Name: Ralph W. Johnson Date: July 16, 1956

Institution: Oklahoma A. and M. College Location: Stillwater, Oklahoma

Title of Study: INDUSTRIAL ARTS IN THE JUNIOR HIGH SCHOOL OF SHERMAN, TEXAS

Pages in the Study: 65 Candidate for Degree of Master of Science

Major Field: Industrial Arts Education

Scope of Study: Industrial know-how has always played a large role in the education of man. This research problem involved a study of the history of industrial education from pre-historic times to the modern concepts of industrial education, a study of the history of the reorganization of the 8-4 plan of education to the modern 6-3-3 plan, a survey of the current program of studies in the Sherman Junior High School, and a study of the current methods of course construction. The study also involved the development of a comprehensive course of study.

Findings and Conclusions: The studies involved in this report have disclosed the historical trends in education for industrial pursuits. This, combined with a history of the modern junior high school and a study of the methods of course construction, has culminated in the formulation of a course of study in eighth grade industrial arts for the use of the writer in the junior high school in Sherman, Texas. This course of study includes an introductory statement, a statement of the department and school objectives and the specific objectives of the department in woodwork, metalwork, electricity, and mechanical drawing. The second part of the course of study presents the general organization and management of the classes, a course outline for each of the instructional areas, and a floor plan showing the arrangement of the wood and metal shop.

ADVISOR'S APPROVAL John B. Tate

INDUSTRIAL ARTS IN THE

JUNIOR HIGH SCHOOL OF SHERMAN, TEXAS

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BY

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SOUTHEASTERN STATE COLLEGE

DURANT, OKLAHOMA

1947

Submitted to the Faculty of the Graduate School of

the Oklahoma Agricultural and Mechanical College

in Partial Fulfillment of the Requirements

for the Degree of

MASTER OF SCIENCE

1956

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MASTER OF SCIENCE

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INTRODUCTION

If the education of American youth is to keep pace in the highly technical society of today more emphasis must be placed upon the scientific and technical curricula within the existing institutions of learning. Although this type of education is usually begun on the high school and college level, much planning and foundation work must begin while the youth is in the most formative years. It is, therefore, the students of junior high school age, 12 years to 15 years, that are of primary consideration in the preparation of this study.

Origin and Need for the Study. The writer has been confronted with the problem of reorganizing much of the existing program of Industrial Arts in the junior high school of Sherman, Texas. Because of a rapid growth in student population, which has resulted in overcrowding, it has become necessary to consolidate two of the existing shops, namely wood and metal, and to reschedule all of the four Industrial Arts subjects currently included in the curriculum. It is the purpose of the writer to plan the most economical use of available floor space and to develop a course of study for use in the Industrial Arts program of the Sherman Junior High School.

Survey of Previous Studies. In making preparation for this report the writer has referred to the library of Oklahoma Agricultural and Mechanical College in search of literature of a similar nature. This survey

resulted in the location of a few reports and theses made by former students of the college and a number of courses of study prepared for various states departments of education. There will be references made to those works where the writer feels that they have a contribution to make to this study.

Methods of Research. The writer has interviewed graduate students on the Oklahoma Agricultural and Mechanical College campus who are industrial arts teachers to collect information on what other junior high schools are doing in the industrial arts instructional field. Some of those ideals will be presented in Chapter IV. Further information has been obtained from administrators in the Sherman, Texas Public School system and much has been collected through selective reading from works of authorities in the industrial arts field through the media of the Oklahoma Agricultural and Mechanical College Library.

Extent of the Study. It is the purpose of this report to carry the problem, about which it is concerned, through its historical background to a logical conclusion using those principles deemed best in the development of a industrial arts course of study.

Definition of Terms. Because confusion sometimes results from similarity of some educational and industrial terminology it seems essential that definitions should be presented at this point. The terms and definitions that follow are defined as they are used wherever they appear in this report:

Program of Studies:

For the purpose of this report the program of studies is defined as

the total offering of the system including the extra curricular activities. It is composed of several curricula and may include such curricula as college preparatory, general education, commercial, industrial, agriculture, and homemaking.

Curriculum:

".... a curriculum is an orderly arrangement of integrated subjects, activities, and experiences which students pursue for the attainment of a specific goal." (10, page 2)

Course of Study:

".... a course of study is a comprehensive plan which shows the scope and teaching sequence of all the activities provided for a particular subject in a curriculum." (10, page 4)

Industrial Arts:

A modern trend in general education which gives the student a basic understanding of the business, management, materials and processes of the industrial world.

Industrial Education:

Educational training with the main emphasis on industrial specialization.

Manual Arts:

Training with emphasis on modes of livelihood which stresses the use of raw materials and tools.

Manual Training:

Training that places emphasis on logical, progressive operations in the use of raw materials and tools utilizing the sense precepts of the student.

Plan of Presentation. The findings of this investigation will be presented to the reader in a logical sequence beginning first with the history of the industrial arts education and secondly with a short history of the junior high school. With this as a background for the work of developing a program of industrial arts in a junior high school, the writer has chosen to present the current total program and philosophies of the junior high school of Sherman, Texas. Next in the sequence, in accordance with the findings, the writer has presented the recognized procedures in the development of a course of study. The recommended course of study is next in the sequence, and with it is presented recommendations for the industrial arts shop layout. The shop layout is based on the existing facilities. The last chapter in the study is devoted to conclusions and recommendations for further study.

In the early stages of world history, the writer has taken the liberty to theorize about industrial education before the times of written history. It is with these theories that Chapter II begins.

CHAPTER II

HISTORY AND PHILOSOPHY OF INDUSTRIAL EDUCATION

Because of the work of a good many leaders and reformers in the field of education, both known and unknown, the value of industrial knowledge, appreciation, and skill (industrial arts) is well intrenched in the program of studies of the modern educational institutions. A history of these leaders and reformers is the history of the industrial arts program, a history with its roots deep in prehistoric times.

Prehistoric Man. From the small amount of historical data that is available concerning the stone age it seems reasonable to assume that the individual was taught the skills of self-preservation by his father. Such skills may have included the art of firemaking, how to make archery equipment or other weapons for protection and for securing food, and of making simple shelters.

> A realization of the fact that skill of hand is an advantage to its possessor goes back to the time when primitive man taught his son all the crafts he knew, and when the exceptionally skilled worker was regarded as possessing super-human power. (3, page 11)

Egypt. Preceeding known records of European history is the history of Egypt, Canaan, and Babylonia. Very little is known about these people concerning the education of their populace. In quoting Bennett on the highly civilized culture of Egypt we find that, "there seems to have been no theory or system in the teaching of these arts," (3, page 12) referring to sculpture and painting. Perhaps this was also true of all

things of their culture. Learning in Egypt was accomplished by imitation, both conscious and unconscious, even as the child learns to walk through unconsciously imitating the parent.

Maspero, an Egyptian Archaeologist, comments, according to Bennett, on Egyptian teaching as follows:

> Theirs was a teaching of routine, and not of theory. Models executed by the master were copied over and over again by his pupils, until they could reproduce them with absolute exactness. (3, page 12)

Canaan. In the strict religious life of the ancient Jew, in the land of Canaan, a trade was considered necessary. The teaching of the trade was a responsibility of the father. It was felt that a person learning no trade was being "prepared to become a robber." (3, page 13)

Babylonia. In Babylonia, in the Tigris and Euphrates Valley, another high culture existed during ancient times. About 2250 years before Christ, an ancient and wise king named Hammurabi gave the world its first set of written laws. Among them was a law governing the adoption of a son. It is interesting here because of its mention of handicraft. The law gave the father a right to take his son home if the artisan failed to teach the son his handicraft and place immunity on the artisan if he did teach the handicraft to the boy.

Greece. When barbaric herdsmen of Central Europe migrated southward into the peninsula of Greece they found good pastures in the valleys of the rough terrain. Along the coastal area of southern Greece the herdsmen found and conquered a highly cultural people, probably a part of the Crete islanders who had settled there. Those who were not put to death became slaves of the Greeks and were used in many ways.

Of special interest to the history of education is the use of the well educated slaves as tutors of the children of the captors. The teaching, however, was confined to reading, writing, music and the more academic subjects. Later, however, as the distinction between the wealthy and the poorer classes widened, trades were more firmly established among the poorer classes and apprenticeship training was not uncommon. For the wealthy, however, slavery performed all the necessary labors.

Rome. The historical beginnings of the Roman Empire was almost a prototype of the history of Greece. It is believed that some Greeks were living in colonies along the southern part of the peninsula when the invasion of the herdsmen from the north began. Whatever the case, through Roman use of Greek slaves much of the culture of ancient Greece became a part of Roman culture. In Rome, as in Greece, slavery prevented any recognized theory or practice of any educational teaching or methods of teaching outside of the use of cultured slaves.

Monasteries. The teaching of manual skills reached a position of great importance in the monastary life of the Middle Ages, the time between the fall of Rome and the time known as the Renaissance. Because of the hermit type of existence it was necessary that all things necessary to life be grown, created, or manufactured within the confines of the hermitage and its surrounding fields. Labor, therefore, was required by the rules of the Saints.

Perhaps the greatest of the Saints was Benedict.

> Following the examples of the monks of the East, St. Benedict (480-543), who founded the order of the benedictines at Monte Cassino in Italy about 529, made manual labor one of the cardinal principles of his rule. (3, page 17)

Another of the great contributions to the world for which the monks must be given credit is the copying of ancient manuscripts which might, otherwise, have been lost to the world. Reading was required of the monks and because of the increase in their ranks a multiplication of manuscripts was called for. (3, page 18)

Renaissance. The period of history that is characterized by a revival of learning is known by the name of Renaissance. It is also marked by a revolt against the monastaries and against the domination by the feudal lords. Feudalism gave way to the growth of nations. It is during this period that industrial education in the schools has its beginnings.

