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Scope of Study: A brief history of industrial arts from ancient times down to the present, with special emphasis on Texas development, is given plus some background study of educational philosophy and psychology prior to presentation of a survey of industrial arts departments in Texas schools taught by members of the Texas Industrial Arts Association membership. Subject matter of the survey includes the training and qualifications of the instructors, factors affecting teaching efficiency, the curriculum and techniques of teaching, and facilities for instruction.

Findings and Conclusions: The industrial arts teachers participating in the study are well qualified from both academic and professional standpoints; they have good tenure in position and are well acquainted with the needs of industry. The curriculum varies from one school to the other; classes vary in size, with some being too large; sufficient equipment is furnished in most instances, but the average classroom space is too small for safety and for the number of boys desiring this instruction. The most often mentioned problem is the dual one of lack of understanding on the part of school administration of the subject and the new emphasis on science and mathematics which draws the better pupils away from elective courses.

Adviser's Approval C. L. Hill

SURVEY OF INDUSTRIAL ARTS
IN THE SECONDARY SCHOOLS OF TEXAS

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IN THE SECONDARY SCHOOLS OF TEXAS

by

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To Mr. C. L. Hill, Head, Department of Industrial Arts Education, College of Education, Oklahoma State University, the writer wishes to express appreciation for his very constructive criticism and for the encouragement he gave throughout the study.

R.W.T.

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CHAPTER I

ORIGIN AND ORGANIZATION OF THE STUDY

Industrial arts is an essential part of general education because it is intimately related to the ways in which a man works, plays, and earns his living. In the traditional days of America when society was very largely rural in nature, the question of industrial arts training did not assume the importance ascribed to it today. Since the Civil War period, and especially during the last few decades, an industrial civilization has displaced the rural society, and there has developed an acute need for training in the schools which will provide opportunities for growing youth to acquire a knowledge and appreciation of the industrial society in which he lives.

The character of the training in industrial arts has changed with the changes in society. It was originally justified on the basis of its training of "hand and eye," but the school of today endeavors to not only give the student training in manipulative skills but to develop a sound understanding of the social-economic forces and conditions operating in the society in which he lives. To this end, the industrial arts program of today includes activities in many industries, use of typical and important industrial tools, experience in handicrafts, study of materials and occupations,

and acquaintance with the organization and operation of industrial and commercial enterprises. (3, page 9)

Industrial arts education, too, is an important medium of adjustment of the individual to the complex society in which he lives. The individual of today has a great deal more leisure time than the one of yesterday; unless this leisure time is used constructively it may become more harmful than beneficial. Industrial arts, through the many different opportunities it provides for creative activities, is one of the most important means of solving this problem of leisure time in a constructive manner.

The extent, then, to which industrial arts is included in the curriculum is an important part of the educational program. The purpose of the present study is to investigate some particular phases of the industrial arts program in the public schools of Texas.

Origin of the Study. The idea to make this study first originated from class discussions about industrial arts in Texas, the possible need for making a survey of the industrial arts program in the state, and the benefits to be derived from such a study. Interest in the subject was also heightened by the fact that similar studies had been made in Nebraska, South Dakota, Oklahoma, and New Mexico.

Need for the Study. There is a constant need for improvement in any field of education. The writer, being especially interested in industrial arts, feels that making a study of the prevailing conditions, practices, and deficiencies in the

Texas industrial arts program will prove helpful and stimulating to development and progress in this particular field. Comparison of the accumulated data with the reports of studies in other states should provide some constructive information about the growth and development of the industrial arts program in Texas schools, its strengths and weaknesses, its problem areas, and its possibilities as a phase of general education.

Methods of Research. Both primary and secondary data were used in the investigation. Some literature in the field of industrial arts as well as that of general education was studied in developing the history and underlying philosophy and psychology governing industrial arts instruction. In gathering data on industrial arts programs in Texas schools, a questionnaire was formulated and mailed to members of the Texas Industrial Arts Association who were engaged in teaching industrial arts courses in Texas high schools. It was believed that these teachers could depict prevailing conditions in Texas high schools.

Definitions of Significant Terms. A number of definitions are available for industrial arts education. The Vocational Association sets up the following definition:

> . . . Instructional shopwork of a non-vocational type which provides general educational experiences centered around the industrial and technical aspects of life today and offers orientation, in the areas of appreciation, production, consumption, and recreation through actual experiences with materials and goods. It also serves as exploratory experiences which are helpful in the choice of a vocation. (2, page 15)

According to the Handbook for Industrial Arts in Texas schools issued by the Texas Education Agency, "industrial arts education emphasizes the tools, materials, and processes of industry . . . fosters an appreciation for the social and economic understanding of various industries." (14, page 1) Wilber has a more definite definition which stresses the place and function of industrial arts in public education and its relationship to general education:

> Industrial arts is defined as those phases of general education which deal with industry--its organization, materials, occupations, processes, and products--and with the problems resulting from the industrial and technological nature of society. (29, page 2)

The writer chooses a composite definition taken from all of these: industrial arts education, featuring the tools, materials, and processes of industry, is a part of general education and aids the pupil in discovering latent aptitudes, abilities and interests, in learning the rudiments of industrial skills, and in developing resources for the constructive use of leisure time.

Related Studies. Two studies closely related to the present one pertain to the industrial arts programs in two states other than Texas. They are briefly reviewed here.

Frank E. Cassidy made a study of the status of industrial education in Arkansas in 1939. (8, pages 1-114) The purpose of the study was to make available assembled data on industrial education in Arkansas for school board members, superintendents, teachers, educators, and the interested public. Data were developed showing the number of schools

offering industrial arts courses, trade and industrial education subjects, the size of the schools in which the courses were offered, the certification requirements for industrial arts and trade and industrial education teachers, the colleges providing instruction in the subject, and the salaries of industrial education teachers in Arkansas. Two methods were used in collecting data, the study of state reports and questionnaires which were sent to all industrial arts and day trade teachers. Some of the important findings of the study were:

1. The schools had done much toward liberalization of the educational program by introducing practical subjects, but the movement was still behind the needs of the educational system.

2. Industrial arts in high schools was exploratory in nature but becoming increasingly vocational.

3. Trade and industrial education had standardized aims and objectives because it was supported by the Federal Division of Vocational Education.

4. Facilities for training industrial arts teachers were limited.

5. Many teachers of industrial arts had little training in the subject.

6. Trade and industrial courses were offered in the high schools as a part of the Federal Vocational Program.

Some of the more important recommendations listed were:

1. Require a bachelor's degree for industrial arts teachers.

2. Have at least one high school inspector on state staff who has had training in industrial arts.

3. An industrial arts advisory committee should be appointed by the state superintendent of public instruction.

4. Colleges offering both industrial arts and trade and industrial education should have a separate curriculum for each.

5. Industrial arts courses should be available in all approved junior high schools and in every senior high school with an enrollment of 200 or more.

6. A state course of study should be set up for each of the industrial arts courses offered in order to assure proper standards.

7. State adopted textbooks for the various courses in industrial arts should be provided, and the state course of study should be based on these textbooks.

8. Industrial arts classes should not exceed twenty-five students. (8, pages 108-112)

Granville Bennett Strunk made a survey of the history and status of industrial arts in the schools of New Mexico in 1941. (25, pages 1-110) The survey included a study of twenty-five accredited public junior and senior high schools in which industrial arts courses were being taught. Data were obtained through a study of records in the New Mexico State Department of Education and the Federal Library, personal interviews, and by the use of a questionnaire. Some important findings of the study may be listed as follows:

1. First instruction in manual arts was begun in 1916 in the State of New Mexico.

2. Industrial arts teachers are required to have a bachelor's degree and a major in industrial arts.

3. Two state colleges in the State offered industrial arts training leading to teaching certificates in this field.

4. All of the schools offering industrial arts in their courses were accredited high schools.

5. Salaries of industrial arts teachers ranged from $1,000 to $2,400 per year.

6. Thirty-two per cent of the industrial arts shops were in separate buildings. (25, pages 86-93)

Some of the more important recommendations were:

1. Industrial arts teachers should be employed eleven months out of the year.

2. A more diversified industrial arts program should be offered.

3. Adults should be encouraged to take industrial arts courses, and special classes should be offered in every industrial arts shop.

4. Teachers should be encouraged to use progressive teaching methods in their shops.

5. Every shop teacher should be required to go to college every third summer; those with a weak major should be required to attend a college or university with an approved department of industrial arts.

6. New industrial arts shops should be built according to specifications of standard shops similar to those found in the Ohio High School Standards for industrial arts.

Comparison of the findings of these two studies with those of the present one are not feasible in the light of the differences in times of the surveys. In the space of two decades, many changes have taken place in industrial arts instruction and practices; and what was true in Arkansas and New Mexico twenty years ago may be a great distance away from present conditions. The two studies, however, point up the growing interest in industrial education as a part of the public school program.

Analysis of the Plan for Presenting the Materials. The study has been divided into six chapters. Chapter I includes the origin of the study, the need for it, the methods of research used, definitions of terms, a review of two related studies, and an analysis of the plan for presenting the materials of the study. Chapter II presents a brief history of industrial arts or manual training as it was first called, its introduction into America and subsequent changes, and the present status of industrial education in the public schools of today. A study of educational philosophy and psychology and the changes in them affecting industrial arts instruction comprises the subject matter of Chapter III. This chapter also includes the writer's personal philosophy of industrial arts instruction. Collected data from the questionnaires and their interpretation are presented in Chapter IV. Problem areas as indicated by the respondents and suggestions for their solution comprise the subject matter of Chapter V. The concluding chapter contains the findings of the study,

the conclusions, and the recommendations. A description of the data tabulation precedes the presentation of the data in Chapter IV. Included in the Appendix of the study are a copy of the letter to the members of the Texas Industrial Arts Association and a copy of the questionnaire which they were requested to fill out.

CHAPTER II

HISTORY OF THE DEVELOPMENT OF INDUSTRIAL ARTS

A comprehensive view of the present industrial arts instruction in Texas cannot be had without first taking a look into past influences, beginnings, and developments which have been instrumental in the development of the program. In any such overview, attention must be given to the many factors which have operated to build present-day practices and techniques.

Part A

Early History

In any phase of human civilization, there has always been a need for manual labor on the part of some of the people. Ways of learning how to perform such labor have varied according to the stages of progress, but in all instances some methods of instruction have had to be used. Man does not instinctively know how to build a house or repair an engine; he learns from others or by the self-experience method.

Industrial Arts in Antiquity. The primeval savages were driven to the acquisition of many skills in order to survive. They had to have skills in the making and using of weapons. These weapons were necessary in obtaining food and in devising clothing and a shelter from the cold or the heat. According

to Davidson, the savage youth "learned to manufacture tools and means from wood, stone, clay, bone, wool, fibre, and hides." (8, page 21)

The savage, however, did not learn these things in school. At an early age, he learned to imitate his elders in their work; later the father taught his sons the needed skills for making a living, building shelters, and for devising clothing.

After man gained the power to control fire, he reached a stage after savagery--barbarism. He was able to cook his food, smelt metals and make them into tools, and to engage in a great many more activities with his hands. Labor, too, became more diversified; some men engaged in mining, others were carpenters, weavers, masons, and so on. Common work experiences drew men together, and groups or guilds were formed from the different occupations.

Learning these skills, however, was a process of imitation and learning by experience. There was no rationalized process of instruction. "Theirs was a teaching of routine, and not of theory. Models executed by the master were copied over and over again by his pupils, till they could reproduce them with absolute exactness." (13, page 165)

The fundamental motive in ancient Jewish education was religious, to make every child a firm believer in Jehovah. Secondary to this was instruction in some trade or vocation. Boys went to school in the mornings and remained at home in the afternoons learning the trade of their fathers. The Jewish law placed the duty of teaching the trade upon the

parent; the objective was to make the child a useful member of society as well as an individual well trained in the faith of his fathers. Jewish instruction in manual skills, thus, went a step further than the instruction given by savage and barbaric people whose main objective was skills in providing shelter, food, and clothes. (3, page 13)

The ancient Greeks regarded manual labor with contempt. Manual labor, of course, was necessary in promoting the art of living; but it was considered beneath the dignity of the higher class of Greek citizens. The little man who worked with his hands to earn his daily bread was "looked down on." (6, page 498) In view of this attitude, the manual arts found almost no place in the training of the Greek youth of the upper classes; but instruction in them was an integral part of the education of the lower classes. The apprenticeship method was the one utilized in transmitting trade skills from one individual to another. The fame of the Greek artisans was such that people flocked to Attica from all parts of the then known world to learn a trade. In so doing, labor became more highly specialized and a prototype of the modern factory system was developed. Xenophon, in referring to the manufacture of shoes, says:

> In great cities, because there are numbers that want each particular thing, one art alone suffices for the maintenance of each individual; and frequently, indeed, not an entire art, but one man makes shoes for men, and another for women; sometime it happens that one gets a maintenance merely by stitching shoes, another by cutting them out, another by cutting out upper leathers only, and another by simply putting

> together the pieces. This system of production is said to have resulted in a large increase in the number of slaves. (3, page 193)

The early Christian monks developed a new conception of the importance of labor with the hands. In fact, manual labor was regarded as the perpetual duty of man, an essential part of his religious life. The following description shows the extent to which labor was required of everyone:

> The days were divided between prayer and work. The work was divided between field labor and the exercise of the various trades, especially the manufacture of those mats which are still so universally used in southern countries. There were among the monks entire families of weavers, of carpenters, of curriers, of tailors and of fullers; among all, the labor was doubled by the rigor of an almost continual fast. All the rules of the patriarchs of the desert made labor obligatory, and the example of these holy lives gave authority to the rule. No exception to the contrary can be quoted or has been discovered. The superiors were first in hardship. . . . Each monastery was then a great school of labor and at the same time a great school of charity. (14, page 182)

The primary purpose of education in which work with the hands played an important part, however, did not have education as its primary purpose; labor was a penance as well as a means of existence.

