A STUDY OF INDUSTRIAL ARTS IN THE PUBLIC SCHOOLS OF TENNESSEE

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W. H. L.

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CHAPTER I

THE PROBLEM

Many factors may influence the research worker in the selection of a thesis subject. A felt need for the investigation of a particular problem, a professional interest in a definite area of education, or any urge that is sufficiently strong to motivate the investigator and challenge his abilities in the field of research will justify any study. This particular study has a double relationship to the professional activities of the writer of this thesis: (1) it fills a vital professional need, and (2) it is a contributing factor to the future professional growth and development of certain principles. For these reasons a diligent effort has been made to validate, in so far as possible, all criteria in connection with the study.

A statement of the problem. The title of this thesis implies that the study is a state-wide investigation, and on that basis the study has been conducted. The title is: A Study of Industrial Arts in the Public Schools of Tennessee. The investigation is to include a study of all the junior and senior high schools of Tennessee in which an industrial arts course is offered as a school subject. Excluded from the investigation are the schools of a vocational nature, private schools and colored schools.

Purpose of the study. It is the purpose of this study to determine the present status of industrial arts in the public schools of Tennessee.

It is hoped that the findings of the study may be of interest and assistance to school administrators, teacher education staff members, industrial arts teachers (both prospective and active), and to others specializing in the field.

Need for the study. A survey of industrial arts in the public schools of Tennessee was last made by Carl Pace in 1933 at George Peabody College for Teachers. The assumption that many changes have occurred during the past seventeen years in curriculum, teacher preparation, number of schools offering industrial arts, and other factors dealt with in his study justify the initiation of a new survey.

The survey conducted by Carl Pace in 1933 was not available for examination on the inter-library loan plan. Therefore, it will not be possible to show in this study the growth and advancement of industrial arts in Tennessee in the intervening period.

A felt need arises for a study of industrial arts in Tennessee to show trends and to furnish information on which predictions for future developments may be based. A need also existed in the fact that the study might be used as a basis for future similar surveys.

Scope and limitations. In this investigation it is planned to make a study of all industrial arts departments in the public schools of Tennessee. Industrial arts is being offered in at least 136 public schools and at least 184 industrial arts teachers are employed in these schools. Vocational schools, private schools, colored schools and other schools in which courses of study commonly associated with industrial arts are offered but on a vocational basis, are not included.

Of the 184 teachers assumed to have received questionnaires, there

were but 159 respondents, a return of only 86 per cent. Therefore, the findings gathered from the questionnaire forms cannot be regarded as absolute.

Procedure and sources of data. The data for this study were obtained from four sources, as follows:

1. State directories
2. Questionnaires mailed to 480 public school principals
3. Questionnaires mailed to 184 industrial arts teachers
4. Bulletins from the Tennessee State Board of Education

The chief method of research used in this thesis is what Good, Barr and Scates called the normative-survey method, which they say is directed toward ascertaining the prevailing conditions. The questionnaire technique was used to collect information for accumulating the findings of the study because it was the only practical method available under the conditions.

The questionnaire has its limitations and may be criticized by some as an inferior tool of research. However, its value in ascertaining practices within a field cannot be denied. Koos, in his book The Questionnaire in Education, states:

> "The questionnaire's use in ascertaining practice seems warrantable, even if for no other reason, by the need for knowing what practices are before attempting their evaluation." (19, page 23).

This study could not have been attempted without the use of the questionnaire to furnish data used in the findings. The data furnished by the questionnaires seem to represent the typical situations that might be found in the public schools of Tennessee.

Selected definitions of terms used. The following definitions are presented here to clarify the concepts represented by special terms used in the study. Proper recognition has been given relative to authorship.

> "As a subject for educative purposes, industrial arts is a study of the changes made by man in the form of materials to increase their values, and of the problems of life related to these changes." (Bonser and Mossman 8, page 5)

> "Industrial arts is a group of school subjects that contribute to the attainment of the goal of general education by furnishing manipulative experiences in the use of tools, materials and machines, and insights into those phases of industry that have become an important part of our social culture." (Policies Bulletin Committee 28, page 2)

> "Manual training, an earlier type of school shop activity usually restricted to fixed exercises in woodwork, metalwork, and mechanical drawing; strong emphasis was placed on tool exercises and manual skill; gave way first to manual arts and later to industrial arts." (Good 12, page 428)

> "Manual arts, one of the earlier terms used to identify shopwork involving design and hand construction in various mediums with the purpose of developing art appreciation and manual skills." (Good 12, page 32)

> "Vocational education is a form of practical education the chief purpose of which is to prepare persons fourteen years of age and older for gainful or wage-earning employment." (Warner 41, page 30)

> "Practical arts is a form of general or non-vocational education which aids or enriches everyday living principally through purposive activity." (Warner 41, page 30)

> "Shopwork includes the planning and production of changes in materials by the use of tools and machines." (Hunt 13, page 19)

> "General shop is a broad group of educative industrial arts activities embracing technics of shop organization and teaching method which enables a community, whether large or small, to present a unified core of content based on life needs as summarized in these aims: developmental experience interpretative of the major phases of the world's industrial work, "handy-man" activities, consumer's knowledge and appreciation, guidance, hobbies, social habits and (for a very small per cent) vocational preparation." (Newkirk and Stoddard 27, page 11)

> "Industrial arts education refers particularly to the industrial arts program in the college or university. It suggests a professional or educational side of industrial arts as a subject and experience that industrial arts may lack when used alone." (Warner 42, page 6)

Much confusion generally results from the various definitions of each of the foregoing terms. Where the terms have been used in the text of this thesis the definitions here quoted have been kept in mind.

Plan for presenting the findings. It is proposed to present the findings which were secured by means of a series of questionnaires by employing the use of tables and by giving a descriptive account of facts as they are reported. The interpretations represent only the questionnaires returned and signed by the respondent. General statements shall be included by the writer to represent some typical situations.

Methods used in obtaining objectivity. The method used in the questionnaire for the purpose of increasing its objectivity and the percentage of returns are as follows:

1. The writer's assurance that all information would be treated as confidential.
2. Assurance that a summary of the findings would be sent to all respondents.
3. Follow-up correspondence.
4. Brevity of the questionnaire forms.

The high percentage of returns of the questionnaire is indicative of the splendid cooperation of the majority of the industrial arts teachers in the public schools of Tennessee. The concerted effort advanced by the industrial arts teachers in complying with requests has been most gratifying.

The next step of the study. With the problem and its purpose stated, the philosophical basis of industrial arts showing how the philosophy of industrial arts is founded on the principles of general education is presented in Chapter II. The need and justification for industrial arts philosophy will be specifically revealed. Presented also in Chapter II will be the philosophy of industrial arts as based upon objectives sought.

CHAPTER II

HISTORICAL BACKGROUND OF INDUSTRIAL ARTS

To think of industrial education as something recent is a mistake. In unorganized form it is practically as old as the human race; it has an ancestry of at least five thousand years. In the early days the industrial problem was securing food and shelter for the home; the father or mother or some member of the tribe was the instructor and the method employed was usually that of demonstration and practice on the job. From this unorganized plan came the apprenticeship training, with a better purpose for organization. The craft guilds established apprenticeship education during the dark ages when other forms of education were almost non-existent.

Little is known about apprenticeship in the days of the Roman Empire, but some writers contend that apprenticeship was in practice at that time. It is agreed that Greece and Rome were predecessors but not the parents of medieval apprenticeship.

Part A

Early History of Industrial Education

Without question it can be said that much of the great progress of industrial arts can be traced back to the influence of the guilds; to the systematic apprenticeship education begun by them and to the ideals of quality in workmanship, pride in craftsmanship, and respect for work well done, that was grounded into those that came under their influence.

Influence of the guilds. Guild life brought a gradual evolution from serfdom to freedom, from labor to owner, and from worker to craftsman. The guilds had risen in response to social and economic need for the protection of workers against neighbors and feudal lords who were little more than robbers. The guilds promoted quality in work, because the masters were compelled to teach the whole trade to the apprentice. The guilds rendered important service to their members in that they provided the only education that was available during a time when learning in its various forms was at a low ebb.

By the middle of the fourteenth century, the idea of genuine apprenticeship was well established. Gradually, however, the guilds began to lose their hold upon the worker because of the irksome restrictions that specified in detail just what the member could make. Other reasons for the decline were rivalry of trade rights, loss of close relationship between master and the apprentice, and specialization in the work. A severe blow came to the guild existence in England with the passing of the Statute of Artificers in 1563. This measure attempted to regulate apprenticeship on a national basis rather than leave either wage or working condition to the guild.

Early American apprenticeship. The colonies in America furnished opportunity for the poor and oppressed to leave Europe. Not having money to pay their passage to America, these people voluntarily sold themselves into slavery for a period of time. Most of the people migrating to the colonies were poor and unskilled, coming to America because of their inability to find work in Europe. This condition naturally caused a scarcity of skilled labor in the colonies, thereby retarding industrial growth.

Apprenticeship passed away, and the factory method of production was developed; thus the new apprenticeship had its beginning.

In 1820, Joseph Neef and William Maclure organized what was known as the manual labor movement in the United States. This plan was to introduce manual instruction into the school on the basis that pupils would work under school auspices, for about half the day, and would receive academic instruction during a part of the remaining time. However, public sentiment was against this plan, and it did not develop very far.

Industrial education in the nineteenth century. During the period from 1820 to 1860, there existed among the leaders a changing sentiment to introduce instruction of some type that was not entirely bookish. The Mechanic Institute Movement of 1820 marked the beginning of considerable instruction in secondary and technical educational subjects. The most famous of these institutes were the Worcester County Free Institute, the Franklin Institute of Philadelphia, the General Society of Mechanics and Tradesmen in New York City, and the Ohio Mechanics Institute in Cincinnati. Other institutions of this kind were founded, especially after the passing of the Land Grant Act of 1862, providing for the endowment of higher education in agricultural and mechanical arts.

Mays (25, page 190) relates that it was soon after the close of the Civil War that people of the United States began to find themselves faced with many of the characteristics of industrial problems. The nation had been completely preoccupied with the political and social problems of a new country and had neglected the industrial problem to the extent that the only way of insuring adequate supply of skilled mechanics was securing the immigrant from Europe. There was a strong and growing feeling of

discontent with the type of education emphasized by the traditional school.

According to Vaughn and Mays, the complaint was:

> "The traditional schools were institutions of aristocracy, and the demand became insistent that something be done to bring reality and vitality into the schools, and give them an appeal that would reach 'all the children of the people'." (Vaughn and Mays 40, page 29)

Soon educators were discussing ways of making education more democratic. Out of such discussion, the demand arose for industrial education in the school curriculum. It was argued that a boy's head was educated at the expense of his hands and that the whole boy should be sent to school. This agitation was slowly but steadily increasing in influence during the decade following 1870.

The manual training movement. In 1868, Calvin Milton Woodward, a man rich in experience with boys in the preparatory school, while teaching a class in applied mechanics in the Washington University, made an important discovery. Because his students found difficulty in visualizing some objects under study, he arranged for the carpenter of the school to assist the boys in working out these objects in wood. To Woodward's surprise, he learned that his pupils did not know even the simplest forms of tool manipulation; therefore, he immediately proceeded to teach his pupils how to use tools. Thus, he began to teach shopwork, which had no direct or immediate trade or industrial motive, though that appeared soon after.

John D. Runkle, president of Massachusetts Institute of Technology, had become aware of a problem similar to the one that had confronted Woodward. His observation was that the few students who entered college

with a knowledge of shopwork, immediately secured positions; while those who had no shop experience, found it difficult to enter professional work without taking one or two years of apprenticeship.

From what has been said in the foregoing paragraphs about changing ideas of various schools involving shopwork instruction, it is clearly evident that the thinking of several American leaders in technical education was well prepared to witness the Russian Exhibit at the Centennial Exposition at Philadelphia in 1876. The exhibit showed the typical exercises used as a basis for school instruction in both wood and iron, devised by Della Vos. Both Runkle and Woodward, who were educational leaders, were deeply impressed by the exhibit and were able to see great possibilities in the Russian system for their respective schools.

It is evident that Woodward had tremendous opposition since money was raised from private sources to purchase the grounds, building, and equipment for the first manual training school in America. The school, known as the St. Louis Manual Training School, was of secondary level, and was used as a preparatory school for Washington University.

This radical break with tradition gave rise to vigorous and sometimes heated controversies. But the state of public mind was such as to welcome the new kind of school program.

> "On March 3, 1884, the first manual training high school to be supported at public expense as a part of public education, was opened in the city of Baltimore. The school was modeled after Woodward's school in St. Louis, and Richard M. Grady was the first principal. . . The Philadelphia Manual Training School was the second high school to be supported at public expense. This school was opened in September 1885, with William L. Sayre as principal. . . In the ten years, from 1883 to 1893, manual training was introduced to fifty cities in the United States, and by 1900, the number had more than doubled. (Bennett 6, page 107)

The antecedents of manual training. Manual training as a part of public education grew very rapidly. The philosophy and underlying thought date back to Pestalozzi, Froebel, and Rousseau. According to Mays:

> "Comenius, Pestalozzi, and Froebel were the three men most instrumental in starting the movement toward the modern conception of education. Comenius advanced the idea that words should convey meaning. Pestalozzi, going a step farther, based his instruction upon the object method and insisted that the mind be supplied with ideas through sense perception, through the observation and handling of objects themselves. Froebel took the next step in the progress from the formal and meaningless study of Latin and Greek grammars to the modern notion of self activity. He undertook to provide opportunity for play, music, nature, and various forms of handiwork." (Vaughn and Mays 40, page 38)

Charles A. Bennett refers to Pestalozzi as "the father of manual training." The immediate impulses stimulating manual training in the United States came from Russia, where Della Vos had developed a series of manual exercises in a technical school at Moscow, and from Sweden where Otto Salomon had developed teaching techniques known as the sloyd system, consisting of one hundred projects to be made in order to master the desired information.

In the year 1830, there was established in the city of Moscow a school of trades and industries. This school soon became known as the Imperial Technical School, and was raised to the ranks of the leading polytechnic schools of Europe by an imperial decree of June 1, 1868. The purpose of the school was to train chemists, draftsmen, foremen, and mechanical engineers. The theory of the Russian system was expressed in the slogan "Instruction before construction". The school made contracts for actual work from private individuals, and paid workmen were employed in the school to help the pupils carry on the construction work. It is interesting to note that the Russian system did not consider the imitative

or apprenticeship method, then in vogue, satisfactory. Victor Della Vos worked out a new system of organization, and formulated the first means of analysis and workmanship instruction in the field of mechanic arts.

The educational sloyd. This system, in the countries of Finland, Norway, Sweden, and Denmark, grew out of a practice of the people, who were forced, because of climatic conditions, to spend many hours within the four walls of their own cottages. In early times, it became the custom for the family to sit around the fire in the evening and make useful articles that could be used in the home and on the farm. As time passed the rural people were able to sell some of the products of the home work, known as home sloyd. The finding of a market transformed the home sloyd into domestic industries. Later the introduction of machinery eliminated this system of domestic trade, and replaced the family circle group. Consequently, a new winter trade, the making of brandy, was begun but the public health suffered from excessive drink as well as from the lowering of standards of both skill and character. Seeing their social and industrial conditions, the leaders in national policy sought to make correction by bringing back the sloyd, by establishing schools in which the sloyd was taught. Two men important in the history of sloyd, were Cygnaeus, who established a normal school at Jyvakyla, and Otto Salomon, who was instrumental in developing what he called "Educational Sloyd".

Both Salomon and Della Vos had somewhat the same objectives, and used much the same materials and tools. Both systems had their shortcomings. Struck made the following statement concerning the system:

> "They were too formal for our purpose. The emphasis was too much upon the manipulative skill rather than the socialized activity. It was a system through which appreciations, attitudes, and much general knowledge was to be taught as well as one for the development of skill." (Struck 39, page 33)

There was one distinct difference, in that the Russian system was based upon a series of exercises, and the Swedish system was based upon one hundred objects or projects, each complete in itself. The projects were made to serve a real purpose in the home life of the family.

Introduction of the Swedish sloyd into the United States. Since the introduction of Swedish sloyd has added such a tremendous impetus to the manual training movement in the elementary school of the United States, it would be logical at this time to give a brief history of its introduction into this country and the period of experimentation preceding. It has been pointed out before that manual training had a hard and bitter struggle in gaining public recognition. The first sloyd experiment was started in Boston in 1871, and was opened in the chapel of the Hollis Street Church, in charge of Frank Rowell. Under the laws of the state, all industrial school work was to be supported by a special appropriation, and was not to interfere in any way with the attendance at the public schools. The chief value of instruction given was to train for the better use of leisure time, rather than skill. There was a great deal of interest manifested by the public, and many philanthropists financed other movements of this type.

Other experiments with sloyd. The next variation from the first experiment came from the North Bennett Street Industrial School in Boston. Teachers in this school invited all near-by schools to send pupils to their school for sloyd instruction. This experiment proved successful, for within two years the public schools were sending six hundred and fourteen pupils a week to the Bennett School where they received instruction in carpentry, printing, shoe work, clay modeling,

sewing, and cooking. It is interesting to know that the North Bennett Street School grew out of what was known as the Bennett Street Industrial Home, a charitable institution established by a group of philanthropists led by Mrs. Quincy A. Shaw and Mrs. Augustus Hemingway. These women reasoned that the best way to render permanent aid to the poor was to give their children practical instruction. Their motive for manual training instruction was mainly for practical and social values.

New York City labored under similar conditions as those with which Boston was confronted. At first the teaching of manual training in the elementary grade was one of experimentation, led by Emily Huntington and Grace Dodge. Emily Huntington conceived the idea while watching kindergarten children playing with blocks and singing their songs of labor. She began immediately to experiment by fitting rooms with child size furniture and writing songs that delighted the children and their parents; thus housework became play. Grace Dodge added momentum to this movement by publicizing the program in every possible way and by endeavoring to enlist others in the work. In 1880, the Kitchen Garden Association was organized to standardize and promote the instruction. On March 21, 1884, the "Industrial Education Association" was organized because Miss Dodge and her associates saw a need for a broader work, offering richer experiences in industrial training. Through the efforts of the Industrial Education Association, manual training became well established in the New York Public Schools as well as in other important cities of the United States.

