, or eight per cent, opened their shop doors inside.

The Shop Library. It is generally agreed by the leading educators in industrial arts that information about

TABLE XXIV
SHOP LIBRARIES

| Teacher Number | Shop Library | Number of Books | : | Teacher Number | Shop Library | Number of Books |
|-------------------|-----------------|--------------------|---|-------------------|-----------------|--------------------|
| 1 | Yes | 15 | : | 14 | Yes | 25 |
| 2 | Yes | 50 | : | 15 | Yes | 35 |
| 3 | Yes | 30 | : | 16 | Yes | 3 |
| 4 | Yes | 6 | : | 17 | Yes | 150 |
| 5 | Yes | 50 | : | 18 | No | 40 |
| 6 | Yes | 20 | : | 19 | Yes | 15 |
| 7 | Yes | 60 | : | 20 | Small one | 11 |
| 8 | Yes | 40 | : | 21 | No | -- |
| 9 | Yes | 5 | : | 22 | Yes | 100 |
| 10 | Yes | 2 | : | 23 | Yes | 20 |
| 11 | Yes | 12 | : | 24 | Yes | 125 |
| 12 | Yes | 20 | : | 25 | Yes | 20 |
| 13 | No | 1 | : | | | |

tools, materials, mechanics, electricity, is very important in shop classes, especially in the junior high school level where cultural values are emphasized. Any progressive educator believes that a student ought to read widely and learn how to find facts for himself. A library containing a variety of books related to shop courses ought to be maintained in the shop where the books will be readily accessible for reference. Carlyle once said: "The true university is a collection of books." Table XXIV shows the school shops maintaining a shop library.

Twenty-two, or eighty-eight per cent of these teachers being studied, said they had a shop library, the balance did not have a shop library. The writer observed that one teacher who said he had no library had forty volumes, assuming, possibly, that forty volumes does not constitute a library. Several others reported libraries with much less than forty books. It seems that there is too wide a range of opinion as to what constitutes a library. The average number of books found in these shop libraries was thirty.

One of the strong objectives for teaching industrial arts in the junior high schools is for cultural gain. This can be accomplished better if a splendid selection of shop manuals is kept within reach of general shop students for reference, notebook work, and reports. Students should be taught to read and look up items instead of asking the teacher for every little word of information.

The One Teacher Shop. Many shops have two or more rooms to house all the units in a well rounded industrial arts program. One teacher must often supervise a program of this kind. The objection to this is that students cannot be closely supervised at all times. By having windows in the adjacent walls, the teacher can arrange conveniently to see what is going on in the adjoining rooms. Most industrial arts programs in New Mexico are of the one-teacher type. Table XXV shows how these shops provide for close supervision. The following question was asked: If you have more than one room to supervise, do you have windows in partition of walls?

TABLE XXV
WINDOWS IN PARTITION OF WALLS

| Teacher Number | Windows in Partition of Walls | : | Teacher Number | Windows in Partition of Walls |
|-------------------|----------------------------------|---|-------------------|----------------------------------|
| 1 | Yes | : | 14 | --- |
| 2 | --- | : | 15 | Yes |
| 3 | Yes | : | 16 | --- |
| 4 | --- | : | 17 | Yes |
| 5 | --- | : | 18 | One room |
| 6 | --- | : | 19 | --- |
| 7 | One room | : | 20 | --- |
| 8 | One room | : | 21 | One room |
| 9 | One room | : | 22 | One room |
| 10 | No | : | 23 | No |
| 11 | One room | : | 24 | No |
| 12 | No | : | 25 | --- |
| 13 | --- | : | | |

Four, or sixteen per cent of the twenty-five shops being studied, have windows in the partition walls, and seven, or twenty-eight per cent, have only one room shops. The balance, or forty per cent of the teachers, did not answer this question, and four, or sixteen per cent said they did not have windows in the partition walls.

TABLE XXVI
TEACHERS' OFFICES

| Teacher Number | Office | : | Teacher Number | Office |
|-------------------|--------|---|-------------------|--------|
| 1 | Yes | : | 14 | No |
| 2 | No | : | 15 | No |
| 3 | No | : | 16 | No |
| 4 | No | : | 17 | Yes |
| 5 | --- | : | 18 | No |
| 6 | Yes | : | 19 | Yes |
| 7 | Yes | : | 20 | --- |
| 8 | No | : | 21 | No |
| 9 | No | : | 22 | No |
| 10 | No | : | 23 | Yes |
| 11 | Yes | : | 24 | No |
| 12 | Yes | : | 25 | --- |
| 13 | No | : | | |

Teachers' Offices. Shop teachers, like other classroom teachers, need to do a certain amount of study and class

preparation. He has a certain amount of personal and confidential items to be kept away from the main shop. He needs a place to hold conferences and counsel with students. The office affords this opportunity. Table XXVI shows this information.