Industrial Arts in the Middle Ages. The Middle Ages was marked with the rise of the guild system, associations formed by members of one particular trade or occupation. New emphasis and prestige came to the man who worked with his hands through the operation of the guilds. In considering the history of industrial arts, one of the important results of the guild system was the development of apprenticeships. This form of instruction, begun mainly in the

monasteries, was the main form of trade education; and it offered opportunity to the youth of learning all branches of his trade.

> The shop was small; master and apprentice often worked side by side at the same bench. The master himself worked at all processes of his handicraft, and therefore it was comparatively easy for him to teach all processes to the lad at his side. It was comparatively easy, too, for the lad. The number of apprentices being small the master could give each one a large part of his attention. . . . (15, page 56)

A well organized apprenticeship system, therefore, developed out of the Middle Ages. Ordinances were passed in towns setting up qualifications requiring apprenticeship before admittance of an individual to a craft or trade. The reciprocal duties of master and apprentice were also set up in the indentures--articles of agreement at the time of binding. These indentures show that the chief duty of the apprentice was to serve his master faithfully not only in business but in the performance of household tasks or other services; the master was obliged to teach the lad his trade and to house, feed, and clothe him. Besides this, he was supposed to give the youth such moral and religious training as a boy of immature age required. The period of apprenticeship varied, but the custom of London was to make the minimum seven years, and this length of time came to be generally accepted. On the whole, it may be said that the institution of apprenticeship met the needs of medieval and even early modern times as a system of industrial education.

A review of the advances of industrial education from the day when the savages were taught necessary skills for the

sake of existence to the guild training of apprentices shows a gradual advance in methods of instruction in manual labor. In no instance was the instruction given as a part of the educative process; that is, skills were learned for utilitarian purposes and not for the intrinsic educational value of the training itself.

Part B

History of the Development in America

The colonists who came to America from the European countries inevitably brought along with them their educational practices and beliefs. The nature of the new environment and varying needs for manual labor had their influence on the development of industrial education in the new world.

Industrial Education in Colonial America. The apprenticeship system of learning trade skills was brought to America by the English colonists and retained, but its scope was broadened. In England it was the responsibility of the master to see that apprentices were given moral and religious training as well as instruction in some trade. In this apprenticeship training, the master was supervised by whatever guild his trade placed him in. In the Americas, there were no guild or craft organizations so that the apprenticeship training was directly the responsibility of the town and colony authorities.

In the well-to-do colonial home, the children were either trained by their parents or by a tutor or sent back to England to private schools. In the majority of instances, the boys

who received this type of instruction were destined for one of the professions. In the middle class homes, the parents taught their children needed skills--the girls housewifely arts and the boys various types of manual skills. Entrance to a trade was usually through the apprenticeship method whereby a boy served as helper to a skilled mechanic of some type as he advanced up the ladder. The poor people, however, were the objects of special legislation in the different colonies for the education of their children. (4, page 268)

In 1641 the General Court of the Colony of New Plymouth passed an act adapting the English Poor Law of 1601 to the needs of the colony. Under this act, towns through their Selectmen could apprentice the children of the poor "into families where they may better be brought up and provided for." (4, page 268) In 1642 the Massachusetts Bay Colony passed an apprenticeship law because there had been neglect by the masters and parents in training their children in labor and training. (4, page 37) A New Plymouth Order of 1671, in addition to provisions for parents and masters, levied a fine of 10 shillings for those negligent of their duties. (4, page 53)

Inability of some parents and masters to teach their children and apprentices to read and write inadvertently led to the establishment of free schools. According to the law, the children must be taught to read and write; and illiterate masters, where they desired to keep their apprentices, were forced to send them to school. Elementary schools came

into being largely because of this need. In 1647 the General Court of Massachusetts ordered that every town of fifty householders should appoint one within their number as a school teacher. Funds for providing the school were obtained from the parents, the masters, "or by the inhabitants in general." (4, page 42) Under this law many towns established free schools. Other colonies followed the example of the New England colonies but were modified according to need. Seybolt, who has made extensive research in the apprenticeship training in the early colonies, makes this conclusion:

> It is interesting to note that the legislative provisions for the kind of education to be given to apprentices in both the New England and New York colonies is contained in Poor Laws. The indentures and other records indicate that they applied to voluntary industrial apprentices as well as to poor apprentices. There was no separate legislation concerning the education of the former class.
>
> In New England and New York the first laws concerning education and the first compulsory education laws were contained in apprenticeship enactments. As we have seen, the apprenticeship system took care of the entire problem of public elementary education during the colonial period. By the enactment of these laws, the scope of apprenticeship was broadened to such an extent that it became a new and peculiarly American institution. (16, page 107)

Although the apprenticeship system was instrumental in establishing free schools, there was no inclusion of training in manual skills as a part of the classroom activities. As a general practice, the early schools included reading, writing, and ciphering for the boys and reading and writing--sometimes only reading--for the girls. (3, page 269)

Training in Industrial Arts in Post-Revolution Times. The Industrial Revolution changed almost overnight the working conditions of the people and the apprenticeship training. One of the early industries of New England was weaving. In the beginning, weaving was carried on in individual homes; but later, even before the machinery period, it began to be taken from the homes and housed in "manufactories." In New England, a "manufactory" was merely a room or rooms where a number of looms were used. These looms were hand powered. Yarn for the looms was spun in homes by women and delivered to the "manufactories." (16, page 37)

The fly shuttle was used in Providence, Rhode Island, as early as 1788; and in 1789 spinning machinery was installed in a cotton mill. The first power loom was used in America in 1814. These inventions brought about many changes. Factories were built and a demand for cheap laborers developed. The factory work did not require long years of apprenticeship but opened up opportunities for men, women, and even children who worked long hours at low wages. The old system of apprenticeship gave way to that of factory operatives. (11, page 45)

Children working in factories brought about changes in schools. Sunday schools, part-time schools, factory schools, and continuation schools for factory workers developed. No effort to include any type of training for manual labor in the school curriculum was made though until after the Civil War.

Industrial Education in the Nineteenth Century. After many centuries of apprenticeship and after the rise of the factory system, the need for school training for industrial workers arose. In the United States this need was met through unit trade schools or evening schools. These schools were either private schools conducted for profit or privately endowed institutions. (11, page 34) The movement which introduced manual training into the school systems of a few of the larger cities in the United States was the outgrowth of a type of education first formally introduced into the schools of Scandinavia and Russia.

In 1858 manual training was introduced into the schools of Finland by Otto Cygnaeus. Due to his influence, manual training as a part of the school curriculum was introduced into the schools of Sweden. Cygnaeus, a strong advocate of handwork for pupils in the public schools, outlined a plan adopted in 1866 by which some form of manual training was made compulsory in Finland in all primary schools for boys from rural districts and in all training schools for men teachers. (9, pages 58-60)

At the Philadelphia Centennial Exposition in 1876, the Imperial Technical Institute of Moscow, Russia, had an exhibit which attracted much interest in the United States and which had an immediate effect on American educational handwork. Friese describes the exhibit as follows:

> The Russian exhibit was a system of fundamental tool instruction based upon the application of the methods of formal discipline or transfer of training to instruction in handwork.

> It was wholly vocational in its objective. Instruction was given through a system of models, many of which were abstract in their application and of no intrinsic worth. (9, page 12)

In 1877, shortly after the Russian exhibit, Runkel established the Mechanic Arts School of Boston in which shop courses were the important part of the curriculum. By 1882 the Scandinavian system gained a foothold in the schools of Boston, and this city became a great experimental center for educational handwork in America.

St. Louis, Missouri, was another outpost in which experimental work in manual training was done in the school. The movement in this city was spearheaded by Calvin M. Woodward, the founder of the St. Louis Manual Training School of Washington University. In St. Louis there had developed slowly since 1857 a plan for handwork instruction in secondary preparatory schools associated with Washington University. This plan became the St. Louis Manual Training School in 1879. For several years prior to this, Woodward had advocated the introduction of handwork instruction as a part of education of all boys regardless of their educational aims. The funds for the Manual Training School, however, came from private sources; the state was not yet ready to assume that manual training was a part of the cultural education of an individual.

Several years passed before it was recognized that there was not a definite line drawn between industrial education and cultural education. Woodward, however, emphasized the cultural aspects of manual training; he wanted to see shopwork placed on the same educational plane as other school subjects.

> He saw the mechanic arts analyzed, pedagogically organized, and taught under the guidance of the same principles that have influenced methods of teaching the sciences, mathematics, and even the languages. The mechanic arts so taught were not to teach trades. The products were to have no market value; therefore the shop must be supported in the same way as science laboratories. (4, page 337)

With these beginnings, industrial arts gradually began to make for itself a place in American education as a part of the regular curriculum. Much controversy was aroused in the National Education Association from 1882 to 1889; however, some definite plans began to take form. In 1893 the Western Drawing Teachers' Association, which later developed into the Western Arts Association, was formed. The establishment of teacher-training work on a broad scale at Bradley Polytechnic Institute, Peoria, Illinois, in 1897 was an important step in the development of manual training in the Middle West. In 1899 the Eastern Arts Association was organized. By 1913 many state and regional manual arts associations had been organized. (9, page 15)

From this time forward, the inclusion of manual arts, later to become known as industrial arts, in the secondary school curriculum became more general and widespread. The value of pupil interest, initiative, and originality was becoming recognized as an important factor in education, particularly in the secondary schools. Industrial arts, it was found, was a valuable medium whereby many students found new interest in school, learned new values, and, at the same time, laid the basis for development of trade skills in later life if he so desired. State after state began to include

industrial arts in the school curriculum. Many educators had come to realize that education in a democracy should provide, at public expense, training in occupations other than the so-called "learned professions." (12, page 17)

Part C

Industrial Arts Education in Texas

Texas, being a southern state, was somewhat slower than the industrial states of the eastern seaboard in including manual training as a part of its school curriculum. In a land where manual labor had been performed by the slaves, it was not easy for the white leaders to recognize that they and their children might have to use their hands in the process of making a living. Up until 1900 manual training as taught in the schools was mainly for Negro students. The catalogue of Prairie View Normal for 1889 indicates the establishment there of a well organized and functioning department with instruction in carpentry and agriculture. (27, page 131)

Early History of Manual Arts Instruction in Texas Schools. The first instance of manual arts instruction in the public white schools of Texas occurred in Austin in the early 1900's. Its introduction there was made possible by a private bequest setting up a sum of money for that purpose.

The man who was responsible for the introduction of manual training into the white schools of Texas was John T. Allan, a native of Scotland and a cabinet maker by trade. After working at his trade in Austin, Texas, for a number of

years, he studied law. In 1877 he was appointed State Treasurer. He died in 1888, bequeathing his property to be held in trust for the establishment of an industrial school in which students "shall be taught the practical use of tools as well as scientific principles." (27, page 132)

The administration of the funds, which grew from $35,000 to $75,000, gave rise to some problems. There was a question concerning the legality of using public funds to pay a teacher for instruction. The question was referred to the State Superintendent of Public Instruction, Oscar H. Cooper. This official ruled that it was legal for the school trustees of the City of Austin to pay the salary of an instructor from the funds derived from state and local taxes for the support of the schools. (27, page 132)

The other problems that arose were obtaining space in which to give manual training courses and securing a teacher. The course was finally introduced as a part of the high school course of study in Austin, and N. S. Hundsen from the Woodward Manual Training School in St. Louis was brought to Austin as the first manual training teacher in Texas.

Hundsen began instruction September 21, 1896, in the temporary capitol building on Eleventh Street, where the department remained for many years. The course of study was organized along the lines of that prescribed for the St. Louis school. The enrollment increased from eighteen the first year to eighty during the first six years, and the male attendance increased more than 100 per cent. An exhibit of the work in 1897 won many converts for manual training, and it was soon

realized that such training was an incentive for boys to remain in school who would otherwise have dropped out.

The success of the manual training program in Austin centered attention on the program for other schools. Concerted efforts now began to get underway for including manual training in the curriculum of other secondary schools. These efforts came in the form of addresses, committees, and legislative appropriations. In 1898 C. M. Woodward, the founder of the successful Manual Training School at Washington University in St. Louis, was invited to address the Texas legislature in favor of manual training in Texas schools. After his address, a meeting of persons interested in industrial education was called in Austin. A number of resolutions extolling the value of industrial education were passed; and Chairman J. S. Kendall, who was State Superintendent of Public Instruction, appointed a committee made up of one person from each senatorial district to promote industrial education. (5, page 17) The work of this committee laid the foundation for industrial arts in Texas schools.

