A PROPOSED PROGRAM IN INDUSTRIAL ARTS

FOR JUNIOR HIGH SCHOOL GIRLS

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By

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E. G.

TABLE OF CONTENTS

LIST OF TABLES

CHAPTER I

THE PURPOSE AND ORGANIZATION OF THE STUDY

The present trend of modern education according to one writer is to prepare the individual to do better the more desirable things in life that he or she will be doing for a successful living. The majority of the present educational programs have failed to provide for the education of girls in industrial arts. Educational leaders must realize that the primary function of industrial arts in schools today is general education, and it must serve the purpose to the girls of tomorrow, who will be performing numerous jobs with tools and mechanical appliances in the performance of daily house keeping chores. A number of schools over the country are now offering home mechanics as an industrial arts course for girls, but the program is not sufficient for the preparation of better living in a highly industrialized nation, as is the United States. An extensive research of books, professional magazine articles, and information related to this study, has indicated that home mechanics is the predominating industrial arts course now available to girls. The girl of today needs a sound understanding of industry and its technological operations. Present developments indicate that many of the everyday problems of living will be influenced by science, industry, the arts and crafts, and the girls in school today will have to adjust themselves quickly and intelligently to changes coming through new developments.

Statement of the Problem. The purpose of this study is to make a careful study of the accomplishments and progress in industrial arts courses for girls. A very careful and thorough research will have to be

conducted to determine the beginning of shopwork for girls, present trends, and public opinion. A course of study in industrial arts courses for girls will be included as part of the study. The writer expects to secure the required information to prove that there exists an urgent need in establishing industrial arts courses for girls.

Origin of the Study. This problem was selected as a research study to familiarize industrial arts instructors and school administrators with the information now available in industrial arts courses for girls. The study will be of immense value in the selecting of content for a course of study. The writer feels that industrial arts for girls is still in its embryonic stage, and future successful developments depend largely on how well future research studies are conducted, and the success of industrial arts in the laboratories. The study will also provide information which should benefit teachers in selecting the required material needed to develop industrial understanding, and in achieving the objectives of industrial arts for girls.

Need for the Study. During the writer's undergraduate work at Oklahoma Agricultural and Mechanical College, the urgent need for courses in industrial arts for girls was foreseen after the completion of a term paper. The information available then, was obsolete, incomplete, and in certain cases misleading. It was then that this subject was considered for research on the graduate level. The writer is of the opinion that there is a need for the study to find new data, new philosophies, new reasoning, and knowledge necessary to distinguish the fundamental from the superficial. The future belongs to the youth, and the present need in industrial arts is to educate the girls in consumer's knowledge, industrial information, avocational interests, and other essential information required for a successful living.

Method of Investigation. The method of investigation employed in conducting this study was that of reviewing census reports, books from the field of industrial arts education, magazines articles, reports, bulletins, and these made available through the interlibrary loan service of the Oklahoma Agricultural and Mechanical College Library. Additional material was obtained from Mr. M. J. Buley, Director, Industrial Arts and Vocational Education, Tulsa Public Schools, Tulsa, Oklahoma.

A selected bibliography has been prepared and references are indicated as follows: (2, page 2). The first number refers to the number given to the publication in the appendix. The last number corresponds to the page number where the source material is found. The selected bibliography is found in Appendix A.

Definition of Terms. In the preparation of this report the writer compiled a number of terms synonymous to home mechanics. The following are examples of such terms.

Household Mechanics

Mechanics of Home Economics

Home Tinkering

Practical Mechanics for Girls

The Exchange Unit

Home Maintenance for Girls

Community Mechanics

The term "Home Mechanics" will be used as the standard term throughout this report to avoid complications in the reader's line of thought.

Home Mechanics Defined. In Creative Teaching, Struck (39, page 479) states that "Home Mechanics" refers to that part of industrial arts education that centers around repair and construction work that is commonly

done around the home".

Industrial Arts Defined. Several definitions to be included in this report were considered, but the following two are more exact and self explanatory. The state Advisory Committee for Industrial Arts in Oklahoma Schools (34) states as follows:

> Industrial arts, as a school subject, may be defined as a study of machines, tools, and processes by means of which the forces of nature are utilized and the raw materials of nature are changed by man to make them more valuable and pleasing. It leads to an understanding of the native qualities of raw materials and of the natural forces together with a knowledge of the methods and practices of utilizing and changing these materials and forces. It is also concerned with the social and economic problems incident to these changes.

Gordon O. Wilber, (42, page 2) Director of the Division of Industrial Arts Teacher Education, State Teachers College, Oswego, New York, states that:

> Those phases of general education which deal with industry--its organization, materials, occupation, processes, and products--and with the problems resulting from the industrial and technological nature of society.

The two definitions of industrial arts cited, stress the importance in knowledge of natural resources and technological changes for a better living. As a part of general education, industrial arts contributes immensely toward educating the public in the appreciation and understanding of industrial civilization as an important segment of American life. It is one of the few curriculum areas where girls have an opportunity to explore the various aspects of natural forces, industrial life and social and economic changes through a public school laboratory.

Reviews of Similar Studies. The five studies reviewed for this report, were selected from several master's theses and reports, for the purpose of informing the reader of the progress made since 1899, when Elizabeth Battle completed Manual Training Related to Girls. The reviews will also be help-

ful in familiarizing the reader with the existing educational research problems.

One of the first studies pertaining to industrial arts for girls was completed by Elizabeth Battle, (4) at the University of New York in 1899. The study was entitled Manual Training Related to Girls. Battle made a philosophical study of manual training as related to girls. At the time the study was being conducted, manual training was considered any work accomplished by the hands for boys and girls. The aims of manual training were to develop neatness, exactness, sense of form, methodical arrangement and general manual dexterity which did not aim at instruction toward a specific trade. The curriculum for girls included sewing, cooking, paper cutting, clay modeling, weaving, freehand drawing, sloyd carpentry, and mechanical drawing.

In 1933, Gilbert A. Horton (26) completed a survey titled, The Extent, Nature, and Objectives of Industrial Arts for High School Girls in the States of Texas, Alabama, Louisiana, and Mississippi for the Year 1932-1933. Horton employed the survey method in his study, and from a total of one hundred and ninety-six questionnaires mailed to industrial arts teachers, principals, and supervisors, the returns numbered one hundred and twenty-seven. A few of the results obtained are as follows:

1. Fifty-eight per cent of the schools surveyed, or seventy out of one hundred and nineteen schools, offered industrial arts courses for girls.

2. From a total enrollment of 19, 535 girls, there were 2,060 enrolled in industrial arts courses. The average enrollment per school was 29.4.

3. The total number of boys enrolled in industrial arts courses in the seventy schools was 7,457. The combined average of both boys and girls was 135.9 pupils per school, of which 21.3 per cent were girls.

4. The two largest cities in the survey were Fort Worth and Dallas, Texas. Eight schools from Dallas reported a total of 459 girls enrolled in industrial arts courses. The Fort Worth schools reported eight girls taking industrial arts.

5. The six subjects reported most frequently and arranged in order of frequency are: Mechanical drawing, bench woodwork, freehand drawing, home mechanics, printing, and auto mechanics.

Ray E. Brown (10) of Oklahoma Agricultural and Mechanical College, completed a survey in 1937, entitled Home Mechanics Instruction for Girls. The purpose of the survey was to determine what should be taught in a home mechanics course for girls. During the school year 1936-37, Brown conducted the research in Enid, Oklahoma, through the visitation and questionnaire methods. The questionnaire was divided into eight major units as follows: (1) the automobile, (2) general metal work, (3) electrical work, (4) painting and refinishing, (5) plumbing, (6) woodwork, (7) mechanical drawing, and (8) general mechanics. Another survey conducted by Brown, was to find out the number of schools that offered home mechanics courses for girls. From a list of two hundred cities, seventy-four returns listed only fourteen cities as having various types of industrial arts courses for girls.

The results obtained in the Enid survey concluded that the following courses and jobs should be included in industrial arts for girls.

1. Art metal work (small dishes, trays, letter openers, etc.)
2. Repairing on extension cord.
3. Putting in a fuse, (house).
4. Repairing an electric iron extension cord.
5. Varnishing furniture and floor.
6. Painting woodwork and furniture.

7. Repairing faucets, (repairing washers).

8. Regluing loose joints in furniture.

9. Use of common woodwork tools.

10. Beadwork, (coin purses and novelties).

11. Making simple furniture drawings.

12. Make house plans.

13. Leathercraft, (coin purses, bill folds, etc.).

14. Cleaning and polishing furniture.

15. Instruction in the operation and maintenance of common mechanical and electrical devices of the home.

Harry W. Kroll (30) of Iowa State College, completed a study in 1938, on the subject, Content For an Industrial Course for Girls. Kroll selected seventy-five housewives in Iowa and twenty-five industrial arts instructors from Minnesota. The women were divided into three groups of twenty-five each and selected as follows: wives of graduate students in summer school, wives of professional men, and wives of men engaged in industrial occupations. The questionnaire used in the survey, contained one hundred and fifty-six units in manipulative and related subject matter, divided into the following courses:

1. Woodwork

2. Automobile Knowledge

3. Electricity

5. Home construction

6. Graphic art and design

7. Painting, finishing, and decorating

8. Household safety

9. Miscellaneous items

The units that received the highest rating in this survey were "Automobile Knowledge" and "Household Safety".

