INDUSTRIAL ARTS SUBJECT AREAS FOR THE SECONDARY SCHOOLS AS LISTED IN STATE LEVEL PUBLICATIONS AS OF JUNE 1957

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CHAPTER I

INTRODUCTION

In every system of cooperative activities which involves two or more individuals, some method of organization is required for the group to function properly and obtain the desired objectives. This applies to a church congregation, a business concern, or a school system. In a school system, every curriculum area needs some type of organization. Whether this curriculum area is a physical education program, home economics program, or an industrial arts program, the information and subject material to be taught by the teacher should be properly organized to insure the attainment of the pre-determined objectives of general education. These objectives may be many and varied, but probably the main objective of general education as advocated by the educators of today is the development of attitudes, skills, and understandings which will enable all students of all parents to be accepted as citizens in a democratic society. In the highly industrial society of today, it is important that the students of our schools, who will be the future citizens of our communities, become intelligent producers and consumers.

A Statement of the Problem. Since industrial arts is

a "phase of general education that concerns itself with the materials, processes and products of manufacture, and with the contribution of those engaged in industry," (75, page 1) every industrial arts program, in a large school system or a small school system, should directly contribute to the attainment of the goal of general education. A common fallacy, however, in establishing and maintaining an industrial arts program, especially in a small community, is to include just woodworking and drafting.

Although woodworking and drafting should definitely be included in an industrial arts program, these two areas in themselves will not accomplish the desired objectives. Because industrial arts is a part of the general educational program, the goal of general education can not possibly be reached if the objectives of industrial arts are not being met.

Needs for the Study. At the present time, many school systems are not accomplishing the goals of general education for all students; partially because of an inadequate industrial arts program. This can be partly attributed to the lack of funds available for the smaller communities to install an adequate industrial arts program, but it can also be attributed to the lack of knowledge and inexperience of teachers in establishing an effective curriculum. An effective industrial arts curriculum should be selected with careful consideration of the needs and interests of both the pupil and the com-

munity; therefore, the industrial arts program should not be invested in only one person, such as a single shop teacher. Because only "one-fourth of newly prepared teachers receive assistance from the schools which employ them in incorporating curriculum trends into practice," some other method of establishing an adequate curriculum must be employed. (11, page 69)

Many different and effective methods could be employed to establish the desired curriculum, but a simple and yet effective method would be the use of a suggested curriculum, published on a state level. Through the combined efforts of a committee of curriculum experts who had surveyed the various needs and interests of the communities and students throughout the state, a suggested curriculum could be obtained. This suggested curriculum would aid in the accomplishment of the objectives of industrial arts and in return, contribute to the attainment of the goals of general education. This publication would include not only the objectives, desired outcomes, and suggested areas to be taught in the industrial arts program, but also would include equipment and tool lists, proposed projects, and the type of industrial arts shop which would be most desirable.

Definitions. The three most common types of industrial arts shops in use today are: the unit shop, the general unit shop, and the comprehensive general shop.

The unit shop is generally defined as a shop where

one single activity of a division of an industry is taught. The unit shop is most appropriate for the senior high school where several shops are provided. This type of shop is also desirable when the same shop is to be used for both industrial arts classes and vocational-industrial type classes.

The general unit shop is concerned with a wider range of activities than the unit shop and covers the subject matter of one complete field of industry. The students rotate through the various activities in the shops to gain experiences in one complete phase of industry. The general unit shop is found in the larger schools where enrollment, finances, and facilities make it feasible to have more than one shop.

The comprehensive general shop is one in which several basic industrial processes and materials are carried on simultaneously in one shop. This type of shop provides instruction in a wide range of areas of industry and crafts. In addition to meeting the needs of the smaller schools, the comprehensive general shop is highly recommended for the junior high school level, as a large number of industrial and craft exploratory experiences can be provided.

Origin of the Study. The original study of this type dates back to 1950, when Tolbert F. Brandon, then a graduate student in the Industrial Arts Education Department at Oklahoma Agricultural and Mechanical College, conducted

a study under the direction of Dr. Dewitt Hunt on the various industrial arts publications and materials which had been published by the forty-eight states. In this study, Mr. Brandon was interested in accomplishing the following:

> (1) to collect courses of study and syllabi from all the states and territories of the United States, (2) to outline these courses and syllabi and to find out what is being done in Industrial Arts, and (3) to summarize these state bulletins into a single table. (6, page 1)

In this study Mr. Brandon prepared an analyzed inventory of forty-six bulletins received from twenty-two different states. These bulletins included both courses of study and other industrial arts syllabi.