> A definite beginning for the current tradition of the theory and practice of industrial education is to be found, however, neither in antiquity nor in the Middle Ages but rather in the Renaissance, and particularly in the utopia which gave expression to the aspirations of that progressive age. (1, page 5)

Anderson gives credit to Sir Thomas More as, "the first to suggest the combination of industrial with common school education." (1, page 7)

It was perhaps early in the Sixteenth Century that the real foundation stones for modern industrial education were laid. Bennett credits the Sixteenth and Seventeenth Centuries with giving forth, "two fundamental ideas upon which modern instruction in manual arts has been built." First of these is the use of sense impressions in learning and, secondly, the idea of learning by doing. (3, page 30)

Martin Luther (1483-1546) well known to students of religion as well as education, was an advocate of state supported schools for all children.

> My opinion, said Luther, is that we must send the boys to school one or two hours a day, and have them learn a trade at home the rest of the time. It is desirable that these two occupations march side by side. (3, page 31)

Among others who contributed to the growing philosophy of learning by doing during this period was Rabelais and Mulcaster, Bacon, Comenius and Hartlib. Very little, if anything, was done to put into practice the ideals of these early thinkers. Their work did, however, form the basis for much of the work performed almost two centuries later. Of these men perhaps Comenius (1582-1670) is best remembered by the students of the industrial arts. To him goes credit as, "first to make a scientific study of the child," and responsible for putting handwork into primary education for the first time." (9, page 3)

Industrial Education in England. Samuel Hartlib is remembered for his influence in bringing the ideas of Comenius to England. Hartlib proposed setting up a college of agriculture in England.

> He advocated the erection of a private college or society of good husbandry; wherein some may teach, some may learne, and all practice the whole and every part of this so honourable an art . . . . (2, page 42)

Sir William Petty was encouraged by Hartlib to set forth his educational philosophies. According to Bennett, Petty more than any of his predecessors "proposed to connect handwork with the school." (3, page 47) According to Anderson, "Among the manufacturers which Petty proposed to have taught in his school were turning, watchmaking, jewel cutting, and jewel setting, painting, carving, ... (1, page 25)

The Royal Society of London, organized by Dr. John Watkins and of which Petty was a member, was organized to encourage further study of natural sciences.

> . . . in discussing the advantages of the society no sharp line should have been drawn between the natural sciences and the manual arts. One finds such statements as this, "It would not be amiss, if before young scholars he be ingag'd in the beaten trades of the

> Scholes, the Mysteries of Manual Arts, the names of their instruments, the secrets of their Operations . . . . " (3, page 51)

Another member of the Royal Society, Joseph Moxon, made a noteworthy contribution to the manual arts in a series of publications on "Mechanical Exercises". These treatises were on Smithing, Hinges, Locks etc., General Metal Work, Woodwork, Carpentry and numerous other manual skills.

The Seventeenth Century in Europe was marked with numerous scientific advances that were to play a part in public education in the natural sciences and manual arts field. The printing press, perhaps the greatest boom to public education, had been invented more than three centuries. In this period Newton discovered gravity, the air pump was invented by Boyle. "Experimental chemistry, mineralogy, zoology, and botany had been established among the sciences . . . . " (3, page 60)

It was in this same period that John Locke made several noteworthy contributions to the field of education. In his scheme, Locke, would have included the manual arts.

> Locke became the chief exponent of the idea that education should fit a boy for practical life, whether it be in a trade or a profession. (3, page 60)

> Locke recommends for the English gentleman a training in gardening, woodworking, and other industrial occupations, mainly as a means of recreation, but also as a means of acquiring skill and experience. (1, page 21)

Even though such men as Petty, Locke, Hartlib, Moxon, and others equally influencial were strong advocates of the manual arts in education it was not until the Eighteenth Century that the program was actually given a place in the schools.

Anderson summarizes the progress of the manual arts of the Eighteenth Century as follows:

> Notwithstanding the frequent proposals by reformers of the seventeenth century it was not until about the beginning of the eighteenth century that handwork was actually given a place in the school program. Francke led the way through introducing wood-turning and other manual occupations as means of recreation into the program of his Peadagogium, a school for boys of the upper classes. A few years later, about 1707, Semler opened in the same city, Halle, a school for apprentices in which he gave instruction in mathematical and other subjects related to trades pursued by his students. After an interval of three or four decades, during which the subject of industrial arts was vigorously discussed, another important beginning was made through the general or classical education available in the trade schools as a part of apprenticeship training. (1, page 34)

Jean Jacques Rousseau (1712-1778), born in Geneva, Switzerland, created quite a sensation in Europe in 1762 through his denunciation of the civilization of the day and his advocation of a new system of education. So strong were his feelings set forth in his "Emile" that he was forced to leave France to avoid arrest. Rousseau was a reformer who would include manual arts and industrial training in education. "His recognition of the fact that the manual arts may be a means of mental training marked the beginning of a new area in education." (3, page 81)

Johan Bernhard Basedow (1723-1790) believed much the same as did Rousseau in that the best way to teach was to use real things as a teaching aid. "But when the thing needed in such instruction was not available he would resort to models and drawings." (3, page 83) The belief of both Rousseau and Basedow was "that the best way to get knowledge was through the senses and through experience." (3, page 83)

Many schools in central Europe were employing the principles of Rousseau near the close of the Eighteenth Century. Among the leading men carrying on the work were Joachim Heinrich Campe (1746-1818), Christian Gotthilf Salzmann (1741-1811), Martin Planta (1727-1772), Ferdinand Kindermann (1740-1801), and Ludwig Gerhard Wagemann.

Kinderman's school in Bohemia was the beginning of an extensive movement toward the "School of Industry" idea. The "Schools of Industry", was a system in which the labors of the students helped to support the schools and defray a part of the students personal expenses.

> The plan was adopted not only in Bohemia, where some two hundred schools gave instruction in the industries, but also in various other parts of the empire and of the continent. (1, page 81)

John Henry Pestalozzi (1746-1827), known to many as the "Father of Manual Training", led an interesting life. He was reared by his widowed mother, educated in Switzerland (Zurich), he prepared for the ministry and later for law. Unsuccessful in these professions he turned to farming. "He decided to burn his manuscripts and become a farmer." (11, page 21) Pestalozzi failed at farming, also, but put his farm, Newhof, near Zurich, to use as a school for poor and orphan children.

> In summer the children were to work in the fields, in winter they were to spin and weave. In the intervals, and even whilst engaged in handwork they were to receive instruction in the elements of reading, writing and arithmetic. (11, page 23)

In this endeavor Pestalozzi failed for financial reasons and the experience left him in poverty. From this point he turned to literature. When several of his writings, which set forth his ideas on education, became popular he again went back to teaching.

Pestalozzi's entire life was a continual series of successes and failures. In almost every instance his failures were due to his inability to handle the financial aspect of his undertakings. Even so, he remained always faithful to his ideals of education, moral, and political reform.

> Pestalozzi was primarily a philanthropist whose one central aim in life was the alleviation of the wretchedness of the lives of the poor. (1, page 85)

Throughout all his endeavors he put the manual arts method of teaching into his schools as a means of preparing his pupils to meet life situations.

> Though at first Pestalozzi seems to have utilized the industrial arts mainly as a means of fitting the pupil to make a living, he later comes to lay more and more emphasis upon them as a means of general education. (1, page 86)

At the end of the Eighteenth Century Pestalozzi was head of a school for orphans at Stanz. Following this he was a teacher and an organizer in the schools of Burgdorf and Yverdum.

One of the great reformers at the turn of the century was Phily Emanuel von Fellenberg of Switzerland. His work was similar to the work of Pestalozzi. The chief difference was in his philosophy of education to promote a better life within ones social class with intermixing the classes.

> . . . this end, he believed with Plato, was to be attained through the training of individuals to a more efficient and intelligent performance of the duties appertaining to their station in life. (1, page 91)

Fellenburg is remembered chiefly for his outstanding work at "The Fellenberg Institution". This institution was named Hofwyl by its owner and was located at Munchenbuchsee. ". . . manual labor constituted the chief distinguishing characteristic of Fellenberg's scheme . . . " (3, page 128)

To give emphasis to the importance of Hofwyl the following quotation has been taken from Bennett:

> It was visited and studied by educators and statesmen, many of whom wrote reports which were published. It has been stated that more than one hundred such reports appeared in print. (3, page 128)

The work of Rousseau, Pestalozzi, and Fellenberg, had important influence on their successors in establishing the industrial arts as a

major phase of the school curriculum. Their ideals were carried forward by Heusinger, Froebel, Cygnaeus, Wehrile, and many others.

Perhaps the best remembered of these is Friedrich Froebel, who is remembered for his work at the kindergarten level. He believed, however, that educational experiences should be given in manual arts in the higher grades.

> Industrial occupations promote, Froebel believes, both physical and intellectual development; hence they should be given a place in the programs not merely of elementary but also of secondary schools. (1, page 103)

Mechanics' Institute. During the years when the "Industrial Revolution" was gaining force the competition between nations for commercial or trade supremacy had a direct influence on education. This was particularly true in England where industrial leaders, trade corporations and the English government, " . . . began to make more adequate provision for the education of all classes of industrial workers both through the establishment of industrial and technical schools and colleges and through the support and encouragement of education in industrial subjects in common and other schools." (1, page 120)

The "Industrial Revolution" gave rise, in England, to the Mechanics' Institute movement. Dr. George Birkbesk's experiments in lecturing to the mechanics' class of workers at the Andersonian Institute was considered to have been the beginning of the movement. (3, page 302)

Sloyd. The impact of machinery on the laboring classes was the cause for another great movement. This movement, called Sloyd, was started in 1866 by a Swede named Otto Salomon. Sloyd, a word which has no English translation, was a method of teaching the manual arts by

constructing a series of projects useful in the home. Emphasis was on utilization rather than on industrial processes.