Thirty-two per cent of the twenty-five shops being studied have an office for the teacher, while fifty-six per cent do not have an office for the teacher. Three of these teachers did not answer this question.

Machines in New Mexico School Shops. Although a question was included in the inquiry form for machinery, only twenty-five per cent answered these questions fully. The most common machines used in these schools may be summarized by listing them here:

- Jig saw
- Drill press
- Wood lathe
- Electric grinder
- Circular saw
- Band saw

Of the twenty-five shops being studied no report of a motor driven surfacer in the shops was given. This includes Albuquerque Public Schools, the largest system in the state. With this exception, Albuquerque Schools and the Jal School have all that is listed above.

Value of Electric Machines. The reader would be better informed as to the way these shops are equipped if he knew how much money had been spent for machines. One can determine to some extent the teaching limitations by the equipment of

a shop. Table XXVII shows the average value of electric machines in these shops being studied.

Six of the questionnaires did not provide this information. The average for the nineteen of those giving this data is \$1566.40. The value of electrical equipment ranges from \$30 to \$15,000.

TABLE XXVII
VALUE OF MACHINES AND HAND TOOLS

| Teacher Number | Value of Electrical Equipment | : | Teacher Number | Value of Electrical Equipment |
|-------------------|----------------------------------|---|-------------------|----------------------------------|
| 1 | \$1500.00 | : | 14 | \$ 500.00 |
| 2 | 35.00 | : | 15 | 750.00 |
| 3 | 1000.00 | : | 16 | 450.00 |
| 4 | 700.00 | : | 17 | 4000.00 |
| 5 | ----- | : | 18 | 30.00 |
| 6 | 500.00 | : | 19 | 1200.00 |
| 7 | 300.00 | : | 20 | ----- |
| 8 | ----- | : | 21 | 2500.00 |
| 9 | ----- | : | 22 | 10000.00 |
| 10 | 230.00 | : | 23 | 15000.00 |
| 11 | 1200.00 | : | 24 | 1500.00 |
| 12 | 900.00 | : | 25 | ----- |
| 13 | ----- | : | | |

PART C

INDUSTRIAL ARTS TEACHERS SPONSORING

EXTRA-CURRICULAR ACTIVITIES

Small schools generally demand that the teacher give some of his time to sponsoring extra-curricular activities. The industrial arts teacher usually is well fitted to do this type of work among boys, especially such activities as home workshop clubs, model airplane, locomotive, or ship making clubs, jack knife carving, yacht racing clubs and boy scout activities correlate closely with his training.

Extra-Curricular Activity of Industrial Arts Teachers of New Mexico. Findings of this study seem to indicate that schools in New Mexico demand less extra-curricular work of their teachers than is the general average, as only two of the twenty-five teachers studied reported a sponsorship. Both of these reported as home room sponsors. Duties connected with this type of activity do not necessarily correlate closely with training of industrial arts teachers.

Additional Duties of Other Industrial Arts Teachers. Of the twenty-five teachers being studied, one is a superintendent, three are principals, three are coaches, two are class sponsors, five take turns in keeping the study hall, ten teachers include mathematics in their teaching duties, and nine are full time teachers of industrial arts.

Chapter V is a study of the number of industrial arts teachers in New Mexico, their qualifications, colleges from which degrees were obtained, major teaching field, teacher's attitudes toward self-improvement, salaries and tenure and other personal qualifications. The shop and its equipment is the subject of Part B, which contains detailed information about the shops and tools in tabular form. Part C contains a discussion of industrial arts teachers and their relations to extra-curricular activities.

Chapter VI includes a review of the findings of this study and a list of recommendations which were suggested by this work.

CHAPTER VI

SUMMATION OF DATA WITH RECOMMENDATIONS FOR THE STATE
PROGRAM OF INDUSTRIAL ARTS

In order to facilitate the use of this study, a summary of the findings is given here. The professional orientation of this summary has been based on the history and status of industrial arts in New Mexico. The two most important parts of the study are the reviewing of the facts that have been uncovered in the process of this work and the recommendations for educational improvements.

PART A

SUMMARY

How the Problem is Organized. In brief, this chapter includes twenty-five terms related to industrial education which are defined. These terms include industrial arts, manual arts, manual training, industrial education, curriculum, area, course of study, and others.