In 1956, L. H. Bengtson, Associate Professor of the Industrial Arts Education Department at Oklahoma Agricultural and Mechanical College, began a similar study. Professor Bengtson was interested in obtaining from the various states and cities of the United States and Canada any published materials pertaining to industrial arts education. This material was to be of any type which would improve the instruction of industrial arts. Sending requests to all state departments of education, state institutions of higher learning, and the larger cities, Professor Bengtson received approximately three hundred industrial arts publications.

Purpose of the Study. Upon the review of these publications, this writer became interested in how well the

curriculum for industrial arts in the secondary schools of the various states was standardized and published, and also, what areas were being taught. Another factor which the writer desired from this study was to find out which type of industrial arts shop was recommended for use by these states.

Numerous pages could be written to compare the different curricula offered by the various states, and more pages could be written to relate which states had published a suggested curriculum for industrial arts education in the secondary schools, and still more pages could be written to compare the different types of shops offered by the various states; but since "one picture is worth a thousand words," the writer, upon the suggestion and assistance of his adviser, has developed two tables which will show at a glance the findings of this study.

CHAPTER II

EVOLUTION OF INDUSTRIAL ARTS

From the era of the savage until the present day, the skills of the hands have been important to the survival of the people in the world. For the savage, it was necessary to employ all of his skills to combat the elements of nature and to protect himself from his enemies. In present day life, the necessities of survival and the comforts of living are still dependent upon the skills of the industrial worker. A brief historical background of industrial arts is presented in this chapter so that a better understanding of the development of industrial arts may be had by the reader.

Part A

Early History of Industrial Arts

Unknowingly, the savage used a form of industrial arts in securing the materials to build a hut for shelter and in securing weapons to kill wild animals for food and clothing. The savage learned that there was an important advantage in being skillful with his hands. Education usually consisted of imitation of either his father or a fellow tribesman.

Primitive Education. In primitive education, the

father was usually the teacher and his son was the student. The method of this education was "learn-by-doing". "When man gained the power to control fire he passed into another stage of civilization--from savagery to barbarism." (3, page 12, as cited by Davidson, Thomas, in A History of Education. Charles Scribner's Sons, 1901.)

Now man was able to cook his food, smelt his metals and shape them into tools. Using these tools, the primitive man was able to engage in crafts unknown and impossible before. This new development brought about a new division of labor. Also with this division in labor came new social groups. Common work experiences brought men together into these groups, and "gilds were formed of those pursuing the same craft." (3, page 12)

Early Jewish Theories of Handwork. The early education of the Jews was evenly divided between instruction in the Law of the church and that of learning a trade. The Jewish Law placed the duty of teaching handwork upon the parents. This could be called the beginning of apprenticeship.

Apprenticeship Influence. With the exception of the monastic schools, which became the center of intellectual life, participation in skilled labor was the only method of education for the middle-class youth. This was also his best means of rising to a position of respectability and influence in the community. As the crafts became more differentiated and specialized, a larger body of "mysteries" were to be learned and manual skill to be

gained. (3, page 21) This helped bring about the apprenticeship training. The period of apprenticeship was usually seven years, and varied greatly with different masters and trades. The masters were not only to teach the apprentices all the mysteries of the trade, which included any arts or sciences involved in the craft, but were also to give the apprentice sound moral, religious, and social training. The masters were to take no more than the number of apprentices which they could "keep, inform, and teach". (3, page 22, as cited by Salzman, L. F., from English Industries in the Middle Ages. The Clarendom Press, Oxford, 1923.)

In addition to receiving instruction in a trade, the apprentice also received wages. In this way, the apprentice earned while he learned his trade.

Early Educators. With the mastering of the art of printing (1423-1480) and the Protestant Reformation, new educational methods were advocated by a number of educators.

Martin Luther (1483-1546) recommended state-supported compulsory education for all children, including both male and female. He strongly opposed monastic schools on the grounds that they injured the young by imposing on their freedom. Luther advocated a school with "a school day of two hours, so arranged that it would allow the older children and youth to carry on the ordinary economic duties of life uninterruptedly". (3, page 31)

Rabelais (1483-1553) advanced ideas of reform against the insincerity of the schools of that time in France, by writing two novels, Gargantua and Pantagruel. "Rabelais saw the advantage of understanding the abstract and remote through the concrete and near at hand." (3, page 32) The influence of these ideas was exerted later upon Locke and Rousseau, and Rabelais' methods were applied by Pestalozzi, nearly three hundred years later.

Richard Mulcaster (1531-1611), head master of the English Merchant Taylor's School, was the first man to include drawing as one of the fundamental studies. Although he believed that all children should learn to read and write, he was most interested in discovering and developing the special abilities of the few.