Cecil W. Acuff (2) completed a study in 1950, at Oklahoma Agricultural and Mechanical College, entitled Industrial Arts for Girls. Acuff's study pertains to the value of industrial arts experiences for girls in the secondary schools and the need for expansion and enrichment of such a course. The following areas of instruction are recommended to be included in industrial arts instruction for girls.

1. Woodworking
2. Electricity
3. Mechanical Drawing
4. Automobile Mechanics
5. Household Mechanics
6. Crafts and Hobbies
7. Safety Instruction

Available Literature on the Subject. The published literature on industrial arts courses for girls is very limited, and no information could be found pertaining to books. Most of the literature available now is through articles published in The Industrial Arts and Vocational Education Magazine; paragraphs in industrial arts education books, and research studies. A list of studies relating to this report has been prepared and is given below. The titles were selected from the Studies in Industrial Education (1), and the Bibliography of Research Studies in Education (41).

1. Buck, Robert Dale (M.A.) The Development of a Curriculum Unit in Ninth Grade Industrial Arts for Girls, University of Denver, 63 pp.

   The development of a course of study in industrial arts for girls based on questionnaire sent to the girls, their parents, and a rating by a jury for checking content.

2. Brumley, Oscar M., The Status of Industrial Arts for Girls in the Secondary Schools of Ohio. Master's, 1939, Ohio University, 74 pp.

Finds that a total of 753 girls were receiving experience and training in the field of industrial arts in these schools in classes for girls, in classes for boys, and in cooperation plans.

3. Garnand, Sidney F. (M.S.) A Study of Procedures in Establishing a Home Mechanics Course for Towns of the Type of Garden City, Kansas. Colorado A & M, 1933, 80 pp.

4. Jones, W. Morris (M.S.) A Study to Determine Content for a Course in Home Mechanics for Girls Based on Current Home Practice in an Industrial City. Colorado A & M, 1935, 56 pp.

A course in home mechanics for girls in East St. Louis, Illinois, to meet their needs for jobs performed in the home. Sixty-one jobs are included in the course.

5. Rogers, Divane Carson (M.S.) A Study of the Types of Home Mechanics That Would be of Benefit to High School Girls. A & M College of Texas, 1938, 36 pp.

A course of study in home mechanics for girls, based on a brief analysis of need.

6. Voth, Moses M. (M.S.) The Organization of a Course of Study in Home Mechanics for Girls at Bethel College, North Newton, Kansas. Colorado A & M College, 1941, 167 pp.

Includes objectives to be met and numerous instruction sheets for the sixty-one jobs chosen for the course content.

7. Werner, Elden A. (Masters) A Program of Home Mechanics for Senior Girls, Kansas State Teachers College, 1940.

The list presented is not a complete list, but will be helpful in future studies. All the theses recorded in this report can be obtained through the interlibrary loan service of the Oklahoma Agricultural and Mechanical College Library.

Expected Use of the Study. The writer of this report is of the opinion that many public school officials have neglected establishing industrial arts courses for girls, because they have completely failed to realize its importance. Dale (13, page 412) states in Methods in Teaching Audio-Visual that:

> Industrial arts is on the whole neglected in our schools. Educators, it is said, cannot "find time" for industrial arts as a general-education course. And yet children are seriously handicapped when they emerge from schools ignorant of certain basic conceptions which they require for adequate adult existence.

The writer hopes that this report will be of inspiration and of assistance in organizing, administering, and developing an industrial arts course of study for girls.

The problem has been stated in this chapter, along with other pertinent information that expresses the attitude of the writer toward the study. Similar studies have also been reviewed for the purpose of acquiring other findings and opinions in connection with this study. To make this study more meaningful, historical records concerning European and American progress in industrial arts for girls will be discussed in Chapter II.

CHAPTER II

HISTORY OF INDUSTRIAL ARTS AS RELATED TO GIRLS

Since the day that primitive man acquired the manual skill to satisfy life requirements, education has become an important phase of everyday living. Between the early period of civilization and the present time, human interest has improved the teaching of handwork and skills through education. The history of industrial arts will be presented in this chapter to show its origin and its development from ancient times to the present modern times.

The early advancements in industrial arts took place in Europe. Numerous experiments were conducted by advocates in manual instruction that resulted in some of the present methods. The European contributions to industrial arts will be presented in section A.

<u>The Beginning of Industrial Arts</u>. The beginning of the present era of industrial arts had its conception during the early days of savagery. The need to seek food, clothing for protection, and shelter for comfort, developed the skillful hands and imparted knowledge in the use of primitive tools. Savage education was not that of books, but that of unconscious imitation transmitted from father to son throughout the dark ages. The handicrafts the savages developed and passed from generation to generation were greatly developed during medieval times by the ancient Jews, Babylonians, and Greeks. This group of people regarded handwork as a supernatural blessing, and placed great emphasis on manual instruction. In ancient Jewish days, religion was the fundamental motive for education as this Jewish law states: "As it is your duty to teach your son the law, teach him a trade". "He who

does not have his son taught a trade prepares him to be a robber". The laws established the custom for the boy to attend religious school in the morning to be taught by the Rabbis and to spend the afternoon learning his father's trade.

In Babylonia the apprenticeship method of educating the boy in handicrafts was practiced. The Babylonian Code of Hammurabi (2250 B. C.) stated that "If an artisan take a son for adoption and teach him his handicraft, one may not bring claim against him". "If he do not teach him his handicraft, that adopted son may return to his father's home". The paternal relationship between master and apprentice existed until the nineteenth century when the factory system came into operation.

During the Homeric age in Greece, the handicraftsman was treated with high respects, and occupied a place of high social standing in the community. Within a period of time the attitude toward the work of the handicraftsmen changed and was held in contempt by the higher class because of the use of slaves to perform the more menial duties. This attitude of selfishness by the upper classes of Greece, hindered the development of handicrafts until the factory system was developed and labor became more highly specialized.

The early Christian Monks in Egypt, required manual labor of everyone in the monasteries. St. Benedict (480-543), founder of the order of the Benedictines in 529, at Monte Cassino, Italy, made manual labor one of the cardinal principles of the Order. In addition to seven daily hours of manual labor, the Benedictines were required to spend two hours of reading from manuscripts. The monasteries became places of learning, and the Order increased in number of monks and monasteries. The increase in number of monks created a shortage of manuscripts, and resulted in the art of bookmaking in the monasteries. Cassiodorus (468-560) an Italian monk, developed

the art of book-making in the monasteries.

The invention of printing books from type in 1450, and the revival of classical learning during the fifteenth century, and the Protestant Reformation in the early sixteenth century, created new education possibilities and revolutionized teaching methods. During this period appeared two of the fundamental ideas upon which modern instruction in industrial arts has been built. Bennett (5, page 30) states:

> The first of these is that sense impressions are the basis of thought and, consequently, of knowledge. The second is the related idea of "learning by doing". Out of the first idea grew the object method of teaching and, later, the laboratory method; out of the second came the recognition of the value of working through a process, of making something with the hands or with tools, of doing something skilfully, as a basis for rational thinking.

This two fundamental ideas were responsible for the birth of modern industrial arts and led to the establishment of workshops and placing handicrafts in the schools.

The fifteenth, sixteenth, and seventeenth centuries, introduced a score of educators, and educational philosophers. In Germany Martin Luther (1483-1546) protested the education given in monastic and ecclesiastical schools. While Luther was proposing to have the reform come through the power of the State, Rabelais (1483-1553) in France was attacking the formalism, insincerity, and shallowness of the Church, the school, and the State. In England, Richard Mulcaster (1531-1611), famous English schoolmaster, and head of Merchant Taylor's School from 1561 to 1586, was beginning the foundation for the modern science of education. Mulcaster is given credit for being the first to establish drawing as one of the fundamental studies of the school.

In the seventeenth century, Comenius advocated teaching according to

the order of nature and the arts, and recommended that all children should learn the most important principles of the mechanical arts. In England Samuel Hartlib proposed the erection for a college of agricultural to be organized on the apprenticeship plan. Among other leaders were Rousseau and Franke, whose writings and schools contributed tremendously toward the advancement in education.

Middle Ages. Johann Heinrich Pestalozzi (1746-1827) son of a Zurich physician and known as the "father of manual training" is credited as a great reformer in the development of industrial arts. Pestalozzi was the first man to organize handwork as a part of general school work in a definite and systematized form. In 1774, Pestalozzi organized the Neuhof Industrial School with twenty poor children. This experiment was the result of a large number of educational institutions in Europe. Among the most successful schools was Hofwyl, established in 1799 by Philip Emanuel von Fellenberg (1771-1844). Hofwyl was established by some of Pestalozzi's principles and attracted more attention then any one institution in Europe or America. Manual labor constituted the main distinguishing characteristics of Fellenberg's methods. The developments at Hofwyl were followed by the establishment of the agriculture school, the industrial reform school, and the manual labor school.

The school established by Fallenberg was not limited to boys, but also included a school for girls, which was a branch of the farm and trade school. The writer believes Fallenberg's school for the girls was the first one established where some form of industrial arts was offered. The curriculum included reading, writing, arithmetic, and the elements of form and linear drawing. The main objective of this branch of Hofwyl was domestic

education.