> One of the causes of this (the introduction of handwork into the schools) was the gradual undermining of the peasant from industries of sloyd by the growth of the factory system. (1, page 183)

Until the introduction of educational Sloyd there seems to have been no system of manual instruction that received world-wide recognition. This recognition was, however, found in the Sloyd system.

The Russian System. The Russian system of teaching the manual and industrial arts seems to have been the first successful teaching of tool processes and methods of construction. In 1830, the Imperial Technical School was established in Moscow. The Russian System, however, had its origin in 1868 when Della Vos reorganized the plan of teaching at the school.

> . . . there seems to be no available evidence that any adequate analyses of the mechanic arts was made until 1868 when the Russian system of workshop instruction was devised by Della Vos and his associates for use in the Imperial Technical School at Moscow. (4, page 4)

The chief advantages of the "Russian System" were that the student learned by a series of progressive mechanical operations and learned the handling of tools in the order of increasing difficulty. Students also "acquired such related useful knowledge as they would need later when employed." (4, page 19)

The "Russian System" was exhibited in 1870 at St. Petersburg and 1873 at Vienna. "The system met with so much favor from that time on that it was introduced into all the technical schools of Russia." (4, page 42)

Manual Training in the United States. The system was also exhibited at the Centennial Exposition in Philadelphia in 1876. Much of the present day program of industrial arts has been patterned after the Russian System and many authorities in the field mark the exposition as the beginning of the manual training movement.

> . . . while the manual training movement has its roots deep down in the philosophy of Comenius, Rousseau, Pestalozzi, and Froebel, the immediate impulse to its development in the United States may be said to have come from the Centennial Exposition at Philadelphia in 1876. (18, page 29)

While much of what Struck has to say about the Russian System is true, a number of other movements which had an influence on the manual training movement should be noted. These movements can be classified in three main types, namely, the apprenticeships, the manual labor movements, and national legislation.

Apprenticeships in Colonial Times. The apprenticeship systems of the colonial states in the Seventeenth Century were but a prototype of the systems in use in England at that time. They were, however, adapted to colonial customs and conditions. (1, page 136) Several legal provisions were made which provided for the apprentice systems in the colonies. These were the Massachusetts Ordinance of 1642, the Virginia Statute of 1646, Penn's Frame of Government of 1682, and the legislation of 1676. (1, page 136)

The Manual Labor Movement. While a number of schools experimented in industrial education and manual arts, as exemplified in Thomas Budd's industrial high school, nothing new was introduced into the United States until the "Manual Labor Movement" was organized in 1820 by Joseph Neef and William Maclure.

> It was in 1820 that Joseph Neef and William Maclure organized what is known as the manual labor movement in the United States. It was a plan of introducing manual instruction into the schools on the basis that pupils would, under school auspices, work for about half of the day, and would receive academic instructions during a part of the remaining time. (18, page 16)

Of the two men there is no doubt that Maclure was the greater. Their first efforts, the New Harmony experiment, collapsed in 1827, but Maclure continued on with other school experiments which combined labor and learning.

Industrial Legislation. By popular request several acts have been passed by the legislature of the United States that have greatly influenced the development of industrial education. Most important of these were the Land Act of 1862 and the Smith-Hughes Act passed in 1917.

Under the Land Grant Act, sometimes called the Morrill Act, "large grants of land were made to the different states for the endowment of agricultural and mechanical colleges." (1, page 150) The Smith-Hughes Act is to be reviewed in a later part of this chapter.

The Manual Training Movement. The man who perhaps is most responsible for the introduction of the Manual Training Movement in the United States was John D. Runkle, President of the Massachusetts Institute of Techniology. In his search for a system of developing skill in the use of tools he visited the 1876 Centennial Exposition of Philadelphia.

> It was in the hope of finding such a system set forth in the exhibit of some engineering school that President Runkle, . . . visited the Centennial in 1876. . . . just such a system as he was looking for he found presented in the exhibit of the Imperial Technical School of Moscow. (1, page 157)

Runkle carried the system back to Massachusetts with him and his recommendations were accepted not only by his institution and state but,

in some form, by many other states. This seems, as already pointed out, to have been the real beginning of the industrial arts movement, at that time called manual training.

The next prominent personality to take up the torch of the movement was Calvin M. Woodward, a professor at Washington University in St. Louis.

> Woodward's central idea seems to have been an institution utilizing logically organized and carefully graduated exercises in the use of tools as an important factor in general education. (1, page 162)

Washington University became the center of the Manual Training program. People from all America and some foreign countries modeled their program of industrial education after Woodward's use of the Russian System. Manual Training schools began to appear in almost every part of the nation. ". . . in 1880 the first manual training school was started; by 1900 these schools were fairly well established in the United States." (18, page 18)

By 1900 teacher-training was being offered in manual training at a number of colleges and universities. Courses were being offered at Teachers College, New York in 1893 and at Columbia University in 1896.

Industrial Education Association. During this same period of time numerous associations were organized for the purpose of extending the ideals and philosophies of manual training and industrial education. In 1893 the "Manual Training Teachers Association" was organized. (4, page 496) In the same year the "Western Drawing Teachers Association" was organized in Chicago (4, page 499) and in Boston in 1897 the "Society of Arts and Crafts" was organized. (4, page 441)

> In the later years of the Nineteenth Century manual training developed in response to the ideas held by educators of that period that general education (not specific trade training) was desired as a part of the public school curriculum. The foundation for vocational industrial education in the public schools, as we today understand it, was to be laid a little later, as it was found that general industrial education is not efficient trade training as was formerly held. (18, page 18)

Throughout the beginning of the manual training movement controversy, as to the relative value of the program in general education and as to whether or not the program should be more in line with vocational trade training, was much in evidence. This controversy continued through the early part of the Twentieth Century. In Massachusetts in 1905 a commission was appointed to study the situation and to promote trade training. This commission was known as the Massachusetts Commission on Industrial and Technical Education. "Its report, issued the following year, contains an admirable review of the conditions giving rise to the vocational movement." (1, page 199) This report charged that manual training was failing because no reference to any industrial ends was being made. The commission made recommendation for industrial education to be given directly for vocational purposes.

During this same year the "National Society for the Promotion of Industrial Education" was organized in New York. (4, page 517) The primary function of this organization seems to have been lobbying for federal legislation in support of vocational training. "The National Society was almost wholly responsible for the Smith-Hughes Law." (9, page 18)

After the Society put the Smith-Hughes law through Congress in 1917 it changed its name to "The National Society for Vocational Education". A few years later the society merged with the Vocational Education

Association of the Middle West. The new organization then became known as the American Vocational Association.

The Industrial Arts Movement. With legislative and national interests of industrial education it seemed for a while that the manual arts movement would be abandoned. "Instead of engulfing manual arts, vocational education is partially responsible for its rebirth and extended growth since the World War." (9, page 21) The aims and subject matter have been altered and broadened to fit into a school curriculum of general education. ". . . one spoke in the great wheel of general education." (9, page 21)

The strengthened manual training program has now become known as industrial arts. Even though the nation has changed from a predominantly rural life to one which is predominantly industrial the underlying philosophies of the "manual" or industrial arts closely parallel those dating back to Comenius, Rousseau, Pestalozzi, and Froebel. The program is well fitted to the needs of the public school systems of today and is particularly well suited for prevocational training, especially at the junior high school level.

CHAPTER III

THE ORIGIN AND DEVELOPMENT OF THE JUNIOR HIGH SCHOOL

Before one can enter into an intelligent study of the proper place of the industrial arts as an integral part of the junior high school, it seems advantageous to possess a fundamental knowledge of the historical development of both, the industrial arts and the junior high school. Chapter two satisfies this requirement for the industrial arts program. The writer has elected to devote chapter three to the origin and development of the junior high school.

Part A

Reform at the Turn of the Century

Need for Reorganization. The latter part of the Nineteenth Century was marked with a great deal of dissatisfaction with the then current system of education. The organizational plan of the public schools at that time was the traditional eight year elementary school and the four year high school.

> The secondary and elementary schools in America developed with little consideration of each other. It was not until the latter part of the nineteenth century and the early part of the twentieth, that educators started to see the need for a better integrated program. (2, page 16)

This system of education was greatly criticized on the grounds that the nature of the adolescent youth was not considered and that the rate of "drop-outs" was too high.

Two fundamental weaknesses were apparent and became the subject of criticisms from educators of both levels, as well as from representatives of colleges and universities. These two weaknesses may be thus stated positively:

1. The origin and development of these two segments did not recognize the physical and psychological growth pattern of students.

2. No adequate provision seemed possible for satisfactory articulation between the two segments. This gap resulted in a heavy drop out before high school. (6, page 9)

Koos also reports these as two of the main causes for dissatisfaction.

> . . . statistical studies showing the high rate of pupil mortality beginning at about the sixth grade and continuing unabated through the earlier years of the four year high school.
>
> Another force, perhaps even more influential than any of those already mentioned, may be set down here: the increasing appreciation of the fact that during the later years of the common school most children are undergoing changes in the nature of a rapid approach to adulthood, changes which make unsuited for them many of the features of that school. (14, page 1)

Although the afore mentioned causes have been commonly noted by many authorities as the most prevalent, Koos adds to the list.

Concerning pupil interests:

> . . . and the repetition and extension of the materials and methods of the "common branches" at a time when the child needs to be engaged by new interests. (14, page 1)

Concerning delay of entry to high school:

> . . . as compared with certain European school systems, for the children in our schools entrance upon the period of secondary education is too long delayed. We have been told that there is a waste of time in our system. (14, page 2)

Concerning overcrowding conditions:

> Here may be mentioned the solution of a knotty local building problem which is made possible by instituting the junior high school plan. For instance, the four-year high school building in a system becomes overcrowded. . . . By removing the pupil of the ninth grade

> from the high school building and housing them with those in the seventh and eighth grades in some older buildings the problem is solved. (14, page 3)

This brief survey of the defects of the educational system of this nation in the later part of the nineteenth century indicated that there was a need for an educational reform. These defects, of course, were the foundation of a movement for reorganization of the public school systems.