Professor John Ordway, president of Massachusetts Institute of Technology, persuaded Lars Erikson of Sweden to come to America to teach the Swedish sloyd. In 1884, Erikson began his work in Anoka, Minnesota,

in the basement of the Augstana Lutheran Church. He next taught in Minneapolis, then later in the North Bennett Street Industrial School. Erikson was never a great success, partly because he had failed to receive enough technical training, and also due to his inability to speak the English language. Gustaf Larsson is said to be the true ambassador of the Swedish sloyd to America. He began his work in a private school in Boston in the summer of 1888. He was fortunate in winning the financial support of Mrs. Quincy Shaw who was renowned for her philanthropic gifts. Larsson, with his original plan of Swedish sloyd, declared that the principles of pedagogy in Boston were unsound, consequently, arousing a great deal of discussion and sometimes opposition. Larsson had a tremendous and extended influence throughout the elementary schools in the United States. His course was rather fixed and rigid at first, but later it became Americanized, gradually becoming more flexible and utilitarian.

Change in emphasis upon manual training. Although both the Russian and Swedish systems were later proven impractical, it should be remembered that they played an important part in the development of industrial education courses in America. Of these systems, Warner states:

> "For a decade or so, approximately 1886-1900, in Boston, the two types of work were developed side by side. The outstanding work was done by Frank M. Leavitt (mainly Russian manual work at first), Gustaf Larsson (mainly sloyd), and B. F. Eddy (who used a modification of the two)." (Snedden and Warner 33, page 1)

In the latter days of the nineteenth century, manual training was gaining a secure place in the public school curriculum.

> "Educators became concerned with the whole child. The training of the mind would not adequately meet the need of the child; the muscles must also be trained. The educators thought that general industrial education was needed rather

> than training in some specific trade; however, it was found that general industrial education was not efficient trade training, and the words "manual training" became obsolete." (Struck 39, page 33)

At the close of the nineteenth century, a gradual change was taking place in the emphasis upon manual training and in the point of view held toward it. This was partly due to the teachings of John Dewey, who expressed a new philosophy of education, the education of the "whole man".

Approximately then, from 1900 until the first World War, the manual training movement with its resulting emphasis predominated over the sloyd and Russian systems, and it was not until the Bonser-Russell plan that further change was affected. Snedden and Warner quoting Dr. Russell say:

> "It is an assured fact that our boys and girls do not enter industrial life with the same confidence that they exhibit in other fields for which academic training has fitted them. . . I would have the school help him define the aim of his life in terms of his now natural endowment and possible attainment. The child has a right to this kind of guidance; the school must give it, and what the school gives must be determined by sympathetic instruction along the lines leading to the goal." (Snedden and Warner 33, page 6)

It should be readily seen that Dean Russell was laying the foundation for the present study of industrial arts. As a result of his influence, a new type shop, known as the general shop, was created. This type introduced such activities as printing, sheet metal work, woodwork, wood finishing, electrical work, foundry, forging, general metal work, elements of machine shop, beginning of automobile mechanics, drawing, and other types of shopwork.

Briefly, manual training found its way into the United States as a result of the exhibit of the work of the Russian schools at the Philadelphia Exposition of 1876. Dr. Calvin Woodward and John D. Runkle

were chiefly responsible for the early development of shop courses in American schools. American ideas of education were undergoing a change at that time, and the schools were ready for the new manual training movement. The stages of development through which American manual training passed were the Russian stage, the sloyd stage, the Arts and Crafts stage, and the industrial stage.

Part B

Trends in Industrial Arts Since 1917

In 1917 Congress passed the Smith-Hughes Vocational Education Act and as a result America began a nation-wide program of vocational education. Trade and industrial, agricultural, and home-making education were now subsidized by federal funds. In the years just following the passage of this law, much confusion and clashes of opinion occurred between industrial arts and vocational education. This was brought about by the difficulty of determining just where the one began and the other ended since both were involved in the same subject matter field of an industrial nature with its tools, processes, and materials.

Relationship between industrial arts and vocational education. It was obvious that a relationship between these two conflicting fields must be worked out in a harmonious manner. It was feared that the predominance of one would hamper the progress of the other. Mays theorizing on the relationship states:

> "During the period of propaganda preceding the enactment in 1917 of the Federal Vocational Education Law, there developed a tendency among some of those advocating the new legislation to disparage all the high school industrial arts courses. As a result of such propaganda, many high school teachers of industrial arts became discouraged and many superintendents of schools seriously considered dropping this valuable phase of

> public school work. In the long run, however, this attitude of some of the advocates of specific vocational industrial training proved to be of real benefit in the development of industrial arts in the high school. Both teachers and administrators were led to re-examine the purposes, content, and effects of the subject and were better able than ever before to define its place in the scheme of public education. They were able to agree with the proponents of specific vocational education in the sense that it definitely trains boys to enter specific trades. They were able to show school patrons that this work in the schools had never claimed such results and in the nature of the case could not become trade training." (Mays 25, page 201-202)

By the 1930's the clarification of the objectives of each reduced this confusion and the result was two equally important phases of industrial education. In addition to discussing briefly the objectives of each, Melvin S. Lewis gave the relationship between industrial arts and vocational education during this period as follows:

> "The two kinds of work differ in their objectives. The purpose of vocational industrial training is to fit for useful employment in a specific trade or industrial occupation. Briefly stated, the generally accepted purposes of industrial arts are apt to emphasize the contributions of the work to general education, stressing such points as that of aiding young people more intelligently to understand modern industry, providing exploratory experiences of value in guidance, and serving as preparatory courses for entrance to engineering and other technical schools. Notwithstanding these objectives, both types of work find their subject-matter in the same place, the industrial life of the country; many of the methods common to one are also used in the other field; equipment and supplies are largely similar in both fields; and in many school systems the same official exercises supervision over both departments. The existence, therefore, of close relationships between the two kinds of work is not surprising; on the contrary, there would be occasion for surprise if industrial arts and vocational trade training were wholly unrelated in school practice." (Lewis 20, page 483)

It must be kept in mind that vocational education means preparation for an immediate wage earning occupation, and any motive of this nature that is present among students in the early years of high school is apt to be rather vague. It must also be kept in mind that industrial arts

is non-vocational in its objectives, however, industrial arts may aid in selecting an occupation.

The laboratory of industries. The idea for the name "laboratory of industry" probably came from Bonser and has been developed by Warner of Ohio State University. The physical equipment is selected and designed to take care of a large class. However, there must be a plan of organization in order to obtain the educational results desired. The teacher delegates authority to a large per cent of his class who act in the capacity of superintendent, foreman, clerks, toolroom and stockroom attendents, and the like, while the teacher acts in the capacity of advisor. There is a wide range of industries represented including woodwork, metal work, electrical, automotive, ceramics, printing, photography, drawing, and others. According to some authorities, the laboratory of industries is a center about which the study of industry revolves, because the whole situation is represented in modern industry.

The general shop. The general shop idea was first established in 1925, however, it was not until the early 1930's that the plan enjoyed popularity among school administrators. It was in this period when it became widely accepted in all parts of the nation.

The definition of general shop which Louis V. Newkirk and George D. Stoddard had formulated in the previous decade still remained true. They had defined it as,

> "A broad group of educative industrial arts activities embracing technics of shop organization and teaching methods which enables a community, whether large or small, to present a unified core of content based on life needs as summarized in these aims: Developmental experience interpretative of the major phases of the world's industrial work, "handy-man activities", consumer's knowledge and appreciation; guidance,

> hobbies, social habits, and (for a very small percent) vocational preparation." (Newkirk and Stoddard 27, page 11)

In its development very few schools were following the same combination of activities. In some schools, the activities were very much unrelated; for instance, woodworking, printing, electricity and metal work in the same general shop. In some general shops the activities were more related, such as general metal work shop with the following activities: Sheet metal, automobile mechanics, machine shop, foundry and forge work.

As industrial arts during the 1930's was becoming an integral part of the junior high school curriculum, it was necessary for industrial arts to broaden the range of its activities to fit the needs and interests of the boys of the junior high school age. As it was practically impossible to provide unit shops for each of the activities of industrial arts, the general shop plan was the only feasible plan. School systems, such as Detroit, were discontinuing at this time the unit courses in the junior high schools and were replacing them with general shop courses.

> "It seems to be the consensus of opinion of those leaders who are best acquainted with the problems and objectives of the junior high school that shop courses should be of a general nature.
>
> "The subject-matter content of industrial arts courses has undergone more radical changes in organization than in actual ingredient. There is a demand for general rather than narrow courses. Those who have given careful thought to the problems involved in offering general courses readily admit that a course can be so general that nothing definite is accomplished. On the other hand, some of the unit courses of the past were so highly specialized that the pupil could find no application for the things learned unless he happened to become attached to the particular trade or industry represented by the unit course in which he had received his training.
>
> "As previously explained, general-shop courses have come into being in response to a new philosophy in education. The

> new shop courses are of such a nature that they require general shops in which to teach them. It is logical, therefore, to assume that a course of study in the industrial arts would be a growing thing, and as the scope of the course became broader, the facilities must be adapted to the newer and changed needs." (Bedell 5, page 205)

A review of the entire movement indicates that the general shop plan has grown because it fills the need for enriching general education by interpreting modern industry with its important social and economic relations as ably expressed by Dewey, Russell, Richards, and others. Further, by offering excellent opportunities for guidance through exploration, it has become intimately associated with the growth of the junior high school. Another idea indicates the general shop is in line with a change in emphasis from the traditional curriculum centered school to one focused on pupil needs.

Promotion of leisure activities. Prolonged periods of unemployment and increasing amounts of leisure during the 1930's called for new programs for the development of leisure or free-time activities and interests. At this time it was realized that in the modern industrial age the average individual would have much time for leisure. To provide something worthwhile with which to spend their leisure, students in industrial arts were receiving experiences which would encourage the development of some form of avocational interest.

Emerson W. Manzer stressed leisure activities in the following statement:

> "The present time seems to afford an ideal opportunity for instructors of the industrial arts to show that their subjects are of vital importance in modern education and are a basis for the training of leisure-time activity." (Manzer 22, page 374)

The industrial arts department was found to be one of the best places in which to start the interest in a wholesome hobby. In the many activities of a school shop, there were found the means of directing the student to some hobby which would interest him. Such hobbies, as handicrafts and model-making, are encouraged. Clubs, such as photography and model airplane, were established and the student had many different clubs from which to choose. The Home Workshop Idea was spreading throughout the country during these days. This was something which appealed to the industrial arts instructors and they did much to encourage boys to buy tools and establish workshops of their own where they could spend their free time and make all those things which they desired.

During this period the Boy Scout Movement continued to enjoy its wide popularity with boys and here in the industrial arts shops of the nation were the facilities to enrich the activities of the Boy Scouts. Many boys were earning many of their merit badges through participation in shop courses.

Position of industrial arts in receiving the same credit as the other subjects in the curriculum. Before 1930, only in rare instances did industrial arts receive the same credit toward graduation or for college entrance as did the academic subjects. This was based on the assumption that industrial arts did not possess sufficient "subject-content" and also little or no outside assignment of work; but in this period industrial arts was proving that it had a valuable content or informational side in addition to its known manipulative activity. As a result, efforts were being made to give it the same credit as academic subjects.

By 1933, both New York and Illinois, in describing the industrial arts courses that were to receive credit, insisted on an adequate informational content but liberally interpreted the problem of outside prepared work. Bawden, a distinguished leader in industrial arts, states:

> "In addition to the leadership of state and city supervisors and the influence of the teacher-training institutions, high-school principals have given a decided stimulus to this development by their efforts to organize the instruction periods of all school subjects on the same basis. This move has been primarily to simplify the making of schedules, while struggling with the problem of increased enrollments; nevertheless, it has focussed attention on the demand for adjustment of teaching methods in shopwork and drawing (and in home economics, fine arts, and the science, as well) so that the pupil may earn the same credit toward graduation as in a one-hour period of any one of the so-called academic subjects. To meet this demand while maintaining reasonable academic standards, requires the shop teacher to put more 'content' into his work and to develop a program of assignment of 'outside' work." (3, page 9)

Under William E. Warner, a study was made in 1936 of the status of industrial arts in various sections of the country with reference to the number of units of high school industrial arts credits accepted for college entrance. It was found that it varied considerably from state to state with some institutions, as in New England, allowing no entrance credits, while others, such as Ohio State University, allowing six credits for the elective subjects under which industrial arts could be included.

Industrial arts in the national emergency and war period. Many demands were made upon industrial arts during this period, especially since industry of the nation played so great a part in the winning of the war on two fronts. In addition to maintaining its regular school program of developing the skills and knowledge of the students and providing them with the proper understanding of modern industry, it was called upon for direct contributions to the war effort.

The following are some of the main contributions of the industrial arts program to the war effort. During the early years of the war, the Bureau of Aeronautics of the U. S. Navy in cooperation with the U. S. Office of Education asked and received the cooperation of the school shops in building model airplanes, exactly in detail for use in identification courses. The American Red Cross also called upon the school shops to make thousands of articles both for the comfort and for the recreation of members of the armed services and also for domestic needs. The War Department through the U. S. Office of Education sought and received the assistance of the school shops in presenting preinduction courses to the boys of high school levels which would provide a suitable technical background for the many varied jobs of the armed services. As it was difficult to replace articles around the home that were no longer serviceable, a great number of industrial arts teachers gave in their shops experiences to the students in the repair and maintenance of the equipment in the home in order to insure its serviceability during the war years.

The following are examples of what the industrial arts departments of certain cities did for the war effort:

> "In addition to presenting fundamental industrial arts instruction, the teachers and pupils of the industrial arts departments have been able to make many definite contributions to the war effort. They have made 12,000 games for Yanks, built 20,000 scale model airplanes for the Navy, Army and civilian defense, designed and built 30,000 items for the Red Cross; given courses in handicrafts to the Gray Ladies of Red Cross so that they may work with convalescent soldiers in the hospitals of the Chicago area." (Newkirk 26, page 89-91)

In the Minneapolis schools the following activities were reported:

> "There are nearly 200 especially equipped laboratories for industrial arts in the secondary schools where instruction in 26 areas is given daily to 9,000 boys and girls.

"The preinduction shop work manual furnished by the U. S. Office of Education enumerated desired experiences in several areas, such as woodworking, metalworking, electric wiring and ropework; and it suggested a single course of instruction to include these experiences. It was decided that with our facilities we would break the single course into several courses and to offer their three levels of difficulty as suggested in the manual.

"The senior high school girls who plan to enter industry after leaving school were encouraged to enroll in shop classes where such groups may be accomodated." (Lush 21, page 92-96)

R. H. Roberts reported that the Tulsa schools made the following direct contributions to the war effort:

"The Junior Red Cross organization has asked the schools for their assistance and our schools are responding generously. Tulsa metal work, woodwork, and electrical shops will produce approximately 3,000 items for the Junior Red Cross this year.

"Last year all of the woodworking shops in Tulsa, as did most of those in the state, participated in the making of the model airplanes which the United States Navy requested from the school shops all over America.

"The students of these shops also made a large number of supply kits, splints, stretchers, and other supplies for the Junior Red Cross organizations.

"They also made a large quanity of police clubs to be used by volunteers in our Civilian Defense organizations." (31, page 101-104)

During the war period, the greatest problem which confronted industrial arts was the teacher shortage. Many of the industrial arts teachers enlisted or were drafted into the armed services or gave up teaching to take more lucrative jobs in industry. For many schools it was practically impossible to obtain a replacement. Quite often, to keep the department operating, it was necessary to appoint men who lacked the proper training or who did not meet the certification standards of the state.

Harold J. Bowers summarized the teacher shortage by stating:

"That a serious shortage of industrial arts teachers exists is evidenced by the fact that during the current school year

> (1942-43) over six hundred industrial arts departments have been closed in the schools of the United States because there are no qualified teachers available. In over eight hundred other schools the industrial arts teaching is being done by undertrained certificated teachers. That this situation will be much more acute by September, 1943, is everywhere agreed." (9, page 242-243)

Supplies and materials for use in the school shops were difficult or impossible to secure as a result of the priority ratings. This forced the teachers to exercise much ingenuity in keeping their shops operating.

Authoritative writings in the 1940's. During this period the bulletin of the American Vocational Association entitled Standards of Attainment in Industrial Arts Teaching was being revised by a new committee of the Industrial Arts Section, composed of Homer J. Smith, Chairman; William T. Bawden; Clyde A. Bowman; Emanuel E. Ericson; John F. Friese; Verne C. Frydlund; Arthur B. Mays; Frank C. Moore; Maris M. Proffitt; and George F. Weber. The earlier bulletin had greatly influenced the progress of industrial arts in the public schools during the 1930's because of its wide acceptance by teachers and administrators. Now it was found that some of its materials were no longer pertinent, that new materials had become available for making it more complete, and that there were many helpful suggestions of those teaching for its further improvement. The new bulletin sought to incorporate these changes and bring it up-to-date. The result was the bulletin Improving Instruction in Industrial Arts, published in 1946.

Lists of learning units for each subject of industrial arts (the analysis of the subject into "Things Pupils Should Learn to Do" and "Things Pupils Should Know") continued to make up the major section of the revised bulletin. The committee did not enumerate worthwhile

attitudes and habits developed in the pupils by names of each subject but stressed the responsibility of teachers in accepting them and planning their inclusion into each industrial arts subject. Eighteen subjects of the most common subject-matter or fields were considered in these learning units. Other subjects such as ropework, textiles, pottery, and junior aviation were mentioned but no learning units were devised for these.

The lists of objectives for the teacher and the suggestions for obtaining them were revised and restated. The number of objectives, enumerated, was nine instead of twelve of the previous bulletin. This was, perhaps, the result of the new philosophy which demands fewer and more achieveable objectives. It was shortened by a restatement and combination of some of the twelve objectives and by the elimination of two: (8) to develop in each pupil the habit of careful, thoughtful work without loitering or wasting time, and (10) to develop in each pupil a thoughtful attitude in the matter of making things easy and pleasant for others. A new and important objective was incorporated into the list: (5) to develop in each pupil desirable attitude and practices with respect to health and safety.

The last section of the bulletin followed the form of the earlier bulletin by giving the organization to attain the stated objectives, analyses of beginning course materials, sample lesson plans, and bulletin board charts. There is no doubt that this bulletin will have the same success as the earlier one and will thus continue the great influence of that publication over industrial arts.