Similar studies were criticized and reviewed. Among these studies were: Status of Industrial Arts Teachers in Louisiana by Fife, A Survey of Industrial Arts in the Accredited High Schools of North Dakota by Montague, A Survey of Local Industrial Arts in a Representative Number of Schools in Washington by Myron, Status of Industrial Arts in Oklahoma Schools in 1938 and Suggested Statements of Controlling Philosophy by Pope, Industrial Arts in the White Senior High Schools of West Virginia by Woodward.

The State of New Mexico and Its Educational Program.

Part A of Chapter II is a brief history of New Mexico from the time it was discovered by the Spaniards in 1528 down to the present time.

Part B deals with the population, geography and economic status of the state. The 1940 census shows a total population of 528,678, a 24.9 per cent increase during the last ten years. The area of New Mexico is 122,503 square miles, the fourth largest of the forty-eight states.

Gold, silver, copper, zinc, and a number of baser metals are mined in New Mexico and these contribute substantially to the economic welfare of the state. Income from ranching in 1938 was more than \$61,000,000. Farm lands are valued at more than \$170,150,140. The gross sales tax amounted to \$3,465,484.78 in the fiscal year 1938-1939. The income from the tourist trade adds materially to the state budget.

Part C is a history of the development of schools with emphasis on the origin and growth of industrial arts within the state. As early as 1721 public schools were established. It was not until 1891 that public schools began to make progress. An act was passed providing for the state university, the school of mines, and the agricultural and mechanical college.

The total enrollment in elementary and high schools is

less than that of Oklahoma, West Virginia, North Dakota, Louisiana, or Washington, with a higher per capital cost.

First mention of industrial arts in state records was made in 1916, when a "manual training" textbook was adopted by the State Board of Education. Table II shows that the salaries of shop teachers in New Mexico ranged from \$400 to \$2200.00. Salaries were slightly higher in proportion to teacher training than now.

Industrial Arts Teacher Education and Certification in New Mexico. This chapter is concerned with industrial arts teacher certification in New Mexico. This state contributed liberally to the support of teacher training institutions before statehood. High standards have been maintained from the beginning and the teacher training colleges and the departments of education in the universities rank favorably with those of any other section of the country. At the present, there are five institutions within the state offering curricula leading to teaching certificates, and one school of mines. Two of these institutions devoted to teacher training have departments of industrial arts; they are Eastern New Mexico College and New Mexico Normal University.

Industrial arts teachers in New Mexico come under the same certification law as the other academic teachers, that is, they are required to have a bachelor's degree and

a major in industrial arts. Their credentials are classified, and they are certified accordingly.

A Description of the Questionnaire. In Chapter IV a description of the technique in making a good questionnaire is discussed. These are some of the more important points which were stressed in the discussion:

Eliminate the asking of questions where the answers can be secured otherwise.

A letter should be enclosed with the questionnaire. The letter and the questionnaire should not be longer than is necessary to accomplish the information, in order to require as little of the respondent's time as possible.

Enclose a self-addressed and stamped envelope, to insure a higher per cent of returns.

An inquiry should be sent out in advance.

The respondent should be entitled to a summary of the study being made.

An extra questionnaire should be enclosed for the respondent.

A Report of Inquiry into the Status of Industrial Arts in New Mexico Schools. In Chapter V it was found that thirty of the one hundred sixty-two accredited white public schools in New Mexico offer courses in industrial arts. All of

these are not municipal or independent schools, only seventy-seven schools fall in the classification of independent schools. The number offering this course was less than one-sixth or sixteen and two-thirds per cent of the total number of schools listed as accredited schools in New Mexico.

All of the schools offering industrial arts in their courses are accredited high schools. The writer did not find any departments for this work existing in any of the second or third class schools.

Forty teachers are teaching industrial arts in the thirty schools offering this subject.

Twenty-two or eighty-eight per cent of the teachers being studied have a bachelor's degree.

The median annual salary is \$1650 and the average tenure is 5.4 years.

Twenty-two of the thirty-one counties in New Mexico offer courses in industrial arts. The nine not offering these courses are listed here: McKinley, Catron, Harding, Quay, Hidalgo, Mora, Sandoval, Rio Arriba, and Torrance counties. Not one county in the state has industrial arts in all its high schools.

Nearly eighty-six per cent of the schools of New Mexico have only one teacher per school to teach these courses.

One small town public school superintendent teaches

industrial arts without college training in this subject. Three small town high school principals teach the only industrial arts courses the schools have, and they are teaching it on weak minors in this field.

Of the twenty-five industrial arts teachers being studied, the average number of semester hours in industrial arts training is thirty-four.

