AN ANALYSIS OF INDUSTRIAL ARTS EDUCATION CURRICULUMS IN FIFTY-ONE SELECTED COLLEGES AND UNIVERSITIES IN THE UNITED STATES

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TABLE OF CONTENTS

TABLE OF CONTENTS (Continued)

LIST OF TABLES

LIST OF TABLES (Continued)

LIST OF FIGURES

CHAPTER I

THE PROBLEM AND SOURCES OF INFORMATION

The curriculums for industrial arts teacher education in colleges and universities in the United States vary a great deal in offerings and requirements for a degree and for state certification. The requirements are affected both favorably and unfavorably by internal influences of tradition and school major-minor requirements and by external influences of state certification requirements, state industrial arts people, the demand for teachers with special training and by state education associations. There is a general trend of increased enrollment in industrial arts teacher education departments in American colleges and universities. The leaders in industrial arts are realizing the importance of the broad educational preparation needed by the new teachers who are entering the teaching profession. These future teachers should be prepared with the broadest educational experiences possible to fill the need for individuals who are well qualified for teaching junior and senior high school industrial arts subjects.

The Problem

Statement of the Problem. The primary purposes of this study are: (1) to analyze the curriculum requirements and offerings in selected colleges and universities; (2) to find the problems that affect these requirements and offerings, which tend to improve or retard the development of an acceptable curriculum for the preparation of junior and senior high school industrial arts teachers; and to develop an idealized curriculum for the preparation of junior and senior high school industrial

arts teachers.

Importance of the Study. One person, or the staff of one industrial arts department, cannot devise or construct a perfect or near perfect curriculum for the preparation of industrial arts teachers without first studying the requirements of representative colleges and universities of other states. Many factors affect the requirements and these must be taken into consideration in devising an idealized program or curriculum for teacher preparation.

In this study an analysis is made of the general requirements, the technical requirements and the industrial arts professional requirements which include practice teaching, for the bachelors degree and for a state teaching certificate to teach industrial arts in the public schools.

The curriculum requirements for a degree in industrial arts education vary in different sections of the country as it naturally will in dealing with the needs and problems of widely separated geographical locations of the schools. These same requirements also vary widely in adjacent states or schools very near to each other. Many colleges or universities stress technical courses and do not require courses for the general and cultural advancement of the student. Other colleges stress the cultural and educational requirements with only a minor emphasis on the technical courses.

The importance of and the need for this study are to determine the requirements of the representative colleges and universities in other states, and the factors which influence these requirements in order to devise a curriculum of industrial arts teacher education for the pre-

paration of teachers of industrial arts subjects in the junior and senior high schools.

Studies of Similar Nature. In 1933, Mr. Paul T. McHenry[1] conducted a survey of forty-two state teachers colleges of the mid-west, to determine the curriculums, buildings and equipment, personnel, and academic requirements in these selected teachers colleges. A large amount of information was collected and presented as a general analysis of these teachers colleges.

Another study of this nature was made by Mr. Lawrence Floyd Ashley[2] in 1936. In this study it was found that there was little agreement in the industrial arts programs over the country, in college course requirements for majors or minors in industrial arts courses or in academic work. The demands of the public schools are largely responsible for the industrial arts teacher education programs. Accepted standards are the basis on which the program should be determined.

Expected Uses of the Study. It is expected that the study will be used by the staff of the Department of Industrial Arts Education and Engineering Shopwork, Oklahoma A. and M. College, to determine the status of the offerings and curriculum in industrial arts teacher education at this institution, in respect to the offerings and curriculums of the representative schools of other states. Constant revision of the offerings

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[1] McHenry, Paul T., A Comparative Study of Industrial Arts Education Programs for Forty-Two Teachers Colleges, Master's Thesis, Oklahoma A. and M. College, Stillwater, Oklahoma, 1933, 39 pages.