In 1903 the twenty-eighth legislature passed the first bill which gave aid to schools that were interested in introducing manual training. The sum of $10,000 was set aside annually for the biennium 1903-1905 to be spent in duplication of any amount not less than $100 and not more than $500 that should be appropriated by the trustees of any common or independent school district for the purpose of purchasing equipment for the teaching of manual training. (5, page 66)

Two schools in Texas had previously introduced manual training; and, with the passage of the bill in 1903, the number grew to eleven independent school districts and one common school district. (5, page 139)

The greatest stimulus to the development of industrial arts came, however, in 1909 when the state legislature passed, first, a bill authorizing the State Board of Education to require the teaching of manual training, domestic economy, and agriculture in all existing and future state normal schools. Secondly, $18,000 was appropriated for the school years 1909-1910 and 1910-1911 for the purpose of providing rooms, equipment, and teachers for practical subjects. The state funds supplemented the local funds in amounts not less than $500 and not more than $2,000. (25, Section 7) The response to this bill was prompt; and, during the first year of its operation, the number of schools wherein industrial arts was taught rose from fifteen in 1909 to forty-two in 1910. (5, page 15)

Another definite result of the legislation of 1909 and 1911 was the general broadening of the curriculum in the field of manual arts. The work was made more practical. There was a wider variety of courses, and the equipment used was more in line with that used in industry. The courses offered were shop work in woods and metals, mechanical drawing, forging, auto mechanics, machine shop practice, and architectural drawing.

Further help for the industrial arts programs came from the federal government. The Smith-Hughes Act, passed by Congress in 1917, supplemented state salaries paid in the training of vocational workers and administrators. The federal funds were not available for buildings or equipment; these must be provided by the state. The purpose of the Smith-Hughes Law was to provide funds for the training of those already engaged in vocations or preparing directly to enter a trade. In this way, subjects were taught with the objective of training students to begin life's work upon high school graduation.

The small rural school, however, could not participate in manual arts training because of the lack of finances and buildings. Help came in 1925 through the passage of the Rural Aid legislation. This law provided state aid in an amount not more than $250 to any school in a district which would provide for proper instruction and demonstration of farm mechanics, carpentry, and other vocational subjects. (26, Section 7) The next legislature raised the amount that might be spent for equipment from $250 to $300 and also provided $100 for maintenance as long as the school met the requirements laid down by the State Department of Education. (26, Section 7)

By 1927 industrial arts was firmly established as an essential part of the secondary school curriculum in Texas. Eighty-eight accredited high schools, out of a total of 558, offered affiliated units in shop work and mechanical drawing.

The State Department of Education set up definite requirements for the accrediting of industrial arts courses in the public schools.

The history of the manual arts training or the industrial education program in Texas schools from this point on has been one of steady progress and growth. The foundation laid in the early 1900's had proved to be stable and responsible. Much of this growth, however, resulted from changes in educational philosophy and psychology rather than from just a natural expansion of the growth of the program. In the next chapter, these changes and their import to the industrial arts educational program in the schools are studied and analyzed.

CHAPTER III

CHANGES IN UNDERLYING PHILOSOPHICAL AND PSYCHOLOGICAL CONCEPTS OF INDUSTRIAL ARTS EDUCATION

The nautre of the prevailing educational philosophy and educational psychology have profoundly influenced the development of the industrial arts program in the public schools and the manner in which the subject has been taught. The purpose of this chapter is to investigate some of the changes in basic concepts underlying the industrial arts instruction and to outline the writer's current beliefs and personal philosophy dealing with the subject.

Part A

Influence of Traditional Thought upon Industrial Arts Instruction

The nature of traditional thought was an influential factor in the development of industrial arts instruction. The aims of the instruction, the place that it occupied in the lives of the people, and the methods of teaching all bore the imprint of traditional thought.

Traditional thought, as it is considered here, is the underlying philosophy and psychology prevalent at the time the study of manual arts was being introduced into the school curriculum. As previously developed, instruction of apprentices in schools was an American innovation necessitated by the fact that masters were required to give training in morals

and principles and reading and writing, as well as instruction in some basic trade. The inclusion of the school as a part of the instruction process inevitably led to the time when the skill instruction was also a part of the school curriculum.

Early Philosophies and Psychology. At the time that manual training was being introduced into the secondary schools of the United States in the latter part of the 19th Century, the prevailing educational philosophy was disciplinary in nature. Subjects were not taught for their own intrinsic value but for the mechanical effects they had upon the mind. When an individual went to school and studied, he did not do this primarily in order to learn but to have his imagination, memory, will, and other faculties trained. The majority of the subjects in the curriculum were there for their disciplinary value. Discipline, then, was the underlying philosophy dominating the curriculum at the time manual arts was first introduced into the school.

Underlying this educational philosophy was that of psychology--how an individual learned. The prevailing psychology at that time was that of the old "faculty" type--the mind is made up of a group of separate faculties, each of which could be trained through exercise. (10, page 31) Traditionally, the learner, then, was thought of as having a mind to be developed chiefly through accumulations of academic subject matter. The school was organized on a subject matter basis; and the program consisted merely of a collection of subjects

taught by specialists in the spirit of competition rather than of cooperation.

The manual training that was the forerunner of the present industrial arts program was introduced into the schools in order to promote the training of boys for industrial work, but the philosophy and psychology of education at that time soon reduced it to the level of other subjects in that it became a "special" subject not too closely related to life experiences. Then, too, certain phases of manual arts such as drafting and lettering were very mechanical in nature and, as such, won the favor of traditionalist educators who favored drill and routine work.

In order to achieve mental discipline, facts concerning tools and materials were memorized in the manual arts classes; skill exercises carried out this discipline in making joints of wood, chipping and filing in metals, and the like. Early industrial arts paralleled such procedures in academic instruction as memorizing the alphabet and number combinations, spelling of isolated word lists, defining parts of speech, and so on. (7, page 134). The pupil was not taught the exercise for its own intrinsic value but for the mechanical effect it had on the mind. There was no attempt to link the exercise with other subject matter, to correlate it with other areas, or to relate it to life activities.

Changes in Traditional Thought. New elements were at work, however, that were to change basic practices and beliefs. Beginning with the teachings and writings of

Rousseau, Pestalozzi, Froebel, Herbart, and down to America's John Dewey, fundamental changes had been developing in the philosophy of education. The traditional concept that education was for the gifted few, that it was disciplinary in nature, and that it was simply preparation for adult living has been supplanted with the doctrine that education is a life process, the right of every individual, and a means of adjusting to life's problems in childhood as well as in maturity. A description and explanation of Dewey's philosophy by Cubberly is a good presentation of the changes developed in the philosophy of education:

> Education, in Dewey's conception, involves not merely learning but play, construction, use of tools, contact with nature, expression and activity; and the school should be a place where children are working rather than listening, learning life by living life, and becoming acquainted with social institutions and industrial processes by studying them. The work of the school is in large part to reduce the complexity of modern life through simplified experiences. Its primary business may be said to train children in cooperative and mutually helpful living. The virtues of a school, as Dewey points out, are learning by doing; the use of muscles, sight and feeling, as well as hearing; and the employment of energy, originality, and initiative. The virtues of the school in the past were the colorless, negative virtues of obedience, docility, and submission. Mere obedience and the careful performance of imposed tasks he holds to be not only a poor preparation for social and industrial efficiency, but a poor preparation for democratic society and government as well. Responsibility for good government, under any democratic form of organization, rests with all, and the school should prepare for the political life by training its pupils to meet responsibilities, developing initiative, awakening social insight, and causing each to shoulder a fair share of the work in government in the school. (7, page 480)

Dewey's concept of education, apparent from a study of the foregoing quotation, called for new methods and practices

in the schoolroom. His belief that education involved the use of tools as well as books, the study of industrial processes, learning by doing, and interest-motivated activities instead of imposed activities provided a strong foundation for manual training or industrial education as a part of the life process of education.

Changes in beliefs concerning how a child learns and educational psychology also had a part in developing a different type of industrial education in the schools. Where the traditional psychology held that the mind is made up of a group of several faculties that can be trained through exercise, a group of modern psychologists, the Gestalts, formulated the concept that a child learns through understanding on the basis of a whole instead of in separate parts. (7, page 31) This educational psychology, coupled with the Dewey educational philosophy, had a profound effect on the aims of industrial arts education, the place of the subject in the curriculum, and the methods of teaching.

Part B

Influence of Current Beliefs upon Industrial Arts Instruction

The influence of current beliefs upon industrial arts instruction in the public schools can be appraised through a study of modern-day expressed objectives of the industrial arts program, the place allotted industrial arts in today's curriculum, and the recommended techniques of instruction.

Objectives of Modern Industrial Arts Programs.

Richardson made a survey of the objectives of industrial arts education in 1944 and formulated the following set of objectives as representative:

1. To develop the ability to select, care for, and use properly the thing he buys or uses.

2. To develop an appreciation of good workmanship and good design.

3. To develop an attitude of pride or interest in his ability to create useful things.

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

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

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

7. To develop the habit of careful, thoughtful work without loitering or wasting time.

8. To develop an attitude of readiness to assist others when they need help and to join in group undertakings.

9. To develop a thoughtful attitude in the matter of making things easy and pleasant for others.

10. To develop a knowledge and understanding of mechanical drawing, the interpretation of the conventions used in drawings and working diagrams, and the ability to express one's ideas. . . .

11. To develop elementary skills in the use of the more common tools and machines and a knowledge of the methods of procedure in tasks frequently encountered by the average man together with a knowledge of the working qualities and characteristics of some of the most used materials.

12. To develop the ability to use the mathematics required in the various trades. (19, page 555)

An examination of these objectives reveals that they cover a wide range of the average person's activities. In this instance, the industrial arts training does not segregate the subject from others and does not attempt to develop certain skills through drill and repetition; but attention is here directed to the development of the individual as a whole. Knowledge of the specialized field of industrial arts is related to all other phases of life such as development of personality, citizenship, attitudes, and appreciations.

Place of Industrial Arts in the Curriculum. Under traditional influence and thought, manual arts (or industrial arts, as it is called today) was a "special" subject and was not considered as an integral part of education in general. Industrial activities were analyzed into their specifics of knowledges and skills and taught in isolation from practical usage. In the present day concept of education as life activities, industrial arts has changed in status from a "special" subject to one which is an integral part of the general education of the pupil. (21, page 130) The place given industrial arts in the State Course of Study recommended for Texas schools is an example of the place it occupies in the curriculum.

In Texas, the schools have been organized into major areas of activity: Language Arts; Social Relations; Home and Vocational Arts; Creative and Recreative Arts; and

Nature, Mathematics, and Science. (21, page 9). The State Curriculum Executive Committee, which worked out these broad fields of subject matter stated that they emphasized the five most important fields of educational opportunity. Such a program, the Committee declared, was truly dynamic and life-centered. The five core areas reflect the most significant aspects of modern civilization and hold most in prospect for the growing individual. Of the area, "Home and Vocational Arts," this comment was made: "Security and success in home and vocation are essential to individual welfare and to social stability." (21, page 11) It is apparent, from this viewpoint, that industrial arts is regarded not as a "special" subject but as an integral part of the educative process as a whole. The subject matter is fused in a field and is correlated with other broad fields.

Methods of Teachings. Changes which the new philosophy and psychology brought to industrial arts are further illustrated in methods of teaching. Where once drill and repetition characterized the instruction process, the word "project" has replaced them in today's industrial arts instruction. Stevenson states that the term "project" became accepted as a method of teaching in connection with the introduction of vocational education in which the students performed work with their hands as a part of the learning process. (17, page 4)

Industrial arts, because of the opportunities that it presents for life experiences and experiments, has been found to be a prolific field for the project technique in teaching.

As early as 1911-12, a large project was instituted in the Manual Arts Department of the Clifton, Illinois, Public Schools. Manual training at that time was only being introduced into some of the larger, better-equipped schools. There was a desire on the part of the school board, parents, and pupils of the Clifton schools for a course in manual training. The school board was sympathetic with the desire for the work, but they did not have the funds to install expensive equipment. They agreed to furnish the funds, however, for remodeling and building work benches for a woodworking course if the boys would do the work. (17, page 136)

The principal of the school was a practical man, a carpenter and a builder, and worked at his trade during the summer months as well as at odd times during the school year. He accepted the offer of the school board to furnish the funds and the boys to do the work.

In the beginning, the principal set up definite objectives, the purpose of which was to find out what the boys wanted to make and the intended use of the products. Among the things mentioned by the boys were a window seat, a study table, and a playhouse for the children. Each boy had some definite project in mind. The boys or their parents assumed the responsibility of acquiring the tools and necessary materials.

A room in the school building was remodeled by the boys for their shop. The room had been used previously for storing surplus material and lacked a floor and adequate lighting for shop purposes. The boys, working under the direction of

the principal, studied the types of floor construction and decided to use a concrete floor. When it was decided to use concrete, the boys investigated the story of cement in an effort to learn how to mix it. They investigated the kinds of foundations used, the proportions used in mixing, the methods of mixing, the means of applying, and the precautions to be taken. After careful plans were made, the boys bought the cement and other materials, brought them to the school, and laid the cement floor themselves. As a direct result of this achievement, one of the boys bought material, mixed it, and laid a concrete walk at his home. All the boys enrolled in the manual training course planned and participated in the entire project at school. (17, page 245)

The next problem was the benches, sawhorses, and miter boxes. Under the practical supervision of the principal, these were made without waste and in a style that could be used by the boys in their work. In the same way, tool boxes were made to fit the tools that the boys had or might expect to use.

All the work that was done in the shop was carried out by the project method. The principal first made sure that the boy knew what he wanted to make and that he had some use for it. The boy had to submit a working drawing that was "readable" and with dimensions that must "prove out." Very little limitation was placed on the projects attempted except that the product must be useful. The boys were allowed to make the things which they or their parents would be likely

to buy. A few projects were worked out as drill exercises, but this was for the purpose of gaining skill in performing certain needed operations in the larger field. The point to be stressed here is: the student saw some problem as a whole that affected his daily needs and activities. He performed the learning process in answer to some felt need and in a subject in which he had a definite interest. He did not study to train his mind or other faculties.