Greater emphasis on skills and technical knowledge in the 1940's. Industry during the war was constantly calling for men and women in a

desperate effort to keep the "wheels of production" running at tremendous speed in order to hasten the War's end. Throughout this period much consideration on the part of those training workers was given to the task of imparting those skills and knowledges necessary for a given industrial task. This brought about a change in the teaching in many industrial arts shops. During this time instructors of industrial arts were urged to provide much manipulative practice in basic skills for their students and to see that these skills were developed to the point of doing a job in the correct manner.

In the Tulsa, Oklahoma, public schools, R. H. Roberts summarized in 1944 what was being done there by stating:

> "In many of our classes, more emphasis has been placed on the development of skill. Specialization has been encouraged, and considerable technical information has been given. Some shops have narrowed their work down to fewer units so that they would have time for more thorough coverage of what they felt were the more important ones in the development of the fundamental skills and in acquiring the most important related information in the field. These shops are also limiting the tools and machines which the student uses, and are stressing the development of more skill in their use. They are stressing the training of machine operators rather than the all-around worker.
>
> "All this has of course been done as a result of the war effort. This does not mean that industrial arts is attempting to take the place of vocational education. The limitation of time, equipment, and of general working conditions make it impossible to give comprehensive training in a skilled trade. Instructors in this work have felt that a large percentage of these young people would enter industry at the earliest possible moment after completing their school work. For that reason, they were anxious to give them as much specific training as possible before they left school. This new emphasis on the developing of basic skills to such a high degree should be considered temporary in the industrial arts field. This should again be replaced by a broader type of work and should aim at giving more informational material and more opportunity for exploration after the war emergency is over." (32, page 141)

In participating in the model airplane construction program for the Navy Department and also in making many varied articles for the Red Cross and other organizations, skill in the basic processes was demanded on the part of the students in order that the finished models and articles would be of use and value. The students, themselves, realized that this was necessary so they increased their efforts to do worthwhile work.

Noted industrial arts writers, such as Arthur B. Mays, were calling attention to the necessity of greater emphasis on skill not just for the immediate period, but for the future. The following statements of Arthur B. Mays must not lead to the implications of the remarks before quoted, which are concerning skill in a narrow or a specialized sense and not of the type of basic skill in the broad sense of the word.

> "Industrial arts and skill — There must be more emphasis upon skill, both in manual and machine processes, taught. Some extremists in the progressive education movement have discounted the value of skill and much of the educative and prevocational values of industrial arts has thereby been lost. There must be a return to Dr. Woodward's emphasis upon skill and knowledge of tools. A teacher who possesses a high quality of mechanical skill can make the acquirement of skill an attractive aim of his pupils. Few accomplishments give more genuine satisfaction than the conscious possession of manual skill. It easily becomes a factor in self-confidence and self-respect without which the most desirable moral qualities are difficult of realization. Where little or no emphasis is placed upon accurate, skillful performance of tool and machine processes, some of the most important educative values of industrial arts are lost. There are clear indications in the present situation that higher standards of achievement will be required by the new day into which we are moving, and one of the best places in the whole scheme of education to develop high standards of workmanship is the school shop." (23, page 402)

Due to the fact that industry demands and receives skill and accuracy in highly specialized mass production, it is quite logical for education to keep abreast with modern industry. This can fittingly be done in industrial arts courses and at the same time meet the accepted objectives.

Industrial arts should be geared to fit the needs of the students which it serves. If properly administered, a good industrial arts program will contribute its full share to the total education of the child for modern and efficient living. Courses should be organized as integral parts of general education on a functional basis and flexible enough to meet individual needs and differences.

Chapter III

PHILOSOPHICAL BASIS OF INDUSTRIAL ARTS

The writings of noted educational philosophers have been searched for statements justifying the inclusion of industrial arts in the general education of youth. John Dewey, Boyd H. Bode, L. P. Jacks, and W. H. Kilpatrick in their writings gave an implied support of industrial arts. Particularly the writings of John Dewey, by stressing the fact that people learn through doing or through purposive activity, have given philosophical arguments for the inclusion of industrial arts in general education.

Part A

Philosophical Views of Industrial Arts

In the philosophy of industrial arts, much attention has been given to the teaching of psychologists on the subject of individual differences; for it was recognized that industrial arts was a subject that surpassed most other school subjects in the recognition of individual differences among pupils and in the practical application of definite methods to meet this problem. In shop-work experiences, there is an evident difference in the quanity and quality of performance in jobs or projects. In academic subjects it was often difficult for a student to accept the "bookish" student as his superior. Much encouragement was given to the principle of individual advancement through the various activities of the school shop. Projects were also

adapted to the abilities of the student. Quite often there were several different levels of projects. This would meet the individual differences of the students.

Philosophical views of recognized leaders in industrial arts. In a discussion of the place and importance of industrial arts in general education, and as preparation for vocational education, Friese states four principles of philosophy which should be kept in mind.

> "1. A philosophy of industrial arts should be based on the individuals served, their needs, interests, capacities, aptitudes, and abilities.
>
> "2. A philosophy of industrial arts embraces subject matter, personal management, methods, psychology, equipment, supplies, and products.
>
> "3. A philosophy of industrial arts must be in harmony with the accepted philosophy and principles of all education of which it is an integral part, insofar as these approach the truth. To be a part of the American system of education, industrial arts must stand upon the demonstrated immediate values of its particular contribution, and also upon the great and final values, some of which may be quite intangible and deferred.
>
> "4. Learning and developmental experiences in industrial arts, through types of experiences not otherwise available, are essential in the complete social education of every boy in a dominantly industrial democracy." (11, page 1)

There is much attention given by the leaders of general education to the place and the contributions of such subjects as industrial arts to the education of the whole man. It seemed that this subject had reached the stage in its development that general education had to realize the merits of its contents in the education of the youth.

Philosophical views during the 1930's. During the 1930's a new emphasis was placed on the informational content of industrial arts.

Efforts were made by the leaders of industrial arts to make the teacher realize the valuable informational content of this subject. Bawden, has this to say concerning the informational content:

> "One of the tendencies which must be included in any survey of recent progress in industrial arts is a new emphasis on the information or content side. With the more general acceptance of the educational philosophy which is responsible for the junior high school, has come a new vision of the place and purpose of industrial arts. Manipulative activities and skills are not neglected; but instead of being set up as end in themselves, they are more and more looked upon as the means through which certain desirable educational ends are to be achieved. Thus, in addition to skills, the accepted objectives of industrial arts instruction emphasize interest in avocational and leisure-time activities; knowledge about industrial products, processes and occupational opportunities; creative expression and problem solving; and to a somewhat lesser degree, perhaps a bringing to consciousness of individual inclinations, interests, and abilities.
>
> "If the broader objectives are to be realized, there must be a readjustment of the school-shop program, as we knew it a few years ago. Instead of claiming, or hoping, that these values are attained as by-products of instruction consisting chiefly of manipulative shop-work experience, the teacher is now expected to adopt measures, methods, and devices which are specifically designed to attain these ends. The emphasis now is on the learning of something, through the making of something." (4, page 8)

It can be seen that the philosophy of industrial arts was not centered on the acquisition of mere manipulative skill but on the larger field of knowledge of industry, the information side, and also the development of worthy habits in the students of shop work.

Much of the philosophy of the last twenty years has centered on three points. The first was the provision of exploratory contacts with many different phases of industry; the second, closely associated with the first was the "try-out" of students in which, through making

a variety of interesting projects, they would be helped to discover their own interests, aptitudes and abilities; and the third is the correlation of the activities of the school shop with the pupil's life, both in and out of school. The exploratory function of the industrial arts program was deemed very important as it came at that age when the students had become very much aware of the world and its activities. Through the media of many different activities, such contact with wood, metals, electricity, printing, etc., which formed a great part of the work of the world, the student through doing secured a knowledge of the industrial world. While engaged in this exploration, the pupil could realize his interests, aptitudes and abilities in the use of manipulative skills and toward certain occupational lines. Vocational guidance was receiving considerable attention during these days; for efforts were being made to help the student in his decision concerning his future life-work. As industrial arts, aswell as other practical arts, came to the student first hand, and not the second hand written experience of others, attention was given to the correlation of the school shop with the pupil's life both in school and out of school. The knowledge that he had learned in the academic subjects could be applied to his shop classes; for instance, the student in machine shop practice had many opportunities in using decimal fractions in real-life situations. The industrial arts courses also considered the activities of students out of school by providing them with hobby and avocational interests and through experiences to do many kinds of home mechanics, such as wood finishing and repair of faulty plumbing.

At one time in the history of education, the "Three R's" sufficed, but now the age of industry prevails. The public schools must provide for all types of capacities in all their individual variation. There is a need for school life to include occupational samplings in the curriculum to satisfy the demands of industry. Kilpatrick offers a very worthy statement by saying:

> "These considerations mean a reorganization of school aim and procedure. Curriculum and method must both be put on a dynamic basis instead of the old static basis. Because of the educational decline of family and community, and in accordance with a better insight into the learning process, the school must become a place where life, real experiencing, goes on. Only on this basis can our children learn what they need." (17, page 85)

This statement by Kilpatrick presents briefly an idea that has gained acceptance rapidly of late; namely, that formal schooling should not be a thing apart, detached from other experiences and influences that play upon the child, but that the child's life should be made in some way of a unified whole.

Philosophical views in the 1940's. Much of the philosophical discussion in the past six years sought to make industrial arts portray more and more an adequate picture of industry as it is today. As this was a subject which provided firsthand experiences for its students, this would greatly enhance their understanding of modern industry. Arthur B. Mays called attention to this by saying:

> "Industrial arts is the recognized representative of industry in the school curriculum in the same sense that such subjects as physics, chemistry and biology represents the world of science in the schools. The curriculum of the modern school increasingly reflects all the significant aspects of modern life, and since industry is one of the most ubiquitous and obstrusive features of modern life it must, of necessity, be adequately represented in the school exper-

> iences of children and youth, if those experiences are to enable them to become constructively adjusted to modern life. It is important that the representation shall be an accurate reflection of industry as it exists in the modern world, rather than a reproduction at the school level, of the handicraft form of industry of the eighteenth century. There is some justification for the craft type of industrial work in the elementary school for purely pedagogical reasons, having to do with certain forms of art expression, the release and directing of creative urges, and the training of eye and hand of young children. In addition, the historic significance of earlier human practices certain craft activities in the grades. In the high school, however, which deals with youth who are soon to take their places as consumers and producers in the modern world, modern production procedures and modern industrial materials should predominate in the course content of industrial arts. This concept should guide not only the choice of procedures, materials, and projects, but the class organization also should simulate, as far as practicable, the organization of the personnel as practiced in modern industry." (24, page 279)

The philosophies in late years also stressed the close union of science and industry. Without a remarkable advancement in technology, the industrial world would have but slowly developed. In the industrial arts shops are many applications of the sciencesas taught in the physics and chemistry classes. There were some areas such as the electrical area of industrial arts where it was difficult to determine the separation of physics and industrial arts.

It is the opinion of some authorities that more scientific and technical knowledge must be imparted in connection with the shop instruction. Almost every element in the present industrial situation indicates the necessity for this development. There is every indication that a growing need for technical knowledge, not only for vocational ends, but for the purpose of being intelligent about modern life, will exist in the years ahead.

Jack's concept of philosophy embodies principles more comprehensive and more conclusive than the abstract learning concept advanced by the subject matter specialist of the traditional school. This concept of education could not become fully effective in a school system without a vigorous program of industrial arts. The significant concept in this declaration is the all around growth of the individual, and the growth would be impossible without the cultivation of the three sides of his nature; namely, physical, intellectual, and emotional. (15, page 18)

Industrial arts is indispensable. In the development of the desirable qualities of an individual, industrial arts is vitally important. For illustration consider any project made in the shop; the boy acquires experiences in reading a working drawing; estimating of various materials needed; following an orderly plan of procedure in laying out and cutting out materials to specified dimensions; making proper tool application and manipulative processes; and last but not least, the feeling of satisfaction of worthy achievement. These foregoing experiences afford youth the opportunity for a more complete, coordinated and symmetrical growth.

Boyd H. Bode contributes to the interpretation of educational problems from the standpoint of practical philosophy when he says:

> "Aims spring from the soil of experience and new aims constantly arise as experience develops...Growth in knowledge and experience opens new possibilities in geometric ratio, as shadows lengthen with the approach of sunset... Education is a process of growth; it means a liberation of capacity...Our horizon retreats as we proceed."(7, page 3)

Industrial arts makes important contributions to growth of the

individual by leading out to new fields of inquiry and study. For instance, woodwork may lead to the study of forestry, and observation of the properties of iron and steel in metal shops may develop interest in chemistry in industry. Therefore, in order to provide for complete growth of the individual, the school must give a prominent place to industrial arts experiences in the educational program.

The report of the committee on Social Economic Goals brings to light a very vital and important educational problem. The report made by Chairman Kelly was:

> "The enrichment of personality in terms of aesthetic and emotional and standards is a vital need, and properly a concern of the social order. Society must provide for the proper derivation and utilization of values, standards, and outlooks in the enrichment of life . . . Economic and social goals must be consciously pursued that will foster the recognition of individual differences . . . Traits that are distinctive and unique are not only the sources of one's source of all fruitful social change."(Kelly 16, page 6)

A basis for the function of industrial arts. Industrial arts teachers were among the first to make practical application of the discoveries and teachings of the psychologists on the subject of individual differences. Writers in the early part of the century indicate that it was really the manual arts teachers who, years ago, discovered the "individual pupil," of whom the psychologist made so much.

The process of learning by doing is not a recent thing. In the year of 590 B. C., learning by doing was highly advocated in Greece.

Kilpatrick gives a basis for the foregoing functions of industrial arts:

> "The first outstanding demand arises from increasing failure of the informal part of education. The child of well-to-do parents has little first-hand acquaintance with essential economic processes . . . The home is still lacking in educative influence as an agency, either for inducting the child into industrial activity, or for giving him insight into the basic economic-social processes for building into those cooperative moral-social attitudes and habits that underlie social life." (Kilpatrick 17, page 63)

Industrial arts work contributes directly to the adjustment of the schoolboy to adult life situations by developing his active interest in industry and methods of production. He is not just engaged in a busy-work or make-believe atmosphere, but experiences under school conditions show he has participated in the same experiences as the adult; consequently, the industrial arts shop provides for him the outlets for his natural constructive tendencies.

Teachers, supervisors, and students of industrial arts may well be encouraged by what appears to be a new recognition of the significance of industrial arts as a phase of general education. In a review given by Bawden, this forecast is found:

> "The widespread experiment with the so-called "activity program" in the public schools will sooner or later bring realization that learning by doing has been going on for some time in the industrial arts shop, and in the period devoted to handwork in the elementary school, also that educational handwork properly organized and conducted does something for children that is not accomplished so well, if at all by other subjects." (Bawden 3, page 9)

More and more one should realize that he must build educationally for a new era; that the educational plans built in the past cannot meet the requirements of this changing civilization. A high school curriculum that seemed to meet the requirements at a period when seventy-five per cent of the high school boys and girls were preparing for college does not meet the needs in a period when more than

that number of youths leave at the completion of high school to seek an occupation in life.

From William H. Stone's chapter on "Recent History and Trends" in Industrial Arts in Modern Education, this philosophy and its interpretation is given:

> "Industrial arts education must be seen as an organic, or unified, part of education-in-general. Of course, any area of subject matter, as traditionally treated, may be for particular purposes considered separately. This applies to other subjects of study as well as to industrial arts—English, physics, Latin, mathematics, and so on. Moreover, that has been the way of dealing with educational materials, and, for reasons closely related to history and trends, here under consideration." (Bawden 2, page 126)

One fundamental of this movement has been research, and the gist of research has been analysis. Analysis is indispensable as one phase of research, even educational research; but mostly it is wrong when employed asa basis of the teaching-learning process. The result has been that the scientific method in education has served unintentionally for the most part, yet none the less certainly to carry on the traditionalism of specialized subject matter long favored for culture and mental discipline.

In doing this, it has hindered both "the education of the whole man" demanded by Jacks (15, page 18) and the identification of education with life-at-its-best, called for in the generally accepted philosophy of education. For, under traditional influence of the classical ideal, industrial arts and sister subjects have been held to the status of "specials". They have not been considered as integral parts of general education; that status has been reserved for regular subjects, academic in nature. This has been especially true as to method.

Philosophical trends. Traditionally, the learner was thought of as a mind to be developed through accumulations of academic or verbal subject matter; health was physical welfare only; the emotional life was a quality separate from both mental and physical being, and especially related to religion, or to culture defined as the fine arts. The individual was thought of as separate from material environment, and a major aim of education was to maintain and increase this separation.

Stone (2, page 130) contends that now the trend, at least in theory and making some progress in practice, is to conceive life as an organic unity of mental, physical, and emotional powers; continuously and inseparably interactive within the individual and the total effective environment. In the light of this later trend of thought concerning life, education tends to become typically activity, rather than passive absorption of facts; interaction with all types of selected environment, through tools of all types of intelligence, mechanical and social as well as academic.

The following discussion is based upon the "Wisconsin Philosophy" and an attempt is made to justify a philosophy of industrial arts through a realization of objectives sought. The growth of the individual is impossible without cultivation of three sides of his nature: physical, intellectual, and emotional. Traditionally, education has been conceived as a "training or disciplining of the mind." This view is no longer tenable. Industrial arts instruction is especially important, indeed indispensable, in co-ordinating the three sides of the individual. Without something corresponding to the contribution of the industrial arts experiences, there can be no complete and all-

round growth of the individual. Industrial arts instruction also makes an important contribution to the development of the individual, thus emphasizing and providing freedom of individual growth, by leading out to new fields of inquiry and study, to broader outlook, to new adaptations and applications of knowledge, skills and data required.

Industrial arts is an adjustment of adult-life situations. In the discharge of its function of developing an active interest in industrial life and in methods of production, represented in the school the world of industry, the industrial arts shop contributes directly to the adjustment of the individual to adult life situations. Appreciation of the things to be purchased, of good workmanship, of good design, of ability to do useful things, of self reliance, of orderly methods of procedure--these are specific and identifiable adult life values which are contributed directly through industrial arts.

Industrial arts instruction, through its emphasis on the teaching of tool processes and techniques in harmony with the fundamental requirements and standards of industry, makes a unique contribution to education as adjustments to adult life situations. It is especially worthy of note that industrial arts, by contribution directly to education as growth of the individual, aswell as to education as adjustment, occupies a place in education that seeks to harmonize these two concepts.