The mean salary of junior and senior high school industrial arts teachers being studied is \$1597. These salaries range from \$1000 to \$2400.

Twenty-nine is the average number of books found in the shop libraries of those shops being studied in New Mexico, and eighty is the average number of books owned by the New Mexico shop teachers being studied. The average number of professional magazines subscribed to by these teachers was three.

One hundred per cent of these teachers like to visit other school shops for new ideas. Only four, or twenty per cent of these teachers use a checking card.

In New Mexico, thirty-two per cent of the shops have separate buildings, the balance do not have separate buildings. The average size of these shop buildings or rooms is 1583 square feet, ceiling height is eleven feet.

Of these shops that do not have a separate building, ten, or forty per cent of them are located on the first floor. Twenty-four per cent have their shops in the basement. Thirty-six

per cent of the respondents did not give this information. Ten, or forty per cent, of these shops face west, seven, or twenty-eight per cent, face east, four, or sixteen per cent, face north, two or eight per cent face south.

The average number of windows per shop is twelve. Of these shops being studied, fifteen, or sixty per cent, have special tool rooms, the balance do not have such a room.

Ten, or forty per cent, of these shops have wood floors; eleven, or forty-four per cent have concrete floors. Two, or eight per cent were reported as having both wood and concrete floors, while two questionnaires did not provide this information.

Sixteen, or sixty-four per cent of the shops being studied do not have separate lockers for their shop students. Eight, or thirty-two per cent, do have the lockers. One respondent did not supply this information.

Twenty, or eighty per cent, of these shops' doors open outside. Two, or eight per cent, open the shop doors inside. Three, or twelve per cent, did not report.

Four, or sixteen per cent, of the twenty-five being studied have windows in the partition walls, and seven, or twenty-eight per cent have only one room shops. The balance or forty per cent of these teachers did not answer this question, and four, or sixteen per cent said they did not have windows in the partition walls.

Eight, or thirty-two per cent, of these shops have an office for the teacher, while seventeen do not have an office for the teacher. The remainder did not provide this information.

The most common power tools used in these shops are listed here:

Bandsaw
Circular saw
Electric grinder
Wood lathe
Drill press
Jig saw

Not a single shop reported having an electric planer.

The average value of equipment found in these shops is \$1560.40. The values of the tools range from \$30 to \$15,000.

Of the twenty-five teachers being studied, one is a superintendent, who taught industrial arts without a major in that subject, three are principals, two are coaches, two are class sponsors, five take turns in keeping the study hall, ten teachers finish a day's work by teaching mathematics, and nine are full-time teachers of industrial arts.

The average time spent in industrial arts classes is one hour per day or 300 minutes per week.

PART B

RECOMMENDATIONS

After a careful study of the status of industrial arts education in New Mexico, conducted over a period of ten months, the writer has found that the recommendations given here seem to be indicated for the improvement of the industrial arts

program in the state. Full recognition of the physical hindrances and limitations to the advancement of the program of industrial arts is acknowledged, and these recommendations are offered with due respect to those in authority over the fine system of education in New Mexico.

Twelve Months Employment. Superintendents of schools should be encouraged to employ industrial arts teachers eleven months out of every twelve months, allowing the other month for a short course or a vacation.

A More Diversified Program. More units and courses ought to be offered in order to interest all the students in the school and meet needs of the youth of today.

Adults Encouraged to take Industrial Arts Courses. Special evening classes for adults should be offered in every industrial arts shop.

An Adequate Financial Record. A complete record of all business and activities of the department should be kept by every shop teacher.

Group Meetings. There should be monthly group meetings of industrial arts teachers to permit professional discussions. Three or four district organizations might meet the needs of the state.

Self-Improvement. Industrial arts teachers should develop attitudes of self-improvement.

State Objectives. Objectives of industrial arts should be flexible enough to satisfy the practical demands of pupils

in New Mexico. Industrial arts teachers in New Mexico should formulate a statement of controlling philosophy and specific objectives.

Improvement of Teaching. Teachers should be encouraged to use progressive teaching methods in their shops.

Extension of Industrial Arts. The 162 accredited high schools in New Mexico with approximately 3,000 teachers, presents a growing demand for industrial arts courses. There should be at least twenty more industrial arts departments in the state.

Certification. No one should be allowed to teach industrial arts subjects without an industrial arts major. A new plan for certification of industrial arts teachers should be evolved in which permanent certificates would be given only after forty hours of specialization in industrial arts subjects have been earned.

Teacher Up-grading. Those teachers with a weak major should be required to attend a college or university with an approved department of industrial arts, adding at least four hours of credit in industrial arts subjects each year until a minimum of twenty-four hours have been earned.