An examination of the recommended Industrial Arts Program for Junior and High Schools of Texas will show the degree to which the project method is used in teaching the modern industrial arts courses. In a description of the teaching procedure, the following instructions are given:

> The teacher will divide his class into groups according to the industries represented in the laboratory and organize the class under a typical industrial plan. . . .
>
> The projects are to be selected, with the approval of the teacher, by individuals of the group. These projects must . . . serve some immediate need or interest of the pupil. (24, page 29)

The extent to which the industrial arts program is recognized as an integral part of the curriculum is evidenced by the fact that most high schools of today provide for a four-year course in the subject. Beginning years are exploratory; but the instruction is planned so that a student interested in the subject may complete advanced courses in metalwork, woodwork, electricity, auto mechanics, and related subjects. Of necessity, an industrial arts teacher should have a wide range of training in this field, as well as in education, in order to correlate the industrial arts program into other school

subject matter and in order to realize the overall objectives of education.

As any individual will do, the writer has developed his own creed of philosophy and psychology and needed procedures in teaching industrial arts from a study of the foregoing principles of educational philosophy and psychology. These are set out as a framework in which to study some of the results of the questionnaire sent to members of the Texas Industrial Arts Association who are presently engaged in teaching industrial arts in Texas high schools.

Part C

Personal Philosophy of the Writer

Some years of experience in teaching industrial arts, as well as study in college, enter into the personal philosophy of the writer in conjunction with the investigation made of traditional and modern concepts of industrial arts and techniques of instruction. The philosophy, then, may be said to be a composite of experience, training, and specific investigation.

Accepted Definition. The following definition of industrial arts instruction may be taken as the basis of a personal philosophy: Industrial arts education, featuring the tools, materials, and processes of industry, is a part of general education; and it aids the pupil in discovering latent aptitudes, abilities and interests, in learning the rudiments of industrial skills, and in developing resources for the

constructive use of leisure time. This is a composite definition taken from a number of sources.

Accepted Objectives. The objectives, as formulated, have been taken from a number of sources. Briefly, they are:

1. To develop the ability to select, care for, and use properly the thing he buys or uses.
2. To develop an appreciation of good workmanship and good design.
3. To develop an attitude of pride or interest in his ability to create useful things.
4. To develop a feeling of self-reliance and confidence in his ability to deal with people and to care for himself in an unusual or unfamiliar situation.
5. To develop the habit of an orderly method of procedure in the performance of any task.
6. To develop the habit of self-reliance or self-discipline which requires one to do a thing when it should be done, whether it is a pleasant task or not.
7. To develop an attitude of cooperation with others. (19, page 555)
8. To give the pupil practical experience with construction materials and mechanical activities of this industrial period which will be useful in home, avocational, and vocational life.
9. Provide opportunity for developing knowledge related to tools, materials, processes, operations, and other industrial arts information useful to home, avocational, and vocational life. (24, page 10)
10. To develop a knowledge and understanding of mechanical drawing. . . .
11. To develop elementary skills in the use of the more common tools and machines . . . together with a knowledge of the working qualities and characteristics of some of the most used materials.

12. To develop the ability to use the mathematics required in the various trades. (19, page 555)

Accepted Controlling Conditions. Accepted controlling conditions include a trained teacher, adequate time in which to do his work, and some facilities for instruction such as suitable rooms and equipment.

The industrial arts teacher is an integral part of the educational process; and, therefore, he should be well grounded in academic learning, both theory and practice, as well as specialized training, in the field of industrial arts. Inasmuch as present day industrial arts college courses include these, it may well be set up as a requirement that an industrial arts teacher have a degree from some recognized college as one of the requirements for teaching in the field. Further professional training is also recommended.

Industry as of today is a rapidly changing process. The industrial arts teacher, if he is to meet the needs of his students, must keep abreast of the times, know what is being done, keep up with new techniques of instruction. Membership in professional organizations in this field is one way of doing this, and reading professional literature is another. The industrial arts teacher who is truly interested in his field and in his students will participate in the professional organization programs in his field and will read the available literature.

A teacher, in order to do his best work, must have adequate time in which to teach. His subject ranks in importance

with that of other subject material in the curriculum. He is not a janitor nor an athletic coach. A teaching load of six sections daily should be avoided wherever possible, and an assignment of five sections daily should carry with it little or no study hall or other extra class duties. Since many industrial arts classes are double periods one or more days a week, the teaching load of five sections should obviously be less but equivalent to it in the general average.

An industrial arts teacher should be paid sufficient salary that he would not have to take an outside job in order to make a living. Industrial arts instruction requires preparation time as well as other subjects, and the teacher needs the time for professional study and reading as well.

Another much discussed qualification of an industrial arts teacher is previous experience in industry. It is the opinion of this writer that such experience may be helpful but is not at all a necessity. Present day college requirements afford a student an opportunity to get acquainted with the different industries and needs. Basic skills can be adjusted to almost any avocation. It is not the objective of high school industrial arts courses to turn out highly skilled personnel; but, rather, the trend is towards general skills on which to build specialization.

One basic qualification of a good industrial arts teacher is a genuine interest in the subject matter that he teaches. This is a qualification for which there is no

adequate standard of measurement, but where it is present the work of the students reflects this interest in enthusiasm and pride of work.

It goes without saying that industrial arts teaching requires separate rooms for shops and adequate equipment for teaching the various courses. In many instances, the equipment, such as work benches, may be made by the pupils as a part of the instruction. In the more advanced courses, a wide range of equipment is required.

The data obtained from the questionnaires sent to the members of the Texas Industrial Arts Association are evaluated in terms of this personal philosophy. The data, as compiled and evaluated, are shown in the next chapter.

CHAPTER IV

REPORT OF THE INVESTIGATION

The purpose of the present chapter is to make a report and analysis of the data collected from members of the Texas Industrial Arts Association pertaining to the industrial arts program in the public schools of Texas. Data include size of school, course of study of the industrial arts departments, qualifications, experience and industrial training of industrial arts teachers, instruction techniques, information regarding school shops, and major problem areas reported by the participants of the study.

Part A

Methods Used in Collecting Data and Presentation

The questionnaire method of obtaining data was used in the present research. The respondents chosen were members of the Texas Industrial Arts Association and they reside in different parts of the state. Interviewing each one of the respondents was prohibitive both from the standpoint of time and finances. The questionnaire, however, was formulated to elicit quantitative information. The questions were concise and designed to obtain the statistics required for this survey. As a means of testing the validity of the questionnaire, copies of it were presented to the class members of

Industrial Arts Education 572 for discussion and criticism. The questionnaire was then reorganized to include suggestions of the class.

A letter of transmittal was then formulated to accompany the questionnaire. This letter and a copy of the questionnaire have been included in the study and are found on pages 108 and 109 through 113, respectively.

The questionnaires and the transmittal letters were sent to members of the Texas Industrial Arts Association. A list was secured of the members of this Association in order to make up the mailing lists. Questionnaires were sent to 200 members, and 108 questionnaires were returned, 106 of which were completed. In two instances, the questionnaires were not filled out; in one school industrial arts was offered in alternate years, and in another one, the contacted member was director of the department instead of teacher and felt that a teacher should fill out the blanks.

Data from the completed questionnaires were tabulated. The returns were then set up for use in tables, and an evaluation made in terms of the philosophy of the investigator. Inasmuch as the answers to the last two questions concerned major problem areas and suggestions for improvement, data not susceptible to tabulation, the answers to these questions are treated in a subsequent chapter to the present one.

Part B

Results of Survey

In order to present a logical picture and evaluation of the industrial arts programs in the study, attention was first given to the teachers' training, professional attitude, advanced training and research in his field, and keeping abreast of industry through on-the-job experience and personal contacts.

Training and Qualification of Teachers. The academic and professional training of teachers is shown in Table I.

TABLE I

Types of Degrees Held

Degree	Frequency
A.B.	6
B.S.	92
M.A.	18
M.S.	6
M.E.	30
Total	152

Only one respondent had not completed the required college courses for a bachelor's degree, and he stated that he only lacked three hours which he would complete this summer.

The source and frequency of the degrees granted is shown in Table II.

TABLE II

Source of Degrees

School	Frequency Bachelor's	Frequency Master's	Total
North Texas State College	31	10	41
East Texas State Teachers Col.	23	9	32
Sam Houston State Teachers Col.	13	8	21
West Texas State Teachers Col.	12	4	16
Sul Ross State Teachers College	3	1	4
University of Houston	3	10	13
East Central Teachers Col. (Okla)	3	0	3
Texas A&M	2	4	6
Texas A.& I.	2	1	3
Southeastern State (Okla)	1	0	1
Southwestern State (Okla)	1	0	1
Southwest State Teachers Col. (Tex)	2	0	2
Northwestern State College (Okla)	1	0	1
Oklahoma State	1	0	1
Hardin-Simmons	1	0	1
University of Texas	0	2	2
University of Oklahoma	0	1	1
Colorado State University	0	3	3
Western State (Colorado)	0	1	1

North Texas State College, the above figures show, was the source of more bachelor degrees than any other institution, but the proportion of master's degrees did not meet that of other state colleges. The University of Houston was the source of only three bachelor degrees yet had granted ten master's degrees. Changing the major from industrial arts to a major in another field perhaps was a factor in some of the reasons why the figures in Table II show a reversal in the sources of degrees. The number majoring in industrial arts for their bachelor's degree, the number changing majors, and the number not majoring in industrial arts in either bachelor or master's work are shown in Table III.

TABLE III

Number of Respondents Majoring in Industrial Arts

Item	Frequency
Industrial arts major for bachelor degree	98
Industrial arts major for master's degree	27
Changing major from industrial arts for master's degree	23
Not majoring in industrial arts for bachelor or master's degree	4

The data in Table III show that twenty-three out of fifty of the respondents, almost 50%, changed their major field from industrial arts when they began their advanced study for a master's degree. Only four of the respondents had not majored in industrial education at either the bachelor or master's level.

The recency of the training of the respondents is indicated by the date of their completion of work towards the bachelor's or the master's degree. This information is shown in Table IV.

TABLE IV

Date of Degrees Conferred

Date	Frequency Bachelor's	Frequency Master's	Total
1922	2		2
1926	2		2
1931	1	1	2
1935	1		1
1936		1	1
1939		1	1
1940	5		5
1941		1	1
1942		1	1
1946	2	2	4
1947	2		2
1948	5		5
1949	11	4	15
1950	11	4	15
1951	6	11	17
1952	2	5	7
1953	7	5	12
1954	9	0	9
1955	5	2	7
1956	6	4	10
1957	4	2	6
1958	7	6	13
1959	6	4	10
1960	1		1
Total			152

The data in Table IV show that the majority of the degrees received by the respondents have been conferred since the end of World War II in 1945. Only eleven respondents had received the bachelor's degree prior to this time, and seven master's degrees. The data indicate that the training of the respondents for teaching industrial arts, then, is of comparatively recent date. One hundred and seven of these degrees have been conferred since 1950, approximately 68 per cent.

A check was also made on the number of respondents who were working towards degrees. Data from this check are shown in Table V.

TABLE V

Number Respondents Working for Degrees

Item	Frequency	Total
Number working towards I.A. degree		
Master's degree	6	
Doctor of Philosophy	2	8
Number working towards Master's degree (not specified)	6	6
Number working toward B.S. degree	1	1

As the data in Table V show, a total of fifteen of the respondents are working toward an advanced degree at the present time. At the same time, a check of their membership in professional organizations and their professional reading provides an indication of the extent to which they are keeping abreast of the times and up with the many changes which are occurring in the field of industrial education. Data in Table VI show the membership of the respondents in professional organizations in the field of industrial arts and in other areas as well.

TABLE VI

Membership in Professional Organizations

Organization	Frequency
Texas State Teachers Association	88
Texas Industrial Arts Association	68
American Industrial Arts Association	27
National Education Association	25
North Texas Industrial Arts Association	11
Central Basis Industrial Arts Association	9
Phi Delta Kappa	7
West Texas Industrial Arts Association	6
American Vocational Association	6
Iota Lamba Sigma	3
Southeast Texas Industrial Arts Association	2

A number of other respondents mentioned other organizations but only one in a group; these were not tabulated. In addition to checking membership in organizations, a question was also asked regarding the type of professional magazines to which respondents subscribed. Data on the answers received are shown in Table VII.

TABLE VII

Professional Magazines

Magazine	Frequency
Vocational and Industrial Education	70
School Shop	43
Texas Outlook	25
Workbench	11
Popular Mechanics	9
Phi Delta Kappa	7
The Industrial Teacher	4
Leather Craftsman	4

A number of other magazines, one to a respondent, were also listed. The list, as shown, indicates that a consider-

able number of the respondents keep up with changes in the field of industrial arts education through reading professional magazines in this field.

Industrial arts, as it is taught today, is very closely allied to industry. A check was made on the extent to which the respondents had been employed in industry prior to their teaching in the field of industrial arts. The answers revealed that fifty-six of the respondents had worked in some type of industry prior to their teaching experience. The types of industry participated in were:

Industry	Number
Carpentry or allied work	12
Construction	9
Mechanics and welding	8
Engineering	7
Maintenance	4
Miscellaneous	16

Another question seeking to learn the interest of the respondents was asked: Why did they choose to teach industrial arts? The answers given to this question were very revealing. They are shown in Table VIII.