[2] Ashley, Lawrence Floyd, Industrial Arts Education in Teachers Education, Doctor's Thesis, Ohio State University, Columbus, Ohio, 176 pages.

and requirements in industrial arts teacher education is necessary to produce superior teachers who will be qualified to teach in the public schools. This study will provide much useful information on the requirements in other institutions, for the use of the staff of the industrial arts teacher education department at Oklahoma A. and M. College, in determining the courses that should be offered and required in industrial arts teacher education and the new physical facilities which should be provided for these courses.

Procedures and Sources of Data

Data from Catalogs. Catalogs were obtained from 160 colleges and universities, which were listed in the 1940 Industrial Arts Teacher Education Directory.[3] Degrees in industrial arts education or industrial education were offered in all of these schools. These catalogs were studied with the purpose of selecting one state university or agricultural and mechanical college and one state teachers college from each state, that were representative of the educational institutions offering industrial arts teacher education in these states. Many states do not offer sufficient work in this field to warrant the inclusion of institutions from those states in this study. Other states have industrial arts programs offered in the teachers colleges only, thus two teachers colleges will represent those states in the survey. In a few institutions the students choose their plan of study with the assistance of an advisor, therefore these institutions are not included.

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[3] Gerbrack, Carlton J. and Phillips, Kenneth, The 1948 Industrial Arts Teacher Education Directory, American Industrial Arts Association, Cincinnati, Ohio, 1948.

TABLE I

SUMMARY OF DATA CONCERNING INSTITUTIONS STUDIED AND NUMBER OF QUESTIONNAIRES RETURNED

Data	Number
Catalogs studied	160
Catalogs selected for the survey	51
Questionnaires mailed	51
Questionnaires returned	37
Universities studied	10
State A. and M. Colleges studied	3
State Teachers Colleges studied	22
State Colleges studied	16
Number of states included in the survey	34

An analysis or summary of returns of the questionnaire which was sent to the institutions studied and the analysis of types of institutions included in the survey are shown in Table I. Ten universities, three A. and M. colleges, twenty-two state teachers colleges, and sixteen state colleges were studied. (These institutions represent thirty-four states or 72.4 percent of the forth-eight states.)

From the 160 institutions that were studied, fifty-one were selected or chosen as representative of the colleges and universities in the United States. Figure 1 shows the geographical distribution of these representative institutions. A detailed study of industrial arts curriculums as outlined in these fifty-one colleges and universities was made.

The data from the catalogs are divided for analysis study into three groups. The groups are; industrial arts technical courses, industrial arts professional courses and general education courses. These groups are further divided into subject areas or groups to facilitate studying each unit of the curriculum.

First, the technical courses consisting of shopwork and drawing subjects were analyzed. In this group are included those technical courses which are elective or which are required in the curriculum of industrial arts education and also the service courses for other departments in the institution.

Second, the professional courses in industrial arts education or industrial education were analyzed. In many institutions, a part or all of these courses are taught by the education department or college and also by the trade and industrial department, but the special emphasis of the course on industrial arts will qualify them for industrial arts professional courses.

Third, the general education courses required for a degree in industrial arts teacher education were analyzed. This was studied to find the different general education courses such as English, natural sciences, social sciences and education that are required for a degree.

Data from Questionnaire. Questionnaires were sent to the heads of the industrial arts departments in the fifty-one selected institutions. (See list, page 92, Appendix B) The questionnaire was used in order to obtain answers to questions which are not included or clearly understood in the catalogs from these institutions.

Institutional data were obtained to determine the titles of the departments, departmental supervision and the number of teachers on the staff of the industrial arts department of each school.