Summer School Attendance. Every shop teacher should go to college every third summer regardless of qualifications. This applies to teachers with life certificates as well as those not having good basic training.

Shop Planning. When the construction of a new shop

building is being considered, the specifications or similar principles to those found in the Ohio High School Standards for industrial arts should be studied. All shop plans and equipment lists should be submitted to the state advisory committee for approval.

Teacher's Salary. Teachers should be paid according to qualifications. Men teachers should receive higher salaries than women.

Extension of Teacher Preparation. More industrial arts courses should be offered in the higher institutions of learning in New Mexico now equipped to carry on industrial arts teacher education.

State Support. Provisions should be made so that the state budget would permit the extra cost of offering industrial arts in all the high schools of New Mexico.

State Supervision. At least one additional high school inspector should be added to the present inspection staff. This inspector should have had experience as an industrial arts teacher and should be responsible for the supervision of all high school industrial arts programs.

A State Advisory Committee. The systems of state advisory committees in Ohio, Texas, Oklahoma and other states should be studied and a plan suitable to the needs of New Mexico devised. This committee should be appointed by the State Superintendent of Public Instruction and its duties should be advisory in nature.

Further Studies. The following subjects are suggested as being needed for the coordination and development of industrial arts offerings in New Mexico schools.

A detailed study of industrial arts course offerings.

The formulation of a state course of study.

The opportunity for county industrial arts high schools.

The coordination of industrial arts and trade and industrial education courses in New Mexico schools.

5

| | |
|--|-----|
| APPENDIX A - A SELECTED BIBLIOGRAPHY | 98 |
| APPENDIX B - QUESTIONNAIRE FORMS USED IN THE INVESTI- GATION. | |
| Letter of Transmittal | 101 |
| The Questionnaire | 102 |
| APPENDIX C - A DIRECTORY OF TEACHERS IN NEW MEXICO WHO RETURNED THE QUESTIONNAIRE | 110 |

APPENDIX A

A SELECTED BIBLIOGRAPHY

1. Bowden, William T., and Others, Industrial Arts in Modern Education, The Manual Arts Press, Peoria, 1934, 167 pages.
2. Bode, Boyd H., Fundamentals of Education, The MacMillan Co., New York, 1931, 245 pages.
3. Bonser, Frederick Gordon, Industrial Arts for Public School Administrators, Bureau of Publication, Teachers College, Columbia University, New York, 1930, 95 pages.
4. Biennial Report, New Mexico State Department of Education, Santa Fe, New Mexico, 1938-1940, 133 pages.
5. Bulletin, Eastern New Mexico College, Portales, New Mexico, 1941-1942, 104 pages.
6. Bulletin, New Mexico Normal University, Las Vegas, New Mexico, 1939-1940, 128 pages.
7. Campbell, William Giles, A Form Book for Thesis Writing, Houghton-Mifflin Company, New York, 1939, 145 pages.
8. Crawford, Claude C., The Technique of Educational Research, The University of Southern California, Los Angeles, 1928, 320 pages.
9. Dewey, John, Democracy and Education, The MacMillan Co., New York, 1921, 434 pages.
10. Engineering Foundation, Engineering: A Career, A Culture, Published by the Engineering Foundation, 29 West 39th St., New York, 1937, 38 pages.
11. Fife, John G., Status of Industrial Arts Teachers in Louisiana, A Master's Thesis, Louisiana State University, New Orleans, 1939, 64 pages.
12. Flexner, Abraham, Universities, American, English, German, The Oxford University Press, New York, 1930, 381 pages.
13. Friese, John F., Course Making in Industrial Education, A mimeographed preliminary edition of a text book, distributed by the author, State College, Pennsylvania, 1937, 157 pages.
14. Furner, Lester C., "Ranking State School Systems by Educational Efficiency Measures." American School Board Journal, 99:27, July, 1939.
15. Hunt, DeWitt, Shopwork in Engineering Divisions of State Universities and Land Grant Colleges, Unpublished Doctor's Dissertation, Ohio State University, 1939, 411 pages.