TABLE VIII

Reasons for Teaching Industrial Arts

Reason	Frequency
Like the subject	53
Need of youth for industrial training	11
Likes to work with hands	8
Related to previous work	7
Influence of I.A. teacher or others	7
Good opportunity for work	7
Likes to work with boys	6
Interest in machines and tools	5
Tired of other subjects	3
Better prepared in I.A. field	3
Worthwhile subject	2
To learn about industry	1

In one way or another, the information shown in Table VIII indicates that the respondents have a very genuine interest in the subject, like to work with their hands, and have an interest in the young people whom they teach.

Another factor of interest in appraising teacher qualifications and efficiency in their instruction is their number of years experience in the field and tenure of position. Data in Table IX show the number of years experience in teaching industrial arts of the respondents and the number of years tenure in present position.

TABLE IX

Experience in Teaching Industrial Arts and Tenure of Position

Number Years Experience Teaching Industrial Arts	Number of Respondents	Number Years Tenure in Present Position	Number of Respondents
1	6	1	15
2	11	2	15
3	8	3	2
4	11	4	11
5	5	5	10
6	9	6	10
7	9	7	5
8	2	8	4
9	3	9	6
10	10	10	5
11	4	12	4
12	6	13	1
14	3	14	1
15	3	18	1
20	4	20	1
22	1	22	1
23	2	23	1
19	1	24	1
25	1	25	1
33	1	30	1
37	1	33	1
50	1	34	1

As shown in the data in Table IX, seventy-four of the respondents had teaching experience of less than ten years. Correspondingly, seventy-eight of the respondents indicated less than ten years tenure in position. At the same time, a significant number of those teaching over ten years showed present tenure over that period. The data indicate a high rate of stability in tenure of position in relation to number of years experience in teaching.

Still another factor indicating the interest of the respondents in the industrial field for which they help to

prepare students is the way in which they spend their time during the summer. In answer to a question asking the type of work done by the respondents for the last five summers, considerable data were collected. These data are shown in Table X.

TABLE X

Summer Employment Record of Respondents for Last Five Years

Type of Employment	Num. In 1955	Num. In 1956	Num. In 1957	Num. In 1958	Num. In 1959
Att. School	26	18	21	20	22
Army	10	7	4	2	0
Employment	30	30	35	34	32
School Mainte.	20	20	21	20	24
Self Employment	10	20	21	17	15
Miscellaneous	10	11	4	13	13

The majority of the respondents who mentioned "miscellaneous" activities had either traveled or taken a vacation during the summer months. School maintenance, which for the most part is repair of buildings and furniture, utilizes the skills of the respondents in this respect. In the field of employment, a variety of activities is represented, many of which are in the industrial field such as welding, construction, and engineering. Taken as a whole, the respondents indicate that they either attend school or find some type of employment in the field of industry.

The data presented in regard to the professional training, interest in the profession, and tenure of experience and position indicate that the respondents in study are well

qualified in all areas for instruction in the field of industrial arts. A decided interest in the field is indicated, service in industry is shown, there is a high degree of professional training, and the tenure of position indicates that the respondents are doing efficient work in their field.

One note of question may be raised: A significant degree of the respondents who have majored in industrial arts for the bachelor's degree have failed to follow up this major in their graduate studies. The majority changing fields have taken the degree of master of education. This change warrants further study of this situation, it is believed, in order to determine the reasons for the change. In studying the data, it was found that more changes in majors at the graduate level had taken place at North Texas State College than in any other institution.

Factors Affecting Teaching Efficiency. Any number of factors may affect teaching efficiency. Some of the more common ones such as the daily teaching schedule, demands made on the teacher's time, and extra-curricular activities were considered in developing the questionnaire sent the respondents in the study.

Sixteen of the respondents did not fill out the blanks showing the number of class periods taught each day. Data on the class periods of ninety-two of the respondents are shown in Table XI.

TABLE XI

Number of Class Periods Per Day

Number Periods	Frequency
3	3
4	10
5	67
6	10

A large majority of the respondents, as shown in Table XI, carry a full five-hour schedule of classes per day. Ten of the respondents teach six classes per day. In addition to the regular teaching duties in industrial arts, a number of the teachers perform other teaching activities. These activities are shown as follows:

Activity	Frequency
Home room duty	25
Study hall	7
History instruction	6
Driver education instruction	4
Physical education instruction	4
Commercial mathematics	4
Health instruction	2
Science	2
Speech	1
Civics	1
Athletics	1

A check was also made on the different phases of the industrial arts instruction taught by the respondents. Data in Table XII show the number of classes taught in wood, metal, machine shop, mechanical drawing, general shop or general industrial arts, leather, arts and crafts.

TABLE XII

Number of Classes in Industrial Arts

Type of Industrial Arts	Frequency
Wood	114
Mechanical drawing	85
General shop or I.A.	65
Metal	48
Arts and crafts	16
Electricity	6
Leather	3
Machine shop	2

Wood, as shown in Table XII, was the most popular phase of industrial arts production, with mechanical drawing and general shop ranking second and third, respectively. The grade levels at which such instruction was given were then checked. Data regarding the grade levels of instruction are shown in Table XIII.

TABLE XIII

Grade Levels of Industrial Arts Instruction

Grade Level	Frequency
Seventh grade	32
Eighth grade	62
Ninth grade	90
Tenth grade	16
Eleventh-twelfth	23
Twelfth	15
Tenth, eleventh, twelfth	85
Ninth through twelfth	28
Ninth and tenth	10
Seventh, eighth, and ninth	1

The data in Table XIII indicate that the majority of instruction in industrial arts classes in the schools of the

respondents comes after the pupil has entered the ninth grade. Inasmuch as the respondents tended to group the instruction in such classifications as "tenth, eleventh, and twelfth" it is impossible to state definitely how many classes were held in industrial arts at the different grade levels, but the data as given do indicate that few of the schools include industrial arts in the curriculum under the ninth grade.

The number of pupils per class also enters into any evaluation of the factors operating to increase or decrease teacher efficiency. Respondents, then, were asked to indicate the number of pupils in the different classes. This information is shown in Table XIV.

TABLE XIV

Number of Pupils Per Class in Industrial Arts

Number Pupils	Frequency
3	1
4	2
5	3
6	4
7	7
8	7
10	5
11	5
12	27
13	3
14	13
15	11
16	16
17	8
18	21
19	24
20	32
21	16
22	23
23	9
24	30
25	14
26	23
27	9
28	23
29	15
30	22
31	15
32	9
35	7
37	1
39	1

The data in Table XIV indicate that some of the respondents have large classes. For example, twenty-three reported classes of twenty-eight pupils and twenty-two, thirty pupils. In only twenty-four instances were classes reported with less than ten pupils.

One of the questions pertained to the size of the school population represented in the survey. In tabulating the data

population brackets were worked out instead of tabulation by individual schools. The data in Table XV show the school population in the schools represented.

TABLE XV

School Population of Schools of the Survey

Population Bracket	Frequency
Under 300*	20
300-500	13
500-700	13
700-1,000	14
1,000-1,500	21
1,500-2,000	16
Over 2,000	5
Total	104

*Four schools listed high school population only

As shown in the data in Table XV, the largest school population was in the less than 300 bracket and in the 1,000-1,500 bracket. In four instances, the schools reporting a school population of less than 300 mentioned that the number reported was for the high school only. Since many schools combine all twelve grades in one school, there may be other instances. The data indicate, however, that over one-half the schools represented have a school population of 700 or over.

Extra-curricular activities, in many instances, call for additional time on the part of the teachers. In order to check the extent of this practice in the schools of the respondents, a question was asked concerning the number of

student organizations sponsored by them in their schools. Information obtained from the answers is shown in Table XVI.

TABLE XVI

Student Organizations Sponsored

Organization	Frequency
Industrial Arts club	10
Senior class	7
Junior class	7
Sophomore class	3
Student Council	3
Mechanical Drawing Club	1
Craftsman Guild of Fisher Body Company	2
American Radio Club	3
Junior Choir	1
Firearms Safety Club	1
Girl Scouts	1
Safety Club	1
Debate Club	1
Model Club	1
T-square	1
Total	43

Forty-three, or approximately 83 per cent of the respondents reported that they sponsored some type of club activity in their respective schools. An additional question developed the information that eight of the respondents also coach some type of athletic game, in some instances this included football, track, and basketball all taught by the same teacher.

More of the respondents failed to fill out the blanks on the titles of textbooks used in industrial arts instruction than in any other phase of the questionnaire. The data reported, for that reason, are not as complete as is some other areas. Table XVII presents the information obtained.

TABLE XVII

Titles of Textbooks Used in Industrial Arts Instruction

Title Textbook	Frequency
Mechanical Drawing--French and Stevenson	46
Mechanical Drawing--McGee and Sterrett	2
General Shop Woodworking	21
Industrial Art Woodworking	17
Bench Woodworking	12
General Woodwork--Smith	2
Machine Woodwork	12
General Metal	22
Technical Drafting and Essentials	5
Drawing, Sketching and Blueprint Reading	4
Advanced Woodwork	4
Instructional Units	8
Sheet Metal	5
Advanced Woodwork and Furniture Making	22
Drafting	2
Leathercraft	2
Jewelry Work	1
General Shop	1
Graphic Arts	1
Oxygen-Acetylene Handbook	1

In the basic training, the data indicate that many schools have the same textbooks. A wider variety of textbooks is found in the more advanced instruction.

Other factors that enter into teaching efficiency are the length of time spent on the job and the salary received by the instructor. Data developed show that seventy-nine of the respondents reported that they were employed for 9 months per year, fifteen reported 10 months, and seven reported that they were employed the full twelve months. Seven respondents did not answer this question.

The salary range, as reported by the respondents, is shown in Table XVIII.

TABLE XVIII

Salary Range of Respondents

Salary Range	Frequency
$3,000 to $4,000	11
$4,000 to $5,000	39
$5,000 to $6,000	20
$6,000 to $7,000	8
Over $7,000	1

A number of respondents failed to answer the question concerning the amount of salary paid. Of those answering, the data in Table XVIII, the majority of those answering are in the $4,000 to $5,000 a year bracket. Only eleven respondents reported a salary of less than $4,000 per year.

In regard to salary provisions, a question was asked the respondents concerning outside jobs held during the time school is in session. Twenty-nine respondents of those answering the question reported that they had outside jobs during the time school is in session. The types of jobs are shown in Table XIX.

TABLE XIX

Types of Outside Jobs Held By Respondents

Type Job	Frequency
Bus driver	13
Carpenter	3
Self-employment	3
Salesman	2
School Maintenance	2
Army reserve	1
Credit work	1
Drafting	1
Artist	1
Labor	1
Engineer	1
Total	29

As the data in Table XIX show, the majority of the respondents with outside jobs drive the school buses. Other types of jobs vary, but in the main they are related to the work done in the industrial arts instruction.

In the final question regarding factors that can affect the efficiency of an instructor, the respondents were queried as to whether or not they were required to do maintenance work for their schools. Data on the answers are shown in Table XX.

TABLE XX

Requirements for Maintenance Work

Requirement	Frequency
Not required to do maintenance	78
Required to do maintenance	6
Required to do a little or "some"	17
Required to maintain I.A. equipment	3
Not required but do some work	4
Total	108

In summing up the factors that might operate to increase or decrease teacher efficiency, these points may be mentioned: As a general rule the respondents carried a full load of five sections or classes per day, while some carried an excess load of six sections. In addition, industrial arts instructors, to a considerable degree, were called upon to act as home-room teachers or keep study halls. Some were given other teaching assignments than industrial arts. The size of classes, too, in many instances was larger than the minimum standards for teaching efficiency. Almost 50 per cent of the respondents received a salary of less than $5,000 a year. In proportion to the time and money spent on training, the salary is low for this percentage of the teachers.

Curriculum of Industrial Arts and Techniques of Instruction. One phase of the study was an investigation of the industrial arts curriculum and the techniques of instruction. The data in regard to the curriculum are shown in Table XXI.

TABLE XXI

Industrial Arts Curriculum in Participating Schools

Phase of Industrial Arts	Frequency
Mechanical drawing	86
Woodwork	69
Metal work	73
Arts and Crafts	10
Electricity	16
General Shop	28

In some instances, the respondents reported the curriculum as Wood I, II, and III or Metal Work I, II, and III. Others reported only advanced woodwork. Inasmuch as the majority of the respondents simply wrote in "Metal, wood, and mechanical drawing," or like descriptions, the tabulation obviously had to be general in terminology. As shown in Table XXI, mechanical drawing had the greatest frequency, metal work second, and woodwork, third. Twenty-eight of the respondents reported their curriculum as "general shop," and this, of course, includes metal, wood, and mechanical drawing. The data indicate that some type of mechanical drawing, wood, and metal work are included in practically all the industrial arts departments. One respondent reported a "Day-trade vocational course."

Eighty-two of the respondents reported that all courses in industrial arts in their schools were elective. Three did not give any information. The twenty-one respondents who reported required courses listed them as shown in the data in Table XXII.

TABLE XXII

Industrial Arts Courses Required

Required Courses	Frequency
7th and 8th grade	8
General Shop I	4
7th grade	4
Exploratory	2
Woodwork, Grade 10	1

Data in Table XXII show that a high percentage of the required courses are at the seventh and eighth grades level. In only one instance is any mention made of a required course above the eighth grade.

The manner in which the industrial arts programs are organized are shown in the data in Table XXIII.

TABLE XXIII

Organization of Industrial Arts Instruction

Type of Organization	Frequency
Unit	42
General shop	26
Both	30
Not answering	8

The unit type of instruction, as shown in Table XXIII, was the one most frequently reported. Eight of the respondents did not provide this information.