Another early educator who is sometimes referred to as the "father of modern pedagogy" was John Amos Comenius (1592-1670). (3, page 39) He also took a practical view of industrial education in the form of using handicrafts to "illustrate a rational method of teaching the school subjects of his time". (3, page 39)

Although Sir William Perry never had a chance to put his plan into effect, his chief aim was to place handwork in the schools to further general education and not to produce artisans.

An early educator who proposed industrial education was John Locke (1632-1704). His chief exponent was his belief that education should fit a boy for practical life,

whether it be in a trade or for a profession.

Jean Jacques Rousseau (1712-1778), with the writing of Emile, which was about an imaginary son who expresses his ideas on education, was the cause of an upheaval in educational thinking in the eighteenth century. Rousseau believed that experience is the best teacher and experiences should be as naturalistic as possible. He believed a person should discover ideas instead of relying on a master or teacher for information or a demonstration. In referring to handwork, he speaks of Emile learning more in an hour by actual experience than he would from a whole day of verbal instructions. (3, page 80) Rousseau valued handwork as an aid to intellectual education. "His recognition of the fact that manual arts may be a means of mental training marked the beginning of a new era of education." (3, page 81)

Pestalozzi, the Father of Manual Training. Influenced by the writings of Rousseau, Johann Heinrich Pestalozzi (1746-1827) established a school in his own home for lower classes of children. He believed that there were two methods of teaching, one from words to things, and the other from things to words. Pestalozzi believed in teaching from things to words.

> And I am more than ever convinced that as soon as we have educational establishments combined with work shops, and conducted on a truly psychological basis, a generation will necessarily be formed which, on the one hand, will show us by experience that our present studies do not require one-tenth part of the time or trouble we now give to them. (3, page 116)

Because of his beliefs, Pestalozzi may very easily be called the "father of manual training". (3, page 106)

Fellenberg's Institution. Using the principles enunciated by Pestalozzi, Philip Emanuel von Fellenberg (1771-1844) established a multipurpose school at Hofwyl, Switzerland. This school was for both the poor and the rich and probably influenced manual training more than any other educational experiment of the early nineteenth century. Probably the greatest contribution of Fellenberg's Institution was the system of practical school administration and organization.

Friedrich Wilhelm Augustus Froebel. (1783-1852) Although it was Pestalozzi who introduced objective study in manual activities, it was Froebel who gave them a creative purpose. Froebel is credited with putting the principles established by Pestalozzi into practice, and at the same time, adding the doctrine of self-activity to educational theory.

Manual Training in Finland. The manual training in Finland was advocated and installed by Uno Cygnaeus. Following the ideas of Pestalozzi and Froebel, Cygnaeus outlined courses to include joinery, turning, and basket-making, as manual training courses. (4, page 58) In 1866, Finland passed a law making manual training a compulsory subject of the general education system.

The Swedish Sloyd System. The man who is credited with doing the most to develop the Swedish Sloyd System

was Otto Salomon. The first work was carried on in the home, but was later begun in the schools. "Sloyd was regarded not as apprenticeship training, but as pre-apprenticeship training." (9, page 25)

> The distinctive features of the sloyd system are as follows: First, the emphasis laid upon the mental and physical development of the child rather than upon the mere acquisition of skill in the use of tools; second, the carefully arranged sequence of the exercises and the care taken to adapt them in other respects to the nature of the child; third, the restriction of the work of the pupil to the making of complete articles, valuable for their beauty; fourth, the importance attached to the knife as being the "first and fundamental tool"; and fifth, insistence upon the trained teachers as instructors. (1, page 186)

The Russian System. In 1868, Victor Della Vos introduced into the Imperial Technical School at Moscow a method of manual instruction. This method was termed the Russian system and was essentially a laboratory method of instruction. The students were required to complete a series of exercises in wood and iron in what was considered to be a logical order for teaching purposes. This was completely different from the sloyd system, as in the sloyd system one hundred objects, each complete in itself, made up the course of instruction.

Part B

Development of Industrial Arts in America

Since America was composed of settlers from European countries, the European influence was quite evident in the

early American schools. Consequently, the two methods of instruction in the early schools were the Russian and later the sloyd systems.