The Reorganization Movement. After more than seven decades since the beginning of the criticism the junior high school is a well established unit of the modern educational system. The events leading up to the establishment of this unit began with the action taken by Charles W. Eliot, then President of Harvard University and a leading educator of the time. Eliot is credited with having made the first constructive attacks on the public schools, his contentions being, that there was too much waste of time in the public schools and the young men were too long delayed in entering Harvard. According to Pringle:

> Beginning with his annual report for 1872-1873, he urged for many years the importance of so arranging our educational system that the young men who were to enter Harvard University might finish their college preparation earlier, graduate younger, and begin specific training for their lifework. This agitation continued through the remaining years of the nineteenth century. His final effort was to convince the public-school men that all forms of waste and delay must be eliminated from both the elementary and the secondary schools. (17, page 15)

Eliot continued his attacks until 1892 when the committee of Ten on Seconday School Studies was appointed by the National Council of Education. On July 9, of that year, Eliot was appointed by the National Education Association to direct the work of a committee of ten of the association members to "secure desirable uniformity in school programs, and in requirements for admission to college". (15, page 156)

The importance of the report of this committee, it would seem, rests in the fact that there was wide spread dissatisfaction with the present elementary and high school system of education. Another important fact was the implication of the committee that the seventh and eighth grades should be a part of the secondary school program, although it was not definitely recommended. In this connection, Pringle states: "Moreover, the report repeatedly implied the principle of individual differences; and the committee clearly had in mind the 6-6 plan, although that was not definitely recommended". (17, page 17)

In 1893, Superintendent William H. Maxwell of New York City was appointed chairman of a committee of fifteen members of the National Education Association to study problems in connection with the organization of a school system, the coordination of studies, and teacher training. Their tasks were to draw out opinions of the educational experts in connection with these problems. The recommendations of this committee regarding reorganization of the elementary education has been the basis of much of the reform in that field. (15, page 156)

Pringle reports on the work of this committee as follows:

> One section of the report dealt with "The Correlation of Studies in Elementary Education," and it contributed directly to the junior-high-school movement. It recommended placing in the elementary program of studies manual training for boys and home economics for girls. (17, page 17)

In 1913 another committee was appointed by the National Education Association. This committee, the Committee on Economy of Time in Education, was to study, as the title suggests, the unnecessary waste of time in the school systems. This committee was the first such committee to recommend an intermediate school. Their recommendation was for a 6-4-2

plan. One member did, however, recommend the 6-3-3 plan of organization. (10, page 10)

The First Intermediate Schools. The first of the intermediate schools were not of the modern 6-3-3 plan of organization, now termed the junior high school. It was, instead, two or more grades housed in separate buildings. Beal summarizes the beginning of the intermediate schools as follows:

> As early as 1896, Richmond, Indiana, had a two-year unit, including the seventh and eighth grades, housed in a separate building. Lawrence, Kansas, and New York City were among the first to introduce the intermediate school. The school year 1909-10 is considered to mark the beginning of the junior high school. In that year, two city systems, Berkely, California, and Columbus, Ohio, introduced the 6-3-3 organization. (2, page 16)

Whether these experiments grew out of a need for additional building facilities or from a genuine desire for reorganization is of little consequence. The important fact is that they did work. These experiments, particularly those in Berkely and Columbus, seems to have furnished the spark needed to start a rapid growth of the junior high school systems.

Growth of the Junior High School Movement. The City of Los Angeles, in 1911, organized five schools similar to those of Berkley and Columbus. Herriott, in an article published by the National Association of Secondary School Principals, summarized the growth of the junior high schools as follows:

> There followed a rapid growth of intermediate schools, with definite objectives based on physical and psychological needs. By 1912 there were 31 cities reporting some form of junior high-school organization. By 1914 there were 193; 1918, 557; 1920, 883; 1930, 1948; 1938, 2372.

> It is also worthy of attention that by 1938 there were 6,203 junior-senior high schools, which gives further evidence of the changing trend in public school organization. (12, page 11)

It can only be assumed that the numbers of junior high schools as reported by Herriott are approximately correct. No accurate counts can be found to attest to the fact in this matter. Koos, in a very recent publication, Junior High School Trends, points out:

> Report on the growth and status of junior high school reorganization during the earlier decades of the movement is hampered by the lack of systematic and official counts of schools and systems operating under the new plans. (13, page 3)

In this same work, Koos reports that the United States Office of Education has made compilations that show that there were in the public schools of the United States in 1952, 3,227 junior high schools, 8,591 junior-senior high schools, and 1,760 senior high schools.

Part B

Objectives and Functions of the Junior High School

The birth of the junior high school is but another link in the evolutionary chain of educational progress. It was conceived out of the needs of the youth in the fading years of the nineteenth century, and as always need gives rise to progress. It is with some understanding of the circumstances leading to the origin of the junior high school that the writer undertakes to define the term, junior high school.

Definition of the Junior High School. The junior high school is an intermediate school which has its place between the elementary school and the senior high school. The school is usually composed of the

seventh, eighth, and ninth grades. The following definition of the junior high school has been offered by Pringle:

> The junior high school is an organization of the seventh, eighth, and ninth grades into an administrative unit for the purpose of providing instruction and training suitable to the varied and changing physical, mental, and social natures and needs of immature, maturing, and mature pupils. "Maturity" here means the arrival of adolescence. (17, page 68)

Objectives of the Junior High School. The junior high school, from its very beginning, has always been considered a part of the program of secondary education. This is evidenced in the fact that most of the early thinking and recommendations favored the 6-6 plan of organization. Such was the case with the reports of the "Committee of Ten" and the "Committee of Fifteen". This being true, the objectives of the junior high school are substantially the same as those of the senior high unit, that is "the seven cardinal principles of secondary education." For a brief review on the aims or objectives of secondary education the writer quotes from Friese as follows:

> In varying degrees the different principles or objectives also apply to primary and higher education. However, we shall consider them only in the light of secondary education. In secondary education is found the junior high school, the now generally accepted place for manual arts instruction. The Cardinal Principles of Secondary Education are as follows:
>
> 1. Health.
> 2. Command of the fundamental processes.
> 3. Worthy home membership.
> 4. Vocation (in full).
> 5. Civic education.
> 6. Worthy use of leisure.
> 7. Ethical character. (15, page 11)

Functions of the Junior High School. Because L. M. Beals, in a recent article appearing in a bulletin of the National Association of Secondary School Principals, has so effectively summarized the functions

of the junior high school no other descriptions on the subject will be offered here. The following quotations have been taken from Beals article, The Junior High School, Past and Present:

> In a rather recent study by Gruhn and Douglass, they prepared a list of functions relating to the junior high school, as indicated by the experience of leaders in the field and by different studies, and submitted them to a selected group of specialists for evaluation. The important functions of the junior high as rated by these specialists are as follows: to provide opportunities for the development of continually widening range of cultural, social, civic, and recreational interest; to provide experiences leading to better personal adjustment; to make provision for differentiated educational facilities to meet varying needs; to systematize and integrate educational outcomes to provide opportunity for social growth and social participation; to provide for the exploration of special interests and capacities as a basis for educational and vocational guidance; to provide a gradual transition from elementary to secondary school, and to prepare pupils to participate as effectively as possible in all present and future learning situations. In summarizing their study, Gruhn and Douglass established six basic functions of the junior high school program. These are integration, exploration, guidance, differentiation, socialization, and articulation. (2, page 19)

With the general objectives and functions of the junior high school stated the reader's attention is directed to a review of the Junior High School Program in Sherman, Texas.

Part C

The Junior High School in Sherman, Texas

The Sherman Public School system is not too unlike the systems of other cities of about 30,000 population. The schools are organized on the modern 6-3-3 plan. There are, within the system, six elementary schools, grades one through six, and two secondary schools that include one junior high, grades seven through nine, and one senior high involving grades ten through twelve. These figures are exclusive of the colored schools.

In as much as this work is concerned with only the lower three grades of the secondary schools, the writer now turns to a presentation of the program of the Sherman Junior High School.

The Philosophy of the Administration. In making preparation for this study, the writer asked for the philosophies of Mr, Byron Davis, Superintendent of the Sherman Public Schools, and Mr. Walter Carpenter, Principal of the Sherman Junior High School. This request included their philosophies of both, the Junior High School Program and the Industrial Arts Program. The administrations philosophy on Industrial Arts will be presented near the end of this chapter.

The philosophy of Superintendent Byron Davis on the total junior high school program in Sherman is as follows:

> My philosophy of the junior high school program . . .
>
> (1) Exploratory. An opportunity to experiment, to look about.
>
> (2) General education -- not specialized.
>
> (3) Much stress on the boy or girl -- Helping them to find and develop themselves. Emphasis on the individual -- on individual development.
>
> (4) Materials and methods of instruction set up to help the individual advance as rapidly as possible according to his abilities.
>
> (5) Much stress on helping boys and girls to adjust.
>
> (6) A program which takes advantage of enthusiasm of this age group, with much "doing" by pupils, many constructive activities, clubs, etc. Much participation.
>
> (7) Athletic program, academic program -- whatever it may be -- music, band, choir, and so forth: not accomplished under duress and stress on boys and girls. Relaxed climate in whole school but not loose in control, in discipline.
>
> (8) Transitional period between elementary schools and more specialized training offered in senior high school. Climate of school should take recognition of this.

Principal Walter Carpenter reported his philosophy as stated in a school bulletin in which he speaks for the faculty.