Forty-eight of the respondents reported that girls were permitted to take industrial arts and fifty-four reported that they were not permitted to do so. In most instances, the respondents reporting industrial arts for girls qualified their statements by the comments that such work was limited to mechanical drawing or arts and crafts.

The use of a course of study in instruction was indicated by many of the respondents. The data in Table XXIV show the number using a course of study of some type.

TABLE XXIV

Use of a Course of Study

Item	Frequency
Course of study (some outside ones)	65
Course of study (personal)	19
No course of study	16
No answer	6

The majority of the respondents, the data in Table XXIV show, use some type of course of study. In nineteen instances, the respondents reported that they had formulated their own courses of study rather than use one set up by an outside source.

Industrial arts instruction, as a general rule, includes both lecture and recitation and laboratory work. Data in Table XXV show the number of respondents reporting that time was set apart for lecture and recitation and the percentage of teaching given to this phase of instruction.

TABLE XXV

Time for Lecture and Recitation

Item	Frequency
Time for lecture and recitation	
Weekly	48
Daily	8
No certain time allotted	48
No answer	2
Percentage of teaching given to lecture and recitation	
Approximately one-third	4
" " one-fourth	12
" " one-third-one-fourth	6
" " one-sixth-one-fifth	24
" " 15 per cent	15
" " one-eighth per cent	1
" " one-tenth	1
No definite answer	43

In regard to the time for lecture and recitation as a part of the instruction, the data in Table XXV show that all respondents except two who did not answer the question, indicated that some time is given to lecture and recitation. Forty-eight respondents reported that they had a definite weekly period allotted for this purpose and the same number reported no certain specified time but given "as needed." Only eight reported this practice daily. In the question on percentage of time given to lecture and recitation in teaching, a considerable percentage did not set any definite percentage of time utilized. In the highest percentage reported, one-sixth to one-fifth, there were twenty-four using this percentage of time. A wide variation was reported by other respondents.

Field trips are used as a part of instruction by many teachers. Data in Table XXVI show the number of respondents utilizing field trips and the number of trips made per year.

TABLE XXVI

Field Trips as a Part of Instruction

Field Trips	Frequency
Respondents Using Field Trips	33
Number field trips per year	
One	10
Two	5
Two or three	6
Three or four	7
About five	1
Ten	4
Number not making field trips	72
Number not answering	1

Thirty-three of the respondents, as shown in Table XXVI, used field trips as a part of the instruction in industrial arts. The number of trips varied from one to ten, with the largest percentage being those making one field trip per year. Seventy-two of the respondents reported that they did not make field trips. One respondent wrote in that time for such trips could not be worked into the schedule and another stated that such trips were against school policy.

Further questions were asked regarding the number of industries and shops visited by the respondents during the past year. Data obtained from the questions are shown in Table XXVII.

TABLE XXVII

Number of Industries and Schools Shops Visited By Respondents

Item	Frequency
Number visits to industries	
One	15
Two	18
Three	17
Four	7
Five	4
Six	2
Eight	1
Ten	1
Twelve	2
Fifteen	1
Number of shops visited	
One	6
Two	10
Three	15
Four	13
Five	9
Six	10
Seven	4
Eight	4
Nine	1
Ten	9
Twelve	4
Twenty	4
Totals	
Visiting industries	68
Visiting shops	89

The data in Table XXVII indicate that a significant percentage of the respondents are keeping abreast of the developments in industry through visiting industrial plants and through school developments by visiting other school shops. In four instances, respondents visited as many as twenty school shops other than their own, and in fifty instances, respondents visited from one to three industries.

Respondents were then asked their opinion regarding value of industrial experience as a qualification for teaching industrial arts. Data in Table XXVIII show the information received.

TABLE XXVIII

Opinion of Respondents Regarding Industrial Experience

Value of Industrial Experience	Frequency
Number respondents favoring industrial experience	56
Number respondents not favoring industrial experience	35
Number respondents undecided on question	15

The answers of the respondents indicate that a majority of them regard industrial experience as a valuable factor in instruction on this subject. Fifteen of them were undecided; the majority of these qualified their statements by comments that they would be more influenced by other factors.

Another question regarding the techniques of instruction pertained to teaching aids utilized by the respondents. Data in Table XXIX show the types of teaching aids reported by the respondents.

TABLE XXIX

Types of Teaching Aids Used by Respondents

Type of Teaching Aid	Frequency
Visual aids	49
Models	63
Professional magazines	31
School shop magazines	22
Movies, films, or film strips	31
Charts	20
Supplementary books	8
Supplemental information sheet	4
Blueprints	4
Resource or professional people	5
Demonstrations	3
All kinds that will help	4
Miscellaneous	8

Models, the data in Table XXIX indicate, were the most used type of teaching aid, by the respondents. Visual aids, in some instances, probably included materials included under the heading of "movies, films, or film strips." In this case, the visual aids would be the most-used type. In a number of instances the comments were made that the respondents used any type of teaching aid that could be utilized or was available.

A brief review of the data on the curriculum and the techniques of instruction indicate that the industrial arts curriculum mainly includes wood, metal, and mechanical drawing. Arts and crafts and electricity are included but to a much lesser degree. Techniques of instruction include courses of study, time for lectures and recitation, field trips, teaching aids, and the extent of visits to industries and other school shops by the respondents.

In evaluating the data, several conclusions have been reached. The industrial arts curriculum, it appears, conforms very closely to that of other areas. The instructors vary shop work with lectures and recitations, both necessary in any program of instruction. A variety of valuable teaching aids are included in teaching. Field trips are utilized by many teachers in acquainting their students with industries and practical work experiences. An interest in the developments in industry and in other school shops is evidenced by some of the instructors. The over-all conclusion is that the respondents appear to be doing effective instruction in the field of industrial arts.

Facilities for Teaching. The facilities for teaching industrial education include the amount of budget set up for buying tools and supplies, the location of the shop, its size, and the adequacy of its tools. Data in Table XXX show the information pertaining to the budgets for tools and supplies.

TABLE XXX

Budget for Tools and Supplies

Budget	Frequency
Schools with fixed budget	63
Schools without fixed budget	39
No answer	4

As shown in the data in Table XXX, sixty-three of the respondents reported that a specific amount of money was

budgeted for tools and supplies each year. Of these, only forty reported a definite sum; the others stated that the needs were supplied as they arose. Data in Table XXXI show the range in budgets set up for the forty respondents.

TABLE XXXI

Amount of Budget for Tools and Supplies

Range in Budget	Frequency
Under $250	10
$250-$500	10
$500-$750	5
$750-$1,250	6
Over $1,250	9

One-half of the respondents reporting a specified budget stated that the amount was less than $500. The fact that nine schools have a budget allowance for tools and supplies of over $1,250 indicates that some of the industrial arts departments in Texas have adequate funds for their shops. A number of the respondents stated that their shops were new and stocked with adequate new tools. Many of those not reporting a specified budget made the comment that needs were met as occasion justified.

A question was also asked concerning the location of the industrial arts shop. The data collected on this question are shown in Table XXXII.

TABLE XXXII

Location of Industrial Arts Shops

Shop Location		Frequency
In separate building		60
In main building		45
1st floor	38	
2nd floor	1	
3rd floor	1	
1st and 2nd floor	1	
Basement	4	
Not answering		1

More than one half of the industrial art shops, as shown in Table XXXII, are located in separate buildings. Approximately 90 per cent of the shops located in the main building are on the first floor. Only three shops are located in the second or third stories.

In regard to the size of the shops, the question asked included the width, breadth, and height of the shops. In figuring the returns, the amount of square feet have been shown; the variety of sizes made it impossible to tabulate the data with any orderly procedure. The data in Table XXXIII show the range in square feet area of the shops.

TABLE XXXIII

Size of Industrial Arts Shops

Range in sq. ft. area	Frequency
Less than 1,000 sq. ft.	6
1,000-2,000 sq. ft.	35
2,000-3,000 sq. ft.	23
3,000-4,000 sq. ft.	18
4,000-5,000 sq. ft.	5
Over 5,000 sq. ft.	13

Six respondents did not answer the question. The data in Table XXXIII show that only six shops had an area of less than 1,000 square feet, while thirty-five have an area ranging between 1,000 and 3,000 feet. Thirty-six shops have an area of over 3,000 square feet. These data indicate that approximately one-third of the shops do not have much space for an industrial arts department.

Heights of the shops ranged from eight to thirty feet. The range is shown in Table XXXIV.

TABLE XXXIV

Height of Industrial Arts Shops

Height Range	Frequency
Less than 10 feet	9
10-12 feet	55
12-15 feet	18
15-20 feet	14
Over 20 feet	4

Six respondents did not give this information. Over one-half of the respondents report a shop height of ten to twelve feet. Obviously, the high-ceiling shops are those located in the main buildings.

The final question in regard to the facilities for teaching industrial arts pertained to the adequacy of the tools for instruction. Data collected are shown in Table XXXV.

TABLE XXXV

Adequacy of Tools

Tool Adequacy	Frequency
Adequate supply of tools	80
Tools not adequate	21
Not answering	5

Twenty-one respondents, the data in Table XXXV show, reported that they did not have adequate tools. Fourteen of these respondents gave a list of tools that they needed. Since the listings were all individual in nature, they are listed as follows:

1. Some tools so old almost antiques.
2. Big equipment.
3. Metal, wood, and leather tools.
4. More engine lathes, hand tools and metals.
5. Electricity and metal equipment.
6. Power saw, more metal lathes, a milling machine, wood lathe, wood shop, finishing room.
7. Planer, welder, sanders, soldering table, mortice.
8. Need blower in ceiling to take care of shop dust.
9. Drafting instruments and equipment, drafting machines, all related supplies.
10. More machine tools.
11. Not enough books for the students.
12. Too many people for shop set-up.
13. Sanding materials of various kinds.
14. New planes, circle saw, space and drawing instruments.

A review of the shop facilities in industrial arts departments in Texas high schools points up some conclusions reached from a study of the data. In the majority of instances, the respondents reported that there were sufficient budget funds for tools and supplies. However, approximately one-fifth of the respondents stated that their shops did not have adequate tools. The area in square feet of the shops indicates that the majority of them have less than 3,000 square feet which is too small for working space and the necessary equipment for a class with many pupils.

The respondents were also asked to state the major problem areas in teaching in the field of industrial arts and to offer their suggestions for improvement, correction, or solutions in these major problem areas. The responses of the industrial arts teachers, in this respect, were so generous that it is believed that they warrant consideration in a separate chapter. The information, then, is presented in the following Chapter V.

CHAPTER V

PROBLEM AREAS IN INDUSTRIAL ARTS AND IMPROVEMENT SUGGESTIONS

On the surface, the data collected from the industrial arts teachers of the study, the curriculum, and the facilities for instruction indicate that the program is progressing satisfactorily. In reality, the number of problem areas mentioned by the respondents indicates some very serious problems. Ninety-nine teachers, out of the 106 respondents, reported one or more problem areas. Two reported no problems, and five did not answer this part of the questionnaire. The purpose of the present chapter is to present the data collected on problem areas and suggested solutions.

Part A

Problem Areas

Poor Students and Lack of Administrative Understanding. The two most often mentioned problems were lack of support of the industrial arts program by the administrative officers of the schools and the fact that industrial arts departments are considered "dumping grounds" for those students that are below average in mental ability or those students who have failed to make progress in other subjects. Thirty-five respondents specifically mentioned these problems.

No hard and fast line of demarcation exists between these two problem areas; indeed, the problem of the "poor students" is believed to be a direct outgrowth of the first problem mentioned. Mere tabulation of these data could not forcibly present the situation; therefore, the procedure followed in the presentation is to give in the respondents' own words their reports on problem areas. Not all comments may be given but those most pertinent have been selected.

1. Poor quality of students--usually handed down from other courses in the school.

2. Too many boys who have failed or are poor in other areas found in industrial arts. Several teachers whom I have known have changed to different professions as a result of the above.

3. Other subjects are taking the place of industrial arts--many of the better students are not taking shop.

4. Need to attract more of the higher academic students. At present too many students with low IQ's fall into shops. We need brains in shops the same as in science and math.

5. Type of students--removals from other classes.

6. Type of students received.

7. Administrators should stop using the shop as a dumping ground for failures of other courses. . . .

8. Too many lower IQ students.

9. The greatest problem that industrial arts teachers have is to motivate the uninterested student to want to do more than just get by.

10. In my particular school, the big problem I have is poor quality of students. I get some excellent students but I also get all the ones who can't pass anything else.

11. Type of students we get dumped on us. It is an elective subject but most are advised to take it.

12. Not enough of the higher intelligent pupils are being counseled into industrial arts.

13. . . . use of shop as "dumping ground" for retarded or problem children.

14. Too much money necessary for type students we are sometimes asked to take. Academic people still look on industrial arts teachers as glorified custodians. We deserve this to some extent because of our lack of interest in other fields.

15. Industrial arts and its relation to our technological society needs to be understood by those who believe school shops are places for the poor student or where he can assemble some project to show his father or mother.

16. Need for capable students. The increasing number of required courses makes it impossible to take industrial arts.

17. Students have too many required courses and not enough elective time. Handling of low IQ students with average and above average students. . .

18. Students come in for easy credit.

19. There is a lack of real building interest by students. Too many problem students are stuck in shop. . .

20. Too many students feel that a shop program should be a play period. They are in the habit of looking for something too easy.