Other contributions of industrial arts. Ability to do is acquired only through doing. In industrial arts, instruction develops ability

to use skills, habits, and data as means rather than ends by engaging the pupil in situations which give him practice in these activities in the solving of his problems. The pupil in solving an industrial arts problem, demonstrates his ability to use skills, habits, and data.

The degree of interest aroused in solving industrial arts problems affords conditions favorable to transfer of attitudes and abilities to other types of situations. The great variety of experiences encountered in industrial arts instruction affords an excellent basis for generalization applicable to new situations. Industrial arts instruction is effective in developing the problem solving attitudes.

In weighing evidence and drawing conclusions the pupil is developing openmindedness. Industrial arts, more than any other school subject, save laboratory science, effectively requires the pupil to deal with concrete situations, materials, tools, to collect and examine data, to weigh evidence, to draw conclusions, and then follow deliberation with action. Industrial arts teachers were among the first to make practical application of the discoveries of the psychologists on the subject of individual differences. Methods of the school shop facilities, detection of individual differences, application of individual remedies, application of stimulus to maximum individual efforts.

Industrial arts ranks high among the school subjects, with reference to inherent capacity to appeal to the native interest of the pupil, and affords a most favorable learning situation, hence, it is a profitable expenditure of time and effort. The shop project is a most effective means for stimulating self directing activity. The

shop affords exceptional situations for inducing the pupil to visualize the goal of the instruction, accept the goal as his own, and check his own progress toward that goal.

If opportunity for self-expression be essential for every pupil, then certainly opportunity "self-expression in the arts" is essential to complete a round of experiences in self-expression. Industrial arts shop affords opportunities for encouraging and developing self-expression such as are not otherwise available, either within or without the school.

In industrial arts instruction, conditions are especially favorable for adapting the work to the individual so that every pupil, from the ablest to the least capable, may make some progress, and know that he is making it. Methods of instruction, to a high degree, stimulate the pupil to judge for himself the quality and extent of his own achievement.

In endeavoring to develop interest in the world of industry, in appreciation of good workmanship and good design, in appreciation of ability to do useful things, in habits of orderly methods of procedure in understanding of mechanical drawing as a medium of expression—in these efforts the public school does not compete with other agencies of the community, for outside the school practically nothing is done to meet these needs of the individual. Instruction in industrial arts is a phase of child education which is vital, is transferable, and is not furnished in the desirable degree by any other agency.

The creed of the progressive educator portrays the philosophy of the industrial arts teacher if he seeks to impart knowledge to others.

"1. I believe in the common man.
"2. I believe that education is primarily for the social well-being of this democracy and not for the individual benefit.
"3. I believe also in the necessity of wide-spread intelligence among all citizens.
"4. I believe that a trained citizenery guided by trained and capable leaders is the life saver of citizenship.
"5. I believe that the main purpose of education in a democracy is to prepare all its people for the duties and responsibilities of everygrade of citizenship.
"6. I believe that the ordinary man needs educational service as much as the 'superior man' and that he is just as much entitled to it.
"7. I believe that education is primarily preparation for the duties of life, that it is life.
"8. I believe that education is primarily training for thinking and doing (things) in some socially useful way.
"9. I believe that there are many forms and kinds of education for training the interests and abilities of many different kinds of people—all of whom are worth educating.
"10. I believe that everyone can and should be educated so that he can work for himself and for society.
"11. I believe that the educator is responsible both for the individual and the social results of his work.
"12. I believe that education must be constantly adapted to the changing demands of life and should therefore never be dominated by tradition or by the mere voice of authority." (Prosser 30, page 154-156)

Part B

Aims and Objectives of Industrial Arts

Over a fairly long period of time, industrial arts has hewn for itself a path which leads to certain definite objectives. Some of these objectives that have been acquired through a long, and at times a painful process, are often over used by teachers given to the unfortunate policy of taking one objective, making a hobby of it, and ignoring the rest. The resulting confusion regarding the purpose of industrial arts is very detrimental to progress.

It is quite difficult to see how one can participate effectively in teaching industrial arts without the guidance of carefully considered ideals, values, and goals. In harmony with a guiding philosophy, it is possible to develop programs of instruction that are well conceived, ably handled, and educationally effective. They make social ideals and courageous action possible. Vision and faith, which are the product of discriminating thinking based upon mature experiences, are far more than idle "wishful wishing."

Objectives for the teacher. Certain general objectives are necessary in order that the course of study and all activities of the teacher may be closely related to the basis underlying philosophies of the subjects. Yet, general objectives for the teacher should not be vague. Selvidge, who prepared a list of teacher's objectives for the American Vocational Association Committee, gave reasons for objectives by saying:

> "The objectives should not be thought of as vague and remote educational ideals, but as a list of specific changes which teachers should endeavor to make in the lives of students." (Bawden 2, page 31)

Throughout the early development and history of industrial arts, each writer and teacher proposed their own list of objectives either for the field in general or for particular subject areas. This was, as it should be, for it gave an idea in what direction the teacher was going; but there resulted a wide range of objectives with often very little in common with what the others were thinking and doing. This led to a lack of agreement as to the acceptable objectives of industrial arts, and in answer to the criticism, the committee of the

A. V. A. in writing the bulletin, Standards of Attainment in Industrial Arts, devoted much study to this problem. This was a very important problem for upon its objectives rested the place that industrial arts would hold in the education of the youth in the schools. The list of twelve objectives proposed by the committee will be discussed later in this chapter.

Industrial arts and the junior high school. Although industrial arts, as a part of general education, was found in the elementary school, the junior and the senior high schools, it continued to emphasize itsposition within the junior high school curriculum. In 1924, Samuel J. Vaughn and Arthur B. Mays voiced their opinion of industrial arts in the junior high school. They stated:

> "In no other place in the entire program of public education has industrial arts work received such unreserved acceptance and general recognition as in the junior high school. The advocates of the junior high school in stating the aims and special functions of this new type of organization have made the inclusion of a rich and varied offering of industrial arts activities an inevitable feature of the curriculum." (40, page 196)

Vaughn and Mays were referring to the general shop idea which had just made its appearance in the junior high school. The increasing popularity of the general shop was due in great part to its contributions to the exploratory and guidance functions of the junior high school curriculum. A few years later the general shop was with the establishment of many of these shops in the industrial arts departments; thus providing the junior high school with an important means of achieving its objectives.

Leonard V. Koos called attention to this when he wrote in 1934

concerning the trends in junior high schools.

> "One of the pronounced trends in the junior high school program is the displacement of specialized courses by more general courses. Thus, for example, courses in arithmetic and algebra have been giving place to "general mathematics." Having much in common with this movement in the academic fields is the trend to develop, in home economics, industrial arts, commerce, and the fine arts, courses which are more or less exploratory in character."(13, page 170)

Because boys are staying in school longer, due to their inability to secure employment under eighteen years of age, the purpose of industrial arts should be to extend the exploratory program began in the junior high school. In order that industrial arts teachers may make the best use of this opportunity, they should discard the formal discipline of the manual training, provide new experience, and see that the boys are better informed about industrial affairs in general.

Accepted industrial arts objectives for secondary schools. The industrial arts section of the American Vocational Association has had a great influence on teachers objectives in industrial arts by the work of its Committee on Standards of Attainment. Persons acquainted with these standards know that they are specific, clear and to the point, and many shop teachers are now using them as a guide for their courses of study. In formulating a list of objectives for the industrial arts teacher, one should keep in mind that it is far better to set the goal for a few, but neccessary objectives, and reach it, than to list a great many, realizing only a small number of them. A definite set of objectives that can apply in every instance to each pupil, should be the ultimate goal for all industrial arts teachers.

The Committee on Standards of Attainment in Industrial Arts with

Selvidge as chairman listed twelve objectives developed in 1934.

"1. To develop in each pupil an active interest in industry and industrial life, including the methods of production and distribution.

"2. To develop in each pupil the ability to select wisely, care for, and use properly the things he buys or uses.

"3. To develop in each pupil an appreciation of good workmanship and design.

"4. To develop in each pupil an attitude of pride or interest in his ability to do useful things.

"5. To develop in each pupil the habit of an orderly method of procedure in the performance of any task.

"6. To develop in each pupil the habit of self-discipline which requires one to do a thing when it should be done, whether it is pleasant or not.

"7. To develop in each pupil a feeling of self-reliance and confidence in his ability to deal with people and to care for himself in an unusual or unfamiliar situation.

"8. To develop in each pupil the habit of careful thoughtful work without loitering or wasting time.

"9. To develop in each pupil an attitude of readiness to assist others when they need help and to join in group undertakings. (cooperation)

"10. To develop in each pupil a thoughtful attitude in the matter of making things easy and pleasant for others.

"11. To develop in each pupil a knowledge and understanding of mechanical drawing, the interpretation of conventions in drawings and working diagrams, and the ability to express ideas by means of a drawing.

"12. To develop in each pupil elementary skills in the use of the more common tools and machines in modifying and handling materials, and understanding of some of the more common construction problems." (Standards of Attainment in Industrial Arts Teaching, 1, page 32)

It is undoubtedly true that shop teachers would not evaluate or emphasize each item in the preceding objectives in the same light which would not necessarily be criticism for the teacher or the objective. Education cannot be reduced to a common denominator or which will produce equal results in every community. Neither can the aims, objectives, standards of attainment, and the like be the same everywhere. Each shop teacher must, himself, have an adequate philosophy of industrial arts which resolves itself into teacher's objectives.

It is quite probable that shop teachers have objectives which are not included in the list of twelve prepared by Selvidge. Such individual teacher's objectives are undoubtedly of great value because they utilize special characteristics of the instructor and shop. In fact, all worthy objectives are of value so long as they are in harmony with the plan of general and industrial arts, and provided they are used in a manner which evidences actual and tangible results.

Currently accepted objectives for industrial arts. Gordon O. Wilbur, a current textbook writer for professional courses in industrial arts, offers what the writer of this thesis believes to be the most acceptable objectives of industrial arts in present day use. They are as follows:

"1. To explore industry and American industrial civilization in terms of its organization, raw materials, processes and operations, products, and occupations.

"2. To develop recreational and avocational activities in the area of constructive work.

"3. To increase an appreciation for good craftsmanship and design, both in the products of modern industry

and in artifacts from the material cultures of the past.

"4. To increase consumer knowledges to a point where students can select, buy, use, and maintain the products of industry intelligently.

"5. To provide information about, and -- in so far as possible -- experiences in, the basic processes of many industries, in order that students may be more competent to choose a future vocation.

"6. To encourage creative expression in terms of industrial materials.

"7. To develop desirable social relationships, such as cooperation, tolerance, leadership and followership, and tact.

"8. To develop a certain amount of skill in a number of basic industrial processes."(43, page 42-43)

It is understood if these objectives are to be defensible, it is necessary that a recognizable relationship exist between them and the aims of general education. One must evaluate them carefully in terms of outcomes expected, and they should become the foundation of the whole industrial arts program.

It is important to develop a formal list of objectives for an industrial arts program. However, the real challenge to the teacher is the development of a plan through which these objectives may be attained.

Many industrial arts teachers have developed adequate plans for the teaching of specific information, skills, and techniques but have made little or no provision for developing appreciations, desirable attitudes, and habits. In general they feel that such development is attained through indirect or concomitant learning and is an outcome of their courses, regardless of any formal plan or special direction.

In part, this is true. However, with the importance which is now being placed on attitudes, habits, and ideals in our modern educational program, their development must not be a matter of chance. The objectives will be fully attained only when there is as much attention given to the planning of the so-called indirect learning situation as is devoted to the development of information, skills, and techniques. It is of little value to make plans for the teaching of specific subject matter if no provision is made for experiences aimed at the development of appreciations, desirable attitudes, habits, and ideals.

Chapter IV

HISTORY AND GEOGRAPHY OF TENNESSEE

Tennessee is an agricultural state, and the culture of its people has grown out of their struggle with the earth. This is true despite the rapid growth of industry, for even the urban areas are dominated by the traditions of farm life. With few exceptions, the cities largely retain the flavor of country towns.

Part A

A Cross Section of a Threefold State

Like Gaul, Tennessee is divided into three parts; the three parts representing the whole area of the state. Each section has its cultural and industrial advantages as will be indicated in following paragraphs. The writer has not been able to determine why Tennessee was divided into the three parts. There are no geographical lines separating any one section from the other.

East Tennessee. East, middle, and west Tennessee, the three geographical divisions, in many ways are like separate states. Although the people are alike in heritage and in general attitude, there are striking sectional differences fostered by the lay of the land. West Tennesseans may differ as much from east Tennesseans in manners and customs as the people of the Appalachian Mountain regions differ from those of the Mississippi Delta.

Between the North Carolina line and the Cumberland Plateau is east Tennessee, an upland region whose high mountains have made it, until recent years, the most shut-in section of the state. In the isolated mountains of east Tennessee the people are content to live somewhat as did the first white settlers.

In politics, as in most things, the east Tennessean shows independence, for here in an otherwise normally democratic state is a strong republican district that regularly chooses republican representatives in both state and federal elections. To the east Tennessean, west Tennessee is almost as far away and unknown as Missouri. They look upon this western section as a swamp and resent the weight of the powerful political machine in state-wide elections.

Middle Tennessee. Middle Tennessee is the heart of the state. Most of the towns are old, and in them and along the highways of this section are magnificent homes, some in decay. Descendants of the state's founders proudly cling to their traditions. Nashville, capital of the state, was in 1780 the scene of the drafting and signing of the Cumberland Compact, whereby 256 pioneers formed an independent government. Near by are the Hermitage, home of Andrew Jackson, and the town of Smyrna, birthplace of Sam Davis, youthful hero of the War between the states. Sixty miles south of Nashville is Pulaski, where the original Ku Klux Klan was formed in 1865.

It is for its cultural advantages that middle Tennessee is perhaps best known. With few exceptions, such as the University of Tennessee at Knoxville, and Southwestern at Memphis, the states leading educational institutions are in this division. Here are Vanderbilt Univer-

sity, George Peabody College for Teachers, the University of the South, Ward-Belmont School, Middle Tennessee State Teachers College, Tennessee Polytechnic Institute, and Fisk University.

West Tennessee. Between the Tennessee River and the Mississippi is west Tennessee. This section leads the state agriculturally. In west Tennessee a good deal of the free and easy spirit of the frontier remains, and both white and Negro accept good luck and bad philosophically. Because cotton has always dominated its economy, west Tennessee has the largest Negro population.

There is a newness about most of the towns in west Tennessee as most of them have practically been rebuilt within the past twenty-five years. Memphis, on the Mississippi River near the Arkansas boundary line, is the metropolis of this division.

The long history of Tennessee has left its landmarks in west Tennessee. Along the Tennessee River near Pittsburg Landing are the remains of the earthworks raised by Mound Builders. In the northwest corner is Reelfoot Lake, formed by the New Madrid earthquake of 1811-12, in the southeastern section, Shiloh battlefield recalls the tragic war years, and Pickwick Landing Dam represents the most noted of the Tennessee Valley Authority present-day development.

Part B

History and Government

The actual settlement of Tennessee began in 1769, when William Bean built his cabin on Boones Creek near the Watauga River and several

families from North Carolina joined him. Bean's settlement and those in Carter's River Valley were known as the Watauga Settlements. The people of the Watauga Settlements felt the lack of organized government. In 1772 they formed the Watauga Association and elected five magistrates to make and administer law. However, the records of the Association became lost and little is known about it. It seems certain, however, that the Watauga constitution was among the first to be written and adopted by independent white Americans.

Tennessee admitted to the union. Directly after the Revolutionary War, Tennessee exceeded by more than a fourth the population necessary for the formation of a state, and the constitutional convention, which met in Knoxville on January 11, 1796, petitioned congress for admission to the union. The constitution was drawn up here and Thomas Jefferson called it "the least imperfect and most republican" to be adopted by any of the states.

Three months later, June 11, 1796, congress admitted Tennessee to the union, but refused to recognize two senators from the new state who were elected at a special session of the legislature. On July 8, 1797, these two senators were charged with treason and expelled from the senate. This marked the introduction of Tennessee into political history as a new state.

Tennessee and the Civil War. At the outbreak of the Civil War the governor of Tennessee called an extra session of the General Assembly to meet April 25, in Nashville. Stating that Lincoln had "wantonly inaugurated an internecine war" upon the people of the south, he urged

immediate action. The assembly adopted a formal declaration of independence, and directed the governor to form a military league with the Southern Confederacy. After waiting to ratify the governor's action, the assembly called a popular referendum on June 8, to decide on affiliation with the confederacy. By more than two-thirds majority the people approved cecession.

On June 24, 1860 the governor of Tennessee issued a proclamation dissolving all connection with the Federal Union. Military headquarters for the three state divisions were established at Union City, Nashville, and Knoxville. President Davis appointed Leonidas Polk to command in Tennessee and, in September, Albert Sidney Johnston, placed in command of the Western Department, arranged a line of defense to keep the federal troops out of Tennessee.

President Andrew Johnson issued a proclamation on June 13, 1865, declaring the insurrection of Tennessee at an end, since the state had announced itself in harmony with the presidential policy and the Thirteenth Amendment. But an element in congress refused to support the president, in the hope of strengthening the republican party in the south and in the belief that the Negro needed protection from the southern whites. It was not until March 23, 1886, after considerable debate, that the state was finally readmitted to the Union.

Post-Civil War developments in Tennessee. Conditions improved gradually throughout the state, especially after Brownlow, who had been elected United States senator for the term beginning March 4, 1869, resigned the governorship. Governor DeWitt C. Senter, who took oath on February 25, 1869, pardoned many confederate soldiers still

in prison, brought the military occupation of middle and west Tennessee to an end, and called a convention for the amendment of the constitution.

Among difficulties faced by the state in the decade following 1870 was a series of plagues and epidemics. The worst of these, yellow fever, came in 1878, taking thousands of lives, principally in Memphis. With more than 5,000 fatalities, 25,000 persons in crazed flight, and 5,000 more sheltered in concentration camps, Memphis was in such a turmoil that the city charter was revoked until 1891. Colonel J. M. Keating, who was then editor of the Appeal throughout the epidemic, directed relief work for what he described as "the horror of the century, the most soul-harrowing episode in the history of the English-speaking people in America."