> The Sherman Junior High School is concerned with providing an environment in which each pupil may have an opportunity to reach his maximum capacity and to prepare to take his place in a democratic society. We believe that the school should provide learning activities which will develop in the child the appreciation for his American heritage and an understanding of the democratic principles by which we live. We recognize the fact that each student has varying interests, capacities, backgrounds, and needs. Our faculty, therefore, must strive to determine the individual differences of each student in order to provide educational facilities to meet these needs and to adjust the school program to fulfill the potentials of each student. Such a program demands the complete cooperation of teacher, student, and parent.
>
> We further believe that the Junior High School is a transition between the elementary and high school. Accordingly, its program should be so arranged as to allow the student to use past experience as a basis for a gradual and continual adjustment to and participation in present and future school experiences. All activities which develop desirable school traits and attitudes and ideals leading to well integrated student behavior should be provided. Due to the adolescent age in which most Junior High School students find themselves, a guidance program which specializes in aiding pupils in exploring special interests, aptitudes and abilities should be inaugurated.
>
> The Junior High School along with all agencies in the community must strive in every way possible to help pupils appreciate our present governmental and economic organizations and they should be made to feel individual responsibility in continuing and improving our American way of life.

The Program of Studies of the Sherman Junior High School. As the reader of this work will note in Table I the transitional aspects of this school are somewhat unique in that there is a gradual transition from the one teacher classroom to a program that is departmentalized in nature. This table shows the period of time that students spend with their Language Arts-Social Studies Teacher (Home Room) and with Subject Teachers. Subject Teachers, as used here means those teachers who teach elective subjects and physical education.

TABLE I

STUDENT TIME SPENT WITH HOME ROOM AND SUBJECT TEACHERS

Teachers	Grade 7	Grade 8	Grade 9
Language Arts and Social Studies	All Day	One-half Day	
Subject Teachers	P.E. only	One-half Day	All Day

There are a few variations of this plan in that: (1) In the seventh grade students take physical education with a teacher of that subject, and those students who have elected to take band leave their home rooms for the beginners band period; (2) although all eighth grade students have a language arts-social studies teacher for one half day, half of the students of that grade have a subject teacher for their home room advisor or teacher, the other half remaining with their language arts-social studies teacher for the home room period; and (3) all ninth grade students have subject teachers for their home room advisors.

Table II (page 32) shows the scope of the instructional areas offered by the school and the option allowed the students.

The Program of Industrial Arts. As may be noted in Table II, eighth and ninth grade students may elect to study industrial arts. This is, however, limited to boys only. In as much as this chapter is devoted to the junior high school, the only mention of industrial arts here will

TABLE II

CHOICE OF SUBJECTS BY GRADES

NAME OF SUBJECT	GRADE 7	GRADE 8	GRADE 9
Language Arts & Social Studies	Required	Required	Completely Departmental
English	L.A. & S.S.	L.A. & S.S.	Required
Social Studies	L.A. & S.S.	L.A. & S.S.	Required
Physical Edu.	Required	Required	Required
Mathematics	L.A. & S.S.	Required	General Math or Algebra Required
Electives	None (Exc. Band)	One	Two
Art		Elective	Elective
Band	Permission	Elective	Elective
Choir		Elective	Elective
Homemaking		Elective	Elective
Industrial Arts		Elective	Elective
General Business			Elective
Latin or Spanish			Elective
General Science			Elective

be confined to the administrations philosophy on the subject and to note, in Table III, the areas covered in industrial arts in the school.

In keeping with their philosophies on the junior high school program, the philosophies of the administratorson industrial arts are as follows:

Mr. Byron Davis:

> I have always looked upon Industrial Arts in the Junior High School as a program of study whereby the student is given adequate opportunity to learn certain skills in the use of handtools, to explore his interest as to future formal training, to gain knowledge about the world of work by reading in popular magazines or from books, to learn the importance of cooperation, proper conduct in a shop situation, safety, care of public or personal property. I have never considered industrial arts in the junior high school as an area in which highly specialized training is given or in which great stress on finished production is stressed. A look at the broad areas of opportunity in this field and the acquirement of certain skills and knowledge appear to me to sum up my point of view. No area of the junior high school offers a richer opportunity for the student to learn good citizenship, acceptance of responsibility, and other qualities which we generally attribute to those whom we hold in high esteem. Particularly in this age, we need to give more attention, not less to this field of training, for it is only through public schools that boys have an opportunity now to learn skills once learned at home or on the farm.

Mr. Walter Carpenter:

> 1. In the industrial arts program for Junior High boys, it is my belief that we are not endeavoring to make skilled craftsmen of the students but rather it is our function to enable each boy to have opportunity to explore the various areas of the industrial arts program so that he may determine whether he has interest in or aptitude for any or all phases of the industrial arts program. If the student finds this to be true, he may wish to continue his study in these fields as a vocational pursutor or as a recreational one.
>
> 2. The industrial arts program should give each student a working knowledge of basic tools, vocabulary, and materials used in these various areas so that even though he does not become a craftsman himself, he has a knowledge of and appreciation for skilled craftsmanship. A knowledge of good craftsmanship is a valuable asset to an individual as a consumer and as a purchaser.

The following table shows the instructional areas covered, by grades, and the duration of each, in industrial arts:

TABLE III

INDUSTRIAL ARTS AREAS OF INSTRUCTION

IN THE SHERMAN JUNIOR HIGH

Subjects	Grade 8	Grade 9
Mech. Drawing	9 weeks	18 weeks
Woodwork	9 weeks	18 weeks
Metalwork	9 weeks	0
Electricity	9 weeks	0

With a knowledge of the program of studies of the Sherman Junior High School and the place of the industrial arts within that program, it is possible to proceed with the next logical step, the planning of the industrial arts program culminating in the development of a course of study for each of the areas of instruction.

CHAPTER IV

A PROPOSED INDUSTRIAL ARTS PROGRAM FOR THE SHERMAN JUNIOR SCHOOL

Part A

Developing the Course of Study

A brief mention was made to the Sherman Junior High School Industrial Arts program in Chapter III, Part C. In Chapter IV, the writer proposes to present a program of eighth grade industrial arts to fit the needs of the youth of the community, a program that can be well integrated in the Program of Studies of the Sherman Junior High School. To accomplish this it seems imperative that the course of study be defined and the essential steps in the development of a course of study be reviewed.

The Course of Study Defined. A course of study, as defined by Ericson, is:

> . . . a presentation of teaching material organized and arranged for instructional use. In its simplest form, it may consist of a mere outline of topics to be covered or processes to be performed. In more complete form, it will include additional features for the purpose of assisting the teacher in the presentation of the subject matter. (7, page 286)

Giachino and Gallington present the following definition for the course of study:

> . . . a course of study is a comprehensive plan which shows the scope and teaching sequence of all the activities provided for a particular subject in a curriculum. (10, page 4)

The course of study as defined by Caswell and Campbell is:

> . . . a guide for teachers in the selection of pupil activities, the material to be used in connection with these activities, and the manner in which they are to be organized. (5, page 451)

General agreement seems to prevail among these authorities in concepts of the course of study. For the purpose of this study, any of the definitions as presented here are acceptable.

Steps Involved in Preparing a Course of Study. The most authoritative sources of information concerning the course of study seems to be the textbooks that have been written for both the industrial arts and vocational education. These dual purpose textbooks have been developed because the publishers have not found it to be economically feasible to produce works designed for either subject alone. It is, therefore, necessary to eliminate, in practice, some of the features presented by the available authorities in undertaking the building of a course in industrial arts.

Friese, in placing emphasis on comprehensiveness, lists ten steps to be followed in the construction of the course of study.

> These steps represent an orderly procedure which has been developing gradually both in building courses and in teaching course construction. The statements of the steps and their order have frequently been modified by the judgement of teachers who have applied them in their own efforts at course construction.

TEN STEPS IN MAKING A COURSE OF STUDY

1. Establish (1) the aims of the school, (2) the aims of the industrial department, and (3) the subject aims for a given grade level.

2. Analyze the occupation or course area for (1) manipulative skills, and (2) related content (information).

3. In vocational courses, eliminate manipulative skills which can be taught better on the job and retain what is best adapted to use in school shops.

4. Eliminate from the remaining manipulative data such materials as do not further the purposes of the school and the course.

5. Arrange the finally selected manipulative subject matter on some determined basis.

6. Select or design vehicles through which to teach the manual skills, and with which the various kinds of related content may be vitally correlated.

7. From the skill-information analysis, select units of related subject matter closely associated with the manipulative core of the course.

8. Plan methods of presenting the manual skills and the related content, and for developing the techniques of problem solving, which are in harmony with the best occupational, pedagogical, and psychological procedures.

9. Plan a format and write the course.

10. Try out and revise the course. (8, page 18)

Ericson, in a treatise on Teaching the Industrial Arts, includes a chapter on course making in which he lists four steps in the procedure in organizing a course.

Traced through its various stages, the making of a course of study involves the following processes:

1. Determine upon objectives or goals for the activity contemplated.

2. Make or obtain a complete analysis of possible operations or jobs.

3. From the total of this listing, select those items that appear to be feasible for the course being planned.

4. Organize the selected material into a course of study. (7, page 286)

Giachino and Gallington have not presented a list of steps in the procedure for the development of a course of study. They have, however, presented a list of the parts of a course of study which would suggest the necessary steps in the procedure of its preparation.

A really comprehensive course of study should include the following information:

1. A general introductory statement specifying the main concepts of the course.

2. The grade level for which the course is intended.

3. The main divisions of the course, with a time limit for each.

4. Specific practices that are to be followed in teaching.

5. Philosophy and objectives pertaining to the specific area of instruction as well as course aims.

6. An orderly arrangement of the manipulative operations to be learned.

7. An outline of the essential related information.

8. The media to be used in learning the established skills and knowledge (projects, jobs, problems, etc.).

9. The activities which are designed especially to foster the development of desirable attitudes and good work habits.

10. The nature of instructional aids that will be used to simplify learning. (10, page 7)

The procedure the writer presents here is a result of considerable research on the course of study. Also, the Sherman Junior High School has been kept in mind while formulating the following procedure.

