A PROPOSED PLAN FOR INDUSTRIAL ARTS IN THE ALTUS HIGH SCHOOL

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CHAPTER I

INTERPRETATION OF THE PROBLEM

The problem of developing American youth for citizenship in a democratic industrial nation is one which is recognized by the majority of educators. Industrial arts education is a very important factor in solving this problem. It gives practical training for students who do not plan an industrial career, as well as provides a basic contribution to the ability to earn a living for those who do plan to enter the field of industry. This fact has led the writer to attempt to establish a plan for a more complete program of industrial arts in the Altus, Oklahoma high school system.

Purpose of the Study. The purpose of this report is to recommend to the administrators of the Altus high school a program of general shop which the writer believes will best serve the high school students of that area. The main question to be considered then is "What type and phases of industrial arts education will best serve the needs of these students?". The writer sincerely hopes that this report will answer this question.

Need for the Study. At the present time the industrial arts program in the Altus high school system consists of woodworking and mechanical drawing under the direction of one teacher. In order to give the students a broader education in this field, a more diversified program is needed.

It is the belief of the writer, that the number of students who leave school at high school age might be lessened considerably by the establish-

ment of a general shop program which would broaden their chances for further advancement in later life and serve their interests to a greater extent. As students enter high school, they are nearing adulthood and much consideration should be given to their education because many of their decisions at this time will influence their entire lives. It can clearly be seen in our ever changing civilization, that certain adjustments must also be made in education to enable the youth of today to make the most of his vast opportunities.

The Extent of the Study. The material in this report is based largely on information obtained from (1) magazine articles pertaining to objectives of industrial arts in general education, (2) textbooks written by leaders in industrial education, (3) summary sheets for courses of study in selected industrial arts subjects, and (4) textbooks written about high schools.

Techniques of Research. The main techniques of collecting material for this report were library research and personal interview. Chapters one, two, three, five and six consist of information gained through library research. Chapter four includes information secured through personal interview with three instructors in the field of industrial arts, in addition to library research.

Definitions of Terms. Some of the terms most frequently used throughout this report are industrial arts, general shop, general education, the high school, and manual training. The following definitions of these terms are given in order to clarify these terms:

> Industrial arts is the study of materials and of the desirable changes made by hand or by the several manufacturing processes from the raw state into products designed to meet the consumer's needs

and comforts for daily living.[1]

Shops that are planned and equipped to teach two or more distinct types of shopwork at the same time under one teacher are general shops.[2]

General Education - (1) to transmit a way of life, (2) to improve and reconstruct that way of life, and (3) to meet the needs of the individuals.[3]

The high school - The school division following the elementary school, comprising most often grades 9 to 12 or grades 7 to 12.[4]

Manual training is a historical term describing education of the mind through the hand based on handwork instruction in the elementary industrial processes and the theory of formal discipline.[5]

In order to have a complete study of a plan for industrial arts in the high school, several factors should be considered. It is important that the history and development of the high school be investigated to give a clearer understanding of the problem at hand. In chapter two the writer has traced the history and development of the high school.

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[1]Newkirk, Louis V., and Johnson, William H. The Industrial Arts Program. New York: The Macmillan Company, 1948. p.5.

[2]Newkirk, Louis V. Organizing and Teaching the General Shop. Peoria: The Manual Arts Press, 1947. p. 15.

[3]Wilber, Gordon O. Industrial Arts in General Education. Scranton: The International Textbook Company, 1948. p. 3.

[4]Good, Carter V. The Dictionary of Education, New York: McGraw-Hill Book Company, 1945. p. 183.

[5]Warner, William E., Bollinger, Elroy, and Hutchinson, Herbert H. The Terminological Investigation. St. Louis: The Western Arts Association, 1932. p. 29.

CHAPTER II

THE HISTORY AND DEVELOPMENT OF THE HIGH SCHOOL

In order to become better acquainted with the industrial arts program, the writer believes that an investigation of the history and development of the high school itself will be beneficial. There has been much discussion and experimentation as well as a great deal of controversy during the period of the arrival of secondary education in the United States. The growth of interest in secondary education represents an important aspect of the cultural and economic advance of this nation.

The Beginning of the High School. In tracing the historical development of secondary education in the United States, we find three distinct eras: (1) The Colonial Period, (2) The Century from 1790 to 1890, and (3) The period since 1890. The social, economic, and political conditions of each period had a great deal to do with determining the character and development of secondary education.

The Colonial period went little beyond the transplantation of the Latin grammar school and the arts college. There were few skilled occupations at this time. The government machinery was simple and social distinction was not as marked as in the Old World. The outlook of the people was very religious, and religion went far toward shaping practices of education.

Secondary schools were rather common in England and other countries in Europe at this time. In England, they were usually known as Latin or

Grammar schools and the curriculum consisted mainly of Greek, Latin, and religious instruction. The colonists transplanted the educational practices of the mother country to their new country and adapted them to their own needs. The New England, the Middle, and the Southern colonies made up three distinct groups, each with its own ideas and attitudes toward education.

Conditions were, by far, the most favorable for education in the New England colonies. The people were more highly educated and realized keenly the need for secondary and higher education. Thus, New England became the cradle of the American public school system.

To the settlers in the Middle colonies, education was more a matter of parochial and private concern and conditions were not as favorable for its development there. Many of the people realized the need for secondary education in the training of leaders, but their views were so divided that a unified action in educational matters was almost impossible.

The plantation system, which prevailed in the South, placed certain limitations on community life and on secondary education. Although the need for secondary education was realized, most of the people felt that it should be provided by voluntary and private action, therefore, public effort toward education was very limited in the southern colonies during this period.

Latin grammar schools of one kind or another were established in all but one or two of the colonies before the close of this period. The curriculum was still limited largely to Latin and Greek, with Mathematics being included in some.

The period from 1790 to 1890 was an era of transformation and marvelous growth for the people of America. It marked the change of a simple and obscure America to the great world power that it has become. The population

increased from less than four million to nearly sixty-three million during this period and the industrial development was almost miraculous.

The social, political, and economic changes during this century paved the way for great progress in educational fields. Up until about the time of the Civil War, the Academy was the main institution of secondary education. The Franklin Academy in Philadelphia was the first academy established in America, but others were soon established in the Middle and Southern colonies. The main support of these institutions came from private contributions and tuition fees. They accepted both boys and girls, and the curriculum was much more general than that of the Latin grammar school. The length of the course was determined to a great extent by the aims of those who attended.

The first public high school was established in 1821, in Boston. At the time that this school was established, the Boston school system provided elementary school facilities for boys and girls up to about fourteen years of age, and Latin school facilities for boys from the age of twelve. The Latin school was primarily intended for those who wished to prepare to enter college. The high school had two aims ... to prepare for life and preparation for college.

The establishment of high schools was confined largely to the state of Massachusetts up to 1840. After that time, however, they spread rapidly and by 1860 there were at least 321 institutions of this kind. There was still much opposition from certain sources but secondary education was gaining a foothold and gradually coming to the foreground.

The American public school system had become rather well established by 1890. Many leading educators, however, were becoming more and more

aware that the school system was not functioning well and they sought to solve the problem by reorganizing and reshaping the several divisions of the system.

Since 1890, there has been amazing progress in education. Not only has there been a tremendous increase in the per cent of pupils enrolled, but new industries and new materials have brought an expansion of curriculum as well. The public high school has broadened from a class institution to a school of the youth of all the people.

The Expansion of the High School. As the demands of public education changed, it became necessary to adjust the school organization to its broader program. The psychological and physiological characteristics of the students as well as the needs of society had to be taken into consideration. From this adjustment came a new organization known as the 6-3-3 plan which provides for six years of elementary school, three years of junior high school and three years of senior high school.