21. Dumping ground for undesirables, failures, trouble makers, and the like.

The above quotations are typical of the comments made on the quality of students enrolling in industrial arts, the requirements for other subjects, and the seeming lack of understanding on the part of the school administration of the importance of industrial arts as a part of general education. This situation, no doubt, has been aggravated by the recent stress on the need for scientists and engineers. One

respondent expressed the opinion that professional men on school boards--doctors, pharmacists--were interested more in chemistry and biology than they were in the vocational fields. The underlying tenor of the majority of the observations was that school boards and administrators lacked the necessary understanding and appreciation of the real values of industrial arts education as a part of general education and favored other subject matter as more essential.

Lack of Uniformity in Curriculum and in Requirements. Another problem area mentioned by many of the respondents was the lack of uniformity from one school to another in the industrial arts curriculum and the differences in requirements. Once again, the respondents point out the areas and their significance.

1. Most junior high courses are being taught without a book of any kind. I think by having so many general type shop classes we are teaching too much too fast. We cannot possibly teach several subject areas in a course whenever the best students we have in shop can do only one or two even half way.

2. Transfer students are often enrolled in industrial arts courses due to schedule difficulties although they were enrolled in some other subject prior to transfer.

3. No standard in courses offered.

4. Trying to teach everything from marbles to missiles in industrial arts field without a basic required foundation.

5. The need for statewide courses of study for minimum content. Too many required credits and no time for electives.

6. Non-uniformity of industrial arts over the state.

7. All freshmen should be required to take mechanical drawing for at least one semester.

8. Lack of a unified state program for teaching.

In the data presented in Chapter IV, it was shown that a wide variety of subject matter was utilized by the different industrial arts departments. The same was true of instruction techniques of the required courses. This lack of uniformity, in the opinion of these respondents, constitutes a problem area in the field of industrial arts. In a number of instances in tabulating the data regarding textbooks, it was found that no textbooks at all were required.

Small Shops. Shops too small for efficient work were listed by a number of the respondents as a problem area. Some typical comments were:

1. Limited floor and storage area in many cases is a drawback.

2. I find that the lack of space is present in most schools.

3. Shops are planned without talking with industrial arts teachers.

4. Not enough space for equipment needed for instruction.

These comments bear out the data presented in Chapter IV on the floor area of the various shops; more than forty of these were found to have less than 2,000 square feet in area.

Minor Problem Areas. Other problem areas mentioned to a lesser degree have been tabulated and are shown in Table XXXVI.

TABLE XXXVI

Minor Problem Areas in Industrial Arts

Problem Areas	Frequency
Too little time	11
Inadequate textbooks and supplemental books	10
Classes too large	9
Lack of equipment	7
Inadequately trained teachers	6
Theoretical teaching by college professors	5
Too many additional tasks for industrial arts teachers	4
Keeping up with project reports	4
Discipline	3
Poor pay	3
Lack of professional organization	3
Lack of progress	2
Miscellaneous	10

"Too little time," as reported, appears to have been directed towards the short laboratory periods. The data collected on the length of periods show that the majority cover a period of sixty minutes. Many of the respondents reported that this length of time was too short, especially in advanced classes, to carry out a complete operation. Some of the respondents indicated a desire for a longer day in order that some of the students with higher I.Q.'s might have time to take industrial arts.

There were a number of comments on inadequate textbooks. In some instances, the report was made that an insufficient number of textbooks were provided for the classes. Others reported out-of-date books along with out-of-date ideas and techniques.

A number of respondents reported that classes were too large. More criticism, however, was directed toward mixed

classes and different grade levels rather than toward an excessive number of pupils. The data on the size of classes shown in Chapter IV indicate that forty-five respondents reported classes of over twenty-eight in number.

Lack of equipment was mentioned seven times as a problem area by the respondents. In some instances, this lack was supplemented by comments that supplies, as well, were limited.

Inadequately trained teachers, as reported here, was meant to apply not to degrees or academic learning but to teachers not trained in industry. The gap between theory and practice was too wide. This was linked closely to the comment on "theoretical teaching by college professors," which was mentioned by five respondents.

The attitude that the industrial arts department is a "fix-it" department was expressed by a number of the respondents. School maintenance, on a minor scale, was taken for granted in some instances. Teachers working on different projects looked to the industrial arts teachers for help in constructing needed materials.

Homeroom duties were also listed by a number of the respondents in their off periods. One of the respondents made the suggestion that these free periods could be used to greater advantage by the industrial arts teachers in working on their records. Keeping records of the individual projects, keeping a record of materials used, and collecting fees were listed as problem areas by several of the respondents.

Part B

Suggestions for Improvements

In many instances, the respondents who listed problem areas did not offer any suggestions for improvement. Some put in question marks indicating inability to offer any suggestions for improvement. In other cases, however, those who replied were most generous with constructive suggestions for improving the problem areas. Some of the most pertinent suggentions for the different areas are quoted.

Poor Students and Lack of Administrative Support. The following suggestions have been selected for this problem area:

1. Industrial arts teachers should try to see the administrative point of view on finance. School finance courses should be required of industrial arts teachers.

2. Eliminate many of the problem students that cannot pass any other course or will not pass.

3. . . . indoctrinate our fellow teachers and administrators as to some of these problems they shower upon us. Do this by explaining our position in the curriculum. The industrial arts teacher should always be prepared to explain the position of industrial arts, without being on the defensive.

4. Drop misfits . . . run off trouble makers. Get rough on requirements.

5. We need more people with some knowledge of vocational work to act as counselors. It seems that most counselors have read a few guidance books and have taken a few courses in counseling, and that is all the qualifications they have. I don't think, on the most part, classroom teachers know much about how to counsel and guide pupils as do men in the industrial arts areas. We are in much closer contact with students and their parents than regular teachers.

6. No industrial arts for low IQ students except in specialized schools.

7. Don't make industrial arts a "sick bay for lame brains."

8. Each problem must be approached according to the teacher's best judgment. I know of no "cut and dried" solution; if I did, I would start teaching teachers.

9. Develop a better program for "selling" industrial arts.

10. I think industrial arts classes should be positively elective courses, and we should not have students enrolled in industrial arts classes because of IQ.

11. I hope the answer is time.

12. Need more school hours so that high IQ students will have time to take shop.

13. Need to sell our program more.

14. Let others see what the boys can do. Could open shop to girls.

15. We who teach in this school system discuss this problem all of the time, and I do not know the answer.

16. Require industrial arts or useful arts as a credit for graduation.

Other suggestions besides these were made, but the ones selected were deemed typical. The investigator, in studying the problem areas and the suggestions for improvement, was impressed with the seriousness of the viewpoints expressed and with the ones who were making the statements.

It is evident that a difficult problem in industrial arts instruction has been created by the new emphasis on science and related subjects. Industrial arts departments and teachers have indeed a "selling job" to do in order to raise the intelligence requirements of the students enrolling for this work.

Lack of Curriculum Uniformity and Basic Requirements. Some of the suggestions offered for improvement in this classification are:

1. Make mechanical drawing a required subject for beginners in industrial arts.
2. Require one year of general shop (metal, wood, electricity, planning) as a pre-requisite for all unit shop classes.
3. Two years of industrial arts could be recognized as one year of applied natural science.
4. Require a unit of industrial arts.
5. See Curriculum Report of State Committee (three of these).
6. Organization of curriculum on a statewide basis.
7. We should have proven high standards and make the students stick to them rigidly without being unfair.
8. Delete courses in 7th grade mechanical drawing or limit them to students with high mental ability.

In the collected data from the questionnaires on the curriculum, the required courses of study, and the different courses taught, it was found that there was little uniformity from school to school. This situation was listed as a problem area by many of those who answered. The suggestions quoted here are typical of the many recommendations that some basic requirements be set up.

Selling the Industrial Arts Program to the Administrators and to the Public. A number of suggestions were offered whereby a greater acceptance of industrial arts in comparison

with required academic or scientific subject matter may be obtained. Some of the more relevant of these are quoted:

1. Introduce the School Board to the shop and show it in its best light. At the same time suggest where instruction would be more valuable if certain items and tools were available. This could be done by having a back-to-school night where the students, accompanied by their parents, try to do some simple operation which would point up, without words, the crowded situation and the possibility of accidents due to such crowded conditions.

2. Allow only industrial arts majors to teach industrial arts; instructors should act like professional people.

3. Develop a better selling program for industrial arts. Let others see what the boys can do.

4. Sell the program to other teachers and parents who, in turn, influence the student's selection of electives.

5. Teachers should start their own campaign to educate people to the importance of industrial arts. Could use Parent-Teacher Association for a place to start show exhibits, etc.

The central core of the problem is indicated to be the lack of general understanding of some of the administrators and the general public of the intrinsic values of industrial arts as a part of general education. Most of the problem areas evolve from this lack of understanding. Disagreement among the industrial arts teachers themselves was reflected in two comments. One of these comments was:

> Not enough parents realize that we are not trying to teach a trade; but, rather, we are broadening the students' horizons so that he or she can more successfully choose the area where they think they would be best suited and happiest.

The other opposite comment decried the influence of John Dewey in education and declared:

> The solution to the problem is simple. . . . all that is needed is to get the industrial arts teachers out of the classrooms, off the highways, back in the shop, back to craftsmanship, back to MANUAL TRAINING.

This respondent then placed the blame for the lack of craftsmanship squarely on the college teachers, stating that the college teacher is "setting the pace."

Many other suggestions were made regarding the problems of financing projects for students not able to pay for materials, for providing more time for instruction, and for improving the record-keeping routines which occupy so much of the teacher's time. Sufficient space, it is felt, has been given to the more applicable comments to emphasize that the industrial arts teachers of Texas are facing many problems. The fact that a study has already been made regarding basic standards plus the interest exhibited by these key industrial arts teachers indicates that much attention and research are being directed to these points. This, of course, holds promise for more progress and advancement in the future.

CHAPTER VI

CONCLUSIONS AND RECOMMENDATIONS

A study of the collected data resulted in the formation of some definite conclusions on which some recommendations have been based. These are best understood after a summary of the findings has been made.

Part A

Summary of Findings

In summarizing the findings of this study, each chapter is considered separately.

Scope and Organization of This Study. This chapter includes some discussion of the importance of industrial arts, the origin of the study, needs for the study, the method used in the research, definitions of significant terms, reviews of two similar studies, and the plan of organization of the study. The method of collecting the data for the study is also explained.

History of Industrial Arts Education in the United States and Texas. The history of industrial arts education extends far back into ancient history wherein craftsmanship and the use of tools were transmitted from one generation to the other. In the earliest times, fathers taught their trades to their sons; but, in later times, a system of apprenticeship

was set up. During the Middle Ages, the monasteries were the centers of learning, and they also kept alive the crafts and their transmission.

The early American colonists brought the system of apprenticeship with them across the waters from Europe. Indentured servants served a period of years learning a trade or paying for their passage overseas. This system continued well after the revolutionary times, but the independent nature of a free people in a free land began to assert itself, and demands arose to include craft training in trade schools. This was just one step away from the public school.

Initial attempts to include craft training in the public schools were made by Woodward of St. Louis, Missouri. He established a trade school as a part of the public school. He was instrumental in spreading the movement throughout the United States.

Part B

Present Situation

Industrial arts education, or manual training as it was first called, was first attempted in the Austin Public School. A bequest in a will made funds available for equipment for such a project, and a group of Austin businessmen aided in securing a building where the training could be carried out. One of the early outstanding results of the manual training was a drop in the number of students withdrawing from school. Aside from its practical value, it was discovered that the subject matter was an important interest-drawing subject.

Other schools followed the example set by Austin and school shops began to appear in the larger school systems. State legislation then provided funds for inclusion of the subject in all public schools where need was indicated. Industrial arts education thus became a vital part of public school education in Texas.

Educational Philosophy and Psychology Effect on Development of Industrial Arts Program. Traditional educational philosophy favored the theory that education's main purpose was training the mind. This, in turn, was based on the educational psychology of learning by repetition.

The teachings and writings of European educators gradually began to change the viewpoint regarding the purposes of education in America and the best techniques of instruction. Changes in belief as to how an individual learns provided the background for the conversion. Where once it was believed that the individual learns through drill and repetition, the theory began to develop that a child learns by understanding through interest in the subject matter to be learned.

John Dewey, the American educator, developed the idea of learning by doing, the activity method. This theory has revolutionized the techniques of instruction in the public schools.

The writer, after studying the history of the development of industrial arts in the public schools and the educational and psychological theories underlying education, worked out for himself his own personal philosophy. This is

stated as a framework on which to base an evaluation of the data collected on the industrial arts programs in Texas schools.

Report of the Investigation. In the beginning, an explanation was made of the methods used in collecting the data and the procedures in tabulating. Areas covered in the survey were divided into the academic and professional training of the teachers, factors affecting teaching efficiency, curriculum and techniques of instruction, and facilities for instruction.

In the survey on the teachers' training and professional qualifications, the data showed that all respondents except one held bachelor's degrees, and forty-four out of 106 instructors held master's degrees of some type. Nineteen educational institutions in the Southwest represented sources of these degrees. Ninety-eight of the respondents had majored in industrial arts for their bachelor's degrees, and twenty-seven out of forty-four master's degrees were in the field of industrial arts. A significant percentage of industrial arts majors had changed their major after completing the regular four-year college course. Approximately 90 per cent of the degrees held by the teachers had been granted since the close of World War II. Only a few of the teachers are working toward an advanced degree at the present time.

Membership in professional organizations was not extensive except for membership in the Texas State Teachers' Association and in the Texas Industrial Arts Association. No

wide variety of professional magazines was read; the most popularly read magazine was "Industrial Arts and Vocational Education."