Mechanic Institutes Movement. During the period from 1820 to 1860, there existed a desire to introduce some type of instruction into the schools that was not entirely done through the reading of books. In 1820, the General Society of Mechanics and Tradesmen of the City of New York opened a library for apprentices and "established a mechanics' school". (3, page 317) Although the mechanics' school was an important factor in the mechanics movement, the most famous institute of this time was the Franklin Institute of Philadelphia. The course of study in this school consisted of English, classical studies, modern languages, mathematics, and practical sciences. Other institutions to offer instruction in the practical sciences and mechanical arts were formed after the passing of the Land Grant Act of 1862, which provided for the endowment of higher education in agriculture and mechanical arts.

The Land Grant Act of 1862. Senator Justin S. Morrill, in 1857, introduced the land grant bill. Although the bill was presented three times before it finally became a law, it satisfied the long felt need for Federal aid in the establishment of agricultural and mechanical arts institutions of higher learning. This act granted to several states, public land equal to thirty

thousand acres for each senator and representative in Congress. This land was to be sold and the money used for the endowment, support, and maintenance of a college to teach agriculture and the mechanic arts.

The Manual Training Movement. In 1868, Calvin Milton Woodward, (1837-1914), who later became known as the "great champion of manual training", was a mathematics instructor in the Washington University of St. Louis. (4, page 318) Because a class of students in applied mechanics had difficulty in visualizing some objects under study, Professor Woodward arranged for the school carpenter to assist the boys of the class in making these objects out of wood. Woodward was surprised to learn his students did not even know the simplest forms of tool manipulation. It was at this time that Professor Woodward became a teacher of shop work which had no direct or immediate trade or industrial motive. His school at St. Louis "became the Mecca for visitors from all over America and from foreign countries". (9, page 29) In this school, Professor Woodward taught mechanical processes through the media of exercises and models, which were of some intrinsic value, but did not hold the interest of his students.

At approximately the same time that Woodward was feeling the need for shop work instruction, another leading educator, John D. Runkle (1822-1902), president of Massachusett Institute of Technology, had become aware of a similar problem in his own school. He found that many

of his students who did not have a knowledge of shop work before they entered the engineering school had difficulty in entering professional work after they had graduated, without first taking one or two years of apprenticeship.

While visiting the Centennial Exposition in 1876, Dr. Runkle saw the Russian exhibit of tool instruction and at once realized that the Russian method "is not only educational, but it constitutes the only true and philosophical key to all industrial education". (4, page 321) Because of Dr. Runkle's strong belief in the Russian system, the Massachusett Institute of Technology adopted the Russian system of shop work and established a school in the mechanic arts. "All the mechanic arts needed by young engineers" would be taught in the instruction shops. (4, page 322)

Like Dr. Runkle, Professor Woodward was very much impressed with the Russian exhibit at the Centennial Exposition.

> To Russia belongs the honor of having solved the problem of tool instruction. Others had admitted that practice in using tools and testing materials should go hand in hand with theory; but Russia first conceived and tested the idea of analyzing tool practice into its elements and teaching the elements abstractly to a class. In their hands, manual tool instruction has become a science. (4, page 322, as cited by Woodward, C. M., in The Manual Training School, D. C. Hiath and Co., Boston, 1887.)

Manual Training in Secondary Schools. With an enrollment of fifty students, the first manual training high

school in America opened in St. Louis in 1880. This school was established as a preparatory school for Washington University, but was soon revised to be mostly vocational, since the money for the grounds, building, and equipment, came from private sources.

On March 3, 1884, the first manual training high school to be supported at public expense was opened in Baltimore, Maryland. This school was modeled after Professor Woodward's school in St. Louis, but it was included as part of the public education of the students. The second publicly supported manual training high school was the Philadelphia Manual Training School. This school was opened in 1885, and in fifteen years, the number of manual training high schools had grown to more than one hundred.

Sloyd in America. Since most of the early manual training high schools were copied after the St. Louis Manual Training School, the Russian system was used almost exclusively. As the emphasis of this system was on the use of tools for skills rather than making functional objects, the American youth were not greatly attracted to the new manual training classes in the secondary schools. They wanted to use tools to produce an object of use or beauty. It was this condition that caused manual training to start to decline in our public schools, and led to the adoption of the sloyd system of instruction.

The first sloyd system was established in Boston, Massachusetts, in the Sloyd Training School, in 1888. This

was a private school established by Mrs. Quincy Shaw, and was placed under the direction of Gustaf Larsson, who was a student under Otto Salomon. Although his course of instruction was rather fixed and rigid at first, it soon became more flexible and utilitarian to meet the desires of the American youth.