Other educational leaders who established schools along the Pestalozzi theories were John Fredrick Oberlin (1740-1826) in France, Robert Owen (1771-1858) in England, Johann Friedrick Herbart (1776-1841), and Friederick Wilhelm Froebel (1783-1852) in Germany. Oberlin established the first infant school, and Owen established a school in Lanark, England, and taught children the weaving trade. Herbart stressed mechanical dexterity and Froebel opened the first kindergarten school as a result of Pestalozzi's practice of training in observation and sense perception.

Recent Foreign Developments. In 1868, the School of Trades and Industries in Moscow, was reorganized and became known as the Imperial Technical School. The purpose of the school was to educate civil engineers, mechanical engineers, draftsmen, foremen, and chemists. The theoretical instruction which resembled that given at the Ecole Centrale des Arts et Manufactures in Paris, was supplemented through practical experience in workshops. This phase of learning proved to be unsatisfactory because of the imitative methods and led Victor Della Vos director of the school, to establish "instruction shops" separate from the production shops where industrial machinery was being built. This educational advancement by Della Vos, was the first attempt at organized vocational industrial education for groups. The instruction was formal and consisted in the making of a series of exercise points and models. The course of study was developed upon occupational analysis.

During the period of reorganization in the Imperial Technical School, the northern countries of Europe, Finland, Sweden, Norway, and Denmark were developing the pedagogical ideas formulated by German educators. This modern movement for instruction in the manual arts which originated in

Germany, became known in the Scandinavian countries as sloyd. This form of handwork first had its beginning in the home, during the long, dark evenings of the winter. The tools were simple and the articles produced were useful. The sloyd movement which had once flourished with great vigor, started to decline with the invention of the steam engine in mass production and the manufacture and sale of alcoholic beverages in 1800. In 1846, the people organized an association to combat the evils of leisure and to convince the leaders in national policy of the importance of sloyd. The Swedish government took action in 1872 and two important developments occurred for the advancement of sloyd. First, the government granted an annual appropriation of 2,500 crown to stimulate instruction in sloyd, and second, Otto Salomon established a sloyd school in Nass, which was to become the center of sloyd influence in later years. The curriculum at Nass included carpentry, carving, turning, smith's work, basket making, saddlery, stone cutting, fretwork, painting, drawing, mechanics, mathematics, and physics. In 1874 a similar school was started for girls, and the sloyd consisted of weaving, sewing, and domestic economy.

The industrial arts movement in Germany received its first inspiration from the sloyd practices in Denmark and Sweden. In 1880, the Leipsic Society for Public Welfare established the Leipsic Boys Workshop under the leadership of Waldemar Goetze (1843-1898), a very progressive leader in the manual training movement in Germany. The industrial arts movement developed by Goetze, had its beginning at Leipzig and soon spread over southern and central Germany. The development was so rapid, that by 1909, forty per cent of the eligible students participated in some form of manual training at Mannheim. Some of the present American industrial arts methods were influ-

enced by Goetze's development at Leipzig.

In France, manual training was being developed from an earlier type of shopwork instruction, which was chiefly economic or industrial in its purpose. Trade schools and schools of technical instruction for boys and girls of twelve years of age and older were being organized over the country. In 1827, the School of Christian Brothers of Saint Nicholas was established in Paris. In 1831, La Mertiniere School for boys and girls was established at Lyons. A special industrial school for girls was organized in 1864, through the efforts of Madame Elisa Lemonnier. The school was organized in Paris, and sponsored by the Society for the Industrial Education of Women. France contributed tremendously toward organizing industrial education for girls.

The historical factors affecting the growth of industrial arts in foreign countries have been presented. During the European movement, Americans were just beginning to realize the importance of industrial arts instruction. The progress performed by American leaders in industrial arts will be discussed in section B.

The progress of industrial education in America was greatly accelerated by the European developments and the factory system. The first schools were established for the purpose of industrial training. The American changes will now be presented.

Early Developments in America. The earliest form of industrial training in the United States, took place in the New Mexico monasteries. As early as 1630, the early Franciscan schools in New Mexico, established courses in tailoring, shoemaking, carpentering, carving, brickmaking, and other courses intended to meet the special needs of the Indians in precolonial days. The

monasteries also included schools for the girls, where sewing and spinning were taught. Other missions teaching industrial subjects on a degraded form of the monastic schools of Europe were located in California and Florida.

Early apprenticeship education in the English colonies in America, retained the same methods as those practiced in England. Apprenticeship was later developed into an educational institution in America because it was under authority of the town and colony authorites. In 1641, the General Court of the Colony of New Plymouth approved the English Poor Law of 1601. The act gave power to a town through its representatives to apprentice poor children and to provide education. In 1647, the General Court of Massachusetts enacted a law whereby school teachers were hired and paid by the town's citizens. This law resulted in the first free schools in America.

Post Revolution Progress. Immediately following the American revolution, the original thirteen colonies began to expand the available educational facilities. In 1787, Cokesbury College in Maryland began to educate students in gardening and carpentry. The work at Cokesbury was very similar to that of advocated by the American Manual Labor Movement from 1825 to 1834. The labor movement was the result of Fellenberg's academy for the upper classes and the farm and trade school for the lower classes. The academy at Hofwyl was established for under a tuition basis, and manual labor was performed only as a means of physical training. In the farm and trade school manual labor was used as a means of paying tuition fees and living expenses. The American advocates of manual labor, headed by Rev. Elias Cornelius (1794-1832) combined the two aims set forth by Fallenberg, and in 1826 established Andover Theological Seminary at Andover, Massachusetts. Other schools established as a result of the American Manual Labor

Movement were the Oneida Institute of Science and Industry at Whitesborough, Utica, New York, and the Manual Labor Academy of Pennsylvania at Germantown. The schools required manual labor from every student and placed great emphasis on the physical-exercise value of labor. Labor was considered as a means of earning board and an education.

The labor movement reached its highest point in 1834, and was followed by the Mechanics Institute Movement. The mechanics movement in America was similar to the movement experienced in Great Britian during the beginning of the nineteenth century. The first important mechanic's school in America was built in 1820 by the General Society of Mechanics and Tradesmen of the City of New York. The second and the most famous school that resulted from the American Movement was the Franklin Institute of Philadelphia in 1824. The Institute was named in honor of Benjamin Franklin.

During the Mechanics Institue Movement, the appearance of the Lyceum Movement in America received the support of statesmen and prominent citizens. The lyceums were established for the purpose of educating those that could not be instructed by the mechanics institutions. The Lyceum Movement was a means of building the American ideal of popular education.

<u>Nineteenth Century</u>. The advancements made in the educational movements in America, created a new type of institution requiring the full time of students in preparation for higher scientific positions. The movement resulted in the establishment of the Gardiner Lyceum in 1823, at Gardiner, Maine, and the Rensselaer School at Troy, New York, in 1824. The outcome of this movement was the beginning of American education of higher learning in applied science and engineering. Higher education was established firmly and securely, and began to gain momentum when the Land-Grant Act of 1862

was approved. The bill was promoted by United States Representative Justin S. Morrill (1810-1878) of Vermont. The act provided for public land for the establishment of agricultural and mechanical colleges.

The Morrill Act of 1862, stimulated the growth of shopwork tremendously. In 1870, the Illinois Industrial University developed instruction in shopwork in connection with engineering and architecture courses, while other colleges were just beginning to experiment with shopwork. Two of the most important experiments were conducted by Calvin M. Woodward (1837-1914) of Washington University at St. Louis, Missouri, and John D. Runkle (1822-1902) president of the Massachusetts Institute of Technology at Boston, Massachusetts. Professor Woodward, the first to lead the teaching of shopwork in 1871, discovered the inability of students in the use of simple woodworking tools while solving a visualization problem in the carpenter's shop. Dr. Runkle was confronted with the similar problem and had observed that mechanical engineering graduates with a knowledge of shopwork were employed in preference of those without any knowledge in the use of hand tools. In the Centennial Exposition at Philadelphia in 1876, the Russian system of tool instruction developed under Della-Vos, was exhibited and American educators were highly impressed at the Russian advancement. The exhibit at Philadelphia resulted in the opening of the School of Mechanic Arts in connection with the Massachusetts Institute of Technology, and the selection of principles of the Russian system by the St. Louis Manual Training School of Washington University. The establishment of the St. Louis Manual Training School in 1880 by Woodward, was the beginning of a movement to establish manual training high schools throughout the United States and across the Atlantic to England. Professor Woodward contributed the greatest advance-

ment toward the education of the American youth in industrial arts. By 1890, thirty-eight public high schools had introduced Woodward's type of shopwork in the regular curriculum and among the first were Montclair, New Jersey, and Jamestown, New York, in 1882.