With this new program, the senior high school provides a more specialized curricula which is closely related to the pupil's preparation for life, whether he intends to enter college, business or industrial employment. Although many schools still use the earlier plan of eight years of elementary school and four years of senior high school, the 6-3-3 plan is coming more and more into general use. It provides a better opportunity for youth to explore a wide variety of vocational and educational interests.

In his book Introduction to Vocational Education, S. Grant Conner lists a set of objectives for secondary education which were formulated by the National Education Association through its Committee on the Reorganiza-

tion of Secondary Education. These objectives are commonly known as "The Seven Cardinal Aims of Education" and are as follows:

Health - Provide such forms of training that will enable the individual to engage in physical activities without any unnecessary handicaps. This is done through games, gymnasiums, instruction on diet, clothing, sanitation, safety and bodily cleanliness.

Command of fundamental process - This includes the acquirement of skills in certain fundamentals as reading, writing, arithmetic, etc. While training in these fundamental processes is done by various school subjects it is evident that the vocational activities make a large contribution in the way of tangible relationships particularly in mathematical computations.

Worthy home membership - This objective involves training in obedience, reverence, courtesy, respect for elders, cooperation, etc. The accomplishment of this objective is realized through such activities as plays, clubs, project-making and other forms of character building, studies and reading; also personal discipline and guidance.

Vocation - This objective necessitates such facilities as will permit instruction of a vocational nature. Under this heading are included the various phases of industrial arts, plus instruction in some specific trades.

Citizenship - As education is a function of the State, to train for better citizenship is an objective of prime importance. Under this heading, we have respect for civil law and the administrative offices responsible for the execution of the law, also interest as prospective voters in all matters pertaining to civic betterment. This objective is gained through the media of such subjects as civics, history, current events, stimulation of interest in all civic undertakings or drives, such as "Clean-up-Week" - "Community Chests" - "Red Cross" - "Xmas Seals" and things of like importance.

Worthy Use of Leisure - This objective has for its purpose the making of better citizens by creating interest in worthwhile avocational activities. Included under this heading we find such things as music, athletics, debating, popular science, radio, stamps, etc. Usually these activities are organized by the formation of clubs under the guidance and supervision of a properly qualified member of the school faculty.

Ethical Character - The result of this objective is development of youth with high standards of relationship with fellow associates. It involves training in honesty, in thought, in act;

the development of a social consciousness and responsibility.[1]

The majority of educators have accepted these objectives as being fundamental to the present educative process. The achievement of these widely accepted aims, has become an important part of the expansion of the present high school curriculum. The philosophy of industrial education follows closely the aims of these seven objectives as we shall see in the next chapter.

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[1]Conner, S. Grant. Introduction to Vocational Education. New York: Industrial Teacher Training Staff, 1947. p. 5.

CHAPTER III

THE HISTORY AND PHILOSOPHY OF INDUSTRIAL ARTS

Leaders in the field of industrial arts had a clear and definite philosophy in mind when "manual training" was first introduced into the curriculum of secondary schools. This philosophy has been included in writings from the very beginning of written history. From the age of prehistoric man, "how to earn a living" has been one of the most important purposes in the education of man. The philosophy of industrial arts is essential to this purpose. The present program of industrial arts education has developed as a result of the work of many administrators and teachers over a considerable period of time.

The Origin of Industrial Arts. In the 16th and 17th centuries, the educational leaders began to see and accept the value of handicraft training. Johann Bernhard Basedow (1723-1790) was the first to include such training for its educational value. Basedow, a professor in ethics and fine arts at Soroe, Denmark, saw the value of handwork as a means of mental training. The work of August Hermann Francke (1663-1727) in Halle, Germany included different kinds of work experiences with general instructions.

In general education, the greatest progress in teaching shopwork was made in northern Europe. The work of Basedow, Pestalozzi, Von Fellenberg and others stimulated the development of formal teaching of several types of handicrafts.

In the Scandinavian countries, in the eighteen-sixties and seventies, efforts were made to revive the household industries to meet the economic needs. Schools attempted to give instruction in such crafts as carpentry, wood carving, brush making and bookbinding. This instruction was authorized by the Swedish Government in 1872. Instruction in handwork based on the "hus" or house occupation, called "Sloyd" finally developed into a system of well organized tool work for boys of twelve to fifteen.

One of the most widely known "Sloyd" schools of that time was located at Naas and taught by Otto Salomon, in 1872. The course of instruction included seven hours a day of wood sloyd, turnery, wood carving and saddlery for boys. In 1877, Salomon visited Finland and as a result of his study of the Finland program was converted to the Froebelian doctrine of self-activity as a means of developing the "faculties" of the child. Consequently, he reorganized his course of instruction, making wood the principal material of instruction. Some of the projects constructed were scoops, shuttles, coat hangers, and ladles for the home. Each object was constructed by the pupil. This experience was for the purpose of giving specific educational values, such as accuracy, dexterity, neatness, patience, and love of labor.

Della-Vos organized a method of training in shopwork for the engineering students in the Russian Imperial Technical School at Moscow in 1868. He gained his ideas for this school from Uno Cygnaeus of Finland. By analyzing the construction trades into their elemental operations, Della-Vos gained the instructional content of his courses. He then arranged these operations according to a logical sequence of difficulty or complexity and grouped them according to the material used and the trades

employed. He had a definite method of tool instruction based on exercises in joinery, turning, patternmaking, forging, bench metal working, and machine metal working. This instruction was intended to give the student the necessary understanding of the best methods of working materials and the types of construction in which the materials were used.

Development of Industrial Arts in America. The "Sloyd" system had a very strong influence in the further development of shopwork instruction. It was widely recognized in America as well as abroad. The teaching of shopwork received real stimulation from the exhibition of Della-Vos' students' work at the Centennial Exposition held in Philadelphia, in 1876. Its greatest advocates were I. D. Runkle, President of Massachusetts Institute of Technology, and Calvin M. Woodward, of Washington University in St. Louis. These men both saw the possibilities of systematic instruction for high school students and did much toward making it possible.

In 1880, Woodward opened the first "manual training school" in the United States. During the decade following the opening of this school, thirty-eight public high schools introduced this type of shopwork into their curriculums. Among the first were Montclair, N. J. and Jamestown, N. Y., in 1882; Baltimore, Chicago and Toledo in 1884; Philadelphia in 1885; Washington, D. C. in 1886; Springfield, Mass., Concord, N. H., Orange, N. J. and New York City in 1888. By 1900, the manual training schools numbered one hundred and sixty-nine and by 1909, more than half of the cities in the United States with four thousand or more population, reported manual training in their high schools.

In general, woodworking continued to be the most common form of manual training for boys in the high school. Today, however, industrial arts

programs include instruction in industrial drawing, art metal works, plastics, leathercraft, ceramics, alabaster and many other areas as well as woodworking. In its changes from these early beginnings, manual training has, as a practical art, played a very important part in the high schools. It has contributed much to vocational education in establishing the fact that tools, machinery, and the materials of the industrial world can be used for instructional purposes in a school. It has taken on important guidance values essential to the selection of specific vocational education to be pursued later.

The Basic Philosophy of Industrial Arts. "We have always had a basic philosophy of industrial arts. It is and always has been the welfare of the common man."[1] A large per cent of the people of the world are common men. Some are common because of emotional, intellectual, and physiological traits, and some are common by chance.

There was an early tendency to look down upon the common man who worked with his hands, but many philosophers, including Socrates, and Bacon, argued for education in the arts and crafts for the well-to-do and the common man alike. The argument being that it would give the well-to-do man a better understanding of the common man as well as an occupation by which he could earn his living if necessary, and it would enable the common man to improve his station in life.