Manual Arts Movement. Although the sloyd system attracted the American youth more than the Russian system, the American youth still wanted something a little different. Before long, a modified sloyd system was brought about. Students began to select and design their own projects. This was the beginning of the manual arts movement. This movement was further developed by the teachings of John Dewey, who expressed a new philosophy of education. His philosophy was that the schools should make the life of the school more real. (4, page 452)

In 1893, a building expressly for art and manual training at Teachers College, New York City, was named the Macy Manual Arts Building. This term was also applied to the new department of the college and later was given to the department of work in the New York City public schools. (4, page 441) After these and other events, the term manual arts gradually gained popularity.

Manual Arts Evolves into Industrial Arts. Although the term manual arts was slowly being accepted, the term manual training was still widely used. In 1904, in an editorial written for the Manual Training Magazine,

Professor Charles R. Richards suggested that the term manual training and manual arts be dropped, and a new term "Industrial Arts" be adopted. (4, page 453) Professor Richards believed that people had changed their viewpoint from the disciplinary thought of manual training. In the term industrial arts, the "industrial" is emphasized; while in manual arts, the "arts" is the historical word; and in the term manual training, "manual" is the important word. (4, page 455)

With this thought in mind, a new course of education was being established, which would close the gap between classroom education and the industrial world.

Part C

Industrial Arts in General Education

In the preceding pages of this chapter, an attempt has been made to formulate a history of the development of industrial arts. The next section of this chapter will be confined to showing how industrial arts is an important part of general education.

Objectives of General Education. Probably the most widely accepted objectives of general education are set forth in the Seven Cardinal Principles. These are:

1. Health
2. Command of fundamental principles
3. Worthy home membership
4. Vocation
5. Civic education
6. Worthy use of leisure time
7. Ethical character (7, page 27)

The objectives of general education as stated by Gordon O. Wilber are:

1. To transmit a way of life.
2. To improve and reconstruct that way of life.
3. To meet the needs of the individual. (10, page 3)

In the Seven Cardinal Principles, as well as Wilber's definition of the objectives of general education, the basic goal of education is to meet the needs and interests of the individual student through guidance and a well balanced, flexible curriculum.

Objectives of Industrial Arts. The objectives of industrial arts in the secondary schools are closely related to those of general education. The objectives, as listed below will show the correlation between industrial arts and general education.

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, followship, and tact.

8. To develop a certain amount of skill in a number of basic industrial processes. (10, page 42)

A more extensive list of the objectives of industrial arts which was compiled and published by the Oklahoma State Advisory Committee for Industrial Arts is as follows:

1. Industrial Arts is complementary to other school subjects and provides opportunity 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 avocation interests.

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. (53, page 3)

This list of objectives represents the combined opinions of several leaders in the field of industrial arts in Oklahoma, and therefore, this list is more comprehensive than the objectives as listed by one author.

As can be seen by the comparison of general education objectives to those of industrial arts, both are dedicated to the development of the students to become better future citizens of a democratic society.

CHAPTER III

THE INVESTIGATIONS REPORTED

Because industrial arts is a part of the general educational program, the curriculum of an industrial arts program should be such as to insure that the desired objectives of general education are being obtained. To do this, many states have published suggested instructional materials for use by the secondary schools. This study was conducted to discover which states had published this type of information, and what subject areas these states advocated in the industrial arts program.

Part A

Materials Utilized

This study was made possible through the review and utilization of many of the 298 industrial arts publications received by the Department of Industrial Arts Education, of Oklahoma State University. These publications were received from the various state departments of education in conjunction with the preparation of Mr. Brandon's report in 1950, and also with the 1956 and 1957 studies as prepared by Professor Bengtson. In these past studies, letters requesting any published materials

relating to the instruction of industrial arts were sent to all forty-eight states. Of the forty states that responded to the letters requesting published information, twenty-seven sent an official publication in which was listed some type of suggested instructional materials for an industrial arts program.

Methods of Study. The first step of this study was to make a comprehensive review of the 298 industrial arts publications. From this review, every publication which was furnished by a state department of education was then filed for further concentrated study. Upon further study of this material, the writer was able to determine which states had published bulletins, and what each of the individual states listed as suggested areas for use in the industrial arts program. The type of shop that was emphasized by each of the states was also obtained from this final review.

Validity of Results. Before the results of the writings of any author can become accepted as sound and conclusive, the validity of the results must be established. For this study to have been 100 per cent valid, current replies and up-to-date publications were needed from all of the forty-eight states. Since, however, letter were received from only forty states, this study is representative of only 83.3 per cent of the United States. Of this 83.3 per cent, the majority of the replies are as recent as March of 1956, and the industrial arts bulletins received are still being used as the official publication

in the individual states.

Taking into consideration that not all states are represented in this study, but also realizing that 83.3 per cent return of inquiry letters is above average for a graduate study, it is the opinion of this writer that the results given on the following pages can be interpreted as being a good representation of the suggested industrial arts programs that are published on a state level throughout the United States.