The earliest records of industrial arts classes for girls in the United States, reveal that in 1878, six girls were admitted to a woodworking class for boys in Gloucester, Massachusetts. By the end of three years, two full classes of girls and a mixed class had been organized in woodwork. In 1884, Grace Dage and other members of the Kitchen Garden Association reorganized into the Industrial Education Association and started the movement for industrial schools for girls. The constitution of the Industrial Education Association listed its objectives as follows: (6, page 413)

> First. To obtain and disseminate information upon Industrial Education, and to stimulate public opinion in its favor.
>
> Second. To invite cooperation between existing organizations engaged in any form of Industrial Training.
>
> Third. To train women and girls in Domestic Economy and to promote the training of both sexes in such industries as shall enable those trained to become self-supporting.
>
> Fourth. To study and devise methods and systems of industrial training and secure their introduction into schools; also, when expedient, to form special classes and schools for such instruction.
>
> Fifth. To provide instructors for schools and classes and, if necessary, to train teachers for this work.

The movement of shopwork for girls continued to expand and in 1885, the Toledo Manual Training School was opened to students of the adjoining high school and grammer school. The Toledo Manual Training School was organized as a result of Mr. and Mrs. Jesup W. Scott's gift of one hundred and sixty acres of land to the Toledo University of Arts and Trades in 1872. Two

important changes were made from the conventional type of education at that time, first, a four-year course, starting with the upper grammer grade was adopted. Second, provisions were made for girls as well as boys for the first time in this type of school. The manual work for girls was prepared on advice from Emma P. Ewing, dean of the School of Domestic Economy in Iowa State College. The curriculum for the girls was as follows: (6, page 380)

1. Light carpentry, wood carving, care and use of tools.

2. Clay modeling, wood turning, introduction to courses in cooking, or garment cutting and making.

3. Instruction in preparing and cooking food, purchasing household supplies, care of the sick, etc.

4. Cutting, making, and fitting of garments; household decoration, typewriting, etc.

The importance of industrial arts as part of general education became evident in the United States. Industrial arts for girls was given for the first time in America. In Part C, the more recent practices in industrial arts will be discussed.

Since the development in handwork through conscious imitation by the savages to the present era, industrial arts instruction has achieved one of the highest educational attainments in general education. Industrial arts subjects have imparted to the youth of America the necessary education for better living. In the past fifty-one years of the Twentieth Century, industrial arts leaders have formulated new methods of instruction that have resulted in the present historical developments. Part C will present the more significant historical factors.

<u>The General Shop</u>. The modern trend in industrial art organization is toward the general shop. This type of shop is planned and equipped to teach

two or more distinct types of shopwork at the same time. The general shop provides a variety of activities that may include a traditional wood shop, to a plan which may include experiences in two to eight distinct areas. Wilber (42, page 105) states the following characteristics that are common to general shops.

1. Activities in two or more industrial areas are evident.

2. A large number of industrial materials are used.

3. The teacher is versatile in many areas.

4. Equipment is diversified, rather than specialized.

5. Breadth of experiences is considered more important than depth in any particular field.

This type of shop is more effective in the junior high school because of a wide variety in activities, and its exploratory nature. The experiences gained through correct tool manipulation result in satisfying the interests and desires of the student. The general shop has been accepted as an organization for the junior high school, and it is here where a majority of the girls received an introduction into industrial arts.

The Unit Shop. The unit shop is defined by Wilber (42, page 101) "As one which deals primarily with the tools, processes, materials, and information of a single occupational area (or a limited number of areas which are very closely related)." These shops are staffed with specialized teachers for each unit of instruction. There exists a wide range of differences in unit shops, but the following traits are common: (42, page 102)

1. The course of study is likely to be based on a trade analysis approach; that is, major stress is likely to be placed on the covering of certain predetermined processes and operations.

2. Skill is likely to be stressed much more strongly than other objectives.

3. Prevocational values are apt to predominate.

4. A uniform course of study for all students is common.

5. A set series of projects is likely to be required from all students.

6. Higher standards of workmanship are likely to be expected than is the case in the general shop, one reason for this being that the teacher is usually an expert in his particular field.

The unit shop of organization is used extensively in large school systems, where financial circumstances permit such shops.

Recent Developments in Industrial Arts for Girls. The history of industrial arts for girls has not been developed extensively and as a result not much is known of the past. In 1929, in Muncie, Indiana, girls were offered a three-week course in shopwork in the junior high school. The course was devoted to the use of the more common woodworking tools, and in correcting difficulties that occurred with common household electrical appliances. In 1932, the first home maintenance course was organized in the junior high school of Lawrence, Kansas. In 1952, Mr. M. J. Buley completed a survey of eight junior high schools in Tulsa, Oklahoma, that had girls enrolled in industrial arts courses. The report shows that from an enrollment of 3,881 girls during the Fall semester of 1951, five hundred and fifty-one girls or 14.2 per cent were enrolled in industrial arts.

The present status of industrial arts education has been accomplished as a result of the interest of professional leaders and teachers in the industrial arts field. New methods concerning instruction, personnel organization, shop planning, shop organization, instruction for girls in industrial arts, and other advancements have appeared in recent years. The changes that have affected the growth of industrial arts, have also affected the philosophy of education in industrial arts.

CHAPTER III

PHILOSOPHY OF INDUSTRIAL ARTS AS RELATED TO GIRLS

The rapid expansion of complex technological changes in the present period, has left the average individual without any knowledge of the modern practices of industry. A few years ago American industry was simple and widely decentralized and people possessed a better knowledge and understanding of the industrial practices. At the same time changes were taking place but at a relatively slow pace, and almost overnight American industry became centralized and moved to a position of world leadership in industrial development. This change which occurred within a few years, created new problems in the education of girls. It created new problems because the homes of today are equipped with machines and other mechanical devices which must be understood and used for effective living. Bennett (7, page 121) states that:

> New discoveries precipitate new problems. New conditions necessitate changes in proceedure. This is just as true in teaching as it is in scientific investigation or in business. Any change in public sentiment, any growth in ideals calls for corresponding change in the teacher's work.

If the teachers are to accomplish the educational objectives, then it becomes a function of the school officials to provide every girl with a clear understanding of industrial civilization.

When the early educational leaders began to see the importance of industrial arts in the development of character, the basic motives of industrial arts were established. New developments resulted in formulating new educational philosophies to meet new demands.

<u>Philosophy During the Middle Ages</u>. One of the earliest industrial arts

philosophies on record was proposed by John Amos Comenius an educational writer during the seventeenth century. Comenius known as "the father of modern pedagogy" advocated educational equality and insisted that girls were entitled to as much education as boys. Comenius wrote (5, page 38) concerning children of six to twelve years of age that

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

This was one of the first statements recorded which indicate that a philosophy of industrial arts was formulated. Another writer and advocate of industrial arts was Jean Jacque Rousseau, who believed emperience to be the best teacher when taught by actions. Rousseau's philosophy concerning the value of manual arts as a vital part of education marked the beginning of a new era in education in the eighteenth century.

During the early part of the nineteenth century Pestalozzi and Fellenberg appeared on the educational scene. Pestalozzi's philosophy was that school children should learn to do handwork which gave the child sense-impressions, and became the basis of knowledge. Fellenberg put into effect Pestalozzi's theories, and expanded them through a philosophy that the lower classes of society should respect and love the higher, and that the higher class appreciate and have sympathy for the lower classes.

<u>Developments Affecting Industrial Arts Philosophy</u>. The successful establishment of the first manual-training high school in America by Professor Woodward in 1880, aroused opposition from educational leaders who did not recognize the value of manual training in general education. A.P.

Marble of Worcester, Massachusetts, ridiculed manual instruction during the summer convention of the National Education Association in 1882, by saying (6, page 361) "There is no information stored up in the plow, hoe handle, steam engine, but there is information stored in books." The criticism of industrial arts in public schools led Woodward to say less about the advantages of giving boys a better secondary school start toward a number of occupations in industry and more about the general education value of manual training. The controversy ended in 1889, and the outcome was so successful that manual training schools became in demand. Another development was the enrichment of the manual training high school curriculum which resulted in the unification with the academic high school and a richer technical curriculum, resulting in the present technical high school.

The early efforts of leaders in the manual training movement were directed toward establishing a place in the educational system for teaching skillful manipulation of tools. The efforts were very successful along with the introduction of the factory system. The country became highly industrialized and new developments took place.

The educator who formulates certain goals without any reason has failed to realize the importance of a sound philosophy. It is through an educational philosophy that the educator is actuated in future procedures. Struck (34, page 1) informs the educators that:

> From a philosophy will emerge guiding principles, valid standards and effective methods and techniques of teaching.

A philosophy must be organized so as to aid the individual in meeting the objectives set forth. It should be based upon an analysis of the particular individual to be served and include present and future practices and conditions as are found in American public education.

Philosophy of General Education. General education should be planned and conducted in such a way as to be of benefit to all persons. The school must assume a constructive responsibility in selecting from educational experiences those of most value in a general way of life rather than a special way. In general education the pupil receives a non-specialized view of many areas of a subject-matter field. The pupil is able to see the dependance of one area upon another and his interests in one area may be directed toward specialization. Schmidt (38, page 227) states that:

> If our aim in general education in nature, the pupil should be the starting point for the selection of projects, activities and course content. If, as Kilpatrick says, "education is actually life desirably carried on with ever more conscious intent to improve itself as it goes," then the school must become a place where such actual life situations may be experienced.

Industrial arts as a subject in the public schools has proved its importance in general education by meeting the needs of individuals and transmitting a way of life.