16. Hunt, DeWitt, The Place of Industrial Arts in a Community Program of Adult Education, a term paper, Ohio State University, 1936, 29 pages.
17. Hunt, DeWitt, Industrial Arts in Oklahoma Schools, prepared for the Industrial Education Section of the Northeast Oklahoma Education Association, Tulsa, October 27, 1939, 12 pages.
18. Koos, Leonard B., The Questionnaire in Education, The Macmillan Co., New York, 1928, 178 pages.
19. Minutes of State Boards and Superintendents of Public Instruction before Statehood, Manuscript Form, State Department of Education, New Mexico.
20. Montague, Charles Adam, A Survey of Industrial Arts in the Accredited High Schools of North Dakota, Unpublished Master's Thesis, University of North Dakota, Grand Forks, North Dakota, 1939, 73 pages.
21. Myron, Elias Ferdinand, A Survey of Local Industrial Arts in a Representative Number of Schools in Washington, Unpublished Master's Thesis, University of Washington, Seattle, Washington, 1937, 104 pages.
22. Newkirk, Louis V., and Greene, Harry A., Tests and Measurements in Industrial Education, John Wiley and Sons, Inc. New York, 1935, 253 pages.
23. New Mexico Educational Directories from 1913-1925. These directories list the superintendents, principals, teachers of each school in the state, their duties, and salaries. The directories were not published between 1925-1938.
24. Ohio State Department of Education, Ohio High School Standards, 1937, State Department of Education, Columbus, 161 pages.
25. Pear, Tom H., Skill in Work and Play, Munthen and Company, Ltd., London, 1924, 107 pages.
26. Pope, Eugene Blair, Status of Industrial Arts in Oklahoma Schools in 1938 and Suggested Statements of Controlling Philosophy, Unpublished Master's Thesis, Oklahoma A. and M. College, Stillwater, 1938, 59 pages.
27. Reeder, Ward G., How to Write A Thesis, Public School Publishing Company, Bloomington, Illinois, 1930, 216 pages.
28. Robertson, David A., American Universities and Colleges, Edited by David A. Robertson for the American Council on Education, Charles Scribner's and Sons, New York, 1928, 884 pages.

29. Selvidge, R. W., and Fryklund, Verne C., Principles of Trade and Industrial Teaching, The Manual Arts Press, Peoria, Illinois, 1930, 419 pages.
30. Snedden, David, Vocational Education, The MacMillan Co., New York, 1930, 587 pages.
31. Struck, F. Theodore, Creative Teaching, Industrial Arts and Vocational Industrial Education, John Wiley and Sons, New York, 1938, 623 pages.
32. Society for the Promotion of Engineering Education, The Report of the Investigation of Engineering Education, 1923-29, Office of the Secretary, F. L. Bishop, University of Pittsburgh, 1930, 1320 pages.
33. Stombaugh, Roy, A Survey of the Movements Culminating in Industrial Arts Education in Secondary Schools, Teachers College Contribution to Education No. 670, Columbia University, New York, 1936, 192 pages.
34. United States Department of Commerce, Bureau of the Census, Statistical Abstract of the United States 1940, Government Printing Office, Washington, D. C., 1941, 963 pages.
35. Warner, William E., Policies in Industrial Arts Education, The Ohio State University Press, Columbus, 1928, 90 pages.
36. Warner, William E., and Others, The Terminological Investigations, Western Arts Association, 5215 College Ave., Indianapolis, 1932, 48 pages.
37. Writers' Program, New Mexico, Hosting House, New York, 1940, 458 pages.
38. Woodward, Calvin M., The Manual Training School, D. C. Heath and Company, Boston, 1887, 360 pages.
39. Woodward, Robert Earl, Industrial Arts in the White Senior High Schools of West Virginia, University of Kentucky, Lexington, Kentucky, 1937, 70 pages.

JAL PUBLIC SCHOOLS
J. L. Burke, Jr., Superintendent
Jal, New Mexico
November 27, 1940

Homer Pender, Chairman
James F. Knight, Clerk
H. F. Steen, Member

K. B. Walker, High School Principal
Jimmy Gammill, Grade School Principal
R. L. Meyers, Music Supervisor

Dear Fellow Teacher:

As a teacher of Industrial Arts, may I ask your assistance in studying and reporting on this subject which is the title of my master's thesis. I am sure you are interested in the history and status of this subject in this state. I consider your part in this to be very important. You can answer this questionnaire better than anyone else.

The past few years industrial arts as a school subject has grown from woodwork and mechanical drawing (called manual training) to include 25 or more subjects. The interest manifested by teachers in the field of Industrial Arts would indicate a more than passing consideration for the worth of Industrial Arts activities.

It was commonly agreed among teachers in the organization of the Industrial Arts Section October 25, at Santa Fe, that something needed to be done to improve the profession. This survey will show clearly what is being done and will furnish a starting place for the improvement of teaching.