Part B

Results of the Study

In presenting the results of a graduate study, a variety of methods may be used, depending upon the nature of the report and the predicted use of the results. Since this thesis is informative in nature, a method of presenting the results is desired which will allow any reader to obtain a summary of the findings quickly and easily without a concentrated review of the complete publication.

Methods of Reporting Results. The methods used for reporting the results of this study are of two types: the table method and the paragraph method. This writer, in attempting to facilitate the utilization of the findings of this thesis for future reference, has chosen to use two tables to relate the major results of this study.

Tables. The first table, TABLE I (page 26), which is a list of the forty-eight states, reveals which states

TABLE I

STATES WHICH RESPONDED TO THE REQUEST FOR INDUSTRIAL ARTS INSTRUCTIONAL MATERIALS

ALABAMA	As of 27 March 1956, no state publication.
ARIZONA	
ARKANSAS	State publication.
CALIFORNIA	State publication, dated 1953 & 1955.
COLORADO	As of 20 March 1956, no state publication.
CONNECTICUT	State publication, dated 1945.
DELAWARE	
FLORIDA	State publication, dated 1948.
GEORGIA	As of 27 March 1956, working on publication.
IDAHO	State publication, dated 1955.
ILLINOIS	State publication, dated 1950.
INDIANA	State publication.
IOWA	State publication, dated 1948.
KANSAS	State publication, dated 1949.
KENTUCKY	State publication, dated 1953.
LOUISIANA	State publication, dated 1952.
MAINE	State publication, dated 1954.
MARYLAND	
MASSACHUSETTS	
MICHIGAN	State publication.
MINNESOTA	
MISSISSIPPI	As of 22 March 1956, revising publication.
MISSOURI	State publication, dated 1949 & 1951.
MONTANA	As of 28 February 1956, no state publication.
NEBRASKA	State publication, dated 1943 & 1956.
NEVADA	As of 2 June 1950, no state publication.
NEW HAMPSHIRE	State publication, dated 1936.
NEW JERSEY	State publication, dated 1946 & 1956.
NEW MEXICO	As of 20 March 1956, revising 1950 publication.
NEW YORK	State publication, dated 1949, 53, 54, 55, & 56.
NORTH CAROLINA	As of 27 March 1956, working on publication.
NORTH DAKOTA	State publication, dated 1953.
OHIO	State publication, dated 1949.
OKLAHOMA	State publication, dated 1942, 43, 51, & 54.
OREGON	State publication, dated 1952.
PENNSYLVANIA	State publication, dated 1952, 53, 54, & 55.
RHODE ISLAND	As of 10 April 1956, no state publication.
SOUTH CAROLINA	As of 17 March 1956, publication obsolete.
SOUTH DAKOTA	
TENNESSEE	As of 27 March 1956, no state publication.
TEXAS	State publication, dated 1955.
UTAH	State publication, dated 1941.
VERMONT	As of 7 March 1956, no state publication.
VIRGINIA	State publication, dated 1949 & 1952.
WASHINGTON	As of 1 March 1956, no state publication.
WEST VIRGINIA	
WISCONSIN	State publication, dated 1951 & 1953.
WYOMING	

have industrial arts instructional materials published on a state level. In addition, this table discloses which states responded to the letters of inquiry sent by Mr. Brandon and Professor Bengtson. Compiling the material obtained from the publications of the twenty-seven states, TABLE II (page 28) was prepared. This table shows what industrial arts subject areas are suggested and regarded as important by the various states for the attainment of the objectives of the industrial arts program in the secondary schools.

Additional Results. As was stated previously in this thesis, one objective of this study was to determine what type of industrial arts shop was being advocated in the industrial arts program of the secondary schools of today. In the publications reviewed for this study, the suggested curriculums were flexible enough to be used in either the unit or the general shop organization. It was found, however, that in the average sized school system, the general shop was becoming more popular than the unit shop. This is due to the fact that in the unit shop, one single type of work experience is carried on that deals with the tools, processes, materials, and information of a single occupational area. This means each unit shop will have to be equipped with all the necessary tools and equipment to teach each occupational area, causing the duplication of a large amount of tools and equipment, as well as the employment of several industrial arts teachers. In the