Objectives of General Education. The Education Policies Commission recommends the following as objectives to be attained in general education for economic well-being: (15, page 33)

1. Education should develop broad social intelligence on economic problems.

2. Education should aim at better understanding of industrial relations.

3. Development of cooperative attitudes tends to increase economic well-being.

4. Education should further raise the level of general mechanical competency.

5. Education should further encourage scientific competency.

6. Higher education should aid the public in studying basic economic problems.

7. The economic contributions of education at early age levels should be further developed.

8. The schools should give greater attention to the education of the consumer.

9. Modern conditions make intelligent consumption difficult.

10. Consumer education and cooperative are essential in modern economy.

11. Quantity production and advertising permit a higher standard of living for the masses.

12. The educated consumer possesses high standards of value and taste.

13. Education is needed for wiser purchasing and consumption of food.

14. Education is needed for wiser expenditure for clothing.

15. Education is needed for wiser purchasing of shelter.

16. Education is needed for wiser purchase of health.

17. Education is needed for better discrimination in avocational expenditures.

18. There is need for better understanding of the significance of public expenditures.

19. Education is needed for wiser saving.

20. Consumer education has its technical phase.

21. The educated consumer is sensitive to his social responsibilities.

Philosophy of Industrial Arts. In this modern industrial civilization, very few people have become independent of their neighbors. Specialization has removed the many personal contacts experienced by the early settlers of America, and has made life far less momentous. The youth of the country is lacking the opportunities of exploration through observations and personal tryout experiences, which can be accomplished through an adequate industrial arts program in the schools of America.

Friese writes concerning the philosophy of industrial arts that it is a great social leveler. The school shops are the meeting places where boys of "both sides of the track" meet and work together and further states that: (17, page 59)

> Industrial arts adds to the delights of home, garden, mechanical devices, and civic improvements when consumers' values are stressed. Intelligent and discriminating demand for, and selection and consumption of, the products of industry are stressed. Consumers' appreciations involve problems of workers, workmanship, structural and aesthetic design, materials, and appropriateness. We must all select and consume the products of industry through we are not all producers in industry. Such consumer emphasis as a very logical place in industrial arts. It results in personal cultural satisfactions and creates a demand for better manufactured good and possibly more of them. It is a splendid way of developing general industrial intelligence in youth--in this instance in either boys or girls. Consumer appreciation of industrial things can be taught to many in industrial arts, whereas the number to whom actual skill in design and manual execution can be taught is more limited. Taking the element of fear out of the use of modern industrial devices is an important phase of consumers' knowledge and skill in industrial arts.

Todays education for girls should not be limited only to home economics courses, but should include industrial arts courses that will prepare them with a working knowledge of adjustments and simple repairs on electrical, mechanical, and plumbing devices. The women are becoming more and more a partner of equal standing in the business of making the home a success, whether it is in the selection of a house design, a problem of interior decoration, or purchasing of a home appliance.

<u>Objectives of Industrial Arts</u>. The purpose of industrial arts in education is to inculcate into each student common reasoning abilities for solving common problems in life. Industrial arts develops attitudes, knowledge and skills that are needed for a every day living. Wilber (42, page 42) states the following objectives of industrial arts as related to 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 and followership, and tact.

8. To develop a certain amount of skill in a number of basic industrial processes.

The objectives of industrial arts should be as flexible as possible to meet community needs, and thought of in terms of general educational changes in a pupil.

Philosophy of Industrial Arts for Girls. Many industrial arts teachers have failed to include girls in the future development of industrial attitudes, appreciation for a better living, and necessary skills to perform simple mechanical tasks in the home. The present housewife must deal with many new mechanical inventions, methods of construction, avocational interest, consumer's knowledge, and factors effecting daily living. Industrial arts courses are just as important to girls as they are to boys, and every school administrator should realize its importance and contributions toward general education. The philosophy of industrial arts

closely parallels the industrial arts philosophy for girls.

Objectives of Industrial Arts for Girls. The writer consulted several articles and publications concerning industrial arts for girls and was unable to find a specific set of objectives for girls. Several writers comment that the objectives of industrial arts are also applicable to girls. Kroll (30, page 68) suggests the following objectives in a research problem:

1. To provide education in tasks of a mechanical nature adaptable to women around the home.

2. To provide adequate information and intelligent understanding of some of the common activities involved in our mechanical age.

3. To provide a more intelligent consumer knowledge pertaining to the more common activities found in domestic life.

4. To encourage and present a variety of possibilities which will serve as the basis for the development of hobbies.

5. To provide experience in a wide variety of materials with actual participation in manipulative processes.

6. To provide an appreciation of our common industrial services and products.

7. To provide the necessary safety education for the common devices and mechanisms pertaining to ordinary domestic, industrial and avocational life.

8. To help develop the ability to think, reason, or solve problems pertinent to active participation in industrial and social life.

9. To provide avocational interest leading to the possible discovery of aptitude traits by guidance through broad occupational contacts and studies.

10. To provide correlation with other vital studies found in the school curriculum.

11. To assist in establishing proper attitudes, habits, and ideals in the social and economic relationships of life.

The philosophy and objectives of industrial arts as related to girls in general education have been presented. If the girls are to meet and cope

with the problems of today, industrial arts programs should be provided to explore and to learn more of the various aspects of industrial conditions.

The writer's personal philosophy of industrial art is the result of the study of developments and changes by leaders in the industrial arts field.

Accepted Definition. Industrial arts for girls is becoming increasingly popular in the general education curriculum. It has been proven that a need exists for the development of more and better planned industrial arts courses for girls. The writer has selected Bonser and Mossman's (8, page 5) definition of industrial arts as the most appropriate for this report.

> Industrial arts is a study of the changes made by man in the forms of materials to increase their values, and of the problems of life related to these changes.

Industrial arts is a part of everyday life, and its main objective is for educational purposes and not vocational purpose. In the study of industrial arts no attempt is made to develop any considerable degree of skill in any of the industries studied. Industrial arts is more concerned with the efficiency in the selection, care, and use of the products of industry.

Accepted Objectives. The following objectives by Robert A. Bardin (24, page 224) are recommended as those objectives which should guide industrial arts courses for girls.

1. To develop correct habits, attitudes and ideals of health and safety in the student.

2. To develop the student's ability to interpret graphic presentations and use them as a means of self-expression.

3. To develop in the student a knowledge and appreciation of industry and industrial life.

4. To develop the student's skill and manipulative ability in using the common tools and machines.

5. To develop the students ability to work and live with other people in a democratic society through an attitude of co-operation and service to others.

6. To develop the student's habits of self-discipline and his ability to proceed orderly in the accomplishment of any trade.

7. To provide experiences which can be used by the student in leisure time and avocational pursuits.

8. To develop the student's ability to select wisely, buy intelligently, and properly care for the industrial products he buys and uses.

9. To develop the students knowledge and appreciation of good workmanship and design.

10. To provide the student with experience which will be helpful to him as he selects, prepares for, enters, and advances in his occupation (not trade training).

11. To develop the student's ability to express himself creatively, using the tools and materials of industry.

12. To develop in the student a feeling of confidence and self-reliance through doing a job well.

Accepted Controlling Conditions. The limiting conditions of an industrial arts course for girls are numerous and only the most important will be presented in this study. One of the leading factors holding the progress of industrial arts for girls are the attitudes of the school administrators. Several school officials have failed to realize the products of industrial arts. Another factor is the limited allotment of funds for more equipment and qualified teachers. The parents of the girls consider industrial arts strictly a boy's course and discouragement through other pupil's curiosity would make the girls self-conscious and result in dropping the course. The controlling conditions can be overcome through careful treatment of the alert industrial arts teacher.

Not enough has been done toward giving girls the educational opportunities to work with tools and the products of nature. Educators must become

conscious of the importance of meeting the need of the individuals and improving the ways of life. The writer's personal educational philosophy has been presented. The following chapter will contain the content for a course in industrial arts for girls.

CHAPTER IV

INVESTIGATION OF PRESENT INDUSTRIAL ARTS COURSES FOR GIRLS

An extensive research was conducted for textbooks concerning industrial arts for girls. At the time this study was completed the only books available were on home mechanics instruction for girls. The writer consulted several magazine articles and the following will be presented to inform the reader of the existing literature on industrial arts courses for girls.

Course of Study by H. S. Preston. The following course of study was developed by H. S. Preston (36, page 33) from Lawrence, Kansas:

1. Drawing.
   a. Read a working drawing
   b. Make an isometric sketch.
   c. Make a working plan.
   d. Draw a floor plan.

2. Metalwork.
   a. Tin a soldering copper.
   b. Sharpen scissors and kitchen knives
   c. Solder a utensil.

3. Plumbing.
   a. Adjust and use a pipe wrench.
   b. Clean a drain trap.
   c. Protect pipes from freezing.
   d. Replace washer in faucet.
   e. Shut off water.
   f. Read water meter.

4. Finishing.
   a. Refinish piece of furniture.
   b. Study the common wood finishes.
   c. Remove spots from furniture.

5. Woodwork.
   a. Plan and make simple project.
   b. Make a picture frame.
   c. Repair a piece of furniture.
   d. Repair a screen-sash.