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[1]Hardin, Robert A. "Our Evolving Philosophy of Industrial Arts," Industrial Arts and Vocational Education. Vol. 39. Milwaukee: The Bruce Publishing Company, 1950. p. 179.

Early Philosophers in Industrial Arts. There is evidence that many of the writers of the sixteenth, seventeenth, and eighteenth centuries advocated some of the principles which were set forth about thirty years ago in the seven cardinal principles of secondary education. John Amos Comenius wrote concerning children of six to twelve years of age:

> They should learn the most important principles of the Mechanical Arts, both that they may not be too ignorant of what goes on in the world around them and that any special inclination towards things of this kind may assert itself with greater ease later on.[2]

Jean Jaques Rousseau wrote about realism in education. He would have had every boy learn a trade so that "he may overcome the prejudices usually conceived against it".[3]

Johann Heinrich Pestalozzi and Philip Emanuel von Fellenberg were the two educational writers who perhaps made the greatest contributions to industrial arts education up to the first quarter of the nineteenth century. Pestalozzi felt that manual work should go hand in hand with academic work. He made progress in using objects and manual labor as a means of teaching the traditional school subjects, but his success along these lines might have been greater if he had possessed the administrative ability necessary to its promotion. Fellenberg had the administrative ability to carry out the experiments of Pestalozzi and the two men worked together on educational projects at times.

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[2]Keatings, M. W. The Great Didactic of John Amos Comenius. London: Adam and Charles Block, 1896. p. 421.

[3]Bennett, Charles Alpheus. History of Manual and Industrial Education Up to 1870. Peoria: The Manual Arts Press, 1926. p. 97.

Johann Friedrich Herbart, one of the world's greatest educational philosophers, believed that handwork was a very necessary part of general education. He said,

> Elementary schools should have workshops, though they should not actually be technical schools. And every man should learn to use his hands. The hand holds the place of honor at the side of the power of speech in raising man above the beasts.[4]

The main purpose of manual training was to teach the boy how to earn a living. After 1870, many changes began to take place and there was much controversy before industrial arts reached its present status in the field of general education. With the growth of the manual training movement, there developed a tendency to broaden the course of instruction to provide for individual differences in the students. One of the most outstanding contributions to the philosophy of industrial arts was made by John Dewey. He regarded manual training as a means of teaching related subjects and he felt that problems directly concerning school life, rather than those of adult life should be used as a basis of instruction. Dr. Frederick Bonser was one of the later leaders in the field of industrial arts education. He once stated that,

> ..it will at once appear that primary emphasis will not be placed upon the production of industrial commodities, but rather upon intelligence and cultivated tastes in their choice and use.[5]

This statement leads us to see industrial arts not only as an end, but also as a means to an end.

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[4]Ibid., p. 161.

[5]Bennett, Charles Alpheus. History of Manual and Industrial Education 1870 to 1917. Peoria: The Manual Arts Press, 1937. p. 454.

The philosophy of industrial arts is continually being modified by the influence of scientific and industrial developments. The needs, interest, physical and mental capacities, and abilities of the individual student, the aims, subject matter, and the standards of industrial education are a few of the factors that must influence the philosophy of industrial arts. The beliefs of the men discussed in this chapter have played an important part in developing industrial arts. The chapter which follows deals with the purpose of industrial arts and its relation to other subjects.

CHAPTER IV

THE PURPOSE OF INDUSTRIAL ARTS IN THE HIGH SCHOOL

Industrial arts is an important part of general education. It is a course which helps the students to prepare for life. Through industrial arts education, boys and girls are given experiences and training which they cannot gain from any other subject in the high school curriculum. Industrial arts develops skill, a knowledge of materials, and resourcefulness and also provides a specific occupational training.

The Purpose of Industrial Arts. The primary teaching aims of industrial arts are summarized in the following eight objectives.

1. Develop the ability to plan and complete projects, using a variety of tools and construction materials in a workmanlike manner.
2. Give experiences that will increase understanding of modern industry and that will lay the foundation for and help determine vocational interests.
3. Develop the ability to read and make working drawings, charts, and graphs.
4. Develop the ability to recognize quality and design in the products of industry.
5. Develop the ability to maintain and service in a safe and efficient manner the common products of industry.
6. Provide an objective medium for expression in mathematics, science, language, arts, and social science.
7. Develop an interest in crafts as a valuable medium for creative expression in leisure time.

8. Give experiences that will develop social understanding and the ability to work effectively with others either as a leader or as a member of the group.[1]

By studying these objectives, the value of industrial arts in the high school curriculum can readily be seen. Industrial arts provides learning experiences. It gives the students an opportunity to broaden their education in many fields. It gives instruction in the correct use of common tools, gives training in industrial adaptability and provides a better background for modern living. Industrial arts has a justified and assured place in the high school curriculum because, with its distinctive physical setting and pupils activities, it provides a highly effective means of reaching worthy ends.

Industrial Arts in Relation to General Education. The primary purpose of education is to develop useful, happy and successful citizens. The aims of general education are parallel in many respects with those of industrial arts, because industrial arts is merely a phase of general education and should always be thought of as such.

Since the Civil War, there has been a continuous growth in industrial development. Each new invention has had its effect upon the growth of industry and these rapid changes have resulted in lack of adjustment for many people. Out of this rapid industrialization has come the need for a new emphasis in the schools. Thus we find the place of industrial arts in general education becoming more and more important.

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[1]Newkirk, Louis V., and Johnson, William H. The Industrial Arts Program. New York: The Macmillan Company, 1948. pp. 270-272.

The industrial arts program contributes substantially to meeting the requirements for preparing youth for the highly industrialized society in which they live today. Industrial education helps to reduce the remoteness of schoolwork from life by bringing into the curriculum everyday problems that develop skills and knowledge that are important for a better social order. Learning through doing is widely recognized as sound educational procedure. The practical work experiences that industrial arts provides is a means of developing character and perseverance in the youth of today.

Wilber has listed some industrial arts objectives and their analysis which the writer believes helps to establish the relationship of industrial arts to general education. These objectives, together with some of the behavior changes expected from the students are as follows:

1. To explore industry and American industrial civilization in terms of its organization, raw materials, processes and operations, products, and occupations.
   a. They will be familiar with the organization of industry and relate the personnel organization of the industrial arts shop to similar systems in industry. Their cooperation in the personnel system will increase.
   b. They will read more intelligently about industry and industrial products. The choice of their reading will be affected.
   c. They will recognize industrial methods and will attempt to apply them in the school shop.
   d. They will choose materials wisely because they are acquainted with their uses by industry.
   e. They will read about and interpret the problems of management and labor more intelligently.

2. To develop recreational and avocational activities.
   a. They will become interested in, and will engage in, one or more constructional hobbies.
   b. They will contribute to class discussions with information gained from reading along lines of their interests.
   c. They will suggest and work on projects related to their hobby interests.

3. To increase an appreciation for good craftsmanship and design, both in the products of modern industry and in artifacts from the material cultures of the past.
   a. They will recognize good design and apply such knowledge in the construction of projects.
   b. They will re-design projects to improve their appearance and utility.
   c. They will recognize and avoid poor design and "over decoration."

4. To increase consumer knowledges to a point where students can select, buy, use, and maintain the products of industry intelligently.
   a. They will look for constructional features in judging the worth of an article.
   b. They will become acquainted with trade names and will look for proven brands when buying.
   c. They will recognize quality and will buy accordingly.
   d. They will buy on the basis of their needs, rather than entirely on the basis of price.