TABLE II

INDUSTRIAL ARTS SUBJECT AREAS FOR THE SECONDARY SCHOOLS
AS LISTED IN STATE LEVEL PUBLICATIONS AS OF JUNE 1957

	ALABAMA	ARIZONA	ARKANSAS	CALIFORNIA	COLORADO	CONNECTICUT	DELAWARE	FLORIDA	GEORGIA	IDAHO	ILLINOIS	INDIANA	IOWA	KANSAS	KENTUCKY	LOUISIANA	MAINE	MARYLAND	MASSACHUSETTS	MICHIGAN	MINNESOTA	MISSISSIPPI	MISSOURI	MONTANA	NEBRASKA	NEVADA	NEW HAMPSHIRE	NEW JERSEY	NEW MEXICO	NEW YORK	NORTH CAROLINA	NORTH DAKOTA	OHIO	OKLAHOMA	OREGON	PENNSYLVANIA	RHODE ISLAND	SOUTH CAROLINA	SOUTH DAKOTA	TENNESSEE	TEXAS	UTAH	VERMONT	VIRGINIA	WASHINGTON	WEST VIRGINIA	WISCONSIN	WYOMING
AERONAUTICS																				x												x																	
ARTS & CRAFTS				x				x			x	x	x	x	x	x				x					x			x		x			x	x							x	x		x			x		
Archery																																		x															
Art Metal												x		x																												x								
Basketry				x				x																																								x		
Ceramics				x				x				x	x	x		x									x			x		x												x	x		x			x		
Jewelry													x												x																		x						
Lapidary				x																														x														
Leathercraft				x				x					x	x	x	x				x					x			x				x		x							x	x		x			x		
Metal Tooling																																x																	
Model Building				x												x																																	x		
Plastics				x				x			x	x	x			x									x			x				x		x			x				x	x		x			x		
Textiles								x				x																x																				x		
AUTO MECHANICS			x			x					x		x	x	x	x	x			x							x	x		x		x	x		x	x				x	x						x		
COMMUNICATION								x							x																																			
CONSTRUCTION								x							x																																			
ELECTRICITY			x	x				x			x	x	x	x	x	x	x			x			x		x			x	x		x		x	x		x	x				x	x		x			x		
FARM MECHANICS														x		x				x					x			x																						
GRAPHIC ARTS			x	x		x					x	x	x			x	x			x								x	x		x			x		x	x				x	x		x			x		
Block Printing				x		x					x	x				x													x						x	x							x					
Book Binding				x		x					x		x			x	x												x					x		x	x				x							
Photography				x									x				x													x					x		x					x	x						
Printing			x	x		x					x	x				x	x			x								x	x		x			x		x	x				x						x		
Silk Screening				x		x					x	x				x													x					x		x	x				x	x					x		
HOME MECHANICS			x										x	x		x										x			x				x			x	x					x							
MANUFACTURE								x							x																																			
MECHANICAL DRAWING			x	x		x		x		x	x	x	x	x	x	x				x			x		x		x						x	x	x	x	x				x	x		x			x		
Arch. Drawing				x				x								x										x																	x		x			x		
Elec. Drafting				x				x																		x									x											x				
Furniture Design																																																x				
Industrial Drawing																																				x														
Machine Drawing				x				x		x																x									x								x				x		
Map Drawing								x																											x											x				
Planning				x		x						x	x			x								x		x						x				x													
Sheet Metal Dr.								x																																							x				
METAL WORKING			x	x		x		x		x	x	x	x	x	x	x	x			x			x		x		x		x		x		x	x		x	x				x	x		x			x		
Art Metal				x		x		x		x	x		x	x	x	x	x			x									x		x		x	x		x						x		x			x		
Bench Metal				x		x		x		x	x	x	x			x	x						x		x				x		x		x	x		x	x				x	x		x			x		
Forging & Heat Tr.				x		x						x	x	x	x		x			x									x		x		x			x	x							x				
Foundry				x		x		x				x	x	x	x		x			x								x	x		x			x		x	x					x		x					
Machine Shop		x	x		x		x					x	x		x		x			x								x	x		x			x		x	x					x		x					
Metal Spinning																	x																													x					
Plumbing						x										x				x											x																			
Sheet Metal			x	x		x		x		x	x	x	x	x	x	x	x			x			x		x			x		x		x	x	x	x	x				x	x					x		
Welding				x		x						x	x		x		x			x													x	x		x	x					x	x					x		
POWER								x							x																																			
POWER MECHANICS																												x																		x				
SERVICE COURSES																																			x														
SHOP MATHEMATICS																												x																					
SHOP PHYSICS & ELEC.																												x																					
SPORT ACTIVITIES																													x																				
TRANSPORTATION								x				x		x			x																																	
WOODWORKING			x	x		x		x		x	x	x	x	x	x	x	x			x			x		x		x		x		x		x	x	x	x	x				x	x		x			x		
Boat Building																																				x														
Cabinet Making												x																x								x								x					
Carpentry												x					x																				x								x					
Hand			x	x		x		x		x	x	x	x	x	x	x	x			x			x		x		x		x		x		x	x	x	x	x				x	x		x					
Machine				x		x		x		x	x		x	x	x	x	x			x			x		x				x		x			x	x	x	x				x	x		x					
Pattern Making												x					x											x								x								x					x		

The above findings were obtained from sixty-two state level publications of twenty-seven states.