6. Electricity.
   a. Rules of safety.
   b. Read an electric meter.
   c. Connect light-socket.
   d. Repair extension cord.
   e. Detect and replace burnt-out fuses.

7. Auto Mechanics.
   a. Read and understand dash panel.
   b. Remove, repair and remount tire.
   c. Clean out the gas line.
   d. Safety rules of the road.
   e. Check oil, gas, water, air, and battery.

8. General.
   a. Glaze a sash.
   b. Adjust shade-roller.
   c. Adjust door-hinges.
   d. Repair garden hose.
   e. Simple upholstery repair.
   f. Care of heating devices.

Ray E. Brown (10, page 51) conducted a survey in relation to a home mechanics course and recommends the following course content:

I. The Automobile.
   1. Washing and polishing the car.

II. General Metal
   1. Sharpening a knife
   2. Sharpening and adjusting a pair of scissors.
   3. Repairing a garden hose.

III. Electrical Work.
   1. Repairing an extension cord.
   2. Put in a house fuse.
   3. Repair an electrical iron. (Replace heating element.)

IV. Mechanical Drawing.
   1. Make simple furniture drawings.
   2. Do lettering or printing.
   3. Make house plans.

V. Woodwork.
   1. Make several small projects so that girls will learn to use the common woodwork tools.
      a. Cutting board or cake board.
      b. Towel rack.
      c. Handkerchief box or sewing cabinet.
      d. Corner shelves.

2. Repairing and rescreening screen door.
3. Regluing loose joints in furniture.
4. Upholstering chair seats.
5. Repairing upholstery.

VI. Painting and Refinishing.
1. Varnishing furniture and floors.
2. Painting woodwork and furniture.
3. Removing scratches from furniture.
4. Cleaning and polishing furniture.
5. Painting interior walls.
6. Painting a porch floor or ceiling.

VII. Plumbing.
1. Repairing faucets. (Replacing washers.)

VIII. General Mechanics.
Instruction in the operation and maintenance of the common mechanical and electrical devices of the home.
1. Electric iron.
2. Electric washing machine.
3. Electric sweeper.
4. Sewing machine
5. Electric fan.
6. Lawn mower.

Course of Study for Indiana State Teachers College. The faculty of the Indiana State Teachers College Training School has developed a course in industrial arts for girls, for the purpose of exploring the opportunities and a new field of education. The course has been offered several times and changes have been made in relation to content, organization and methods of teaching. The course of study is divided into five units. The first unit is four weeks long and deals with mechanical drawing, sketching, and freehand drawing. During the four weeks the girls are taught the fundamental principles of orthographic projection, freehand sketching and pencil-and-rule drawing involving mechanical drawing principles.

The second unit is eight weeks long and deals with a study of design, construction, care and refinishing of furniture. The second unit involves: (44, page 29)

1. A brief study of the most popular periods of furniture, with emphasis upon the characteristics of each period studied.

2. A brief study of a few most common pieces of furniture, such as the chair, table, bed, and dresser, to the extent that the girls will understand something about how they are made and what to look for in the intelligent purchasing of furniture. Frequent visits are made to furniture stores and furniture factories in connection with this part of the course.

3. A brief study of the different kinds of wood used in furniture construction is studied with emphasis upon the characteristics that make each wood adapted to furniture making.

4. A brief study of how to care for furniture, with emphasis upon how to clean and polish and simple repair, such as regluing parts of a chair.

5. A study of the refinishing of furniture, involving actual practice in as wide a variety of work as time will permit. Some girls refinish furniture in their rooms.

The third unit is nine weeks long, and furnishes instruction in furniture weaving. In this part of the course, each girl completes two or more approved projects. The projects required the use of woodworking tools.

The fourth unit covers a three weeks period and is devoted to the care and repair of household mechanical appliances. Other work related to electricity includes: (44, page 30)

1. Conductors and non-conductors of electricity.

2. Electrical circuits and their purpose.

3. Fuses, their purpose and how to replace them.

4. Making an extension cord.

5. Repairing or making an electrical iron cord.

6. A brief study of the electric iron, toaster, vacuum cleaner, fan, etc., in order that the girls may understand better their operation, efficient use, and how to care for them.

The fifth unit is twelve weeks long, and deals with the main problems in the planning and building of a house. The following list of problems are discussed: (44, page 30)

1. The factors involved in the selection of a building site.

2. Style and design as applied to houses.

3. Brief study of the genealogy of the American home.

4. A brief study of types of houses.

5. Factors that determine style of house to build.

6. Thorough study of a number of desirable plans for five and six room houses.

7. Present day trends in home building.

8. Class visits to a few selected and well-planned houses.

9. Visits to houses under construction.

10. Advantages and disadvantages of different kinds of building materials.

11. Study of building codes and their purposes.

12. Value of insulation in building.

13. Advantages and disadvantages of different types of heating systems.

14. Plumbing and plumbing fixtures.

15. Electrical circuits, outlets and fixtures.

16. Interior materials, finish, and hardware.

17. Built-in features.

18. Economy in planning and building.

19. Constants and variables in connection with planning and building.

20. Methods of financing.

21. A brief study of legal documents such as deeds, abstracts, etc., in order that the girls may better understand their importance.

22. A brief study of specifications and their purpose.

<u>Course of Study for Augusta, Wisconsin</u>. Present developments indicate

that within a short time girls that are now in school will have to adjust themselves in an industrial world. In Augusta, Wisconsin, the Superintendent of Schools introduced a one year course in industrial arts for girls with the approval of the state department. During the first semester, the girls were taught simple woodworking procedures, wood finishing, and upholstry. Also many facts about industry, design, materials, and construction were included in the first semester's work. The second semester's work was called "general mechanical drawing," and was concerned with the study of house arrangement and construction, and mechanical and electrical equipment. Rose, (37, page 294) states that industrial arts for girls can claim:

1. Natural interest of a large percentage of the students.
2. Practical values which are not covered in any other course.
3. A positive contribution to the objectives of secondary education.

Rose (37, page 293) further states concerning the development of useful skills, habits of orderly procedure, intelligent consumption, and exploring experiences that:

> If the industrial department is to do these things for the boys, why should we not include the girls? Surely girls need to be able to select wisely, care for, and use properly the things they buy. They should be able to appreciate good workmanship and good design even more than the men, since women do most of the buying for the home. In fact, there is not a single objective in the list set up by the American Vocational Association two years ago which would not be as useful to a girl as to a boy. Of course, the projects used to gain these objectives should be developed to meet the specific needs of the girls just as they are for the boy, but the modern girl living in an industrial age should not be denied knowledge of the industrial arts.

<u>Course of Study by S. F. Hall</u>. In Clayton High School, Clayton, Missouri, S. F. Hall has organized a home mechanics course in industrial arts for girls.

The course includes instruction in the use of tools which are commonly found in the home, or which are useful to women in the home. Instruction is also given in the construction, operation, care and maintenance of the various types of mechanical and electrical appliances. Hall (23, page 159) states the following aims in practical mechanics instruction for high school girls:

1. To teach how to operate, care for, and maintain the mechanical and electric devices of the modern home.

2. To give information concerning the wise selection of industrial products.

3. To develop the ability to read blueprints and other drawings, and an understanding of how a dwelling is designed and constructed with respect to practical and esthetic values.

4. To provide opportunity for exploring abilities and aptitudes in craft work.

Hall states that the following area of instruction have been in demand by the high school girls: (23, page 159)

Home Mechanics.

1. Electric serve on the home
2. The water-supply system
3. Miscellaneous repairs and adjustments.

Woodwork.

1. Benchwork: Nothing should be undertaken that would overtax the strength; small power machines should be used, so far as possible. Suggested jobs: whatnot shelves; small footstool; decorative boxes.

2. Wood-carving: A craft that may be traced back through the ages, with many interesting ramifications; rudimentary exercises and designs may be developed in connection with small woodworking projects.

3. Wood-turning: May be undertaken by girls who show interest and proficiency. Suggested projects: potato masher, bud vase, gavel, candlestick, lamp.

Finishing.

The primary aim is to give information on the proper care of finishes on the furniture and other woodwork in the home; the

materials used in finishing and how to repair and renew finishes.

1. Care of floors and wood trim.
2. Care of furniture.

Metal Craft.

Copper, pewter, and silver are metals have a background rich in historic content and ideals; handwork in these metals responds to the constructive abilities of young people. Girls find in these handcrafts pleasurable activities and worthwhile ideas for leisure time. Suggested projects: book-ends, desk-sets, bowls, trays, ornaments.

Planning.

The girls should learn how to make sketches and simple working drawings; they should plan, design, and draw pieces they expect to make in the shop.

Course of Study by William H. Johnson. In 1939, Superintendent William H. Johnson of the Chicago Public School, introduced an industrial arts course in home mechanics for the seventh and eighth grade boys and girls. The home mechanics course is given twice a week and the periods are sixty minutes long. The broad objective of the Chicago home mechanics course is general education. The specific objectives listed by Johnson (22, page 119) are:

1. To give consumer knowledge about the selection and use of the products of industry.

2. To develop handyman abilities with common hand tools and a variety of construction materials.

3. To promote the use of handcraft for leisure time activities in the home.

4. To contribute to the development of the personality of the child and to further the social objectives of general education.