Government. The original Constitution of Tennessee, 1796, gave suffrage to every free man, allowed free negroes the right to vote, permitted freedom of speech and of the press, and guaranteed the right of trial by jury. Future legislators were forbidden to permit any "tendency to lessen the rights and privileges" of the people, or to require a religious test as qualification for public office. This last provision was retained in both the later constitutions.

The revision of 1834 promoted education and, like the earlier constitution, recognized slavery. The new version was regarded as adequate until 1870. A new constitution, drawn up in that year, granted the Governor the power of veto, provided for a supreme court, chancery, and circuit courts, and "such inferior tribunals as the legislature may deem advisable." Intended to serve for only a few

years, the constitution has been in force ever since. Except for the clauses recognizing the abolition of slavery, forbidding future laws pertaining to the property rights of man, setting up a judiciary, forbidding state participation in public investments, and giving suffrage to negroes, the present constitution is substantially the same as the one it superseded.

Laws in Tennessee are made by the General Assembly, consisting of a Senate and a House of Representatives which convene every two years. There are thirty-three Senators and ninety-nine Representatives, all elected for two-year terms. To become a law a bill must be read on three different days and passed each time in the house where it is sponsored, with the same procedure repeated in the other house; it must then go to the governor for final approval.

The appellate court, reorganized in 1925, operates in each of the three divisions of the state and has final authority in civil cases. Lesser judicial agencies designed to meet the needs of a growing population, rural and urban, have been established from time to time.

Recommendations of the Tennessee Planning Commission resulted in Reorganization Bill (1936) which centralized executive control in the office of the governor. This administrative rearrangement provided more efficient means for carrying out programs of social security, conservation, public works, health, education, and financial management. The newest of nine departments directly under the governor is the department of conservation. The nine commissioners administer eighty-one divisions and boards. There are also twenty-seven special

commissions, principally involving the professions, appointed by the governor. For the ten-year period ending June 30, 1936, there was a total disbursement of nearly $500,000,000, with 47.56 per cent of the tax dollar going to highways and highway bridges, 18.58 per cent to education, 7.48 per cent to penal and charitable institutions, and 26.38 per cent to all other activities.

There are thirty-four counties in the eastern, forty in the middle, and twenty-one in the western division of the state. In these ninety-five counties, all the functions of state and city government are duplicated in administrative detail.

Part C

Tennessee in 1951

Tennessee is probably well marked on the maps of enemy nations as a state to be heavily bombed in case their long range bombers could reach the United States. Here, in 1951, are located the Atomic Research Center of the nation, the largest aluminum producing plant in the world, the vast Tennessee Valley Authority Dams and the seven mile "wind tunnel" now being constructed for the testing of air craft by the Army Airforce.

Population. Much of the population of Tennessee is migratory since a great many industries are seasonal and employ transient workers. According to the 1950 census of population, Tennessee ranked sixteenth in the nation as to population, having a total of 3,282,271. The 1940 census report showed Tennessee to have 2,915,841

in population. The 1950 population was 10.6 per cent higher than that of 1940.

Industry and commerce in Tennessee. Economic Tennessee in general follows its geographic divisions, with commercial activity for the surrounding regions centering in neighboring cities and towns. Nashville and Memphis are predominantly commercial cities, while Knoxville and Chattanooga are more industrial. In these four cities, which contain two-thirds of the urban population of Tennessee, are establishments representing nearly every commercial and industrial interest in the state.

In east Tennessee are the railroad towns of Erwin and Harriman. Knoxville draws on farming, textiles, mining, processing of marble, and the rayon industry. Chattanooga is a manufacturing center which concentrates on heavy metals and textile finishing.

Nashville is the financial, wholesale, and distribution center for middle Tennessee. In the towns surrounding Nashville are important tobacco markets, livestock markets and phosphate mining centers. On the railroads and highways are numerous manufacturing and industrial plants.

The industrial activity of west Tennessee is mainly in Memphis which draws heavily on Mississippi and Arkansas as sources of supply for woodworking, cotton handling, cottonseed processing, and drug manufacturing. Memphis, the railroad hub of the south, is the largest inland cotton handling port in the country.

With economical transportation available by land and water, and cheap hydroelectric power being developed by the Tennessee Valley

Authority, Tennessee is likely to expand further industrially. Occasionally some communities have offered new industries preferred tax rates for a period of time, but in general this has not been the trend. Tennessee as a whole does not practice this method of attracting new industries but depends more upon the natural resources and the economies of the particular section to invite new industrial activities.

Higher education in Tennessee. According to statistics in 1950, close to seven per cent of the population of Tennessee is illiterate. It is hard to believe that a state which boasts of thirty, four-year colleges, ten junior colleges, 417 public schools and numerous private schools could have seven per cent of its population illiterate. It must be remembered that a large area of Tennessee is mountainous and sparsely settled. These mountain folk are people of the land and see no use in education; schools are few and far between in some of these sections.

Higher education has gradually spread throughout Tennessee in recent years. In 1949 the colleges of Tennessee graduated more of their students than ever before in its history. Every college offering a four year curriculum was filled to capacity with students seeking a degree.

Thefollowing is a complete list of the colleges and their location in Tennessee.

STATE FOUR-YEAR COLLEGES

Austin Peay State College.....Clarksville
Memphis State College.....Memphis
East Tennessee State College.....Johnson City

Middle Tennessee State College.....Murfreesboro
Tennessee Polytechnic Institute.....Cookeville
The University of Tennessee.....Knoxville
Agricultural and Industrial
Teachers College (Negroes).....Nashville

STATE JUNIOR COLLEGE

The University of Tennessee Junior
College.....Martin

PRIVATE AND DENOMINATIONAL FOUR-YEAR COLLEGES

Bethel College.....McKenzie
Carson-Newman College.....Jefferson City
Cumberland University.....Lebanon
David Lipscomb College.....Nashville
George Peabody College for Teachers.....Nashville
King College.....Bristol
Lambuth College.....Jackson
Lincoln Memorial University.....Harrogate
Madison College.....Madison
Maryville College.....Maryville
Memphis College of Music.....Memphis
Milligan College.....Milligan
Scarritt College.....Nashville
Siena College.....Memphis
Southwestern.....Memphis
Tusculum College.....Greeneville
Union University.....Jackson
University of Chattanooga.....Chattanooga
University of the South.....Sewanee
Vanderbilt University.....Nashville
Fisk University (For Negroes).....Nashville
Knoxville College (For Negroes).....Knoxville
Lane College (For Negroes).....Jackson
LeMoyne College (For Negroes).....Memphis

PRIVATE AND DENOMINATIONAL JUNIOR COLLEGES

Freed-Hardeman College.....Henderson
Hiwassee College.....Madisonville
Martin College.....Pulaski
Southern Missionary College.....Collegedale
Tennessee Wesleyan College.....Athens
Trevecca College.....Nashville
Ward-Belmont College.....Nashville
Morristown Normal and Industrial
College (For Negroes).....Morristown
Swift Memorial College (For Negroes) .....Rogersville

Among institutions doing special work in vocational training are

Lincoln Memorial University at Harrogate, the Pi Beta Phi Settlement School at Gatlinburg, and the Cumberland Homestead Project at Crossville. The Alvin C. York Agricultural Institute is supported by the Fentress County Board of Education in cooperation with the State Board of Education. The College of Agriculture of the University of Tennessee combines practical and theoretical training in farming. Although emphasis is placed on training men and women for farm life, most of the graduates are drawn into more lucrative positions as teachers and demonstration agents.

Illiteracy remains one of the state's major problems in education. In 1940 the percentage of rural illiteracy was 8.8, twice as high as that in the urban areas. At this time there were 18,536 persons between the ages of 10 and 20, and about 127,000 persons 21 years old and over, who were illiterate. Of the total number, 87,406 were whites and 57,251 were Negroes. The appreciable decrease in illiteracy rate for the total population between 1940 and 1950, from 8.8 to 6.8, as well as the consistent increase in school attendance during the same period, indicates definite educational progress.

CHAPTER V

INDUSTRIAL ARTS IN THE JUNIOR HIGH SCHOOLS OF TENNESSEE

The secondary schools of Tennessee include junior high schools and senior high schools belonging to the Southern Association of Secondary Schools and Colleges and those accredited by the State Department of Education which meet the requirements of the policies, regulations, and criteria for accrediting secondary schools. There were no schools offering industrial arts which did not meet these requirements. This chapter should reveal the lack of and the potential needs for industrial arts in the junior high schools of Tennessee. The population of Tennessee has rapidly changed from rural to urban to meet the demands of a fast-growing industrial state. It is felt by the writer that more schools should include industrial arts to enrich and broaden the general education values provided in the schools of the state.

Part A

Current Trends of Industrial Arts in the Junior High Schools of Tennessee

The junior high school is comparatively young in the educational system of this country, yet, it has developed rapidly in most of the schools of any size. The program of study is decidedly greater in scope and in richness of content than that of traditional elementary schools. The pupil has a choice of studies and is promoted by subject rather than

by grade. It offers a plan of supervised study giving recognition to the peculiar needs of retarded and superior students. It offers departmental teaching and includes provisions for discovering aptitudes in academic, prevocational, and vocational work.

Definition of a junior high school. A current definition of the junior high school has been searched for that would be acceptable in this study. The following definition proposed in 1937 is felt to be widely accepted for the junior high school.

> "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." (Pringle 29, page 68)

The junior high schools are usually housed apart from the other units of a school system. More commonly it is located in a separate building or wing of a building with its own principal and teaching staff. The junior high school is maintained as a separate unit in the American public school program apart from the elementary and the senior high school. It has its own distinct purposes and definite functions, difficult of realization in the plan of eight elementary and four high school years.

Standardization of industrial arts in the junior high schools. The subject of industrial arts in any city does not lend itself to standardization to the extent that is true of English or mathematics. The subjects which are taught in the industrial arts curriculum vary quite sharply with each community or city. Occupational activities of the community may be reflected to some degree in the program and emphasis may well be given to the most important local industries. If the community is one emphasizing agriculture, the industrial arts activities and

projects should reflect more of the farm life. However, the fact that industrial arts in its own right is highly desirable and beneficial to all students, regardless of what may be their future occupation or where they live should not be lost sight of. This implies that a variety of experiences in many of the major phases of industry must be provided.

Table I

A LIST OF APPROVED JUNIOR HIGH SCHOOLS IN TENNESSEE,
SCHOOL YEAR 1950-51
WITH NAMES OF INDUSTRIAL ARTS TEACHERS

Town or school	Ind. Arts teacher	Name of course	Grade taught
ATHENS	None		
ATWOOD	None		
BEECH GROVE	None		
CARYVILLE	None		
CHATTANOOGA			
Brainerd	C. J. Woodson	Ind. Arts	8,9
Dickinson	James McCullough	Ind. Arts	7,8,9
East Lake	Fred Clark	Ind. Arts	7,8,9
East Side	A. J. Verble	Ind. Arts	8,9
	Evan M. Jones	Ind. Arts	8,9
Hardy	Frank Copeland	Ind. Arts	8,9
Lookout	Floyd Yarbrough	Ind. Arts	7,8
N. Chattanooga	Lawrence Morgan	Ind. Arts	7,8,9
COBLE	None		
DUCK RIVER	None		
ELIZABETHAN	Nathaniel Burchfield	Ind. Arts	7,8,9
FAYETTEVILLE	None		
FINGER	None		
GASSAWAY	None		
GRAHAM	None		
GRANVILLE	None		
HAYDENBURG	None		
HILLSBORO	None		
HORNSBY	None		
HUMBOLDT	None		
JACKSON	Robert West	Ind. Arts	9
JOHNSON CITY	William K. Hart	Ind. Arts	8,9
	John Hillenbrand	Ind. Arts	7,8
KINGSPORT	Robert Jordan	Ind. Arts	7,8
KNOXVILLE			
Christenberry	Donovan Stringham	Shop	8,9
	Jim Hartsell	Shop	8,9

Table I (continued)

Town or school	Ind. Arts teacher	Name of course	Grade taught
Park	Lauton Edwards	Shop	7,8,9
	O. H. Monday	Shop	7,8,9
	James Reasonover	Shop	7,8
S. Knoxville	E. E. Alsinger	Metal Shop	8,9
Tyson	Victor Walter	Shop	7,8,9
	Russell Gunther	Shop	7,8,9
LAVINIA	None		
LITTLE LOT	None		
LYLES	None		
MANCHESTER	None		
MEMPHIS			
Bellevue	Wayne Russell	Gen. Shop	8,9
Fairview	Edwin H. Braley	Gen. Shop	8,9
Frayser	Carlton Pruitt	Ind. Arts	7,8,9,10
Hollywood	J. H. Spray	Gen. Shop	8,9
Snowden	John W. Long	Gen. Shop	7,8,9
MORRISTOWN	None		
NASHVILLE			
Bailey	Charles Williams	Ind. Arts	7, 9
Cavert	George Shreeve	Ind. Arts	7, 9
East Nashville	Haskell Newman	Ind. Arts	7, 9
	John Thomas	Ind. Arts	7,8
	Cecil Webb	Arts and Crafts	7,8
Highland Heights	Jesse Buchannan	Ind. Arts	7,8,9
Tarbox	None		
Waverly-Belmont	Charles E. Adwell	Ind. Arts	8
NIOTA	None		
NUNNELLY	None		
OAK RIDGE			
Jefferson	W. L. Adams	Ind. Arts	7
	Johnny E. Tigue	Ind. Arts	9
	James E. Heck	Ind. Arts	8,9
	C. H. Naive	Ind. Arts	8,9
RICEVILLE	None		
SAULSBURY	None		
SILERTON	None		
SNEEDVILLE	None		
STANTONVILLE	None		
SUMMITVILLE	None		
TAZEWELL	None		
TOONE	None		
VAN LEER	None		

Approved junior high schools. The only printed definition of an approved junior high school found by the writer is one quoted from a leaflet printed by the Tennessee State Board of Education.

> "An approved junior high school is one which meets all the standards and regulations for accrediting prescribed by the State Board of Education and/or the policies, regulations, and criteria of the Southern Association of Colleges and Secondary Schools." (Tennessee State Board of Education)

A junior high school can be approved either by the Tennessee State Board of Education or the Southern Association of Colleges and Secondary Schools. The junior high school may also be approved both by the State Board of Education and the Southern Association of Colleges and Secondary Schools. Those schools accredited by both agencies receive a higher rating than those being approved and accredited by the State Board of Education alone.

Table I shows a list of the approved junior high schools in Tennessee and those including industrial arts in their curriculum. Column one shows the name of the town or school; column two indicates the name of the industrial arts teacher if any; column three lists the courses offered; and column four shows the grades taught. There are 59 approved junior high schools in Tennessee. There are 39 junior high schools in Tennessee which do not include industrial arts in their offerings. The total number of industrial arts teachers in the junior high schools of Tennessee is 37.

Size and number of industrial arts classes in Tennessee junior high schools. There are 26 junior high schools offering industrial arts in the public schools. It was found that all but four of these junior high schools are in cities over 150,000 in population. Table II shows the per cent of the total number of classes for each class size. Column one indicates the number of pupils enrolled in each of the industrial arts

classes. Column two, indicates that 185 classes are being taught in the junior high schools. Column three shows the percentage of each class size.

Table II

SIZE AND NUMBER OF INDUSTRIAL ARTS CLASSES IN TENNESSEE JUNIOR HIGH SCHOOLS

Size of classes	Number of classes	Percent of total number of classes
1 - 9	0	0.0
10 - 14	19	10.27
15 - 19	41	22.16
20 - 24	43	23.24
25 - 29	42	22.70
30 - 34	33	17.83
35 - 39	5	2.70
40 - and over	2	1.08

Classes enrolling fewer than 10 or 12 pupils are probably so small that the teacher is not fully occupied throughout the entire period. Classes exceeding 25 are so large that a teacher is unable to provide the necessary individual attention. Classes of this size, meeting for fifty minutes a day, make it impossible for an instructor to spend sufficient time with each pupil to prevent him from making serious mistakes. The ideal class size for industrial arts classes is approximately 20 to 25 pupils. It seems the trend is toward larger classes in the junior high school.

Teaching load. In Table I the names of 37 teachers who teach the 185 industrial arts classes in the junior high schools are listed. The number of classes taught by these teachers is shown in Table III.

Column one, of Table III, indicates the number of classes per day in industrial arts. Column two, indicates the corresponding number of

teachers who teach the number of classes shown in column one.

Table III

TEACHER LOAD FOR VARIOUS NUMBERS OF PERIODS OF INDUSTRIAL ARTS CLASSES IN THE JUNIOR HIGH SCHOOLS OF TENNESSEE

Number of classes per day in industrial arts	Number of teachers
Less than four	4
Four	9
Five	10
Six	12
Seven and over	2

Sixty-four per cent of the teachers are teaching industrial arts classes five, six, and seven periods per day. Table III indicates that many teachers teach industrial arts and nothing else. Thirty-six per cent of the teachers teach other subjects along with industrial arts.

Teaching experience. Column one, in Table IV, indicates the number of years of teaching experience per teacher, and column two indicates the number of teachers who have been teaching for the corresponding number of years. The table indicates that 64 per cent have been teaching from one to twelve years. One of the three teachers who has been teaching for 21 years or longer is drawing the top salary of near $5,000 for a ten months school year.

Strangely enough, all of the industrial arts teachers have accumulated their teaching experience in Tennessee. Still more strangely, all of the teachers reported that they had received one or more academic degrees in one of the educational institutions of Tennessee. The teaching experience of most teachers has been continuous with the exception of a few years interruption during the war. Some entered the armed services and others were engaged in war production jobs.

Table IV

TEACHING EXPERIENCE OF INDUSTRIAL ARTS TEACHERS IN TENNESSEE JUNIOR HIGH SCHOOLS

Years experience teaching industrial arts	Number of teachers
1 - 3	3
4 - 6	10
7 - 9	6
10 - 12	5
13 - 15	7
16 - 20	3
21 - and over	3

Teacher qualifications. Column one, of Table V, shows the number of college hours or degrees earned in industrial arts. Column two indicates the number of teachers having the corresponding hours or degrees. Sixty-two per cent of the industrial arts teachers in the junior high schools of Tennessee have the Master's Degree. The teacher qualifications are good as to academic qualifications. Many do not have trade or industrial experience which might be desirable to enrich their educational background.