1. A study of the aims or objectives of the Industrial Arts Program.

2. A study of the aims of the Sherman Public School and specifically the junior high school program.

3. Establish the course objectives for the subject areas to be taught, i.e. woodwork, metalwork, mechanical drawing, and electricity.

4. Develop a plan of general organization and management.

5. Determine the basic skills and related subject matter in the four areas of instruction.

6. Select projects which will include skills in the order of increasing difficulty.

Objectives of the Industrial Arts Program. The place of the industrial arts program in general education seems secure and, therefore, hardly needs justification here. However, it is the objectives of any course that determines whether or not that course has a place in the program of studies of the school. The broad objectives of the industrial arts program have been stated many times and in many forms. The writer has chosen a few authorities to use in the presentation of the industrial arts objectives.

The following quotation is from Wilber.

> There is one primary purpose of all subjects. That purpose is to achieve the objectives of the particular course in question. (19, page 57)

Wilber lists the objectives of industrial arts as follows:

1. Exploration of products; Raw materials; Processes and Operations; Occupations; Organization.
2. Aesthetic appreciation.
3. Recreation and avocation.
4. Consumer knowledge.
5. Guidance.
6. Creative expression with industrial materials.
7. Social relations.
8. Skills. (19, page 32)

Newkirk and Johnson say that the following objectives summarize the teaching aims of the industrial arts program.

1. Develop the ability to plan and complete projects, using a variety of tools and construction methods in a workable 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. (16, page 7)

Giachino and Gallington, in translating the philosophy of industrial arts into more specific terms, offer the following list of objectives.

1. Provide experience in correctly performing operations involving basic industrial hand tools and common machines.

2. Acquaint the students with the various fields of industry, including the materials, products, and employment opportunities.

3. Develop desirable work habits and ability to work co-operatively.

4. Develop safety habits with industrial hand tools and common machines.

5. Stimulate an interest in hobbies.

6. Develop an appreciation of good craftsmanship.

7. Provide opportunities to satisfy creative desires.

8. Develop the ability to think rationally, to plan shopwork wisely, execute plans effectively, and appraise finished products intelligently.

9. Develop the ability to select and use wisely the products of industry.

10. Develop ability to perform common household repairs.

11. Develop a basic understanding of labor-management-consumer relationships in an industrial society. (10, page 53)

The following quotations are from Friese.

The following aims were suggested to Dr. Smith (Homer J.) through data uncovered in a detailed study of the history, current conditions, and practices of industrial arts in Minnesota in 1924.

DR. SMITH'S OBJECTIVES

1. To develop skill in the use of common tools. (For more worthy home membership, avocational purposes, and general preliminary training.)

2. To afford industrial information and social intelligence. (For a better understanding of materials and processes of manufacture, economic necessity and social usefulness of skillful labor, and conditions and problems of industrial employment.)

3. To foster appreciation of good materials and workmanship. (For intelligent and discriminating selection of manufactured products for home and business consumption and proper valuation of substantial and beautiful constructions in environment.)

4. To further intelligent choices of life occupations. (For wider knowledge of the requirements of industrial jobs and positions, for better understanding of individual abilities and capacities, and for consciousness of the desirability of these two success factors being considered together.)

5. To inculcate worthy personal traits and attitudes. (For the building of habits of industry, initiative, resourcefulness, independence, exactness, economy, and co-operativeness.)

6. To provide a measure of specific occupational training. (For advantageous entrance upon and progress in suitable lines of work, when conditions point to early assumption of the responsibilities of earning a living.) (8, page 93)

From the close similarity between the objectives of industrial arts as presented by the preceding authorities, it would seem that a desire for individuality constitutes the essential differences. In summarizing, it may be said that industrial arts is that part of general education that provides an understanding and appreciation of the materials, skills, tools, processes, organization, and social importance of industrial

pursuits through manipulative and problem solving situations. Although the preceding statement presents more of a philosophy than a list of objectives it seems to include a major proportion of the items included by the afore mentioned authorities.

Objectives of the Sherman Junior High School. The philosophy of the Sherman Junior High School was presented in chapter 3, part C. Important as they are in the development of a course of study it hardly seems necessary to repeat them here. The objectives of the administration are clearly set forth in these philosophies.

Specific Course Objectives. In considering the specific objectives of the subjects to be offered the writer feels that a list for which the instructor feels a personal responsibility should be developed. The first step is to list as many desired outcomes from the instruction as can be expected. They should then be evaluated on the basis of, "Do they satisfy the objectives of the school and of the department?" Those objectives that can be realized only with great difficulty should be eliminated and those that are retained should be evaluated on the basis of activities and instructional experiences that can be provided for their attainment.

Giachino and Gallington's recommendations for establishing specific course objectives are as follows:

> At this point in the preparation of a course of study, the teacher should carefully study the broad objectives which were previously listed for general education and those for his special field. From this list he should select those objectives which he feels have a definite relationship to his course. Each objective should be analyzed from the standpoint of the activity which can be provided to promote its development, and then the objective retained or rejected on the basis of the facilities available to place the activity into operation. (10, page 62)

Objectives then, become the most important consideration in the selection of projects, activities, operations, and related information in any class.

> There is one primary purpose of all subjects. That purpose is to achieve the objectives of the particular course in question. (19, page 57)

The specific course objectives for the areas of instruction that have been developed for the Sherman Junior High School have been included in the course of study at the end of this chapter.

General Organization and Management. In the organization and management of industrial arts classes there is an excellent opportunity to achieve the objective of developing citizenship and leadership. This is accomplished through assigning responsibilities for the care and maintenance of the shop. Friese recognizes several advantages in delegating shop responsibilities.

> Industrial teachers are confronted with a major assignment of management, including personnel, equipment, and supplies. Some managerial duties may well be assigned to pupils. The chief advantages of planned and controlled management in school shops are:
>
> 1. Prevents disciplinary problems from arising.
> 2. Relieves teacher of routine details.
> 3. An aid to accident prevention.
> 4. A positive educational value to the pupils participating.
> 5. More and better teaching and learning is possible. (8, page 144)

Newkirk and Johnson also recognize a value to be gained through the use of student personnel in the organization and management of the industrial arts shop.

> Industrial arts classes are usually organized with a pupil personnel system. It is common practice to have a shop foreman, assistant foreman, tool clerk, shop librarian, and safety engineer. The particular duties of the different officers are either specified by the teacher or worked out by the teacher and students. The officers are either appointed or elected, and they should not be retained

> too long in one position. The personnel system offers valuable experiences in learning to work with people, and the jobs should be rotated so that all students will benefit from the experiences. (16, page 197)

Ericson offers some interesting comments on shop organization.

> . . . the teacher will plan for student participation in management in order to furnish experience in real-life situations similar to those found in adult occupational life and in social groups. Whether the plan saves time for the teacher becomes unimportant if it promises to develop a sense of responsibility and leadership on the part of the student. (7, page 288)

A plan of shop organization for the industrial arts program in the writers school will be presented in the proposed course of study.

Basic Skills and Related Subject Matter. Once specific course objectives have been determined and the class organization established, the instructor's next job is to determine the basic skill and related subject matter that should be taught for each of the courses in the curriculum. These items will be presented in the proposed course of study also. A listing of them here would be too lengthy and repetitious. There are, however, some basic considerations that were used in the selection of the skills and subject matter that might well be reviewed. These considerations are:

1. Does the skill promote the objectives of the course?
2. Does the subject and/or skill take into account the age of the student for which it is intended?
3. Is it reasonable in cost?
4. Can the work be completed while student interest can be held, or is it too time consuming?
5. Is there a problem solving situation involved?

Selection of Projects. The selection of the projects used in the course have been based on the skills to be learned and on the subject matter to be taught.

There exist among the teachers of industrial arts, quite varied opinions as to whether to require specified projects or to allow the student a guided free choice in making their own selection of projects. In arriving at a decision in this matter the writer asked a group of Oklahoma Agricultural and Mechanical College graduate students of a class in course construction in industrial subjects to list their arguments for and against both methods. It was stipulated in the request that the students were to be beginners in the four instructional areas under consideration. Their responses have been compiled and the results from the thirteen respondents are as follows:

Seven favored teacher selection of first projects.
Two favored student choice in project selection.
Two favored student choice of a limited number of teacher selected projects.
Two were noncommital.

The advantages and disadvantages of the teacher selected projects listed by the respondents were:

	Advantages	Number times reported
1.	Facilitates instruction	8
2.	Demonstrations of basic skills and student observation easier	4
3.	Better discipline control	3
4.	Conservation of time and material	3
5.	Better observation and evaluation of student ability	2
6.	Students have a better opportunity to learn from each other	2
7.	Saves equipment and less needed	2
8.	More time for students to plan future projects is provided	1
9.	Facilitates purchase of materials	1
10.	Helps in keeping with grade level	1

Disadvantages	Number times reported
1. There is less student interest	3
2. Tendency for students to just slide-by	1
3. Lack of interest in problem solving	1
4. Lack of interest in technical skills	1
5. Lack of initiative in related materials	1

The advantages and disadvantages of guided free student choice in the selection of projects.

Advantages	Number times reported
1. Better student interest	4
2. Student can make better use of the finished product	3
3. Student can control the cost	2
4. Discipline made easier	1
5. Good problem solving situations arise	1
6. Some measure of success achieved by every student	1
7. Iniatiative of the student is stimulated for related skill and processes	1
8. Better chance for developing a vocation or avocation	1
9. Best technical skills tend to be developed	1
10. A better analysis of the student can be made	1
11. Teaching design is easier	1
12. Parent interest is easier to secure	1

Disadvantages	Number times reported
1. Greater teaching load	2
2. Students are likely to start projects beyond their abilities	2
3. Materials more likely to be wasted	1
4. A greater variety of equipment is needed	1
5. More time is required out of class	1
6. Idleness results due to inability of students to make decisions	1

The class was almost unanimous in the belief that all students should be given a free, but guided, choice after one or two teacher selected beginning projects are completed but a new skill or operation should be learned with each new project. There seems to be no available

documentary proof of the superiority of either method or combinations of the two. The writer proposes to use a required first project, a limited choice of a second project, and a guided free choice in the selection of subsequent projects.