It is hoped that this study is important enough to merit your time and effort to fill out this questionnaire, even though it comes at a time of the year that finds you perhaps busier than any other. And, speaking of being busy, I am sure if you realize the short time remaining for me to complete this study, you will sit down now and answer the questions and return the questionnaire today in the stamped self-addressed envelope which has been enclosed for your convenience.

An extra copy of the inquiry form is enclosed for your files, and I shall be glad to send you the results of the survey as soon as it is completed.

Thank you very much for your cooperation and prompt response.

Very sincerely yours,

G. B. Strunk

Approved:

Adviser
Head, Department of Industrial Arts
Education and Engineering Shopwork
Oklahoma A. and M. College

An Inquiry Concerning the History and Status of Industrial
Arts in New Mexico

Conducted by Granville B. Strunk, Teacher of Industrial Arts courses,
Jal, New Mexico and graduate student Oklahoma A. and M. College,
Stillwater, Oklahoma.

Directions:--Please answer the following questions to the best
of your ability. This material will be used in my thesis entitled
"History and Present Status of Industrial Arts in New Mexico". An
early reply will be appreciated.

Granville B. Strunk

QUESTIONNAIRE

The History and Status of Industrial Arts in New Mexico

Name of respondent _____

Address _____

Position _____

I. Your Qualifications:

1. Are you a college graduate? _____

2. What college? _____

3. Where is it located? _____

4. Do you have a Master's Degree? _____

5. If not, are you working on one? _____

6. What is your major? _____

7. How many undergraduate semester hours (2 semester hours is
equal to three term hours) have you earned in your major
subject? _____

8. What is your minor? _____

9. How many semester hours have you earned in it? _____

10. Do you have other majors or minors? _____
11. If so, list here _____
12. Do you believe it is desirable for the industrial arts teacher to go to school every summer? _____
13. Every other summer? _____
14. Every third summer? _____
15. Even if you had your master's degree completed, would you attend summer school? _____
16. Did you attend summer school last summer? _____
17. Where? _____
18. Are you going to attend some summer school in 1941? _____
19. Where? _____
20. Do you like to visit other teachers' shops? _____
21. Why do you visit them? _____
22. Do you use a checking card to note your observations? _____
23. How many industries did you visit last year? _____
24. How do you spend your vacation? _____
25. How many years of teaching experience have you had? _____
26. How long have you been in your present position? _____
27. What is your annual salary? _____
28. What professional magazines do you take? (List them in the order of importance to you) _____
29. Do you have a professional library? _____ How many volumes? _____
30. Estimate the cost of it. _____

II. The Shop and Equipment.

1. Do you have a separate shop building? _____
2. The width of building is _____
3. Length is _____

4. If the shop is located in the main building, is it on the first floor, second floor, or in the basement? (Underline)
5. The height of ceiling is _____
6. Number of windows in shop? _____
7. The shop faces south, north, east or west. (underline)
8. Does the shop have a tool room? _____
9. Lecture room or space? _____
10. Floor is made of wood, concrete. (Underline)
11. Does each student have a separate locker? _____
12. How do your doors open, inside or outside? (Underline)
13. Do you have a shop library? _____
14. How many industrial arts books are there in the school library? _____
15. If you have more than one room to supervise do you have windows in partition of walls? _____
16. Do you have an office? _____

Please submit the following information concerning the machines used by boys for educational purposes in your shop.

| Name of Machines | Make | No. of Machines | Size of H.P. Rating | Are machines equipped with individual motors |
|---------------------|------|--------------------|------------------------|--|
|---------------------|------|--------------------|------------------------|--|

WOOD LATHE

MACHINE LATHE

CIRCULAR SAW

BAND SAW

JOINTER

DRILL PRESS

JIG SAW

SURFACERMORTISERTOOL GRINDERROUTERSHAPERPAINT SPRAYERCYLINDER PRESSJOB PRESSLINOTYPEMONOTYPEMETAL SAWMAT CASTERPAPER CUTTERFINISHINGARC-WELDINGOXY-ACETYLENE
WELDING

Total value of equipment _____ What new equipment is needed?