The organizational techniques followed in practice or directed teaching in each institution was included to determine the methods employed

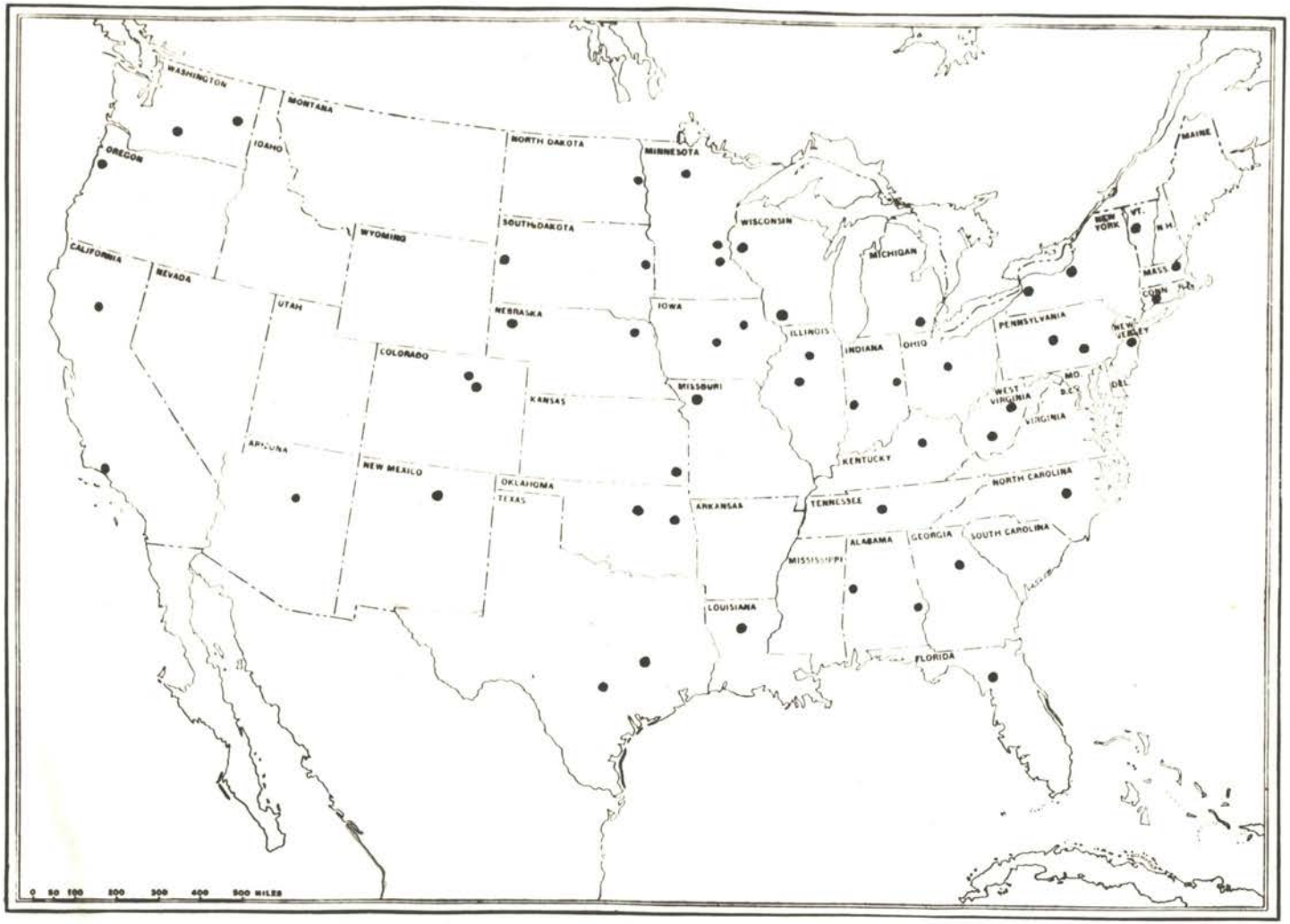

FIGURE I

GEOGRAPHICAL DISTRIBUTION OF THE SELECTED INSTITUTIONS

in the majority of schools. While these practices might not be the best types, they are the ones followed at the present time.