The writer's ideas in connection with the course of study have been clearly stated and documented in this chapter. The rest of the chapter has been devoted to the proposed course of study for the eighth grade industrial arts program of the Sherman Junior High School.

Part B

A Course of Study for the Industrial Arts Program in the Junior High School of Sherman, Texas

This course of study has been prepared as a plan of teaching industrial arts courses in woodworking, metalworking, mechanical drawing, and electrical areas of instruction. The course of study contains the objectives of the industrial arts program, the objectives of the school and the objectives of each of the instructional areas, as well as the general plans of shop organization, projects to be used, skill to be taught and the related subject matter in the above mentioned industrial arts areas. Also included are the suggested equipment arrangements in the two rooms that are available to the program.

Section 1

Objectives

Objectives of the Industrial Arts Program.

1. Develop the ability to plan and complete projects, using a variety of tools and construction methods in a workable manner.

2. Give experiences that will increase understanding of modern industry and that will lay the foundation for and help determine vocational interest.

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. (16, page 7)

Objectives of the School. The aims of the school, in general, conform to the "Cardinal Principles" of secondary education: (1) health, (2) command of fundamental processes, (3) worthy home membership, (4) vocation, (5) civic education, (6) worthy use of leisure time, and (7) ethical character. In addition, the Sherman Junior High School recognizes the individual differences in youth of adolescent age and provides a smooth and gradual transition from the elementary school to the work at the high school level.

Specific Course Objectives.

Woodworking Objectives

1. To teach students to interpret working drawings and to plan projects in wood.

2. To provide an understanding of the woodworking industry and its vocabulary.

3. To provide a knowledge of good design and construction in projects of wood.

4. To teach the use of a variety of woodworking tools and materials.

5. To teach care of, and safe handling of, the common woodworking tools.

6. To provide practical experience in the use of mathematics and language arts.

7. To create an interest in the use of woodwork as a means of utilizing leisure time.

8. To provide experiences in working together as a means of citizenship training and social understanding.

Metalworking Objectives

1. To teach students to interpret working drawings and to plan projects in metal.

2. To provide an understanding of the metal industry from mining through the manufacture and use of metals and the vocabulary of the metal industry.

3. To provide a knowledge of good design and construction in projects of metal.

4. To teach the use of a variety of metalworking tools and materials.

5. To teach care of, and safe handling of, the tools commonly used in metalwork.

6. To provide practical experiences in the use of mathematics and language arts.

7. To create an interest in the use of metalwork as a means of utilizing leisure time.

8. To provide experiences in working together as a means of citizenship training and social understanding.

Mechanical Drawing Objectives

1. To teach the use of the drawing instruments and the materials used in the drafting profession.

2. To provide an understanding of the opportunities and operations in the field of mechanical drawing.

3. To teach visualization of simple and familiar objects and to interpret them through the media of the working drawings.

4. To develop habits of neatness and order.

5. To teach care of mechanical drawing equipment.

6. To provide practical experience in the use of mathematics and language arts.

7. To provide experiences in working together as a means of citizenship training and social understanding.

Electricity Objectives

1. To develop an understanding of the place of electricity in industry and in the home.

2. To develop safe work habits in the use of electricity and to recognize safe electrical installations.

3. To teach the use of a variety of electrical materials and tools.

4. To provide practical experience in the use of mathematics and language arts.

5. To develop interests in leisure time activities in the use of electricity.

6. To provide experiences in working together as a means of citizenship training and social understanding.

Section 2

General Organization and Management

Time Available, Size of Classes, and Rotation of Classes. Each group of students meets class in industrial arts for one fifty-five minute period daily for nine weeks in each of the areas of instruction. Because of the limitation of the available space and equipment the classes are limited in size to a maximum of twenty students. Two teachers in the department will each teach five classes daily. In order to avoid conflicting use of class rooms and equipment the classes under the supervision of the writer will utilize the wood and metal areas the first eighteen weeks of the school term while the other teacher will use the area housing the mechanical drawing and electrical equipment.

Equipment Available. The lists of equipment that is available is not in minute detail. Only the most basic equipment is included due to the extensiveness of a detailed list.

The basic equipment in the woodworking area includes eight woodworking benches, each accommodating two students, and one woodworking bench accommodating four students. These benches are equipped with woodworking vises. In the open type tool rack, located on the wall of the shop near the benches, are hand planes, jack, junior jack, and smooth try-squares, and marking gauges of sufficient number that each student has the use of them at any time. Other tools contained in the rack are:

Hand saws, cross-cut and rip

Back saws

Socket hand chisels - 1/4", 1/2", 3/4" and 1"

Claw hammers - 12 oz. and 14 oz.

Braces

Auger bits, 1/4" to 1"

Expansion bit

Hand drill

Drill bits, set

Framing squares

Bench rules

Bench dusters

Block planes

Assorted screw-drivers

The tool rack is designed so that empty spaces can be readily detected.

Small items of equipment are kept in supply cabinets and the teachers desk and given out only as the need arises.

The shop is equipped with a lumber room, finishing room, and an office. Woodworking machines in the shop includes two wood lathes, a band saw, a scroll (jig) saw, a circular saw, a jointer, a planer, and a drill press. Pupils of the eighth grade are restricted to the use of the lathes, scroll saw, and the drill press.

In the metalworking area there are five work benches, each equipped with two stationary vises. Each bench accommodates four pupils. Other equipment in the room includes three gas bench furnaces, a drill press, a small set of metal forming tools, and two grinders. An open type tool rack contains the following:

Six ball peen hammers in assorted sizes

One soft hammer, plastic

Wooden mallet

Rubber mallet

Two tinners hammers

Four wood bench rules (2 ft.)

Two 2 ft. metal bench rules

Four center punches

Four cold chisels

Miscellaneous files

Four Combination squares

Rivet sets

Six scribers

Six screwdrivers, miscellaneous sizes

One set of open-end wrenches

Other small tools are kept in the teachers desk. A set of drill bits and a drill press vise are located near the drill press.

The drawing room is equipped with a drawing table and stool for each student in the class, and a drawing table and stool for the teacher. Equipment for each student includes:

Drawing board

T-square

45 degree triangle

30-60 degree triangle

Scale

Eraser

Drawing paper and pencils are furnished to the student at no extra cost. Two students are required to share one set of instruments, which includes a compass, ruling pen, bow pencil, and dividers. Less commonly used equipment is kept in a cabinet and includes four irregular curves, four protractors, extension bars, and erasing shields.

The electrical area is equipped with two tables which seat five students on each side and a demonstration table for the teacher. The class is equipped with a Crow Electric Demonstration kit. The equipment used by the students include:

Screwdrivers

Bar magnets

"Horse-shoe" magnets

Dry cell batteries

Transformers

Bells and buzzers

Common types of switches

Bell wire

Magnet wire

Misc. wire cutting tools

Electric soldering irons

Switch boxes

Junction boxes

And other misc. wiring supplies

Statement of Financial Policy. Each student who elects industrial arts is required to pay a fee of one dollar and fifty cents for the year. This fee covers such items as the drawing paper and pencils the students use, sandpaper, nails and items of a like nature. In addition to the fee the student is expected to pay for all materials that he uses from the shop supply of lumber, metal, and similar items. At the beginning of the school year the student is to put up a deposit of three dollars to cover the cost of the material he uses. If the student does not use material enough to consume the deposit the balance is to be refunded at the end of the year. Of course, if more material is used than the deposit will take care of the student is expected to pay the balance.

Shop Controls Delegated to the Student. The students are to put away their own tools at the end of the period and to clean the area around his work station. In addition, students will be rotated on the following assignments.

Shop Foreman

Assistant Shop Foreman

Heating and ventilation foreman

Tool checker or foreman

Supply room foreman

Finishing room foreman

Some of these offices, of course, will not be filled in the drawing and electricity areas.

The teacher should retain the duties of calling the roll and dismissing the class and duties of a like nature.

Text and Reference Books. No textbooks are required or used in any of the areas of instruction except mechanical drawing. The mechanical drawing book used is Introduction to Applied Drawing by Hale, McGinnis, and Hill and is furnished by the school. The students have access to many project and reference books in the shop libraries.

Keeping the Class Together. Once the students complete an assigned (teacher selected) project in each area no attempt is made to keep the class together. In starting the class all students are held to a set pace to facilitate demonstrations.

Reporting Student Progress. A letter grade is given only at the end of the year. Parents are sent quarterly statements describing the work and progress of the student. This report is in paragraph form. Grading is based on citizenship, attitude, initiative and quality of work. The grading is somewhat subjective.

Methods of Teaching. The teacher will use the demonstration method extensively. Some instruction will be given using the lecture method, visual aids, discussions, field trips, and individual instruction. About eighty per cent of the time will be devoted to student project work.

Closing Instructional Areas. At the end of each nine week term the area will be left in good condition. The students will clean and oil or otherwise take care of all the equipment used in that area of instruction.

Outline of Instruction. The following pages are given to the development of an instructional program in each of the areas.