The teachers indicated a very strong interest in the subject of industrial arts as the reason for being in this field. The number of years of teaching experience, when contrasted with the tenure in present positions, indicates that there was a great deal of stability of tenure. A check of the employment records of the teachers during the summers for the past five years yields the conclusion that approximately 25 per cent have attended school, one-third have been employed in various phases of industry, one-fourth in school maintenance, and the remainder either in self-employment or miscellaneous activities. A further check of employment before teaching showed that approximately 40 per cent of the teachers had worked in some type of industry related to the field of industrial arts.

Taken as a whole, the data on the industrial arts teachers contacted in this study indicate that they are well qualified from the standpoint of academic and vocational training, that they have a decided interest and liking for their teaching field, and that they have a working knowledge of industry.

Factors Affecting Teaching Efficiency. The factors studied in regard to teaching efficiency were the daily teaching schedule, demands made on the teachers' time, and extra-curricular activities in which they were asked to participate.

The survey on the teaching schedule of the instructors shows that seventy-seven, or approximately 75 per cent, taught five or six periods each day. In addition to instruction in industrial arts, twenty-five, or approximately 25 per cent, were assigned duties as homeroom teachers; and seven, or approximately 7 per cent, kept study halls. Nineteen teachers taught subjects other than industrial arts. No one pattern of classes was found in the subject matter taught or in the grades in which it was taught. One hundred and thirty-nine classes were reported in which there were twenty-five or more pupils, an excessive number for effective teaching. Forty-three of the instructors reported that they sponsored some type of extra-curricular activity. No great uniformity was found in the textbooks used in instruction, except in mechanical drawing. Almost 50 per cent of the teachers had a salary of less than $5,000 per year. Twenty-nine, or approximately 29 per cent, of the instructors held outside jobs during the school year, mainly bus driving. For the most part, the teachers were not required to do school maintenance; when they did this work in the summers, they received extra pay for the work.

The Industrial Arts Curriculum and Techniques of Instruction. Answers to the questionnaire were not specific regarding the industrial arts curriculum. Some gave the number, kind, and level of the courses; others gave only general information such as wood, metal, mechanical drawing. No definite information was obtained except enough to indicate

that the curriculum varies from one school to another. Eighty-two, or approximately 80 per cent, reported that all industrial arts courses were elective; the schools that required industrial arts courses named mechanical drawing, general shop, and exploratory courses as the required courses. No unity was found in the type of organization of the classes; approximately 40 per cent were organized as the unit type, and approximately 35 per cent were organized as both unit and industrial shop. About 25 per cent were organized along general shop lines. Approximately 50 per cent of the schools permitted girls to take industrial arts, but most of these limited the subjects to mechanical drawing and arts and crafts. No uniformity was shown in the time set apart for lecture and recitation. Approximately 33 per cent of the teachers utilized field trips as a part of instruction. A significant number of the teachers had visited industries and other school shops during the year. A wide variety of teaching aids used in industrial arts instruction was reported. While the overall conclusion was reached that effective instruction had been accomplished, it was shown that the program was not coordinated and had no basic requirements from one community to the other.

Facilities for Teaching Industrial Arts. The instructors, in many instances, were found to have limited budgets for tools and supplies. Sixty of the industrial arts shops had separate buildings, while forty-five were located in the main building. Of these, thirty-eight were located on the first floor, four

in the basement, and the others on the first, second, and third floors. Range in size in square feet of the shops indicates that the majority of them were inadequate for the number of pupils and for adequate tools for instruction. Eighty instructors reported that their shops had adequate tools for instruction, while twenty-nine, over 25 per cent, stated that they did not have adequate tools.

In the overall evaluation, the shop facilities of the industrial arts program in Texas were found to be too small for adequate instruction in many cases, very often there were insufficient amounts set aside for budgets, and some were lacking in the necessary tools and equipment.

Problem Areas in Industrial Arts and Improvement Suggestions. The industrial arts teachers were asked to point out the problem areas in their programs and to suggest improvements for these problems. The response of over 95 per cent of the teachers indicates their interest in these problems and their ideas on how to improve them.

The problem areas most often mentioned were those of lack of support of the industrial arts program by school administration and the consequent overflow into the department of students who, for one reason or another, have failed in other areas of study. The new stress in education for more scientists and engineers has caused an increase in the required subject matter; the time needed for this leaves little time for electives. The lack of support, the

respondents agree, is caused mostly by a lack of understanding of the importance of industrial arts as a part of general education.

Another important problem area designated was that of a lack of coordination in practices, curriculum, and instruction in industrial arts throughout the state. There were no uniform basic requirements, no uniform course of study, no one pattern of selection or subject matter. This practice, to a certain extent, conforms to educational theory that the subject matter should be chosen in the light of the needs of the community; but the respondents in this study who expressed themselves pointed out the need for more coordination and more basic requirements.

Many of the respondents mentioned that their shops were too small and lacked room for the students from the standpoint of safety. Other problems mentioned were: too little time in class periods, inadequate textbooks, classes too large, lack of equipment, too much theory and too little practice, too many additional tasks for industrial arts teachers, too much paper work, discipline, poor pay, lack of professional organization, no progress in ideas, and many other small items.

Many of the respondents acknowledged that they had no suggestions for solving the problems they mentioned. However, the solution most often recommended was a selling program for industrial arts that would bring recognition of its true worth in general education and, thus, attract students with a higher level of ability. This would eliminate the fact that

industrial arts courses are too often used as a "dumping ground" for students who are discipline problems, students who are failing other courses, and students with little ability and ambition. Many recommended that the state program be better coordinated to enable students to transfer from one school to another without losing credits and to enable them to carry on work started in another school.

Part C

Conclusions

The following conclusions appear to be warranted from the study of the accumulated data:

1. Industrial arts instruction is not yet generally accepted as an integral part of general education; all the problem areas mentioned stem from this one thing.

2. The data on teacher qualifications, training, and teaching experience indicate that the industrial arts teachers are well prepared to teach in their field and that there is much stability in tenure--an indication that their work has been efficient.

3. There is a lack of coordination throughout the state which is recognized by the recent effort toward a better coordinated curriculum.

4. Two schools of thought are represented by the respondents--craftsmanship versus broadened horizons.

5. There is a need for a more thorough understanding of the values of industrial arts education.

Part D

Recommendations

The following recommendations are made in the light of the interpretation of the data acquired in this survey:

1. The industrial arts teachers, individually and through their professional organizations, should attack the problem of lack of understanding of industrial arts as a part of general education and endeavor to develop a more favorable climate for the program at both the administrative and the parental levels.

2. A public relations program should be developed by every teacher in his own area to sell the program as a worthwhile one and one which is needed as much as the program for scientists and engineers. The nation of today is an industrial one.

3. Closer contacts should be maintained between industry and the industrial arts program.

4. One of the great values of industrial arts has been its holding power for students not otherwise interested in school; industrial arts teachers should recognize this and exercise guidance and patience with the student who takes shop when he fails in other subjects.

Educational philosophy holds that each individual needs an opportunity to achieve success in some one thing in order to gain confidence and in order to attack other problems. In view of the many adverse comments about the "poor pupil" by the respondents in this study, it seems logical to recommend that more study and research be directed to this particular problem.

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APPENDICES

APPENDIX A

LETTER OF TRANSMITTAL

P. O. Box 7974
North Texas Station
Denton, Texas

Dear

As a student of Oklahoma State University working toward a Master's Degree in Industrial Arts Education, I appeal to you for your assistance in making a survey of industrial arts in the secondary schools of Texas. Your background and experience qualify you as the professional source I must have to get an accurate picture of this program in Texas secondary schools.

An attempt is being made to locate the weak points in our program and to reveal the actual problem areas encountered by the teacher. Your cooperation in completing the enclosed questionnaire will be appreciated, since information about your particular situation will provide a basis for making recommendations for improvements in the overall industrial arts program.

I feel that the subject and inquiry are worthy of your time and attention; and, of course, I will consider any help you can give me a personal favor.

Please return the completed form to me in the self-addressed envelope as soon as possible.

Yours truly,

R. W. Thornton

Approved:

C. L. Hill, Head
School of Industrial Arts Education
Oklahoma State University

APPENDIX B

QUESTIONNAIRE

Directions: Please answer the following questions to the best of your ability as they apply to your situation.

Reported by_____ Position_____

Address_____

Name of School_____ Date_____

1. Your qualifications:

Degree Held	Year Recd.	Institution	Major

2. Are you working toward a degree at the present time?

_____ Type of degree_____

3. Have you ever worked in industry?_____

Industrial Experience

Number of Yrs.	Position	Name of Company

4. Why did you choose industrial arts as your teaching field?

_____

_____

_____

5. How many years have you been teaching industrial arts?

_____

6. How many years have you been in your present position?

_____

7. List the professional organizations of which you are a member:

_____

_____

_____

_____

8. To what professional magazines do you subscribe?

_____

_____

_____

9. How did you spend your summer months for the past five years? (If you attended college, please indicate the name of the college. If you worked, indicate the name of the company or employer and the position you held).

1955_____

1956_____

1957_____

1958_____

1959_____

10. Supply the information asked for in the following teaching schedule (please indicate home room, activity period, etc.):

Your Daily Schedule

Period	Time	Subject Taught	Grade Taught	No. in Class	Title of Textbook Used

11. What is the total number of students enrolled in your school?_____

12. What student organizations do you sponsor?_____

_____

13. Do you coach in addition to teaching?_____

14. How many months per year are you employed by your school?

_____ Salary (optional)_____

15. Do you hold a job outside your teaching assignment during the school year?_____ What type?_____

16. Are you required to do maintenance work for your school?

_____

17. List all industrial arts courses offered in your school:

_____

_____

_____

_____

18. Are all industrial arts courses in your school elective? _____ If not, which courses are required? _____

_____

19. Is industrial arts in your school organized as a unit shop, general shop, or both?_____

20. Are girls permitted to enroll in industrial arts?_____

21. Do you have courses of study for each course you teach?

_____

22. Do you have regular time set aside for lecture and recitation? Weekly_____ Daily_____ No_____

23. What per cent of your teaching is given to lecture and recitation? _____

24. Are field trips a part of your program?_____ How many field trips to you make per year?_____

25. What teaching aids do you use (visual aids, models, professional magazines, etc.)?_____

_____

26. Are you given a yearly budget for buying tools and supplies?_____ If so, how much?_____

27. Is your shop in a separate building? _____

28. If your shop is in the main building, is it on the first floor, second floor, or in the basement?_____

29. What is the size of your shop? Length _____ Width _____Height of Ceiling_____

30. How many industries did you visit last year?_____

31. How many school shops did you visit last year?_____

32. If you were a superintendent interviewing industrial arts applicants, would industrial experience be an important factor in your choice?_____

33. Do you have adequate tools, equipment, and materials for your industrial arts courses?_____ If not, what tools, equipment, and materials do you need most? _____

_____

34. What, in your opinion, are the major problem areas in teaching in the field of industrial arts?_____

_____

_____

_____

_____

_____

_____

35. May I have your suggestions for improvement, correction, or solutions in these major problem areas?_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

APPENDIX C

LIST OF RESPONDENTS

NAME	ADDRESS
Adams, James	Joinersville, Texas
Adcock, James M.	Galena Park, Texas
Andrews, Allwee	Anahuac, Texas
Armentrout, Bill	Austin, Texas
Baker, G. E.	Midland, Texas
Baker, L. Lyle	Dallas, Texas
Baldwin, Philip D.	Rockport, Texas
Bardwell, Bobby R.	Daingerfield, Texas
Barrilleaux, Everette J.	Port Bolivar, Texas
Barrs, Herman D.	Kermit, Texas
Belew, Charles R.	Pharr, Texas
Birtchet, Jack	El Campo, Texas
Brooks, Cecil	Port Lavaca, Texas
Brouanux, James H.	Carrolton, Texas
Burks, Lester E.	Texas City, Texas
Byrd, B. L.	Texas City, Texas
Byrd, Zack	Port Neches, Texas
Campbell, Billie Joe	Plains, Texas
Cherry, F. H.	Borger, Texas
Cherton, J. E.	Edna, Texas
Chester, Clay E.	Fort Worth, Texas
Christenson, B. F.	Dallas, Texas
Clayton, Byrl	La Marque, Texas
Cody, J. D.	Fort Worth, Texas
Conner, Bill	Cuero, Texas
Coulter, W. T.	Dallas, Texas
Cox, B. D.	Talco, Texas
Cox, L. L.	Dallas, Texas
Cowart, Ray	Dallas, Texas
Cunningham, J. B.	Freeport, Texas
Damksreiter, L. H.	Fort Worth, Texas
Dean, B. F.	Palestine, Texas
Dillon, J. A.	Victoria, Texas
Doudney, E. R.	San Antonio, Texas
Driskill, J. R.	White Deer, Texas
Dunahoo, J. M.	Corpus Christi, Texas
Duncan, J. L.	Corpus Christi, Texas
Dyche, Ray	Fort Worth, Texas
Foy, R. L.	Ballinger, Texas
Freeman, A. L.	Winnie, Texas
Gantt, S. M.	Andrews, Texas
Gentsch, Donald E.	Garland, Texas
Gibbens, Sid	San Antonio, Texas

NAME	ADDRESS
Goff, Martin	Corpus Christi, Texas
Goodner, H. R.	Fort Worth, Texas
Gray, F. O.	Longview, Texas
Haddick, L. B.	Austin, Texas
Hanna, R. M.	Grand Prairie, Texas
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