Orientation of the freshman in shop subjects was studied, to determine the percent of the institutions which utilize the general shop as a freshman orientation program.

The heads or chairmen of the industrial arts departments were asked to list the courses or subjects in shop and theory classes which they are considering adding to the curriculum in their respective institutions and to list the factors, both favorable and unfavorable, that influence the curriculum of industrial arts education in these schools.

A short history with date of founding of the industrial arts department in each institution was obtained from the questionnaire study.

Scope and Limitations of the Problem

A teacher education study to be valid, should be extensive enough in scope to be representative of the industrial arts teacher education programs in the United States. This survey includes representative institutions in 72.4 percent of the states. There will be limitations of the problem when selected institutions are studied instead of including in the survey all schools that offer a program for preparation of industrial arts teachers.

The Scope of the Problem. The problem of analyzing the offerings and requirements of the curriculums in industrial arts teacher education in all the colleges and universities in the United States would be far too ambitious for a study which is undertaken by one person. Surveys

have been made which study the curriculums of all colleges and universities in America, but these studies were made by the staff or class of one institution and by industrial arts associations.

The fifty-one colleges and universities included in this study were selected to represent each state where possible. One A. and M. college or state university and one teachers college will be representative of the industrial arts program offered in each state. Many states do not offer industrial arts teacher education in the A. and M. college or state university; two teachers colleges were studied as representative of these states. Fourteen states do not offer sufficient industrial arts programs in any institution to warrant their inclusion in the survey. Thirty-four states, or 72.4 percent of the forty-eight states, are represented in this study. Appendix B includes a list of the fifty-one selected institutions, their location and the director or head of the industrial arts department of these institutions.

The catalog from each institution was studied to examine the curriculum and to analyze the course offerings and requirements. The courses were recorded in the form of tables with the course titles, which conformed to the description of the course rather than the titles named in each catalog. These tables, with limited interpretation, form the basis of one part of this study.

Questionnaires were sent to the director or head of the industrial arts department in each of the selected institutions. This questionnaire was sent to get information which is not included or is not clearly stated in the catalogs from these institutions.

Limitations of the Problem. All surveys of this kind have limitations in the studying of selected institutions which may not be truly representative of the industrial arts programs offered in the various states.

The analysis of the catalogs from each school represented is another limitation of the problem. The department of industrial arts teacher education is under the supervision of widely separated schools or colleges in the different institutions studied and therefore, a true comparison cannot be made of the offerings and requirements of these departments. A curriculum in industrial arts teacher education department under the supervision of the college of education will vary a great deal from the curriculum in a department under the supervision of the college of engineering or agriculture. This limitation may be found in one institution which offers a degree in industrial arts in either the college of education or the college of engineering.

The interpretation of data from the fifty-one catalogs will be a definite limitation due to the methods in which the offerings and requirements are presented in the catalogs.

The interpretation of questions in the questionnaire, which was sent to the head of the department of industrial arts of each of the selected institutions, will vary with the individuals to whom the questionnaire was sent. Interpretations of the answers to the questionnaire will again be a limitation of the problem.

CHAPTER II

WHAT IS INDUSTRIAL ARTS

Industrial arts as a subject in the junior and senior high schools of the United States is comparatively new in the development of and the trend for general education. What is meant by general education? Wilber[4] sums up general education as implying three basic purposes: "to transmit a way of life, to improve and reconstruct that way of life, and to meet the needs of the individuals." Industrial arts in general education can teach the boys and girls of this and future generations to live. Children living in the modern civilization of today must understand the civilization that is composed of mechanical devices. These mechanical devices which fashion the tools and materials of every day living are not readily available for study by the average individual.

Education for all is the problem confronting the educators at the present time. Many theories and philosophies have been developed to attain the perfect school system which would give all persons an equal opportunity for an education. These theories and philosophies must include industrial arts to assure that the students will be educated for life.