Table V

QUALIFICATIONS OF INDUSTRIAL ARTS TEACHERS IN TENNESSEE JUNIOR HIGH SCHOOLS

Number of college hours or degrees (quarter hours)	Number of teachers
Below 120 hours	None
120 - 160	1
160 - 180	2
B.S. or A.B.	11
M.S. or M.A.	23
Ph.D.	None

Other duties. Column one, of Table VI, shows other duties performed and subjects taught by the 37 industrial arts teachers being studied.

Column two indicates the number of industrial arts teachers having the corresponding duties or classes.

Table VI

DUTIES OTHER THAN TEACHING INDUSTRIAL SUBJECTS IN THE JUNIOR HIGH SCHOOLS OF TENNESSEE

Other duties or courses taught	Number of teachers
Coaching	3
Principal	2
Mathematics	3
Science	2
History	2
Health and physical education	2

Though not included in the table, some teachers reported being sponsors of extra-curricular activities and clubs. One teacher reported that in addition to teaching duties, he was school repairman.

On the more professional side of teaching industrial arts, there are 23 full-time teachers who teach nothing else but industrial arts. Mathematics or science seem to be the preferred teaching combination with industrial arts subjects.

Salary of teachers. Column one, of Table VII, indicates the range of annual salary of the 37 junior high school industrial arts teachers. Column two indicates the number of teachers receiving the corresponding salary in column one.

The salary of all the industrial arts teachers in the junior high schools are above state schedule. The state schedule for a teacher with a master's degree and one year of experience is $2,250 per year. Some of the larger salaries may be explained when it is understood that some teachers receive a $100 increment per year for each year of teaching

experience up to a certain maximum.

Table VII

SALARIES OF INDUSTRIAL ARTS TEACHERS IN THE JUNIOR HIGH SCHOOLS OF TENNESSEE

Salary per year	Number of teachers
Below $2,000	None
$2,000 - $2,400	6
2,401 - 2,800	8
2,801 - 3,200	7
3,201 - 3,600	6
3,601 - 4,000	5
4,001 - 4,400	3
4,401 - and over	2

Length of class period. As is indicated in Table VIII, the length of the class period is not very well established or standardized. Column one indicates the length of class period, and column two indicates the number of schools using the corresponding class period shown in column one.

Table VIII

LENGTH OF CLASS PERIOD

Length of class period	Number of schools
120 minutes	4
60 minutes	5
55 minutes	10
45 minutes	4
40 minutes	3

Ten schools of twenty-six including industrial arts use the 55 minute period and the other class periods are about equally divided as to frequency of use. It seems that a majority of Tennessee junior high schools are organized on the one-hour-to-each-class basis, with five minute intermissions between classes.

Location of shop. Column one, in Table IX, indicates the location of the shop and column two indicates the number of shops in the corresponding location shown in column one. Wherever the shop is located it should be thought of not only as a place for making projects, but equally as a place for planning, investigating, testing, experimenting, consulting, and evaluating. In short, the shop should be thought of as a place for thinking as well as for feeling and doing.

Table IX

LOCATION OF SCHOOL SHOP

Shop location	Number of school shops
Basement	4
Ground floor	10
Second floor	2
Separate building	10

Industrial arts as a required subject in the junior high schools of Tennessee. The State Department of Public Instruction does not require industrial arts in the junior high schools. However, most of the larger schools require one or more courses in industrial arts. Many of the larger schools also provide an industrial arts program to begin in the seventh grade; in these schools all boys in the seventh grade are required to take those industrial arts courses offered.

It was indicated by the questionnaire investigation that sixteen junior high schools in Tennessee require industrial arts as a school subject and ten junior high schools include industrial arts as an elective. This writer is of the opinion that a diversified program of industrial arts might well be started as a requirement in the seventh

grade, continued in the eighth, and made elective in the ninth year. Industrial arts was found to be a required subject in the larger schools where equipment, facilities and space were adequate. It is felt that as space and facilities are provided in the smaller schools, they too will require industrial arts in the junior high school. It is possible in the future for the state to require industrial arts in the junior high school as the basic importance of industrial arts work becomes recognized by the taxpayers and educators.

Table X

VALUE OF SHOP EQUIPMENT IN TENNESSEE JUNIOR HIGH SCHOOLS

Cost of equipment	Number of schools
$ 499 or less	0
500 - 749	1
750 - 999	2
1,000 - 1,499	3
1,500 - 1,999	1
2,000 - 2,999	1
3,000 - 3,999	1
4,000 - 4,999	1
5,000 - 5,999	2
6,000 - 6,999	2
7,000 - 7,999	3
8,000 - 8,999	3
9,000 - 9,999	2
10,000 - and over	4

Value of shop equipment. The information in Table X shows a wide range in the cost of shop equipment. Some of these shops share class periods between trade and industrial education and industrial arts. The writer of this thesis has visited several of the school shops in the junior high schools of Tennessee and found some of the shops' equipment very meager while others in the larger schools are elaborately equipped.

Column one, of Table X, indicates the approximate value of shop equipment. Column two shows the number of schools having the corresponding cost of equipment shown in column one.

The questionnaire study reveals that a higher than normal percentage of the junior high school shops are well equipped in terms of monetary value. This might be explained when it is remembered that many schools have received a great deal of equipment from "war surplus" at little cost to them. One industrial arts teacher reported their shop equipment valued at two million dollars. This report may be open to question, however, the physical plant of this school is rated as one of the most elaborate in the nation and the industrial arts teachers receive top salaries.

Table XI

INDUSTRIAL ARTS SUBJECTS OFFERED IN THE JUNIOR HIGH SCHOOLS OF TENNESSEE

Name of industrial arts subject	Number of industrial arts subjects taught
General Shop	11
Home Mechanics	4
Woodwork	21
Mechanical Drawing	18
Plastics	4
Electricity	12
Cabinet Making	6
Sheet Metal	2
Art Metal	2
Upgraded Shop	1
Industrial Arts I and II	3

Industrial arts courses offered in the junior high schools of Tennessee. Woodwork, mechanical drawing and electricity seem to be the preferred industrial arts subjects in the junior high schools of Tennessee as is shown in Table XI. General shop is being preferred also,

several teachers mentioned that general shop would be added to their program in the future.

Column one, of Table XI, indicates the name of the industrial arts subject being taught and column two indicates the number of schools in which the industrial arts subject shown in column one is taught. Some of the questionnaires were not complete on this subject, therefore, the table cannot be regarded as absolute.

Part B

A Proposed Industrial Arts Program of Studies for the Junior High Schools of Tennessee

The present junior high school industrial arts programs in Tennessee vary from the one teacher shop, which most commonly is woodworking and which sometimes consists of woodworking and mechanical drawing, to programs which offer six to ten industrial arts subjects. In the following pages, a suggested program of studies is offered for the junior high schools of Tennessee. Though time and space limits the discussion to a few pages, the reader may gain an insight into the suggested program.

Considerable opposition may develop in considering these views and proposals, however, the writer is fully aware of the incompleteness of the proposed program. It is the aim to suggest broad standards that are possible of attainment in the various junior high schools and still provide for considerable freedom and initiative regarding the industrial arts program of any particular school.

The pupil becomes acquainted with industrial arts for the first time. When the pupil reaches junior high school, he learns to work to certain dimensions and specifications in wood and metal and in the school

shop instead of the formal classroom. In order to learn this new language and work in this environment, textbooks which tell "what" and "how" with pictures, diagrams, and drawings are introduced. The instructor demonstrates each operation sufficiently so that individual students may proceed with the work. The textbook and supplementary materials should be studied by the supervised study method as they are in history or geography or other subjects. Especially helpful in stimulating interest and giving instructional demonstrations is the use of visual aids when projectors and films are available.

Selection of criteria. In the shop the pupil begins his individual work by using job and instruction sheets, diagrams, and pictures. The instructor should offer suggestions and point out mistakes to the individual student. Safety should be taught for each operation and each tool used. In most shops the project system is used and the pupils work as fast as they wish. In individual work of this type, the class would seldom be together.

In the seventh and eighth grades the courses should be planned to cover a list of operations determined by the teacher as a standard for industrial arts. In the ninth grade pupils should be permitted to design their own project or work from any standard high school project book. One semester of mechanical drawing should be required in the seventh grade; a nine-week period should be devoted to this phase of the work in the eighth grade also.

One of the most urgent needs of the industrial arts department, as the writer sees it, is an extension of the program to include a special course in practical home mechanics. This course should be compulsory for boys before completing the junior high school so that, should they

not continue with their high school education, they would have the basic training in home upkeep. The course should include sketching, some knowledge of working drawings, using tools found in practically all households, simple furniture repair, refinishing, painting, upkeep of floors and repairing of simple electrical equipment.

Proposed objectives for the junior high school. The committee which produced the copy of the policies bulletin "Industrial Arts in Oklahoma Schools" formulated a list of objectives which they felt most adequately represent industrial arts in Oklahoma. These objectives might well be used in Tennessee to complete a program in industrial arts and to enrich the course offerings. The objectives proposed by the Policies Committee are as follows:

"1. Industrial arts is complementary to other school subjects and provides opportunities to apply knowledge learned in other school subjects.

"2. Develops an appreciation of applied knowledge and skills.

"3. Provides a knowledge of industrial drawing, the language of industry, and methods of expressing ideas by means of drawings.

"4. Contributes to later vocational efficiency.

"5. Stimulates students knowledge and appreciation of good design.

"6. Instills a satisfaction in personal creative achievement.

"7. Develops the ability to analyze a job into its processes and organize them into correct procedure.

"8. Contributes to consumer knowledge and induces an appreciation of the value of industrial materials and the need for their conservation.

"9. Trains in industrial and home safety (including fire prevention).

"10. Acquaints students with industrial information and induces a recognition of the standards of industrial attainment.

"11. Develops avocational interest.

"12. Trains individuals to be more resourceful in dealing with the material problems of life.

"13. Stimulates correct attitudes toward an orderly shop and home and their environment.

"14. Aids in making vocational choices.

"15. Develops qualities of leadership.

"16. Develops cooperative attitudes in work habits.

"17. Develops an appreciation of the dignity and importance of the occupation of one's neighbor." (28, page 29)

The importance of objectives cannot be stressed too greatly. In business and science great care is exercised in stating the ends that are expected to be attained as a result of following certain procedures. Education in a democracy has certain goals toward which it strives; industrial arts as a part of that education has specific aims in that it attempts to contribute distinctly as well as concomitantly to those ends. Objectives are definitely predetermined statements of the direction in which industrial arts attempts to proceed and the ends it hopes to attain.

A suggested industrial arts program for a typical Tennessee junior high school. In proposing the following three year program, the writer suggests an arrangement of these subjects, fully aware of the flexibility which might be dictated by the industrial character of the community or city. Table XII shows the subjects arranged according to a required sequence.

This suggested program was proposed by the policies bulletin committee which produced the handbook "Industrial Arts in Oklahoma Schools"

in 1948 (28, page 145). It is felt that the proposed program would suit the needs of the average sized junior high school in Tennessee which depends on one industrial arts teacher to teach its industrial arts program. Such a school usually has adequate facilities and equipment, and it is for this type of situation that the suggested program is planned. Larger or smaller junior high schools would need to make adaptations.

Table XII

A PROPOSED INDUSTRIAL ARTS PROGRAM FOR A TYPICAL TENNESSEE JUNIOR HIGH SCHOOL

Course	Units	Grades
General Shop (small high school)	1	7,8,9
General Woodwork (large city) Including drawing and electricity	1 or ½	7,8,9
General Metal Work (large city)	1 or ½	7,8,9
Crafts	1 or ½	7,8,9
Home Mechanics	1 or ½	7,8,9

Even though the physical aspects of the junior high school industrial arts shops may vary in the different sized school systems, the curriculum offerings should be somewhat similar with details adjusted to meet specific local needs and community interests. Averaged sized junior high schools should aim to establish at least a minimum program in industrial arts, while the larger ones can add much enrichment to their present program.

Chapter VI

INDUSTRIAL ARTS IN THE SENIOR HIGH SCHOOLS OF TENNESSEE

In the senior high school, industrial arts subjects are usually elective and the emphasis shifts from that of broad offerings in a variety of industrial arts subjects to more specialized work in one or two shopwork or drawing activities. The senior high school provides its students with opportunities for advancement toward a chosen goal. It builds upon the courses presented in the junior high school and should offer specialized as well as general courses, both for the students planning to continue their work in college and for those expecting to leave school and begin work.

Industrial arts contributes to future professional preparation. For the students expecting to take academic or liberal arts courses in college, the high school industrial arts offerings are the last real chance to experience the creative satisfactions of manipulative activity with the tools and materials of industry. Many adults now deplore the fact that they were unable to enroll in shop classes because of the necessity of adhering strictly to a college preparatory curriculum. This is no longer the general rule except as teachers, advisors and other school officials may be prejudiced. Many high school faculties now encourage the college preparatory students to take industrial arts because they will not have the chance in college.

For the high school students who have definite ambitions for

certain professional careers, the industrial arts course is almost a "must" course. For all future engineering students a variety of industrial arts courses would be most helpful with special emphasis being placed on specialized shopwork courses and on mechanical and applied drawing.

Size and number of industrial arts classes in Tennessee senior high schools. There are 110 senior high schools offering industrial arts in the public schools of Tennessee. Questionnaires were returned covering information about industrial arts in 101 schools. There are 122 industrial arts teachers reported to be teaching either part or full time in industrial arts in the 101 senior high schools. Table XIII, shows the per cent of the total number of industrial arts classes for each class size.

Table XIII

SIZE AND NUMBER OF INDUSTRIAL ARTS CLASSES
IN THE SENIOR HIGH SCHOOLS OF TENNESSEE

Size of classes	No. of classes	Per cent of total number of classes
1 - 9	6	1.05
10 - 14	61	10.72
15 - 19	108	18.94
20 - 24	174	30.52
25 - 29	106	18.59
30 - 34	74	12.98
35 - 39	22	3.85
40 - and over	19	3.33

Column one, of Table XIII indicates the number of pupils enrolled in each of the industrial arts classes. Column two, and column three, show a total of 570 classes with the percentage of frequency in each

class. It seems that from twenty to thirty pupils is about the average class size.

Length of class period. As is indicated in Table XIV, the length of class period is pretty well standardized in the senior high schools of Tennessee. The junior high schools, reported in Table VIII, were much less consistent in length of class period. The number of class periods was reported uniformly as five per day in the 101 questionnaires returned from the senior high schools.

A vast majority of the senior high schools use the sixty minute class period for all shop and mechanical drawing courses. It seems that most high schools are organized on the one-hour-to-each-class basis.

Table XIV

LENGTH OF CLASS PERIOD IN INDUSTRIAL ARTS IN TENNESSEE SENIOR HIGH SCHOOLS

Length of class period	No. of schools
120 minutes	6
60 minutes	67
55 minutes	20
50 minutes	6
45 minutes	2

Column one, of Table XIV represents the length of class periods. Column two, represents the number of schools using the corresponding class period shown in column one.

Location of industrial arts shop. A most important consideration in industrial arts is the location of the shop. Due to the noise factor, industrial arts shops have often been relegated to the basement,

along with toilets and the furnace room. Basement rooms are damp resulting in rusted tools and equipment, air circulation is poor, lighting is usually inadequate, and they are often inconveniently located. The industrial arts shop should be located in as desirable a place, all things considered, as that provided for other school subjects. The location should be such that necessary noise will not disturb other classes. A wing of the building proper or a separate shop building usually offer good shop locations. In some schools, very acceptable shop locations are incorporated into the present building.

Table XV

LOCATION OF THE INDUSTRIAL ARTS SHOP
IN THE SENIOR HIGH SCHOOLS OF TENNESSEE

Location of school shop	No. of school shops
Basement	10
Ground floor	38
Second floor	4
Separate building	49

Column one, of Table XV represents the location of the school shop. Column two, represents the number of shops in the corresponding location shown in column one.

Industrial arts as a required subject in the senior high schools of Tennessee. There were no senior high schools reporting industrial arts to be a required subject. However, in a few cases it was mentioned as being one of the electives of several that could be chosen as a required elective. By way of summarization of all the returned questionnaires, industrial arts is purely an elective in the senior

high schools of Tennessee.

Value of shop equipment. On a comparative basis the senior high school shops are quite well equipped. Some of the schools report a very small inventory of equipment while others report equipment to be valued at $200,000 and over. It must be remembered that these well-equipped shops are in the larger cities and that war surplus machinery might have added a considerable amount to their equipment inventory. It must also be understood that some high schools that have machine shops trained war production workers during the early years of World War II and gained considerable equipment by doing so. However, this was done only in the larger school systems in industrial communities.

Table XVI

VALUE OF SHOP EQUIPMENT IN THE SENIOR HIGH SCHOOLS OF TENNESSEE

Value of shop equipment	No. of schools
$ 500 or less	6
501 - 1,000	18
1,001 - 2,000	17
2,001 - 4,000	18
4,001 - 6,000	13
6,001 - 8,000	10
8,001 - 10,000	12
10,001 - 100,000	4
100,001 - and over	3

Column one, of Table XVI, indicates the approximate value of shop equipment. Column two shows the number of schools having the corresponding cost of equipment shown in column one.

Salary of industrial arts teachers in the senior high schools of

Tennessee. The returned questionnaires indicated that salaries of high school teachers were about the same as for the junior high school teachers. There is no distinction in the state salary schedule of Tennessee as to salaries of junior or senior high school teachers. The 122 returned questionnaires about individual teachers, indicated that all salaries of the industrial arts teachers were above state schedule. The higher salaries are paid to teachers with fifteen to twenty-five years experience.

Column one, of Table XVII, indicates the annual salary of the industrial arts teachers in the senior high schools of Tennessee. Column two, indicates the number of teachers receiving the corresponding salary in column one.

Table XVII

ANNUAL SALARIES OF INDUSTRIAL ARTS TEACHERS IN THE SENIOR HIGH SCHOOLS OF TENNESSEE

Annual salary	No. of teachers
Below $2000	0
2001 - 2400	23
2401 - 2800	33
2801 - 3200	21
3201 - 3600	25
3601 - 4000	9
4001 - 4400	7
4401 and over	4

Qualifications of the industrial arts teachers in the senior high schools of Tennessee. The academic qualifications of the senior high school industrial arts teachers seem to be very good. In addition to their academic qualifications, many have several years trade and industrial experience which is desirable.