5. To provide information about, and in so far as possible, experiences in, the basic processes of many industries, in order that students may be more competent to choose a future vocation.
   a. They will read and talk about various occupations.
   b. They will make tentative choices of a vocation.
   c. They will visit industries and observe the various workmen under normal working conditions.
   d. They will choose elective courses which provide additional information about occupations.

6. To encourage creative expression in terms of industrial materials.
   a. They will experiment with new ways of solving construction problems and will make improvements on the basis of their experiments.
   b. They will take ideas from different sources and create new designs.
   c. They will increasingly attempt to solve their own problems.

7. To develop desirable social relationships, such as cooperation, tolerance, leadership and followership, and tact.
   a. They will cooperate with others in promoting a group program.
   b. They will assume and discharge leadership responsibilities in connection with the personnel organization.
   c. They will give help and advice willingly.
   d. They will accept assignments given them by leaders in the personnel organization and will recognize leadership of others.

8. To develop a certain amount of skill in a number of basic industrial processes.
   a. They will perform tool processes with an increasing degree of accuracy.
   b. The quality of workmanship in their projects will be improved.
   c. Their self-assurance will increase and will be indicated by a willingness to attempt more difficult projects.
   d. They will practice difficult operations in order to perfect the skills.[2]

These objectives clearly follow the pattern and purposes of general education. Industrial arts is not merely a course, but rather a combination of courses which provides lifelike experiences. Such studies help to smooth out the everyday problems of trying to be good workers, good citizens, and good parents.

Industrial Arts in High Schools in Other Cities. Through personal interview, the writer has attempted to illustrate the industrial arts programs of the high schools in three cities: Drumright, Oklahoma, El Paso, Texas, and Duncan, Oklahoma. The people interviewed were: Robert Kinsley, high school industrial arts instructor, Drumright High School, Drumright, Oklahoma, O. C. Miller, high school industrial arts instructor, Austin High School, El Paso, Texas, and Cecil Acuff, high school industrial arts instructor, Duncan High School, Duncan, Oklahoma.

The interview with Mr. Robert Kinsley revealed the following: the industrial arts subjects taught in the Drumright High School are: mechanical drawing, woodworking, plastics, and Keene cement. These subjects are offered to the students in the ninth, tenth, eleventh and twelfth

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[2]Wilber, Gordon O. Industrial Arts in General Education. Scranton: The International Textbook Company, 1948. pp. 47-54.

grades. Table 1 outlines the subjects offered and the grades in which the students may enroll in them.

TABLE 1

DRUMRIGHT HIGH SCHOOL, DRUMRIGHT, OKLAHOMA

INDUSTRIAL ARTS PROGRAM

Ind. Arts Subjects	Grade 9 No. of Wks.	Grade 10 No. of Wks.	Grade 11 No. of Wks.	Grade 12 No. of Wks.
Mech. Drawing	9*	9*	9*	Elective
Woodwork	18*	Elective	18*	Elective
Keene Cement		9*		Elective
Plastics	9*		9*	Elective

*Required courses in industrial arts.

The hand woodworking is offered to freshmen and sophomores. After completing hand woodworking, they may enroll in machine woodworking. The woodworking course consists of eighteen weeks of instruction, mechanical drawing nine weeks, plastics nine weeks and Keene cement nine weeks.

There is one industrial arts teacher employed to teach in the Drumright High School. The school is organized on the 8-4 plan and the class periods are 50 minutes in length. The shop is a part of the regular high school building.

In the interview with Mr. O. C. Miller, it was learned that the Austin High School system includes the eighth, ninth, tenth, eleventh, and twelfth grades. These grades are all housed in the same building. There are four shop teachers and one drawing teacher in this school. The industrial arts subjects offered are listed in Table 2 on the following page.

TABLE 2

AUSTIN HIGH SCHOOL, EL PASO, TEXAS

INDUSTRIAL ARTS PROGRAM

Ind. Arts Subjects	Grade 8 No. of Wks.	Grade 9 No. of Wks.	Grade 10 No. of Wks.	Grade 11 No. of Wks.	Grade 12 No. of Wks.
Hand Woodwork	6*				Elective
Machine Woodwork		36*		36	Elective
Metalwork		18	18*	18	Elective
Welding		18*	18	18	Elective
Mech. Drawing		18	18	18	18*

*Required courses in industrial arts.

The shops in this school are unit shops and they include woodworking, metal shop and drawing. The students may take four years of woodworking. Shops 1 and 2 consist of hand woodworking, and shops 3 and 4 consist of machine woodworking. The metal shop includes metal lathe, general metal, acetylene welding, electric welding, and ornamental metal work. The drawing is divided into first, second, third, and fourth semesters of mechanical drawing, and one semester of aircraft drawing and two semesters of architectural drawing are offered. The students must complete four semesters of mechanical drawing before they are eligible to enroll in architectural or aircraft drawing.

The outcome of the interview with Mr. Cecil Acuff is reviewed in Table 3 on the following page. This table lists the industrial arts subjects which are offered in the Duncan high school.

TABLE 3

DUNCAN HIGH SCHOOL, DUNCAN, OKLAHOMA

INDUSTRIAL ARTS PROGRAM

Ind. Arts Subjects	Grade 10 No. of Wks.	Grade 11 No. of Wks.	Grade 12 No. of Wks.
Welding			9*
Plastics		9*	Elective
Leathercraft	9*		Elective
Woodwork		18*	Elective
Mech. Drawing		9*	Elective

*Required courses in industrial arts.

The Duncan High School is organized on the 6-3-3 plan. It is composed of the tenth, eleventh, and twelfth grades. This high school offers five industrial arts subjects. These are woodworking, welding, plastics, mechanical drawing and leathercraft. There are two industrial arts instructors in this school; one teaches woodworking and drawing, and the other one teaches plastics, welding and leathercraft.

In discussing the purposes of industrial arts, its relationship to general education, and by comparing the industrial arts programs of the high schools just mentioned, the writer has attempted to present a clear picture of industrial arts and its outlook in the high schools of today. The proposed plan for the industrial arts program in the high school at Altus, Oklahoma is presented in the next chapter.

CHAPTER V

THE PROPOSED PROGRAM FOR THE ALTUS HIGH SCHOOL

The proposed industrial arts program for the high school at Altus, Oklahoma will consist of a one teacher general shop. In making plans for this proposed program, several topics have been considered. These include teacher qualifications, types of shops, the plant itself, selection and organization of subjects to be taught, and a summary of a course of study for each of the proposed industrial arts courses. These topics will be discussed in this chapter.

Teacher Qualifications. The senior high school industrial arts teacher should have adequate cultural, professional, and industrial arts training. He should have completed a four-year college course and when possible he should have a masters degree in industrial arts. An effective teaching personality is important as well as a natural aptitude for working with tools, machines, and construction materials.

The following pledge is one which every teacher of industrial arts should follow.

> We pledge ourselves that through a wholesome and moral personal life, we will set an example of satisfaction in living to the boys in our classes.[1]

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[1]Hunt, DeWitt. The Professionalization of Industrial Arts Teaching. Pamphlet, Oklahoma Agricultural and Mechanical College, Stillwater, Okla.