Bonser and Mossman[5] say that industrial arts is "a study of the changes made by man in the forms of materials to increase their values, and the problems of life related to these changes." and Wilber[4] defines

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[4] Wilber, Gordon O., Industrial Arts in General Education, Scranton, Pennsylvania, International Textbook Company, 1948, page 2.

[5] Bonser, Frederick G. and Mossman, Lois Coffee, Industrial Arts For Elementary Schools, New York, The Macmillan Company, 1923, page 5.

industrial arts 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." These definitions of industrial arts explain the objectives and indicate that industrial arts is truly education for life.

Importance of Industrial Arts

Industrial arts with the many phases or subject areas that it contains is important to the modern secondary schools in America. The practical value of skills that are developed are secondary to the values that are received by the student. The study of industrial arts by the boys and girls is indeed the study of the methods and materials of our modern civilization. Truly the study of industrial arts can be considered the study of life. Through the use of tools, materials, the study of visual aids and the field trips that the student comes in contact with in the industrial arts shop or laboratory, a better understanding of life will develop for the adolescent child. Industrial arts need not be confined to the secondary school, but should eventually become a part of the elementary and adult educational programs.

Industrial arts should provide the realism in education that is necessary if the American schools are to give education for all. On realism, Bonser[6] said,

> Since the days of Comenius, or at least since the days of Pestalozzi, educational leaders have pleaded for more reality in school life, for more activity of the kind natural to growing boys and girls, for more attention to the kinds of

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[6] Bonser, Frederick G., Life Needs and Education, Bureau of Publications, Teachers College, Columbia University, New York, 1932, page 106.

> experiences which are identified with the needs for better and more abundant living. In a measure realized by no other subject, method or means, Industrial Arts provides the content, and the procedure for adapting elementary and junior high school work to the abilities, interests, and the needs of children and to the problems and needs of social life. It affords the means for changing early education from a series of meaningless, imposed, formal tasks to a series of interesting, educative experiences in which children engage with enthusiasm and zest. A speaker, in talking of adult education, recently said that it was a way of "getting on to the world in which we live." This is just what Industrial Arts helps children to do—to become intimately acquainted with the ways by which life is maintained and improved.

The needs of the student can be met in no other subject in the schools if the children are to receive a broad general education that will prepare them for their place as productive and informed citizens.

Industrial Arts and Life. The high school of today can play a large part in the development of the citizens of tomorrow. More than half—sixty percent—of the high school students are not getting the training and preparation needed to make even a moderate success in life. School drop-outs prove that the students are not getting the kind of education that they need and are interested in. Boys are in development, either physical or creative, where they can see the immediate results of their efforts. The physical development can be cared for in the athletic program which at the present time is on the increase, and the creative urge or instinct can be developed in an industrial arts program.

The urge to do and the curiosity to know is a driving force in the youth of the country. Hobbies and self-stimulated desire to create and learn is a factor which has helped the industrial arts program to develop in the past. Whether the student is interested in tinkering with a radio, building model airplanes, or drawing the plans for a house, the urge to do and to work will carry over into later life. Industrial arts is not to

be thought of as merely a craft course or hobby course, but through these outlets the teachers can get and retain the interests of the boys and girls that is absolutely necessary if the students are to remain in school through the senior high school. Home mechanics will give the student the information and knowledge that will make him or her a better homemaker than if only academic subjects are studied.

The industrial arts program is not designed nor intended to be vocational. Industrial arts is many times vocational in nature for the students who do not finish high school. The knowledge and skills that are developed will give the student advantages which are necessary to live a complete life. DeWitt Hunt,[7] in a speech on the "Professionalization of Industrial Arts", quoted the definition of industrial arts in the following manner:

> Industrial arts as a phase of public education is a field of studies. It includes working with many materials such as wood, metals, plastics, etc. It involves a great variety of processes as for example, printing, industrial drawing, molding (in the foundry) etc., and it includes a study of power in general and electricity in particular. In its earliest stages industrial arts is non-vocational and includes learning units of value to all students. In more advanced courses it becomes increasingly vocational in its aims.