The instructional divisions of the home mechanics course are as follows:

Seventh Grade-First Semester

1. The reading and making of simple work drawings.
2. Care and use of hand tools.
3. Selection and care of clothing.

Seventh Grade-Second Semester

1. Care and adjustment of plumbing.
2. Selection and serving of foods.
3. Care and use of finishing materials.

Eighth Grade-First Semester

1. Care and adjustment of electrical devices in the home.
2. Care and repair of metal articles in the home.
3. Selection and arrangement of home furnishings.

Eighth Grade-Second Semester

1. Selection and care of wood construction.
2. Care and adjustment of windows and doors.
3. Care of lawns and shrubs.

Course of Study by L. H. Harnsberger at the Central High School of St. Paul, Minnesota. L. H. Harnsberger, has established an industrial arts course for girls. The girls receive instruction in hand woodwork and certain woodworking machines. Harnsberger (25, page 335) writes relating the course of study:

> Also the methods of construction, processes, and principles which are involved in the making of projects that develop ideals in workmanship, design, and finish. A liberal amount of supplementary information is given, including facts about tree growth, lumber manufacturing, cabinet woods and veneers, seasoning, and lumber defects. Special emphasis is placed upon wood finish, stains, staining, varnishing, refinishing, painting, and enameling with the necessary auxiliary information.

> Instruction begins with a demonstration on the sharpening, adjusting, and use of the jack plane. Other tools are demonstrated in their sequence in the process of squaring stock which forms the first unit of learning. When the first unit of learning has been accomplished, each student has a piece of stock ready for her first project.
>
> Beyond the first semester, students are given a very free choice of projects which may be suggested by the instructor or may be of individual creation. So far as practical, a group is expected to select the same project, thus permitting group instruction. An advanced student is usally appointed as an assistant to the teacher, and her duties are varied-aiding beginners in learning shop manners, sharpening tools, and being generally helpful about the shop.
>
> The primary object of this course is to teach the girls to be better homemakers. In establishing a home it is important to know something about each item that goes into its furnishing. The upkeep of a home makes many demands, and with the knowledge gained from this course, these girls are better fitted to supervise, if not to actually do the work themselves.

The industrial arts program at Central High School has been very successful.

The cooperation of the principal and the industrial arts supervisor has been very encouraging in the development of the program.

Louis V. Newkirk writes in <u>The Industrial Arts Program</u> that eight-year elementary schools should provide seventh and eighth grade girls with a well planned industrial arts course. The course should be concerned with the projects requiring the use of common tools and the selection, adjustment, and maintenance of the products of industry used in the home and community. Newkirk (33, page 134) lists the following eight objectives and further states that:

> Industrial arts in grades seven and eight has the same general objectives as industrial arts in all other grades, but the objectives must be interpreted in the light of the needs and capacities of boys and girls at this educational leve.
>
> 1. Develop the ability to plan and complete projects, using a variety of tools and construction materials in a workman-like manner.

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

3. Develop the ability to read and make working drawings, charts, and graphs.

4. Develop the ability to recognize quality and design in the products of industry.

5. Develop the ability to maintain and service in a safe and efficient manner the common products of industry.

6. Provide an objective medium for expression in mathematics, science, language, arts, and social science.

7. Develop an interest in crafts as a valuable medium for creative expression in leisure time.

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

The following content for an industrial arts course in practical mechanics is recommended by Newkirk (32, page 71).

I. General.
   1. Replace broken glass in window or door.
   2. Study the methods of controlling heating plants.
   3. Repair defects in a plastered wall.
   4. Frame a picture.

II. Electrical.
   1. Detect and replace a blown fuse.
   2. Assemble or repair the attachment cord of a home electrical appliance.
   3. Hook up bells and buzzers.
   4. Wire an extension cord for an electric lamp.
   5. Read the meters for gas, water, and electrical service.
   6. Give first aid to a person who has received an electrical shock.
   7. Install a radio set.

III. Drawing.
   1. Read a working drawing.

IV. Woodworking.
   1. Use simple woodworking tools.
   2. Install a screen in a window or door.
   3. Use corner plate, corner brace, mending plate, and corrugated fasteners to strengthen a weak joint.
   4. Use glue for general repair.

5. Select and use the different types of nails and screws.

V. Finishing.
1. Apply paint to new or old surface.
2. Apply stain, filler, and varnish on new wood.
3. Refinish furniture or woodwork.
4. Wax floors.

VI. Metalwork.
1. Sharpen knives.
2. Repair cooking utensils by soldering or riveting.
3. Clean and tin a soldering copper.

VII. Plumbing.
1. Repair a leaking compression faucet.
2. Repair a fuller faucet.
3. Repair a flush tank.
4. Clean a drain trap.

VIII. Auto Mechanics.
1. Lubricate the car.
2. Take proper care of cooling system.
3. Clean and test spark plugs.
4. Test battery, fill with distilled water, and clean the terminals.
5. Repair a leak in an inner tube, mount tire on rim, and inflate.

IX. Concrete.
1. Cast an article from concrete, using wet or dry mix.

The review of the present industrial arts courses for girls indicate that there exists a need for better organized courses of study. The course of study developed by Preston includes eight areas of instruction, but has failed to include the manipulative subject matter and the related subject matter. The course content is inadequate and incomplete and would have to be revised before being used.

The results of the survey by Brown were excellent since it indicates the important jobs performed around the home. The eight divisions of instruction outlined by Brown will have to be developed into a course of study before being used for class instruction.

Louis V. Newkirk has formulated a practical mechanics course for girls into eight instructional divisions with a number of jobs to be performed by

the pupil. Newkirk (32, page 71) has listed the following aims for the practical mechanics course of study:

(1) To teach the use and care of tools and mechanical devices used by women in the home and community, together with the principles involved.

(2) To give information needed in the wise selection of industrial products.

(3) To give some appreciation of the industries as to types and workers.

The courses of study presented in this study represent the current conditions of industrial arts for girls. The results indicate that there is a tremendous amount of work to be done before adequate courses of study in industrial arts for girls can be developed. The following chapter will present the writer's proposed course of study.

CHAPTER V

SUMMARY, CONCLUSIONS AND RECOMMENDATIONS OF THE STUDY

The reviews of other courses of study in industrial arts for girls have revealed that a need exists for a well prepared course of study that will meet the needs of the individuals. The writer will present a proposed course of study in industrial arts for girls as the conclusion of the study.

Summary of Findings. The study includes the progress of industrial arts from the time it had its beginning in the prehistoric days to the present time. The European developments of the great educational leaders are discussed and the American developments that have been responsible for the present status of industrial arts have been presented. Courses of study in industrial arts for girls have been reviewed and found inadequate and incomplete. The progress toward the development of better organized courses in industrial arts for girls has been very slow. The controlling factors mentioned in this study have been responsible for the very slow developments in industrial arts courses for girls. If the present method of education is to be successful in preparing the individuals to do better the more desirable things in life that she will be doing for a successful living, educators must take the responsibility of establishing the proper courses in industrial arts for girls.

Teacher Qualification. The junior high school industrial arts teacher should have cultural, and professional experience for successful teaching. The teacher should have completed the requirements for a bachelor's degree and may be either a man or a woman. At the present time the majority of

the industrial arts teachers are men. The educational requirements should include thirty semester hours in industrial arts education and fifteen semester hours in education and psychology. The teacher must possess high morals and an effective teaching personality as well as a natural ability to work with tools, machines, and materials. The industrial arts teacher must be progressive, sympathic, and understand the elements involved in successful teaching.

The Industrial Arts Shops. The two most common types of shop organization are the unit shop and the general shop. The unit shop deals with the tools, processes, materials, and information for a single occupational area. The general shop deals with two or more industrial areas which may be studied simultaneously. The general shop is the most used type of school shop organization in the unior high school level because of the exploratory nature of the work.

Selecting and Organizing the Course of Study. In organizing the course of study, it is important to begin with the objectives of the course. This involves considering the age of the student, previous experience, and concentration for desired results. After the completion of the objectives for the course, an analysis containing manipulative subject matter, related subject matter, recommended projects, and recommended textbooks must be outlined. From the prepared analysis the items that appear best suited for the course of study will be selected and formulated into the desired course of study. In relation with the basic principles in curriculum construction, Newkirk (32, page 28) states that:

> Common practice in establishing a curriculum is to begin with a list of aims or objectives, and then forthwith to select arbitarily a number of school tasks and projects which may plausibly be expected to fit in with the aims.

In selecting the desired courses for the junior high school girls, the writer has considered the following factors.

1. Selection of activities that will follow the objectives of general education in the junior high school.

2. Selection of activities that will coincide with the writer's accepted objectives of industrial arts for girls.

3. Selection of activities that will encourage group activity.

After considering the above mentioned recommendations, the writer suggests the following industrial arts activities for the junior high school girls: (1) mechanical drawing, (2) hand woodworking, (3) leather craft, (4) electricity, and (5) plastic working. Table I shows the organization of the courses.

TABLE I

A TWO SEMESTER INDUSTRIAL ARTS PROGRAM FOR JUNIOR HIGH SCHOOL GIRLS

Industrial Arts Subjects	1st. Semester No. of Weeks	2nd. Semester No. of Weeks
Drawing	6	
Hand Woodworking	12	
Leather Craft		6
Electricity		6
Plastic Working		6

The suggested activities will develop the pupil's activity, skill, and knowledge of industrial arts. It will provide an opportunity for the girls to explore and understand everyday problems.