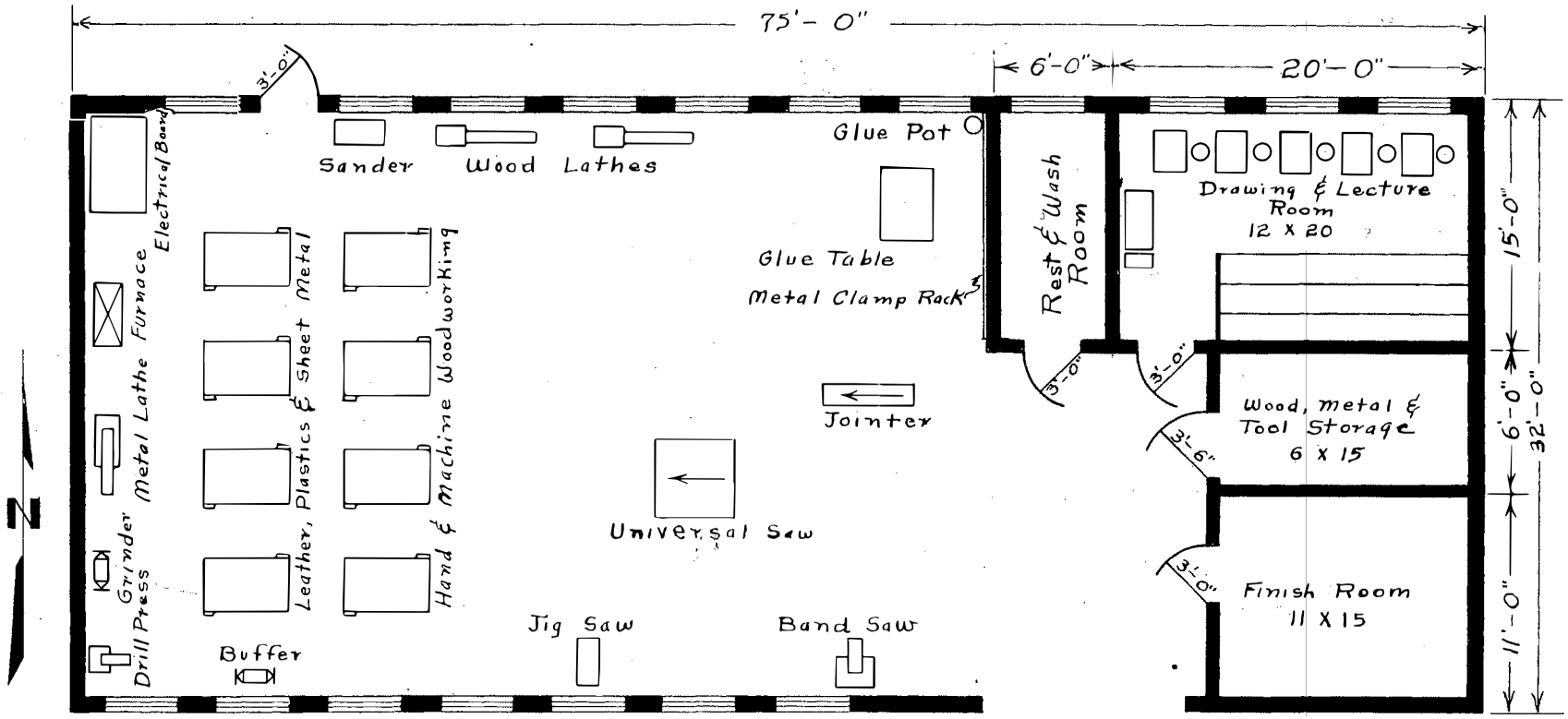
The teacher and his attitudes have a great bearing upon the responses that students will give. He should be interested in teaching and in the subject which he is teaching. He must know his subject matter. The industrial arts teacher should be a progressive teacher. He should make a continuous study of the processes of industry so that he can teach his students the most modern methods as well as the established fundamentals. He should have a thorough knowledge of elements involved in successful teaching.

Types of Shops. The two most common types of shop organizations are the unit shops and the general shops. In the unit shop, the instruction is limited to one type of shop activity. This type is usually inadequate except in large districts where there are a number of different unit shops and the pupils may be rotated. The general shop is one in which several types of shopwork are carried on under the instruction of one teacher at one time. This is the most adequate type and the most widely used plan.

The Plant. The shop plan shown in Plate 1 on the following page, is the proposed arrangement for the high school general shop at Altus, Oklahoma. This plan has approximately 2,250 square feet of floor space, which provides ninety square feet per pupil for a class of twenty-five.

The drawing room serves as a lecture room, drawing room, planning room, and an office. It may also be used for a dark room for showing motion pictures and slides.

The shop will be equipped with a sufficient number of electrical outlets conveniently located. The ceiling will be covered with acoustical material to lessen the noise and the room will be decorated with light green walls to make the shop an attractive and pleasant place in which to



A High School General Shop Including Provisions for Electrical Work, Sheet Metal Work, Hand & Machine Woodworking, Plastics, Leather Craft and Industrial Drawing.

work and learn. The floor will be constructed of concrete to withstand the rough usage that it will get from sheet metal and furnace work. The shop will be housed in a building apart from the rest of the school plant. There will be many other features such as lighting, heating and ventilation that should be discussed with the architect who will be in charge of building.

Selection and Organization of Subjects. A number of factors have influenced the selection of the subjects to be offered in this general shop program. The writer has listed a few of the things that have been considered in this selection. They are as follows:

1. Selection of subjects that will follow the objectives of general education in the high school.
2. Selection of subjects that will insure the maximum development of the senior high school students.
3. Selection of a variety of subjects that will meet the individual interests of the students and help them to develop their abilities.
4. Selection of subjects that will encourage group activity.
5. Selection of subjects that are adapted to meet the needs of different grade levels of students.

After considering the foregoing criteria, the writer suggests the following subjects for the senior high school general shop: (1) industrial drawing, (2) hand woodworking, (3) machine woodworking, (4) sheet metal, (5) electricity, (6) plastic work, and (7) leather craft. Table 4, on the next page, shows how these courses will be offered.

TABLE 4

A PROPOSED GENERAL SHOP PROGRAM FOR THE

SENIOR HIGH SCHOOL, ALTUS, OKLAHOMA

Industrial Arts Subjects	Grade 10 No. of Wks.	Grade 11 No. of Wks.	Grade 12 No. of Wks.
Drawing		12*	Elective
Hand Woodworking	12*	6	Elective
Machine Woodworking		18	Elective
Sheet Metal	6*	6	Elective
Electricity	6*	6	Elective
Plastic Work	6*	6	Elective
Leather Craft	6*	6	Elective

*Required industrial arts courses.

The courses suggested will offer experiences that will develop the student's interest, ability and skill. They will provide an opportunity for him to explore his aptitudes for this type of work and perhaps help him to decide upon his future preparation for a vocation.

The general shop program, consisting of twelve weeks of hand woodworking, six weeks of sheet metal, six weeks of electricity, six weeks of plastics, and six weeks of leathercraft, should be a required course for the tenth grade boys. The class periods will be forty-five minutes in length and will meet five days each week. In the eleventh grade, twelve weeks of drawing and eighteen weeks of machine woodworking should be required and the other courses should be elective. In the twelfth grade no industrial arts courses will be required, but the student may elect those which he chooses.

Summary Sheets for Courses of Study. In proposing a plan for the industrial arts program, summaries of the courses of study have been planned. The summary sheets for the suggested courses in this program include manipulative units of instruction, material relative to them and projects recommended for teaching the manipulative units. The following paragraphs in this chapter will be used to discuss the summary sheets for the suggested subjects in this field.

Industrial Drawing. The high school students should learn industrial drawing as a part of their regular education. It would be very beneficial to every student to have at least one semester's work in this subject. To the manufacturer, the home maker, contractor and engineer, industrial drawing is indispensable. Industrial drawing develops the power of visualization, trains in exactness of thought and teaches the student how to read and write the language of the industries. Summary sheet No. 1 is planned for this course and will provide information concerning principles of lettering, free hand drawing, and orthographic projection.