BEGINNING WOODWORKING COURSE OUTLINE

PROJECTS	SKILLS, PROCESSES AND OPERATIONS	RELATED INFORMATION
Sandwich Board	Learn procedure for squaring stock to dimensions	Technical:
	Cut a chamfer	Sharpen a plane iron
	Bore a hole	Learn nomenclature of the plane
	Prepare surface for finishing	Read a rule
	Apply a simple finish	Read working drawings
Choice of:	Plan a working procedure	Types and uses of boring tools
Corner Shelf	Make a bill of materials	Locate a center for boring or drilling
Wall Shelf	Cut stock to rough size	Learn types and uses of abrasives
Shoe Shine Box	Make a joint:	Learn types of finishes
Picture Frame	Simple butt	Learn types and uses of screws
	Dowel	Sharpen a chisel
	Dado	Shop Safety
	Rabbet	Nomenclature of tools
	Miter	How to layout and transfer designs
	Mortise and Tennon	Learn elements of good design and construction
Free Choice (guided)	Joint and glue lumber	General:
	Make a trial assembly	Logging industry
	Transfer a design and use the scroll saw	Sawmilling or lumber
	Use the drill press	Kilning, dressing, and storing lumber
		Commercial uses of lumber
		Occupational opportunities in the lumber industries
		Manufacturing of screws, nails and hardware

BEGINNING METALWORKING COURSE OUTLINE

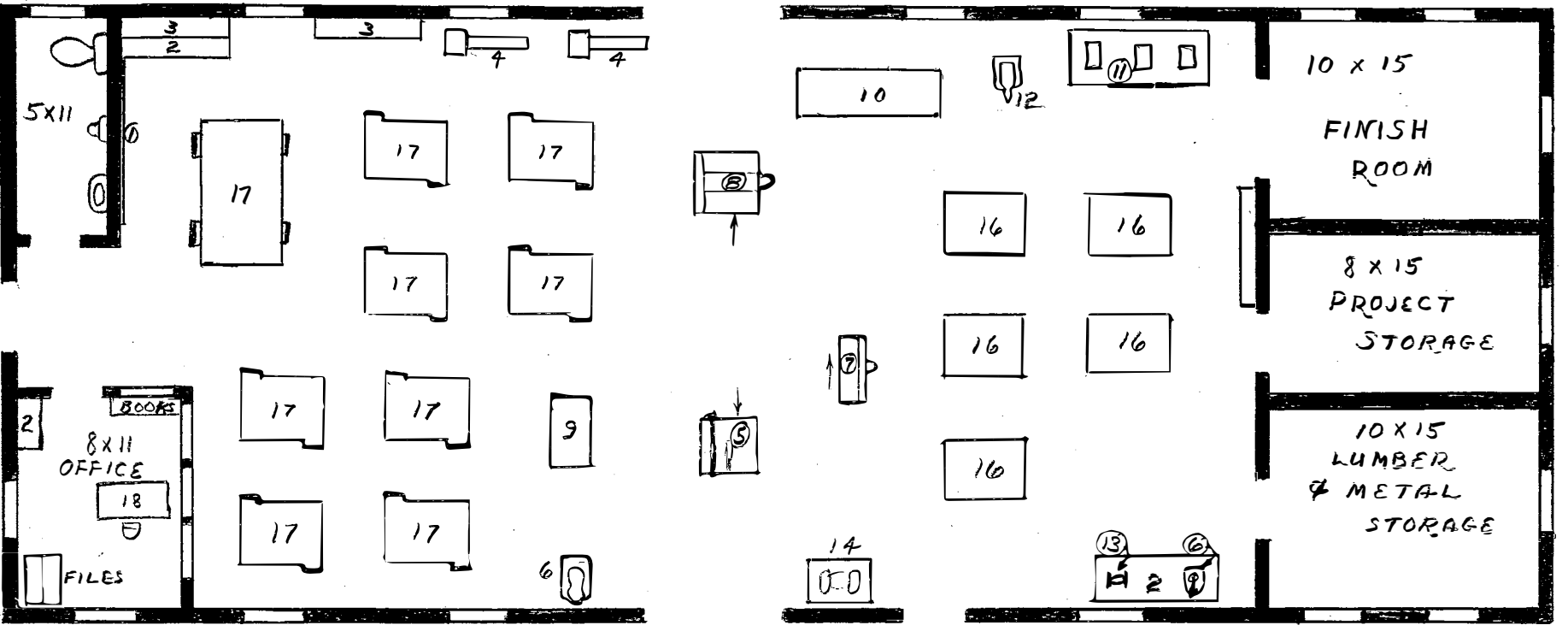
PROJECTS	SKILLS, PROCESSES AND OPERATIONS	RELATED INFORMATION
Cold Chisel	Cut Stock	Technical:
	Anealing	Using the hack saw at proper speeds
	Forming	Types of metals
	Grinding	Heat treating metals
	Filing	Simple case hardening
	Polishing	Use of files
	Hardening	Guages of metals
Second project	Planning	Planning procedures in working with metal
Guided Choice	Layout and scribing	Computing costs of metal projects
	Cutting metals	Nomenclature
	Folding seams	Measuring on metal using a rule
	Soldering	Fluxing and otherwise preparing metal for soldering
	Riveting	How to tin a soldering copper
	Forming metals	Sharpen and care for metalwork tools
	Threading operations	General:
	Drilling in metal	Mining operations
	Punch holes	Smelting ores
		Rolling, Casting, etc.
		Industrial uses of metals
		Machines used in the metalworking industry
		Characteristics of different metals
		Occupational opportunities

ELECTRICITY COURSE OUTLINE

PROJECTS	SKILLS, PROCESSES AND OPERATIONS	RELATED INFORMATION
	Natural magnetism and magnetic fields	Technical: The earths magnetism Principles of attraction and repulsion Reading electrical symbols Electrical conductors and insulators Dry cells Simple switches Circuits, open and closed Series and parallel circuits Measurement of direct current-amperage-voltage Splices - rat tail, western union, tee and cable Types and purposes of electrical tapes Construction of dry cells Wiring in the home Safety precautions General: Opportunities for the draftsman in the electrical field Opportunities in the field of signal wiring Characteristics of electricity Christmas tree lights Use of electricity in everyday life Properties of solder Composition of fluxes Manufacture of tapes and insulating materials Chemistry in the electrical fields Reading electrical instruments Use of storage batteries
Make an electromagnet	The electromagnet	
Make an electric motor	The electromagnet in the electric motor	
Draw floor plans and include a wiring diagram	Making the commutator and brushes	
	Soldering electrical wire	
	Wiring simple bell circuits	
	Connecting dry cells in series and in parallel	
	Making electrical splices	
	Making a simple wet cell	
	Wiring switches and outlets for home construction	

MECHANICAL DRAWING COURSE OUTLINE

PROJECTS	SKILLS, PROCESSES AND OPERATIONS	RELATED INFORMATION
Drawing in Textbook	Sketching - isometric to orthographic Sketching - orthographic to isometric Use of mechanical aids Horizontal and vertical lines Oblique lines and inclined surfaces Circles, arcs, and tangents Drawing to scale Sections Free-hand orthographic sketching Drawing for the industrial arts shop	Technical: Types and uses of drawing pencils Fastening paper to drawing board Kinds of sketches Types of lettering and purposes Rules for dimensioning Developing inclined lines Use of the T square and triangle Combinations of triangles Use of compasses Symbols Alphabet of lines Centering views on paper Use of the scale General: Drafting in industry Occupational opportunities Kinds of paper Metals used in manufacture of drawing instruments Reading blueprints Types of scales



30 ft. x 75 ft

SCALE $\frac{1}{8}$" = 1 ft

~ LEGEND ~

1. BLACK BOARD
2. SUPPLY CABINETS
3. WOODWORK TOOL RACKS
4. WOOD LATHE
5. TABLE SAW
6. DRILL PRESS
7. JOINTER
8. 24 IN. PLANNER
9. MITER BOX
10. SMALL METAL FORMING TOOLS
11. GAS FURNACES
12. ANVIL
13. BENCH GRINDER
14. FLOOR WET GRINDER
15. METAL TOOL RACK
16. METAL-WORK BENCHES
17. WOOD-WORK BENCHES
18. TEACHER'S DESK

CHAPTER V

CONCLUSIONS AND RECOMMENDATIONS

The reflections of the writer, back through the history of the world in which we live, brings to light that the skills of living have largely been the skills of self preservation. Education, both general and specific, have come about through a need for providing for food and protection. In both these areas of maintaining an existence, skills were developed which brought about continual improvement in man's ability to utilize the natural resources.

Perhaps one of the greatest single influences in the development of man has been the necessity for self-defense. It seems that man's ability to fashion weapons for this purpose, as well as for the acquisition of food, has controlled a large part of the industrial development of the world. Only in those areas of the early world where terrain offered a natural defense did the more cultural phases of education thrive. Such areas no longer exist. This nation, once isolated from most of the world by two large oceans, is now only a few hours away from any potential enemy our civilization may produce. The multi-billion dollar annual expenditures of this nation for defense purposes attest to this fact.

Man's ability to communicate successfully with one another, aided by the invention of the alphabet, has done much to lessen the need for self-defense and has contributed greatly, perhaps more than any other single factor, to the cultural progress of mankind. The communications

arts have enabled man to make more intelligent use of the natural and human resources. As may be noted in the objectives of the program, industrial arts is greatly concerned with these resources.

The work the writer has presented here has been an effort to show the need for industrial arts education and its place in the junior high schools, and more specifically, the Junior High of Sherman, Texas. The proposed course of study is by no means inflexible and to be effective, it must be continually revised and reorganized as experience is gained and new materials, industrial processes, and teaching methods are developed.

The lesson plans have been purposely omitted. The writer feels that, to be effective, this part of teaching is a weekly or even a daily task of the teacher. The course of study is used as a guide in lesson planning to provide continuity in the teaching of a subject.

Recommendations. The writer recommends that the course of study as presented in this report be extracted from the report, revised if necessary, enlarged to include the ninth grade industrial arts program and reproduced for use in the Sherman Junior High School. It is further recommended that forms be included for: (1) students individual progress reports, (2) student project planning sheets, (3) project sheets for required projects, (4) job sheets, and (5) information sheets.

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THESIS TITLE: Industrial Arts in the Junior High School of Sherman, Texas

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The content and form have been checked and approved by the author and thesis adviser. Changes or corrections in the thesis are not made by the Graduate School office or by any committee. The copies are sent to the bindery just as they are approved by the author and faculty adviser.

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