The industrial arts program consists of six weeks of mechanical drawing and twelve weeks of hand woodworking during the first semester. The second semester will include six weeks of leather craft, six weeks of electricity, and six weeks of plastic working. The course is recommended for seventh and eighth grade girls.

Type of Course Organization. Courses of study may be classified into two types, the abbreviated type, and the comprehensive type. The abbreviated type will be used in the proposed program. This type of course organization contains a list of the major operations that the class should perform, and will be listed under manipulative subject matter. The abbreviated course will also contain units of related and technical knowledge and will be listed under related subject matter. It will also contain a number of projects that will help in acquiring the techniques and knowledge specified. This type of course organization is based upon the assumption that the teacher can and will use suitable teaching techniques and will have the needed skill, imagination, and experience to supply the detail which is lacking.

The Proposed Course of Study. The following is a proposed course of study in industrial arts for junior high school girls.

I. Mechanical Drawing.

1. Manipulative

a. Making simple sketches.

b. Making a floor plan.

c. Making a simple working drawing to scale.

d. Tracing a drawing.

2. Related Subject Matter.

   a. How to layout drawing paper, use triangles, and T-square. Measure with the scale.

   b. Learn vertical and inclined lettering. Make numerals.

   c. How blue prints are made.

   d. Learn to draw the various angles.

   e. Know how to draw different types of graphs.

   f. Learn to transfer distances with the dividers.

3. Recommended Problems.

   a. Draw an orthographic drawing of a simple block of wood.

   b. Letter the alphabet, using vertical lettering.

   c. Draw an isometric drawing.

4. Recommended Textbook.

   a. Fryklund and Kepler, General Drafting.

II. Hand Woodworking

1. Manipulative.

   a. Classifying common types of woods.

   b. Reading a working drawing.

   c. Using the jack plane, try square, and marking gauge.

   d. Using the rip, crosscut, back, and coping saws.

   e. Sharpening hand tools.

   f. Drilling holes with the auger and expansion bits.

   g. Gluing stock.

   h. Applying finishes.

2. Related Subject Matter.

   a. The uses of hard and soft woods.

   b. The standard sizes and the method of measuring lumber.

c. Geographical location main producing area of soft and hard woods.

d. Name of woodworking tools.

e. Steps in squaring stock to size.

f. Classification of wood screws, and nails.

g. Types and uses of various wood joints.

h. Application and care of different types of finishes.

3. Recommended Projects.

a. Cutting board.

b. Bookends.

c. Sewing box.

d. Book shelf.

e. Flower stand.

f. Jewel box.

4. Recommended textbook.

a. Douglass and Roberts, Units in Hand Woodworking.

III. Leather Craft.

1. Manipulative.

a. Cutting leather.

b. Learn to use leather working tools.

c. Transferring designs to leather.

d. Skiving leather.

e. Lacing leather.

f. Attaching snap buttons.

g. Decorating leather.

h. Finishing leather.

2. Related Subject Matter.

   a. Materials and tools used in making patterns.

   b. Know tools and procedure in cutting leather.

   c. Know different types of lacing.

   d. How to locate and punch holes.

   e. Know how to allow space for lacing, folds, snap buttons, and creasing.

   f. How to prepare leather for tooling.

   g. How to dye and finish leather.

3. Recommended Projects.

   a. Belt.

   b. Key case.

   c. Coin purse.

   d. Billfold.

   e. Decorate a coin purse.

4. Recommended textbook.

   a. Groneman, Chris H., Applied Leathercraft.

IV. Electricity.

1. Manipulative.

   a. How magnets are made.

   b. Socket wiring.

   c. Repair an appliance cord.

   d. Replace a blown fuse.

   e. Compute an electric bill.

2. Related Subject Matter.

   a. Electrical symbols.

   b. Reading circuit diagrams.

c. Bell transformers.

d. Overloaded circuit

e. Short circuit

f. Types of fuses

3. Recommended Projects.

a. Make an extension cord.

b. Wire bells in series and parallel.

c. Wire a one, two, and three way switch.

4. Recommended textbook.

a. Johnson and Newkirk, The Electrical Craft.

V. Plastic Work.

1. Manipulative.

a. Designing, laying out, cutting and squaring stock.

b. Drilling, boring, and countersinking holes.

c. Forming projects.

d. Cementing projects.

2. Related Subject Matter.

a. Learn to use a scratch awl in laying out lines. Lay out and cut designs. Laying out lines around a cylinder. Using try-square, dividers, and back saw.

b. Know the difference between positive and negative rake. How to use hand drill and bit and brace. Learn to tap and thread plastics.

c. Learn temperatures for heating different plastics. Know the construction and uses of jigs.

d. Learn how to apply cement. Know the different kinds and uses of plastic cements.

c. Know how to remove marks. How to use sandpaper, and the methods in polishing plastics.

3. Recommended projects.

a. Letter opener.

b. Belt slide.

c. House numbers.

d. Tableware.

e. Paper weight.

4. Recommended textbook.

a. Cherry, Raymond, General Plastics.

b. Groneman, Chris H., Plastics Made Practical.

Recommendations for Further Study. The future of industrial arts for girls depends on the success of further studies. Many school officials are still of the opinion that girls should not be enrolled in industrial arts classes. Industrial arts for girls is relatively new in the general education curriculum and educators must be informed of its importance in a highly industrialized nation. The writer believes that there is a need for a study to determine the number of colleges and universities that have established courses in industrial arts education for girls. Institutions of higher learning should organize such courses for the advancement of general education for girls. Another recommendation for further study that would be of interest toward the advancement of industrial arts girls, would be a survey to determine the enrollment and the number of industrial arts classes for girls in the State of Oklahoma.

It is hoped by the writer of this report that the future trend in industrial arts will be toward establishing industrial arts courses for girls. Every girl should have the opportunity of enrolling in such courses

so that she will become a more efficient member of society. At the present time, several schools have already formulated industrial arts for girls, and the results have been very successful. The inclusion of industrial arts courses for girls, will from an industrial arts viewpoint be a great contribution to the broader aims of general education.

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APPENDIX B

TULSA PUBLIC SCHOOLS
Industrial Arts

Percentage and Enrollment for
Junior High
First Semester 1951-1952

Cherokee Junior High

Total boys enrolled	173
Total girls enrolled	173
TOTAL ENROLLED	346
Boys in Industrial Arts	173
Girls in Industrial Arts	77
TOTAL INDUSTRIAL ARTS	250
% boys in Industrial Arts	100.0
% girls in Industrial Arts	44.5
% students in Industrial Arts	72.2

Cleveland Junior High

Total boys enrolled	768
Total girls enrolled	765
TOTAL ENROLLED	1533
Boys in Industrial Arts	572
Girls in Industrial Arts	123
TOTAL INDUSTRIAL ARTS	695
% boys in Industrial Arts	74.4
% girls in Industrial Arts	16.0
% students in Industrial Arts	45.3

Clinton Junior

Total boys enrolled	329
Total girls enrolled	309
TOTAL ENROLLED	638
Boys in Industrial Arts	329
Girls in Industrial Arts	0
TOTAL INDUSTRIAL ARTS	329
% boys in Industrial Arts	100.0
% girls in Industrial Arts	0
% students in Industrial Arts	51.5

Horace Mann Junior High

Total boys enrolled	595
Total girls enrolled	555
TOTAL ENROLLED	1150

Boys in Industrial Arts	324
Girls in Industrial Arts	0
TOTAL INDUSTRIAL ARTS	324
% boys in Industrial Arts	54.4
% girls in Industrial Arts	0
% students in Industrial Arts	29.9

Lowell Junior High School

Total boys enrolled	232
Total girls enrolled	225
TOTAL ENROLLED	457
Boys in Industrial Arts	297
Girls in Industrial Arts	68
TOTAL INDUSTRIAL ARTS	365
% boys in Industrial Arts	128.0
% girls in Industrial Arts	30.2
% students in Industrial Arts	79.8

Roosevelt Junior High School

Total boys enrolled	684
Total girls enrolled	671
TOTAL ENROLLED	1355
Boys in Industrial Arts	638
Girls in Industrial Arts	92
TOTAL INDUSTRIAL ARTS	730
% boys in Industrial Arts	93.2
% girls in Industrial Arts	13.7
% students in Industrial Arts	53.8

Wilson Junior High School

Total boys enrolled	797
Total girls enrolled	785
TOTAL ENROLLED	1582
Boys in Industrial Arts	626
Girls in Industrial Arts	142
TOTAL INDUSTRIAL ARTS	768
% boys in Industrial Arts	78.5
% girls in Industrial Arts	17.9
% students in Industrial Arts	48.5

Carver Junior High

Total boys enrolled	410
Total girls enrolled	388
TOTAL ENROLLED	798
Boys in Industrial Arts	330
Girls in Industrial Arts	49
TOTAL INDUSTRIAL ARTS	379
% boys in Industrial Arts	80.4
% girls in Industrial Arts	11.5
% students in Industrial Arts	47.4

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