Hand Woodworking. Woodworking is one of the first industrial arts subjects to be introduced into the high school curriculum. The high school students need instruction in woodworking as a part of their general education in order that they may be able to use common hand tools and be intelligent consumers of the products of the woodworking industries. Woodworking should give the students a clear picture of vocational opportunities and lay a foundation for those students who wish to earn their living in this industrial field.

This course will include information concerning the different types

of wood and instruction in how to use common woodworking tools and their processes. The students will learn about the construction of furniture and the various finishes that are used in the industries of today. They will learn the qualities that constitute good design in furniture. The main objective of woodworking in the high school is to instill in the students desirable habits of thinking, in terms of material things through analyzing, planning and performing mechanical tasks within the abilities and interests of the students. The summary sheet for this course is No. 2.

Machine Woodworking. Machine woodworking is an advanced form of woodworking and is no doubt, the most popular subject of industrial arts being taught in the high schools of today. This course provides extensive experiences in practical thinking and planning and requires close application on the part of the student. Good instruction in this subject is most important so that accurate work may be produced with the maximum degree of efficiency and safety.

The chief aim of instruction in machine woodworking is to teach the students the correct use and safety of each power machine in the machine woodworking shop. Although few boys who enroll in advanced woodworking courses in high school industrial arts classes will be entering cabinet making or furniture manufacturing occupations, much of the knowledge gained there will mature the individuals and prove to be valuable in later industrial vocations. The outline of this course will be found in summary sheet No. 3.

Sheet Metal. Metal working is an important field of instruction in the industrial arts curriculum. The uses of sheet metal are many and

varied and the students should be taught the correct uses so that they may be able to judge quality and durability. They should know how metals are worked and the operations used in shaping them. They should learn about the different types of metals and some of their uses in modern industry. Metal work offers an opportunity for the students to increase their creative ability and knowledge as a consumer.

The manipulative processes consist mainly of cutting, shaping, forming and joining thin metals. This course will provide an opportunity for the students to construct many useful metal projects for use in the home as can be seen in summary sheet No. 4, which is planned for this course.

Electricity. The study of electricity is a very important subject both from the standpoint of its use in the home and from the standpoint of vocational opportunities. The industrial arts shop cannot cover all of the phases of industry, but it can give the elementary theory and enough practice to enable the students to get a fairly clear picture of the electrical industries.

The high school course in electricity should teach the safe use of electrical devices common in the home. The course should also provide practice in making and wiring the more common types of circuits. The best means of learning the theory of electricity is by applying it in working projects which are interesting to the students. This course is outlined in summary sheet No. 5.

Plastics. The plastic industry has grown rapidly in the last few years. Plastic is taking the place of wood in many items. Its outlook for the future is very bright and the opportunities for employment in this

new and expanding industry are very promising. Courses in plastics are becoming very common in the high school industrial arts curriculum. The students are curious to learn the qualities and processes of plastics in the school shop. Plastics are particularly adaptable to craftwork and many projects may be made at a small cost to the student. A knowledge of plastics is very important today because so many of the products that we buy are made partly or entirely of plastic. Summary sheet No. 6 gives an outline for this course.

Leather Craft. The working and decoration of leather is an ancient and honorable Art. It is a fascinating hobby for leisure time as well as a very profitable business for many people. The course in leatherwork develops a knowledge of the kinds and uses of tools used in working the leather, care of the tools, preparation of the leather, making patterns, transferring designs, coloring the leather and cleaning and polishing leather. These things are shown in summary sheet No. 7. Leather craft develops creative ability in the students and its study gives them a better consumer's knowledge of leather articles.

It is the desire of the writer that the foregoing recommendations will aid in the establishment of a broader and more complete industrial arts program in the senior high school at Altus, Oklahoma. It is felt that by offering the various courses recommended in this proposal, the individual needs and interests of the students can best be served.

No. 1

A SUMMARY SHEET FOR A COURSE OF STUDY FOR FORTY-TWO WEEKS OF INDUSTRIAL DRAWING.
Textbook: Fryklund and Kepler, General Drafting.

A. Manipulative Units of Instruction	Textbook Page No.	B. Informational Material Relative to the Manipulative Unit Listed in Column A.	Textbook Page No.	C. Projects Recommended for use in Teaching "A" and "B"	Textbook Page No.
1. Making a simple working drawing.	10-41	How to layout paper. How to use triangles and T square. Measure with a scale. Select and sharpen a pencil. Fasten drawing paper to board.	34 39 36 13 32	Draw a sand block.	44
2. Learning more about simple working drawing.	10-41	Learn vertical and inclined lettering. Making numerals.	23 25 27	Draw a vise block.	44
3. Simple working drawings continued.	10-41	Learn the alphabet of lines. How to erase. Selection and arranging view for a working drawing.	10 15 16	Draw a seat.	44
4. Finishing working drawings of straight visible lines.	10-41	How to dimension a working drawing. Make arrowheads. Space lettering. Care of drawing instruments.	20 23 31 33	Draw a paper weight.	44
5. Drawing objects with straight and invisible outlines.	45	Review alphabet of lines. Learn how to check drawings. Learn how to locate hidden lines.	45 46	Draw: Mortised block. Hot dish stand. U-Block. Nail box.	 47 47 47 47

A SUMMARY SHEET FOR A COURSE OF STUDY FOR FORTY-TWO WEEKS OF INDUSTRIAL DRAWING (Con't)

A. Manipulative Units of Instruction.	Textbook Page No.	B. Informational Material Relative to the Manipulative Unit Listed in Column A.	Textbook Page No.	C. Projects Recommended for use in Teaching "A" and "B".	Textbook Page No.
6. Drawing objects with inclined lines.	47-53	Learn to draw the various angles. Learn the difference between horizontal, vertical and oblique. Learn to transfer distances with dividers. Know the procedure of bisecting a straight line.	47 48 49 51 52	Draw a: Seat bracket Plane block. Line winder. Gibbed way.	 53 53 53 54
7. Drawing projects of cylindrical objects.	66-70	Learn the procedure of drawing circles. Dress compass pencil lead to a bevel point. Learn to sketch arcs and circles.	68 68 67	Draw a: Wooden wheel. Ink bottle holder.	 70 70
8. Drawing objects that involve sectional views.	76-80	Learn the purpose of sectional views. Know the various ways to show sectional views.	76 77 78	Draw: Arbor washer. Rocker arm. Cylinder head.	 79 80 79
9. Drawing graphs.	127-131	Know the procedure of drawing different kinds of graphs.	127 129 131	Draw: Line graph Bar graph Area graph	Title Assigned
10. Inking and blue printing drawings.	121-126	Know names and uses of each drawing instrument. Know the procedure of tracing and making a blue print.	121 123 125	Ink and make a blue print of one drawing in each unit.	

No. 2

A SUMMARY SHEET FOR A COURSE OF STUDY FOR FORTY-TWO WEEKS OF WOODWORKING.
Textbook: Douglass and Roberts, Units in Hand Woodworking.

A. Manipulative Units of Instruction.	Textbook Page No.	B. Informational Material Relative to the Manipulative Unit Listed in Column A.	Textbook Page No.	C. Projects Recommended for use in Teaching "A" and "B".	Textbook Page No.
1. Checking out lumber.	32	How to use rule, try square and framing square. How to make a bill of material.	28 29	Measure layout, and figure cost of a bread board.	Teacher's specification.
2. Reading a working drawing.	24 25	Know the alphabet of lines. How to place dimensions. How three views are drawn.	24 25	Draw and dimension bread board.	
3. Using a hand plane.	42 46	Parts of a plane. Kinds of planes. Assemble and disassemble.	43 47	Small book shelf or table.	Teacher's specification.
4. Squaring stock.	48 49	Steps in squaring a board. Hand tools used in the procedure.	48	Work on bread board.	
5. Using and sharpening the hand saw.	36 37	How to set a saw. Difference in crosscut and ripsaw. Sizes of files.	38 39	Finish bread board.	
6. Sharpening plane iron.	44	Safety rules of grinder. Correct procedure in grinding. Whetting and removing wire edge.	44 45	Small book shelf.	
7. Chamfers	54	Using a T bevel. Difference in chamfers and bevels. How to clamp for cutting.	54	Work on book shelf.	