Which of the above machines do you consider less valuable to your
department? _____

What additional equipment do you think most needed? _____

Please fill in this form which will give information about
your daily teaching schedule.

| Period | From | To | Course | No. of students |
|----------|-------|-------|-------------------------------|-----------------|
| Example: | 10:30 | 11:15 | Beginning Hand Woodworking | 16 |

1. _____

2. _____
3. _____
4. _____
5. _____
6. _____
7. _____
8. _____

III. The Curriculum

1. Do you have courses of study for each course taught?

2. Do you require textbooks be used in your classes? _____

3. What textbooks do you use? List courses and textbooks.

4. What per cent of your teaching is given to lecture and recitation and what per cent is given to shop practice?

IV. Historical Data

1. When was industrial arts first organized in your school?

2. Who was the first industrial arts teacher? _____

3. Was he a college graduate? _____

4. What college? _____

5. What subjects were offered the first year? _____

6. What was the instructor's annual salary the first year? _____
7. How many students were enrolled in industrial arts the first year it was taught in your school? _____
8. How many are enrolled in industrial arts in your school now? _____
9. What were the objectives then? _____
10. What are they now? _____
11. Do you have more tools now than they had then? _____

V. Extra-Curricular.

1. Do you sponsor an industrial arts club? _____
2. Do you sponsor a home work shop for boys? _____
3. If a student wants to make a model airplane do you allow it to be done in class, or do you let him take of it in the club? _____
4. If you do not give your full time to industrial arts, what other subject do you teach? _____
5. Do you have a home room to keep? _____
6. Do you have a class to sponsor? _____
7. Freshman, Sophomore, Junior or Senior Class? _____

Curriculum.

Check the kinds of work you are equipped to teach. Fill in blanks with the number of boys in each.

| Kind of work | No. of boys | Approximate Age | Approximate grade |
|-------------------------------|-------------|-----------------|-------------------|
| <u>Bench Woodwork</u> | | | |
| <u>Cabinet making</u> | | | |
| <u>Carpentry</u> | | | |
| <u>Furniture construction</u> | | | |

Pattern making

Upholstering

Wood turning

Wood carving

Printing

Bookbinding

Operating linotype

Mechanical drawing

Auto mechanics

Electricity

Sheet metal

Foundry

Machine shop

Leather craft

Brick laying

Concrete

Shoe repair

Forge

General repair work

Industrial field trips

Auto mechanics

Arc-Welding

Oxy-acetylene Welding

Wood finishing

Metal finishing

Total No. Boys in shop classes

Do you think industrial arts teachers are going on the extreme in stressing too much handwork? _____

Too much machine work? _____

Which of the two divisions do you think is the more important?

Why? _____

APPENDIX C

A Directory of Teachers in New Mexico Who Returned the Questionnaire

| Name | Street Address | Subjects Taught | Kind of School | City |
|-------------------|------------------------|-----------------|-----------------|-------------|
| ader, L. R. | 1007 W. Shipp | Ind. Arts | Jr. High School | Hobbs |
| ritt, Leonard | | Ind. Arts | Jr. & Sr. H.S. | Dexter |
| razil, R. W. | | Ind. Arts | High School | Endee |
| arlson, Walter | | Ind. Arts | Sr. High School | Belen |
| avis, R. M. | 217 McKimis | Ind. Arts | Jr. High School | Santa Fe |
| oak, O. W. | 303 E. Union | Ind. Arts | Jr. High School | Portales |
| oodwill, A. P. | 1500 E. Coal | Auto Mech. | High School | Albuquerque |
| arwell, Jess | 212 E. Schar- bauer | Ind. Arts | High School | Hobbs |
| olcomb, J. H. | 1138 Forrester | Printing | High School | Albuquerque |
| ones, Ben Ware | | Ind. Arts | Sr. High School | Las Vegas |
| itchens, Lester | 226 N. Amherst | Machine Shop | High School | Albuquerque |
| laudt, Otto | | Ind. Arts | High School | Deming |
| iersey, R. C. | 1102 National | Ind. Arts | High School | Las Vegas |
| axey, C. A. | | Ind. Arts | Jr. & Sr. H.S. | E. Vaughn |
| orris, S. M. | 1316 N. Main | Ind. Arts | Jr. High School | Clovis |
| earce, A. L. | 1006 Forrester | Ind. Arts | High School | Albuquerque |
| eterson, D. W. | | Drawing | High School | Alamogordo |
| eynolds, J. T. | | Mech. Dr. | Sr. High School | Albuquerque |
| trunk, G. B. | Box 61 | Ind. Arts | Jr. & Sr. H.S. | Jalisco |
| ownson, John S. | Box 135 | Ind. Arts | High School | Las Cruces |
| atson, W. H. | | Ind. Arts | Jr. & Sr. H.S. | San Jon |
| atkins, Winston | | Ind. Arts | Jr. & Sr. H.S. | Eunice |
| illis, Charles B. | | Ind. Arts | High School | House |
| ood, Donnie | | Ind. Arts | High School | Carrizozo |
| iegler, John | Box 556 | Ind. Arts | Jr. High School | Santa Fe |

Typist:

Winnifred Young Vogler

Stillwater, Oklahoma