The industrial arts teacher should be as well educated as any teacher in the school. Besides the formal college shop courses his training should include work in a variety of other fields. The physical sciences, because of their close relationship to industry and industrial products, should be stressed. In order to interpret the world of work and the characteristics of the various occupations, more than a simple knowledge of the social sciences is necessary. Geography, with an accent on the sources of products and materials, finds a direct outlet in the teaching of industrial arts. Fluency in composition as well as in speech is needed by every industrial arts teacher.

Column one, of Table XVIII, shows the degree or degrees earned by industrial arts teachers. Column two indicates the number of teachers having the corresponding degree shown in column one.

Table XVIII

ACADEMIC QUALIFICATIONS OF INDUSTRIAL ARTS TEACHERS IN THE SENIOR HIGH SCHOOL

Degree or degrees earned	No. of teachers
No degree	5
B.S. or A.B.	76
M.S. or M.A.	41
Ph. D.	0

Teaching experience. The extent of the teaching experience of the industrial arts teachers in the senior high schools is somewhat less than that of the junior high school teachers. This might be explained by the fact that a sizeable number of the senior high school teachers have several years of trade or industrial experience, whereas the junior high school teachers were low in trade or industrial experience.

Column one, of Table XIX, indicates the number of years teaching experience per teacher. Column two indicates the number of teachers who have been teaching for the corresponding number of years shown in column one. The average extent of the teaching experience of high school industrial arts teachers in Tennessee is slightly less than ten years.

Table XIX

TEACHING EXPERIENCE OF SENIOR HIGH SCHOOL INDUSTRIAL ARTS TEACHERS

Years experience teaching industrial arts	No. of teachers
1 - 3	8
4 - 6	22
7 - 9	34
10 - 12	25
13 - 15	15
16 - 20	10
21 and over	8

Teacher load. Column one, of Table XX, indicates the number of classes in industrial arts per day. Column two, indicates the corresponding number of teachers who teach the number of classes shown in column one. Fifty-eight per cent of the 122 industrial arts teachers reporting are teaching industrial arts courses five, six and seven periods per day. Forty-two per cent of the teachers are teaching other subjects along with industrial arts.

Other duties. Thirty-one per cent of the 122 industrial arts teachers who teach in the senior high schools of Tennessee have other duties or teach other classes in addition to industrial arts. One of

the major problems in connection with "other duties" is the tendency which has existed over a period of years in the smaller schools, of combining the teaching of physical education or coaching and industrial arts. These two areas necessarily require as much time as any other subject in the curriculum. Many schools have demanded a winning team to the extent that the industrial arts shop has been neglected.

Table XX

TEACHER LOAD FOR VARIOUS NUMBERS OF PERIODS OF INDUSTRIAL ARTS CLASSES IN THE SENIOR HIGH SCHOOLS OF TENNESSEE

No. of classes per day in industrial arts	No. of teachers
Less than four	28
Four	23
Five	25
Six	43
Seven or more	3

Column one, of Table XXI, shows other duties performed and subjects taught by the industrial arts teachers. Column two, indicates the number of industrial arts teachers having the corresponding duties or classes.

Table XXI

DUTIES OTHER THAN TEACHING INDUSTRIAL ARTS SUBJECTS IN THE SENIOR HIGH SCHOOL

Other duties or courses taught	No. of teachers
Coaching	17
Principal	2
Mathematics	6
Science	6
History	7

A general statement of conditions. For purposes of analysis, it is possible to classify the school systems of Tennessee into three major groups; (1) those in the larger cities such as Memphis, Nashville, Knoxville and Chattanooga, (2) those in the medium sized and smaller cities such as Oak Ridge, Jackson and Kingsport, and (3) the county consolidated school systems found in the agricultural and sparsely settled regions. Industrial arts has a definite contribution to make in each of these types of schools, and, although the physical aspects of the shops may vary from group to group, the broad curriculum offerings should not differ except as regards details of specific community needs and interests.

Industrial arts shops are common to the junior and senior high schools of the state. However, the administrative practices and the standards of teaching found in these shops are not common to each other; in fact, a wide variation is noted. The shop building and equipment of a junior high school in one locality may far surpass that of a senior high school in another. A small school may have a better teacher than a large school, but the facilities will not be adequate for the teacher to produce results commensurate with the capabilities of the teacher. One school may have excellent equipment for a diversified program, but the instructor is especially interested in woodwork and teaches that to the exclusion of many other activities. Additional descriptions will but verify more forcefully the fact that a variety of practices and conditions do exist and that a determined effort should be made on the part of teachers and administrators to raise the standards of work and to help each other make industrial arts as functional and educational as it has the inherent structure to be.

On the other side of the balance, the future of industrial arts in Tennessee looks promising. In general, school administrators are highly interested in developing a desirable program in industrial arts. Due to many lessons learned and made evident during the war effort, people are becoming more critical of the educational program and are demanding emphasis along the lines of the industrial arts. This has been reflected in the attitude of boards of education to the extent that sufficient funds were appropriated for the expansion and development of many commendable programs in industrial arts as well as in other school subjects. The great need, and the one which will not be satisfied, is the staffing of industrial arts programs with teachers who have a progressive outlook and an adequate background of experience.

At the present time, common to all schools, is a lack of uniformity in the industrial arts organizational patterns and curriculum offerings. These inconsistencies are evident in such items as teacher qualifications, course content, grade placement, time allotments, and amount of credit. It is hoped that this study will aid materially in adjusting some of these conditions, for without some uniformity in these items, efficient administration is extremely difficult.

A suggested industrial arts program for the senior high schools of Tennessee. In a senior high school industrial arts program the interests and abilities of the individual students diverge into different occupational and intellectual fields. It is felt that to develop for each individual an educational program that is consistent with the interests and abilities of the student requires a well planned industrial arts program.

In discussing the more specific emphasis of industrial arts at the senior high school level, Ericson says:

> "At this level the acquisition of skill may receive more attention. Developments of maturing work habits, independent and cooperative effort, may be expected to reach more advanced stages at this age. Since there is more likelihood that the student has made at least a tentative choice of an area of occupational work he can now choose subjects in industrial arts that will strengthen his background for further education or occupational training." (10, page 256)

Industrial arts in the senior high school should develop efficient work habits, wholesome attitudes, varied interests, and elementary skills. In addition, more specific information and guidance pertaining to occupations should be given.

Table XXII

A SUGGESTED INDUSTRIAL ARTS PROGRAM
FOR THE SENIOR HIGH SCHOOLS OF TENNESSEE

Subject	Area time division	No. of semesters	No. of H.S. credits	Periods per week	Grade
INDUSTRIAL ARTS I Rotating	Near equal time in each area offered	2	1	5-60 min.	9th
INDUSTRIAL ARTS II* Personal interests and ability discoveries	Minimum 9 weeks Maximum 18 weeks	2	1	5-60 min.	10th
INDUSTRIAL ARTS III AND IV Special interests and ability pursuits	18 weeks or more	2-4	1 or 2	5-60	11th and 12th

*Students who have completed required work in industrial arts in junior high school begin high school work here.

A considerable amount of time has been spent in search of a suggested industrial arts program that would satisfy the foregoing

discussion. The writer feels the industrial arts program proposed by the Industrial Arts Production Committee of the State of Iowa would most nearly serve the needs of the senior high schools in Tennessee. This program is presented graphically in Table XXII.

It will be noted in Table XXII that the ninth grade is included in the suggested program for the senior high schools. The inclusion of the ninth grade was felt necessary since industrial arts courses are not offered in many high schools of Tennessee in earlier grades. In the various high schools it may be necessary to make adaptations.

> "Industrial Arts I. This level of industrial arts presents the basic fundamentals of each shop subject considered desirable to develop elementary skills, consumer knowledge, simple technical information, and to inspire individual interest and test personal aptitudes. It is recommended that all students in each class rotate on an individual basis through all industrial arts subjects offered. Suggested minimum program for Industrial Arts I should include general drawing and three other shopwork subjects — woodwork, metal work, general electricity, general crafts, home and farm mechanics.
>
> "Industrial Arts II. (Prerequisite, Industrial Arts I) Courses offered on Industrial Arts II level should probably include all the industrial arts subjects selected for the rotating program of Industrial Arts I plus several others. The time element most satisfactory for each industrial arts subject will vary with the amount of depth or penetration desired. Suggested program should include two or three of the following industrial arts subjects: mechanical drawing, woodwork, metal work, electricity, crafts, home mechanics and farm mechanics, transportation (automobile mechanics and aircraft), and/or others.
>
> "Industrial Arts III and IV. (Prerequisite, Industrial Arts II) Sequences might be composed of any of the following courses depending upon the available equipment of any particular school, the teaching personnel, and the local needs and interests. It is recommended that schools plan for future offerings in all courses suggested here, plus any others which seem desirable. Suggested program for Industrial Arts III and IV: mechanical drawing, woodwork, metal work (cold), metal work (hot), trans -

> portation (automobile mechanics and aircraft), electricity and crafts. It is suggested that a specialization field be selected in mechanical drawing or metal work, or both." (Industrial Arts Production Committee 14, page 38)

This suggested industrial arts program for the senior high schools of Tennessee should be interpreted liberally and applied with flexibility, taking into account the organization pattern, the size, the wealth, and other varying elements in each community or city. It should be brought to the reader's attention that each level of industrial arts in the suggested program is more advanced than the preceding one and no subject matter should be duplicated in the various levels.

Broad areas of work have been suggested which might be covered during a semester's time or some such similar period, with the details of the course being left to the discretion of the individual teacher. The suggestion of the plan outlined is to have all schools in Tennessee offer similar courses at the same time, which will eliminate the problem caused by the transfer of students from one school to another. Such a plan standardizes, but does not inhibit; it provides all the benefits of standardization while allowing for a freedom of activity on the part of the individual teachers and schools.

CHAPTER VII

CERTIFICATION OF INDUSTRIAL ARTS TEACHERS

In recent years, industrial arts has grown so rapidly in most of the states that it has been deemed important that proper attention be given to teacher certification. It is necessary to study the certification plan for industrial arts teachers in other states for comparative purposes. The certification plans for industrial arts teachers in four states have been secured and included in this chapter for study and comparison. In making this selection two plans from adjacent states, one plan from the east coast and one plan from the west coast were decided on to give a more general impression of industrial arts teacher certification.

Certification of industrial arts teachers in California. In the state of California, a special certificate is issued to industrial arts teachers. This certificate is issued to an applicant who has completed a four-year college course with a bachelor's degree and the required industrial arts teacher education courses in an institution approved by the State Board of Education for preparing industrial arts teachers. The certificate authorizes the holder to teach specific industrial arts subjects or shops in which he has had training and experience.

Certification requirements. Forty semester hours of special technical training suited to the needs of teachers of junior high and senior high school industrial arts. Distribution approximated as follows: (Courses in teaching field)

Automobile Mechanics	3 hours
Woodwork	3 hours
Electricity and Radio	3 hours
Drawing	3 hours
Metal Work	3 hours
Total	15 hours

Twenty-five hours of shop electives shall be made up of additional courses in the subjects listed in the above required group, or selected from the following subjects.

1. Battery Construction
2. Vulcanizing and Tire Repair
3. Home Mechanics and General Shop
4. Forging and Welding
5. Wood Finishing and Painting
6. Leather Work
7. Upholstery
8. Art Metal
9. Foundry
10. General Shop
11. Printing

PROFESSIONAL COURSES IN ADDITION TO THE ABOVE ARE AS FOLLOWS:

Directed Teaching in Industrial Arts Method Courses in Industrial Arts Courses dealing with Aims, Scope, and Outcomes of Secondary Education Organization and Administration	15 hours

The State Department of Education in California issues a special secondary certificate for Industrial Arts, authorizing the holder to teach the subject named on the face of the certificate.

New York. In the state of New York two teaching certificates are issued, a provisional certificate and a permanent certificate. A provisional certificate is issued to candidates who have completed a four-year approved curriculum leading to the baccalaureate degree. The holder of a provisional certificate is eligible for the permanent certificate provided he completes thirty semester hours in approved courses in addition to the minimum standard of preparation. Roy G. Fales is the state supervisor of industrial arts.

Preparation for a provisional certificate. The candidate shall have completed the requirements leading to the baccalaureate degree (or approved equivalent preparation) including:

Eighteen semester hours in professional courses approved for teaching in public schools. The schedule which follows will be used to appraise the said eighteen semester hour program:

Supervised student practice teaching in elementary and secondary schools including conferences on teaching problems . . . . . 4 to 8 hours

Industrial arts methods and materials . . . . 4 to 6 hours

Adolescent development and/or psychology for teachers . . . . . 2 to 4 hours

History, philosophy, problems and/or principles of industrial arts . . . . . 2 to 4 hours

Thirty-six semester hours in approved courses related to the field of industrial arts.

Preparation for a permanent certificate. The candidate shall have completed an approved four-year curriculum leading to the baccalaureate degree and in addition thirty semester hours in approved advance courses. The total program of preparation shall include:

Eighteen semester hours in approved professional courses as required for a provisional certificate; and

Thirty-six semester hours in appropriate industrial arts courses as required in a provisional certificate.

The state of New York also imposes another requirement for the holders of permanent certificates. The holder of a permanent certificate must complete six semester hours in approved courses or the equivalent in approved professional activity other than classroom teaching during each successive ten-year period from date of issuance.

North Carolina certification requirements. The minimum scholastic training represents graduation from a standard four-year college. It is recommended that one be qualified to teach two or more subjects including his major field. North Carolina lists no state supervisor of industrial arts to coordinate the industrial arts programs in the public schools.

The summary of requirements for North Carolina is expressed in terms of professional requirements and academic requirements. Individual certificates is granted in any major field of specialization.

I. Professional requirement . . . . . 18 SH

a. The Pupil 6
b. The School 6
c. Teaching and Practicum . . 6

II. Academic requirements vary with the subject for which certification is granted. In terms of semester hours, the minimum subject matter credit for the teaching of industrial is as follows:

Industrial Arts . . . . . 30 SH

a. Drawing and Design 6
b. Woodwork (including bench work, machine work, carpentry and cabinet making) 6
c. General Metal Work (including cold metal, sheet metal, forging, foundry, machine shop, art metal and welding) 6
d. Electricity (including general principles, house wiring, common appliances and radio. . . 6
e. Electives from a, b, c, d, or from other courses as graphic arts, (printing, silk screen, photography) ceramics, automotives, aeronautics, crafts, (jewelry, leather) . . . 6

Certification requirements in the Commonwealth of Kentucky. In the state of Kentucky the following requirements have been established for a provisional high school certificate in industrial arts.

I. Professional preparation . . . . . 18 SH

A. Student Teaching . . . . . 8 SH
at least -
B. Other Professional Courses . . . . . 9 SH
at least -

(1) Child Growth and Development
(2) Fundamentals of Secondary Education
(3) Organization and Administration of the public school system.

II. Teaching Field in Industrial Arts.

A teaching area in industrial arts shall consist of a minimum of forty-two semester hours distributed as the following:

General Shop . . . . . 3 SH
Metal Working , ... 9 SH
Woodworking . . . . . 9 SH
Graphic Arts (drawing, printing, design) . . . . 9 SH

Electives, including, if possible, electricity, leather craft, plastics, and other subjects to be determined by needs of the student . . . . . 12 SH

The provisional high school certificate in North Carolina may be renewed every four years after three years teaching experience. The standard high school certificate is issued to persons who meet the general regulations of the State Board of Education and have completed a four-year curriculum for the training of high school teachers and who complete the requirements for a master's degree.

Certification of Tennessee high school teachers. The State Commissioner of Education is the sole authority for issuing certificates to teachers in Tennessee. Tennessee issues only one type of certificate, a permanent professional certificate. As in many other states, Tennessee does not have a state supervisor of industrial arts to coordinate the work of the industrial arts programs in the state.

Education. The applicant must have completed at least twenty-seven quarter hours in education as prescribed by the State Commissioner and State Board of Education. The twenty-seven quarter hours in education must include:

a. Educational Psychology . . . . . 3 QH

b. Principles of Secondary Education . . . . . 3 QH

c. Material and Methods of Teaching Ind. Arts . . . . 6 QH

d. Directed and Practice Teaching in Ind. Arts. . . . 3 QH

The remaining twelve quarter hour credits of the twenty-seven quarter hours required are elective and will be selected from the courses including the following list:

1. History of Education.
2. Adolescent Psychology.
3. Educational Tests and Measurements.
4. High School Administration, Organization and Management.
5. Educational Sociology.

6. General Psychology.
7. Curriculum of the High School.
8. Philosophy of Education.
9. Mental Hygiene.
10. Audio-Visual Aids.
11. Guidance.

Professional Requirements. The applicant shall offer a minimum of twenty-seven quarter hours credit in industrial arts and be certificated in the following fields with nine quarter hours in each:

Graphic Arts: including drawing, planning, printing and photography.

Woods and Construction: including furniture construction, carpentry, cabinet making, wood finishing, saw filing, millwork, painting and decoration, upholstering, concrete work, masonry, and plastics.

Metals: including sheet metal, art metal, foundry, machine shop, forging, metal finishing, welding, and ornamental iron.

Applied Electricity: including communication, electric motors, power, radio, light, refrigeration and air conditioning electronics, and general electricity.

Mechanics: including auto mechanics, home mechanics, general shop, air-craft mechanics and crafts.

An applicant may be certified to teach any one of the mentioned fields by offering eighteen quarter hours in that field.

A careful study of the included plans from other states with that of Tennessee shows Tennessee out of line in the certification of industrial arts teachers. However, all of the Tennessee colleges approved by the State Board of Education for the preparation of industrial arts teachers indicated in the curriculum of the school catalog that from fifty-four to sixty-three quarter hours in industrial arts were required for a bachelor of science degree.

Suggested changes in the certification plans for Tennessee. It is the opinion of the writer if Tennessee is to meet the challenge of a growing industrial state it will have to revise the certification plans

for industrial arts teachers to meet the trends in the field . The requirements under "Education" seem to be satisfactory for industrial arts teachers. However, the "professional requirements" should be more specific in the certification plans. It is suggested the following changes be made in professional requirements for certification of Tennessee industrial arts teachers.

Professional Requirements.