A SUMMARY SHEET FOR A COURSE OF STUDY FOR FORTY-TWO WEEKS OF WOODWORKING (Con't)

A. Manipulative Units of Instruction.	Textbook Page No.	B. Informational Material Relative to the Manipulative Unit Listed in Column A.	Textbook Page No.	C. Projects Recommended for use in Teaching "A" and "B".	Textbook Page No.
8. Layout and cut curves.	56 57	How to transfer patterns. Cutting curves with a turning, coping, and compass saw.	56 57	Make a wall shelf.	148 149
9. Smoothing curved surfaces.	58 59	Knowledge, use, and kinds of various wood chisels and sandpaper.	58 59	Work on wall shelf.	
10. Boring holes.	60	Sizes of wood bits. Measuring depth. Parts of bits.	60	Work on wall shelf.	
11. Fastening with screws.	66 68	Sizes and kinds of screws. Tools used in fastening screws.	64- 68	Make a flower stand.	24
12. Jointing stock together.	77	Kinds and uses of various joints.	77 79	Work on flower stand.	
13. Using glue.	91	How to use hot and cold glue. Know composition of each.	91	Make a coffee table.	153
14. Applying finishes.	109- 119	Know composition of each finishing material. How to apply finishes.	109- 119	Finish each project.	

No. 3

A SUMMARY SHEET FOR A COURSE OF STUDY FOR TWELVE WEEKS OF MACHINE WOODWORKING.
Textbook: Hjorth, Herman, Woodworking Machines.

A. Manipulative Units of Instruction.	Textbook Page No.	B. Informational Material Relative to the Manipulative Unit Listed in Column A.	Textbook Page No.	C. Projects Recommended for use in Teaching "A" and "B".	Textbook Page No.
1. Ripping with Circular saw.	7-8	Setting Ripping fence to Rip saw width. Placing stock. Placing splitting guard. Cover guard.	7-8	Make book-shelves.	Teacher's specification.
2. Cutting short pieces to length.	12-13	Set according to scale. Use Crosscut saw. Clamp in position. Push stock and guage past the saw.	12 13	Porch swing.	"
3. Cutting grooves.	18-20	Assemble Dado Head. Starting machine. Using stopblock.	18-19	Make book-ends.	"
4. Making Joints.	21-26	Making Dado Joints, Half-Lap, End-Lap, Slip joints and Tenons.	21-26	Make small table.	"
5. Multiple sawing on band saw.	36-37	Cutting patterns, marking stock and sawing.	36-37	Make what-not shelf.	"
6. Compound sawing on band saw.	38	Use narrow blade. Adjust to height. Saw on waste side of lines.	38	Cabriole leg.	"
7. Edge planing with jointer.	61	Clamp fence, set infeed table to cut small cut. Push board over cutterhead.	61	Table.	"

A SUMMARY SHEET FOR A COURSE OF STUDY FOR TWELVE WEEKS OF MACHINE WOODWORKING (Con't)

A. Manipulative Units of Instruction.	Textbook Page No.	B. Informational Material Relative to the Manipulative Unit Listed in Column A.	Textbook Page No.	C. Projects Recommended for use in Teaching "A" and "B".	Textbook Page No.
8. Face Planing.	63	Take light cut. Use pusher.	63	Table.	Teacher's specification.
9. Rabbeting.	66	Set fence by measuring width of rabbet from front edge of both tables. Lower in-feed table.	66	Make picture or mirror frames.	"
10. Boring holes with drill press.	106-107	Boring evenly spaced holes. Boring holes in disk, and boring at an angle.	106-107	Dowel Joint.	
11. Mortising on the drill press.	109	Use special attachment for mortising. Clamp work on table.	109	Table legs.	"
12. Spindle turning on lathe.	145	Center and mount stock on lathe. Turn stock to dimensions. Practice all the cuts.	145	Table legs.	
13. Face Plate turning.	154	Screw stock to face plate, mount on lathe, place tool rest parallel to stock. Face off using Round nose chisel. Square the edge using skew chisel flat on tool rest. Make all concave and convex cuts with the Round nose chisels.	154	Make a bowl.	

No. 4

A SUMMARY SHEET FOR A COURSE OF STUDY FOR SIX WEEKS OF SHEET METAL WORK.
Textbook: Dragoo, A. W. and K. L., General Shop Metal Work.

A. Manipulative Units of Instruction.	Textbook Page No.	B. Informational Material Relative to the Manipulative Unit Listed in Column A.	Textbook Page No.	C. Projects Recommended for use in Teaching "A" and "B".	Textbook Page No.
1. Cutting sheet metal with shears.	45	How to use straight and curved tin snips. Know the common sizes and guages of sheet metals.	45 55	Pancake turner.	39
2. Punching and drilling holes in thin metals.	46	Names and uses of tools in this operation. Sizes of drills. Safety rules in working with metal.	69 46	Finish pancake turner.	39
3. Using a soldering copper.	51	Prepare, use and clean the soldering copper. Composition of solder. Prepare and use different fluxes. Process of soldering different metals.	50 51 52	Make a waste basket.	41
4. Forming by hand.	46	Layout a pattern. Different stakes and uses. Methods of forming cylinders and cones.	46 47 48-49	Make a funnel.	44
5. Turning a hem.	47	Tools used in hemming. Allowances for hem. Purpose of a hem.	47	Finish waste basket.	41

A SUMMARY SHEET FOR A COURSE OF STUDY FOR SIX WEEKS OF SHEET METAL WORK (Con't)

A. Manipulative Units of Instruction.	Textbook Page No.	B. Informational Material Relative to the Manipulative Unit Listed in Column A.	Textbook Page No.	C. Projects Recommended for use in Teaching "A" and "B".	Textbook Page No.
6. Preparing and wiring an edge.	47	Purpose of wiring an edge. Diameter of various wire. Tools in marking patterns. Process of wiring straight and cylindrical edges. Kinds and uses of seams.	47 48	Finish the funnel.	44
7. Outside reading on sheet metal.	52	How sheet metal is made. How sheet metal is surfaced, treated by annealing, galvanizing, and galvannealing.	54	Reports to be handed in.	53 54 55

No. 5

A SUMMARY SHEET FOR A COURSE OF STUDY FOR SIX WEEKS OF ELECTRICITY.
Textbook: Johnson and Newkirk, The Electrical Craft.

A. Manipulative Units of Instruction.	Textbook Page No.	B. Informational Material Relative to the Manipulative Unit Listed in Column A.	Textbook Page No.	C. Projects Recommended for use in Teaching "A" and "B".	Textbook Page No.
1. How magnets are made.	6	How north and south poles are made. Composition of cells.	4	Magnetize a nail with a dry cell.	5
2. Socket wiring.	85	Know various kinds of sockets. How to tie the underwriter's knot.	81 82	Make an extension cord.	82
3. Splicing wires.	86	Know various kinds of splices. How to use a soldering copper.	87	Repair an extension cord.	87
4. Electrical signals.	24	How bells and buzzers work. How to install them.	24	Set up a door bell.	24
5. Parallel and series wiring.	95	Know the procedure of wiring.	95	Wire a circuit in parallel and in series.	95
6. Switches.	25	Know differences in one-way, two-way, and three-way switches.	25	Wire a one, two, and three-way switch.	25
7. Checking voltage.	94	Know what voltage is. How produced. Use of a bar magnet and copper wire.	94	Generate current and check for voltage.	94

No. 6

A SUMMARY SHEET FOR A COURSE OF STUDY FOR SIX WEEKS OF PLASTIC WORK.
Textbook: Cherry, Raymond, General Plastics.