The nomenclature of the above subject areas may vary, due to the difference of terminology in the individual state publications.

majority of the school systems, funds are not available to meet these requirements; therefore, more emphasis is placed on the general shop organization. The type of general shop organization that was emphasized by the various states in this study, was either the comprehensive general shop or the general unit shop. The general unit shop was stressed in the medium sized school systems that employ from two to four industrial arts teachers, whereas the comprehensive general shop was emphasized in both the junior high school programs and in the smaller school systems. Since the general unit shop covers the subject matter of one complete field of industry, a wide range of activities can be provided at considerably less cost than in the unit shop. In the comprehensive general shop, the smaller school systems can provide for exploratory experiences in several industrial processes, while utilizing a minimum of tools and equipment.

Even though the physical aspects of the industrial arts programs may vary in the different sized school systems, the broad curriculum offerings should be somewhat similar, with details adjusted to meet the specific local needs and community interests. The occupational activities of the community may be reflected to some degree in the industrial arts program; but since industrial arts is highly desirable and beneficial to all students, regardless of what their future occupations may be, or where they may live, "a variety of experiences in many

of the major areas of industry must be provided". (27, page 36)

CHAPTER IV

CONCLUSIONS AND RECOMMENDATIONS

Since the first form of industrial arts was introduced in the secondary schools of the United States in 1880, many changes have been made in the curriculum and objectives of the industrial arts program. Because these objectives have changed so vastly, and have become so important, some type of an "educational plan" is needed to insure that these objectives are being properly met in all schools. (12, page 1)

Summary of Findings. Of the forty states which responded to the letters of inquiry requesting industrial arts instructional materials published on a state level, twenty-seven were found to have some type of available materials. Two of the forty states were working on a proposed industrial arts bulletin to be published in the near future; and two states were revising previously published materials. One state had previously published an industrial arts bulletin, but this publication was now out of print. The remaining eight of the forty states had no state publications, and no indication was made that any publication in the future was anticipated.

In examining the bulletins from the individual states

which had published state level materials, it was found that the majority of these states were in favor of a comprehensive industrial arts program, covering a wide range of subject areas. Through a state level publication of industrial arts instructional materials, a nucleus for an industrial arts curriculum was suggested which would be flexible enough to be adapted to a local school system. By using these suggested materials, a curriculum could be developed which would assist in assuring that the objectives of industrial arts were being met. While the unit shop was still desirable when the school system was large enough to afford this type of organization, the general shop was more extensively recommended. This was due to the fact that the general shop type of organization was more adaptable to both the large and the small school systems.

Conclusion. As a result of this study, it is the opinion of the writer that more work is needed on the state level to publish industrial arts instructional materials. Although some states have published an excellent suggested industrial arts curriculum, other states have publications which need to be revised and expanded. Many states leave the responsibility of establishing the industrial arts curriculum to the local communities within the state. In many instances, this practice results in the larger school systems establishing a quite adequate industrial arts program, while the smaller communities,

because they lack the necessary personnel and funds, fail to establish and maintain an industrial arts program that will accomplish the objectives of industrial arts.

Recommendations. It is the recommendation of the writer that some type of material should be available to the local school systems which will assist them in establishing an adequate industrial arts program. This material should be in the form of a suggested industrial arts curriculum, published on a state level, by a committee of industrial arts curriculum experts. Although most school systems are highly critical of a standardized course of study and prescribed teaching methods, (which the writer is by no means advocating), it is inconceivable that a minimum suggested curriculum should not be published for use in the secondary schools. A publication of this type would certainly serve as an aid in insuring an effective and uniform industrial arts program.

Since a "high school education is becoming more and more recognized as essential for all people to become happy and useful citizens", an effective and adequate industrial arts program would answer the needs of many of today's youth. (47, page 6) This same curriculum may well be the means of keeping the potential "drop out" from leaving the school program before he has completed his high school education.

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Thesis: INDUSTRIAL ARTS SUBJECT AREAS FOR THE SECONDARY SCHOOLS AS LISTED IN STATE LEVEL PUBLICATIONS AS OF JUNE 1957

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