Basic Woodworking	6 QH
Basic Industrial Drawing	6 QH
Organization and Administration of Industrial Arts .	2 QH
Industrial Arts Design	3 QH
Care of Shop Equipment	2 QH
A "Major" in one of the following industrial arts fields	15 QH
	34 QH

The industrial arts fields from which a "Major" of fifteen quarter hours may be selected are as follows:

1. Automobile Mechanics
2. Crafts or Handicrafts
3. Electrical Work
4. General Shop (including two or more quarter hours of work in each of four shop courses in addition to woodwork and drawing)
5. General Metal Work (including two or more quarter hours of work in each of four courses using metal work tools and processes)
6. Industrial Drawing
7. Machine Shop Practice
8. Printing
9. Woodworking

The adoption of the suggested changes in the certification plans should help to correct many misconceptions as to the purpose of industrial arts. It is felt that revisions and changes are necessary before industrial arts will take the place it should in the educational system of Tennessee.

Certification standards are to be considered as minimum standards for teacher preparation. It is expected that colleges and universities that prepare industrial arts teachers will develop and emphasize much higher standards in their teacher education programs. The teacher is by far the most important single factor determining the success of an industrial arts program, and when certification standards are high and kept up to date, better qualified industrial arts teachers will be prepared for the public schools.

Chapter VIII

CONCLUSIONS AND RECOMMENDATIONS

It is evident as developed in the course of this study, that the industrial arts activities should have an important place in the junior and senior high schools of Tennessee. The activities should be encouraged to the extent that they will make a contribution to the development of youth, toward the type of citizens which life in the modern world requires.

Part A

Conclusions

The writer realizes that much has been left out of this study that should have been investigated and reported. A great deal of material and information has been necessarily omitted because of the extensive nature of the study. It is felt, however, that much has been accomplished toward determining the needs of industrial arts in the secondary schools of Tennessee and furnishing a basis for future similar studies.

A general concluding statement. There are 417 public high schools in Tennessee, of which, 358 are senior high schools and fifty-nine are junior high schools. Of the 358 senior high schools there are 110 schools in which one or more industrial arts courses are available to their students. This indicates that forty-four per cent of

the junior high schools and thirty-one per cent of the senior high schools include industrial arts courses in their curriculum. Of the total number of junior and senior high schools in Tennessee only 136, or thirty-three per cent include industrial arts in the curriculum.

Those who are not familiar with the public schools of Tennessee might think that this low percentage of junior and senior high schools in which industrial arts is offered is an indication that industrial arts is not of any great value in the curriculum asa school subject. With no intention of attempting to defend the low percentage of industrial arts programs in the public schools of Tennessee, the writer offers the following statements from school principals on why industrial arts is not included in the curriculum of the school they represent.

"Farm shopwork satisfies our needs for industrial arts." (Statement given by six principals)

"Trade and industrial education courses are offered in the place of industrial arts." (Statement given by nine principals)

"Money is not available for equipment and enrollment is not large enough." (Statement given by sixteen principals)

"There is no space available for a shop at the present time." (Statement given by four principals)

"We plan to offer industrial arts in the future." (Statement given by eleven principals)

"We would like to have industrial arts but there is no demand for it." (Statement given by two principals)

"We used to have industrial arts but the students lost interest in it." (Statement given by two principals)

"We are not interested in industrial arts at this school." (Statement given by four principals)

"Would like to know more about industrial arts. What is it?" (Statement given by one principal)

The foregoing statements indicate that six principals are unfavorable toward industrial arts being included in the curriculum. Fourteen principals are favorable toward industrial arts and thirty-five do not express unfavorable attitudes. It is the opinion of the writer that a large percentage of the school administrators would include industrial arts in the curriculum if they knew more about industrial arts and its contribution to general education.

By and large, the future of industrial arts looks bright in the public schools of Tennessee. There are industrial arts committees now functioning in east, west and middle Tennessee for the purpose of advancing the cause of industrial arts and compiling material for an industrial arts handbook and a state wide course of study. In the future it is hoped that a State Advisory Committee for industrial arts might grow out of the three sectional committees now functioning.

Part B

Recommendations

The recommendations offered here are those the writer feels should improve the status of industrial arts in the secondary schools of Tennessee and place industrial arts on a more recognized basis in the minds of school administrators. These recommendations are offered with due respect to those in authority over the splendid educational system in Tennessee.

Industrial arts in the junior high schools. Industrial arts should be included in all approved junior high schools in the state.

The exploratory and general educational nature of industrial arts presents a challenge to all the junior high schools of Tennessee in which this program is not offered.

Industrial arts in the senior high schools. Industrial arts courses should be available to all students in every senior high school of Tennessee having an estimated enrollment of 250 or more.

Size of classes. Industrial arts classes should not exceed twenty-five students since larger numbers would prevent proper instruction and supervision. The nature of industrial arts makes it imperative that some individual instruction be given.

Teachers salary. Salary schedules should be based on amount of professional preparation as an inducement to further study by the industrial arts teacher. In addition, appropriate increments should be made in salary for each year of tenure up to a maximum salary.

State course of study. In order to assure proper standards in industrial arts over the entire state, there should be a state course of study for each of the industrial arts courses offered.

State textbook adoption. There should be state adopted textbooks for the various courses offered in industrial arts. The state course of study should be based on these state adopted textbooks.

Industrial arts advisory committee. The plan of state advisory committees of Iowa, Oklahoma, Utah and other states should be studied and a plan suitable to Tennessee be devised. This committee should

be appointed by the state superintendent of public instruction and its duties should be advisory in nature.

State supervisor. There should be a state supervisor of industrial arts to coordinate and supervise the industrial arts programs in the state. Any program will attain greater heights under a capable and recognized leader.

Certification. The present certification plans for industrial arts should be revised and brought up to date. This would do much in raising the qualifications of the industrial arts teachers in the state.

Professionalization of industrial arts teachers in Tennessee. Special meetings should be scheduled for industrial arts teachers at the state teachers meeting. The industrial arts associations in east, west and middle Tennessee should meet at least once in every three months period for the advancement of the industrial arts profession.

Future studies. The status of industrial arts in Tennessee should be conducted every five years to discover the potential needs of industrial arts in the junior and senior high schools. Industrial arts as in other fields needs reviewing and reanalyzing in order to advance and keep abreast with modern education.

APPENDICES

Appendix A

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Appendix B

DIRECTORY OF INDUSTRIAL ARTS TEACHERS IN
THE SECONDARY SCHOOLS OF TENNESSEE

School Year 1950-51

CITY SCHOOLS

Alcoa

Joseph D. Lindsey	Industrial Arts	Alcoa High School

Bristol

Rupert M. Smith	Industrial Arts	Bristol High School

Chattanooga

John R. Osteen	Mechanical Drawing	Chattanooga High School
Thomas L. Haman	Industrial Arts	Chattanooga High School
James McCullough	Industrial Arts	Brainerd Jr. High School
C. J. Woodson	Industrial Arts	Dickinson Jr. High School
Fred Clark	Industrial Arts	East Lake Jr. High School
A. J. Verble	Industrial Arts	East Side Jr. High School
Evan M. Jones	Industrial Arts	East Side Jr. High School
Frank Copeland	Industrial Arts	Hardy Jr. High School
Lloyd Yarbrough	Industrial Arts	Lookout Jr. High School
Lawrence Morgan	Industrial Arts	N. Chattanooga Jr. High School

Clarksville

George E. Durisko	Industrial Arts	Clarksville High School

Covington

R. E. Scott	Manual Training	Byars-Hall High School

Dyersburg

N. O. White	Woodwork and Mechanical Drawing	Dyersburg High School

Elizabethon

Nathaniel Burchfield	Industrial Arts	Junior High School

Etowah

Paul M. Levengood	Shop	Etowah Jr. High School

Jackson

Robert West	Industrial Arts	Jackson Jr. High School

Johnson City

Cecil King	Industrial Arts	Science Hill High School
Terrell Ponder	Industrial Arts	Science Hill High School
William K. Hart	Woodworking	Johnson City Jr. High School
John Hillenbrand	Industrial Arts	Johnson City Jr. High School

Kingsport

Victor G. Simpson	Automobile Mechanics and Home Mechanics	Dobyns-Bennett High School
Gordon B. Wasinger	Woodwork	Dobyns-Bennett High School
Rollin Kennerly	Mechanical Drawing	Dobyns-Bennett High School
Robert Jordon	General Shop and Home Mechanics	Junior High School

Knoxville

Paul Brewer	Industrial Arts	Knoxville High School
Paul Coyner	Industrial Arts	Knoxville High School
Allen Wickersham	Industrial Arts	Knoxville High School
Harold S. White	Industrial Arts	Rule High School
Fred Hartin	Mechanical Drawing	Rule High School
Donovan Stringham	Shop	Christenberry Jr. High School
Jim J. Hartsell	Shop	Christenberry Jr. High School
Lauton Edwards	Shop	Park Jr. High School
O. H. Monday	Shop	Park Jr. High School
James Reasonover	Shop	Park Jr. High School
E. N. Aslinger	General Metal	S. Knoxville Jr. High School
Victor A. Walter	Shop	Tyson Jr. High School
Russell Ginther	Shop	Tyson Jr. High School

Maryville

Calvin Dunbar	Industrial Arts	Maryville High School
Ben Greene	Industrial Arts	Maryville High School

Memphis

C. A. Branyan	Radio	Central High School
W. B. Ely, Jr.	General Shop	Central High School
W. S. Hiltpold	Drafting	Humes High School
H. R. Widdop	Woodworking	Humes High School
M. J. Bradley	Woodworking	Tech. High School
C. T. Cooley	Electricity	Tech. High School

Herbert Drane	Drafting	Tech. High School
E. H. Smith	Printing	Tech. High School
J. R. Ralston	Metal Work	Messick High School
Paul J. Williams	Woodwork and Electricity	Messick High School
W. A. McGinnis	General Shop	East High School
Paul Greer	Drafting	South Side High School
Clyde B. Harrison	General Shop	South Side High School
Raymond McElroy	Woodworking	South Side High School
H. I. Fredericks	Mechanical Drawing	Treadwell High School
W. H. Sharp	Metal Work and Electricity	Treadwell High School
Wayne Russell	Woodworking	Treadwell High School
Willis Barnes	General Shop	Bellevue Jr. High School
John W. Long	General Shop	Snowden Jr. High School
Edwin H. Braly	General Shop	Fairview Jr. High School
J. H. Spray	General Shop	Hollywood Jr. High School
L. W. Paschal	Industrial Arts	Mallory Heights School

Morristown

William B. Keezel	Mechanical Drawing	Morristown High School

Nashville

J. E. Binns, Jr.	City Supervisor of Industrial Arts	Nashville
S. S. Ervin	Industrial Arts	Cohn High School
Joseph C. Wells	Industrial Arts	Cohn High School
B. S. Doak	Industrial Arts	N. Nashville High School
A. E. Smedley	Industrial Arts	N. Nashville High School
J. T. Appleton	Industrial Arts	Howard High School
D. J. Ayers	Industrial Arts	E. Nashville Sr. High School
Hilary Martin	Industrial Arts	E. Nashville Sr. High School
Haskell Newman	Industrial Arts	E. Nashville Jr. High School
John Thomas	Industrial Arts	E. Nashville Jr. High School
Cecil Webb	Arts and Crafts	West End High School
Paul Mortimer	Industrial Arts	West End High School
Charles Williams	Industrial Arts	Bailey Jr. High School
George Shreeve	Industrial Arts	Cavert Jr. High School
Jesse Buchanan	Industrial Arts	Highland Heights Jr. High School
Charles E. Adwell	Industrial Arts	Waverly-Belmont Jr. High School

Oak Ridge

Willis Adams	Industrial Arts	Jefferson Jr. High School
A. B. Harper	Industrial Arts	Jefferson Jr. High School

Frank J. Heck	Industrial Arts	Jefferson Jr. High School
Johnny E. Tigue	Industrial Arts	Jefferson Jr. High School
Charles C. Carnes	Industrial Arts	Oak Ridge High School
Charles Nave	Industrial Arts	Oak Ridge High School
J. E. Thomas	Industrial Arts	Oak Ridge High School

Tullahoma

Charles Thomas	Industrial Arts	Tullahoma High School

COUNTY SCHOOLS

Bedford County

Stone Wiseman	Industrial Arts	Central High School Shelbyville, Tennessee
Herbert Cooper	Industrial Arts	Community High School Unionville, Tennessee
Billy Gunn	Industrial Arts	Wartrace High School Wartrace, Tennessee

Blount County

Spence Renfro	Industrial Arts	Everett High School Maryville, Tennessee

Bradley County

Daniel Weekley	Mechanical Drawing	Bradley County High School Cleveland, Tennessee
Frank Whitaker	Woodwork	Bradley County High School Cleveland, Tennessee

Cannon County

R. M. Hitt	Industrial Arts	Auburn High School Auburntown, Tennessee
Clark Turney	Industrial Arts	Woodbury High School Woodbury, Tennessee

Carter County

A. H. Hyder	Industrial Arts	Hampton High School Hampton, Tennessee
Thomas Morgan	Industrial Arts	Elizabethon High School Elizabethon, Tennessee

Claiborne County

A. W. Baldwin	Industrial Arts	Claiborne County High School Tazewell, Tennessee

	Coffee County	
Guy Hart	Mechanical Drawing and Woodwork	Central High School Manchester, Tennessee
	Davidson County	
Joe N. Hunt	Industrial Arts	Central High School Nashville, Tennessee
A. E. Wright	Industrial Arts	Cumberland High School Nashville, Tennessee
Ralph Partee	Industrial Arts	Central High School Nashville, Tennessee
Gordon Lovell	Industrial Arts	Litton High School Nashville, Tennessee
Doyle Smith	Industrial Arts	DuPont High School Old Hickory, Tennessee
Ed Hessey	Industrial Arts	Hillsboro High School Nashville, Tennessee
	Dickson County	
J. H. Bryant	Woodworking	Charlotte High School Charlotte, Tennessee
	Franklin County	
Rudy White, Jr.	Industrial Arts	Huntland High School Huntland, Tennessee
Horace D. Jared, Jr.	Industrial Arts	Franklin County High School Dechard, Tennessee
John M. Williams	Industrial Arts	Franklin County High School Dechard, Tennessee
	Giles County	
Owen Bass	Industrial Arts	Beech Hill High School Pulaski, R.#7, Tenn.
Robert Henson	Industrial Arts	Campbellsville High School Pulaski, R.#2, Tenn.
Hillard Kincaid	Industrial Arts	Minor Hill High School Minor Hill, Tennessee
Urban Smith	Industrial Arts	Giles County High School Pulaski, Tennessee
	Hamilton County	
J. M. Seaton	Mechanical Drawing	Central High School Chattanooga, Tennessee
R. S. Wharton	Mechanical Drawing	Central High School Chattanooga, Tennessee

J. J. Fletcher	Automobile Mechanics	Central High School Chattanooga, Tennessee
James L. Milburn	Printing	Central High School Chattanooga, Tennessee
James I. Calfee	Mechanical Drawing	Red Bank High School Chattanooga, Tennessee
Lawrence Cuba	Industrial Arts	Red Bank High School Chattanooga, Tennessee
Joe L. Maddox	Industrial Arts	Tyner High School Tyner, Tennessee
Robert Freeman	Industrial Arts	Tyner High School Tyner, Tennessee
	Hancock County	
Milburn Hopkins	Industrial Arts	Hancock High School Sneedville, Tennessee
	Henry County	
Hudson Hartsfield	Industrial Arts	Henry County High School Paris, Tennessee
	Humphreys County	
Charles McMillen	Industrial Arts	Waverly Central High School Waverly, Tennessee
	Jackson County	
Clifford Gentry	Woodworking	Jackson County High School Gainesboro, Tennessee
	Knox County	
James M. Large	Industrial Arts	Central High School Fountain City, Tennessee
William I. Denton	Mechanical Drawing	Young High School Knoxville, Tennessee
William Davidson	Mechanical Drawing	Beardon High School Beardon, Tennessee
Glen Christian	Industrial Arts	Beardon High School Beardon, Tennessee
	Lawrence County	
Seth Springer	Home Mechanics	Summertown High School Summertown, Tennessee
A. H. Warf	Home Mechanics	Lawrence County High School Lawrenceburg, Tennessee

	Lincoln County	
Leonard Mansfield	Industrial Arts	Fayetteville High School Fayetteville, Tennessee
	Maron County	
Donald Gibson	Industrial Arts	Whitwell High School Whitwell, Tennessee
J. T. Whitlock	Industrial Arts	Marion County High School Jasper, Tennessee
Pink A. Fouch	Industrial Arts	S. Pittsburg High School S. Pittsburg, Tennessee
	Madison County	
Kirby McKnight	Industrial Arts	J. B. Young High School Bemis, Tennessee
John T. Bryan	Industrial Arts	Northside High School Jackson, Tennessee
	Marshall County	
Roy Derryberry	Industrial Arts	Marshall County High School Lewisburg, Tennessee
	Maury County	
Luther D. Ralph, Jr.	Industrial Arts	Central High School Columbia, Tennessee
	Polk County	
Troxey V. Jordan	Industrial Arts	Ducktown High School Ducktown, Tennessee
	Putnam County	
B. P. Smith	Industrial Arts	City School Cookeville, Tennessee
	Rhea County	
W. J. Officer	Industrial Arts	Dayton High School Dayton, Tennessee
	Robertson County	
Thomas F. Chambliss	Industrial Arts	Springfield High School Springfield, Tennessee

	Rutherford County	
Donald O'Brien	Industrial Arts	Central High School Murfreesboro, Tennessee
	Scott County	
Cla Q. Byrd	Home Mechanics	Norma High School Norma, Tennessee
Clarence McIntyre	Home Mechanics	Robbins High School Robbins, Tennessee
	Shelby County	
Harvey G. Lewis	Industrial Arts	Whitehaven High School Whitehaven, Tennessee
Jack R. Manking	Industrial Arts	Bartlett High School Bartlett, Tennessee
Carlton Pruitt	Industrial Arts	Frayser High School Memphis, Tennessee
	Sullivan County	
Walter Reed	Woodworking	Sullivan County High School Kingsport, Tennessee
Cecil Davis	Woodworking	Blountville High School Bloutville, Tennessee
	Unicoi County	
Carl Barnes	Industrial Arts	Unicoi High School Erwin, Tennessee
	Washington County	
Paul Slonaker	Industrial Arts	Lamar School Jonesboro, Tennessee
Joe Green	Industrial Arts	Lamar School Jonesboro, Tennessee
	Williamson County	
Leland Gore	Industrial Arts	Franklin High School Franklin, Tennessee

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