A. Manipulative Units of Instruction.	Textbook Page No.	B. Informational Material Relative to the Manipulative Unit Listed in Column A.	Textbook Page No.	C. Projects Recommended for use in Teaching "A" and "B".	Textbook Page No.
1. Laying out, cutting and squaring stock.	12-16	Learn to mark with a scratch awl. Layout work on masking paper. Layout lines around cylinder. Using a try square and dividers. Knowledge and use of hack saw, backsaw, coping saw, tin snips and paper cutter. Square stock with sandpaper, block plane, wood chisel and mill file.	12 13 14 15 16	Make a letter opener.	75
2. Boring, countersinking and punching holes.	17-19	Learn the difference between the negative and positive drills. Knowledge of hand drill, brace and bit and their uses in drilling. Learn to make punch from a nail or other material.	17 18 19	Make a ring and insert a set.	78
3. Forming projects.	25-29	Learn the different procedures in forming various plastic materials. Temperatures for heating different plastics. Know how to make and use a jig.	25 26 27 28	Make tableware.	117
4. Cementing projects.	33-36	Know the kinds of cement to use on different kinds of plastics. Clamping plastics. Learn methods of applying cement.	33 34 36	Make a house number.	79

A SUMMARY SHEET FOR A COURSE OF STUDY FOR SIX WEEKS OF PLASTIC WORK (Con't)

A. Manipulative Units of Instruction.	Textbook Page No.	B. Informational Material Relative to the Manipulative Unit Listed in Column A.	Textbook Page No.	C. Projects Recommended for use in Teaching "A" and "B".	Textbook Page No.
5. Coloring and dyeing plastics.	38-39	Learn to prepare powdered dye. Knowledge of cold water dip dyes and hot dip dyes. Handling dyed projects. Safety precautions in dyeing.	38 39	Make a bracelet.	82
6. Carving projects.	65-68	Learn the procedure of internal carving.	66	Make buttons.	76
7. Buffing and polishing.	32-33 63-65	Know the procedure of hand buffing and maching buffing and polishing.	32	Buff and polish made projects.	64 65

No. 7

A SUMMARY SHEET FOR A COURSE OF STUDY FOR SIX WEEKS OF LEATHERCRAFT.
Textbook: Groneman, Applied Leathercraft.

A. Manipulative Units of Instruction.	Textbook Page No.	B. Informational Material Relative to the Manipulative Unit Listed in Column A.	Textbook Page No.	C. Projects Recommended for use in Teaching "A" and "B".	Textbook Page No.
1. Making a template.	44	How to layout patterns. Materials and tools used in making pattern.	45	Make a template for a coin purse.	88
2. Cutting leather.	40	Know tools and procedure in cutting leather.	40 165	Make a wristband.	98
3. Lacing leather.	56 86	Know different styles of lacing. Punching for lacing.	34	Make a billfold.	109
4. How to set snap buttons.	67	How to locate and punch holes. Procedure in fastening.	67 72	Make belt.	145
5. Prepare and decorate.	51	How to wet leather. How to use tools in decorating.	51 54	Decorate a project.	187 205
6. Finishing leather.	58 59	Learn how to color and polish leather.	58 59	Finish project.	

CHAPTER VI

CONCLUSION

This proposal for the general shop program for the Altus High School would not be complete without a suggested list of equipment for the shop. This concluding chapter will suggest a list of equipment which the writer believes is adequate for the industrial arts courses that have been recommended.

Equipment List. The writer realizes that each industrial arts teacher will have his own ideas as to the amount and type of equipment that is needed and also that the school budget will determine the amount that can be purchased. However, it is hoped that this equipment list which follows will aid in the planning of the general shop program for this particular school.

DRAWING

Equipment for Five Students

Name of Equipment	No.	Name of Equipment	No.
Drawing boards, 18" x 24"	5	Triangles, 30-60 degrees	5
Drawing sets	5	Triangles, 45 degrees	5
Drawing tables	5	T squares, 24" blade	5
Scale (architect's)	5	T squares, 36" blade	1
Stools	5		

HAND WOODWORKING

Equipment for Eight Students

Name of Equipment	No.	Name of Equipment	No.
Auger bits, set of 13	1	Miter saw	1
Back saws	4	Nail sets	2
Bar clamps	12	Planes, 14"	8
Bench brushes	4	Rip saw, 22" 7 point	2
Brace, 8" swing	2	Rules, 12"	8
Chisels, ½,1/8,¼ & 1" each	3	Rules 24"	2
Coping saws	6	Saw set	1
Counter sink, ½" 60 degree	2	Screw drivers, 4",6" & 2½"	4
Cross-cut saw, 22" 8 points	4	Spoke shave	2
Dividers	2	Try square, 8"	8
Framing square	2	Two pupil benches	4
Glue pot	1	Wood files, assorted	5
Hand screw	12	Wood mallets	4
Marking guage	8	Yard stick	1

MACHINE WOODWORKING

Equipment for Eight Students

Name of Equipment	No.	Name of Equipment	No.
Band saw, 14"	1	Jig saw, table type	1
Disk sander	1	Jointer, 8"	1
Drill press	1	Table saw, 12" tilting arbor	1
Glue table	1	Wood lathes	2

SHEET METAL

Equipment for Four Students

Name of Equipment	No.	Name of Equipment	No.
Anvil, 70 lbs.	1	Grinder	1
Ball peen hammers, assorted	3	Hand drills	2
Bar folder	1	Pliers	2
Cold chisels, assorted	4	Scratch awl	2
Curved snips	2	Soldering coppers	2
Forming roll	1	Straight snips	2
Gas furnace	1		

ELECTRICITY

Equipment for Two Students

Name of Equipment	No.	Name of Equipment	No.
Door bells	2	Sockets & Plugs, assorted	6
Dry-cell batteries	2	Switches, assorted	3
Electrical panel	1	Voltmeter	1

PLASTICS

Equipment for Two Students

Name of Equipment	No.	Name of Equipment	No.
Buffing wheel	1	T bevel, 6"	1
Carving tools, set	1	Try square, 6"	2
C Clamps, assorted	6		

LEATHER

Equipment for Two Students

Name of Equipment	No.	Name of Equipment	No.
Dye brush	1	Sheepskin polisher	1
Edge creaser	1	Skiving knife	1
Heavy-duty scissors, 10"	1	Snap-setting outfit	1
Junior size steel square	1	Straight edge	1
Lacing guage punch with guides	2	Tracer and spoon modelers	2
Lacing needle	3	Wood mallets	2

If the funds are not available to fully equip the shop for the program, it is suggested that the immediate essentials be purchased first. Each year the school can add to the equipment as the funds allow and as the need arises.

Conclusion. The purpose of this report has been to plan and recommend an industrial arts program for the senior high school at Altus, Oklahoma.

The general aims and objectives of industrial arts have been considered, as have the needs and interests of the students of the Altus high school.

It is the sincere belief of the writer that the students of this high school need and will be greatly benefited by a broader general shop program such as the one suggested in this report. It has been with this purpose in mind that the report has been written.

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TYPIST PAGE

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