Industrial arts then can be thought of as not vocational, but prevocational. Through the studies in the industrial arts shops and laboratories, the student can select the type of vocation for which he is best suited and learn the basic skills and gain the knowledge that will be necessary to make a choice of a vocation. This is not only true of industrial arts, but of manual training which preceeded industrial arts in the

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[7] Hunt, DeWitt, The Professionalization of Industrial Arts Teaching, 1948, page 2.

schools. Leavitt[8] quotes one early teacher of manual training, who said,

> The teachers of manual training very early began to deny that the practical value of the work was paramount, and to insist that their function, like that of the teachers of Greek and Latin, was to develop the character of the pupil, not to increase his potential economic value. They said, "we are not teaching a trade, we are educating children; not teaching them to earn a living, but teaching them to live."

Industrial arts teaches consumer education for the many household items which will be selected by the student when he takes his place as a citizen of the community. Industrial arts provides a background of information to enable one to make suitable selections in colors, furniture, rugs, draperies, kitchen labor-saving devices and the desirable architectural style in housing. Industrial arts provides a hobby for the worthy use of leisure time. Industrial arts provides information about the tools and materials of industry and results in an understanding of our modern machine age civilization. These things are all a part of the students general education that will make him a useful and informed citizen of the community.

The Place of Industrial Arts in the School. Manual training promoted by the leaders such as Woodward was one answer to the need for a subject where the student could learn by doing. Manual training was mostly the development of manual skills with little time and thought given to the general education values. The manual training teacher who was just quoted was one of the first thinkers to realize the intrinsic values of the subject, but this thought was not necessarily followed in all schools. Manual training was replaced by manual arts which was developed to place

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[8] Leavitt, Frank Mitchell, Examples of Industrial Education, Ginn and Company, New York, 1912, page 13.

more emphasis on the arts rather than the physical skills. Manual arts was soon succeeded by the more modern industrial arts. The industrial arts program is continually enlarging and expanding to include more subjects and learning situations.

Through the development of a shopwork program from manual training to industrial arts, the shop was considered in many cases to be a dumping ground for students who did not have sufficient intelligence to grasp the academic subjects material presented in the mass education system. Industrial arts was looked down on by the academic leaders, and as a stepping stone by the vocational education leaders. This policy has been corrected in some measure by the greater number of advanced degrees which are offered in industrial arts teacher education. Through professionalization, industrial arts is beginning to have equal standing or rating with the academic subjects in the secondary schools. The necessity and appreciation of the need of industrial arts has been so widespread that no junior high school is judged to be standard unless industrial arts is included.

The shop is coming up out of the basement. In the early development the industrial arts or manual arts shop was relegated to the basement of the school with the janitor and the furnace room. Modern architectural styling in the new high schools provides facilities for industrial arts that are comparable with the facilities for athletic and academic subjects.

Industrial arts will rate with the academic, athletic, and vocational subjects as a necessary part in the general education of the student in the preparation for life as an informed and productive citizen. The scope

of industrial arts will be increased for the benefit of all students in the elementary and secondary school programs.

The Extent of Industrial Arts in the Public Schools. There are approximately 30,000[9] teachers of industrial arts in the United States. Since the advent of manual training in the 1880's and during the development of industrial arts since 1909, the industrial arts program in the public schools has grown steadily with only the popular support and demand of the public responsible for the phenomenal rise to its present standing. Serving the general education needs of over 3,000,000 students in the public schools, industrial arts now has the responsibility of coordinating the program through the establishment of a state supervisor of industrial arts in each state. Through a centralized office and the help of the director or supervisor, the industrial arts departments in the elementary and secondary schools could be expanded to increase the benefits to the students through the use of coordinated curriculums, the addition of new equipment, and the establishment of industrial arts programs in all public schools.

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[9] Fales, Roy G., Pawelek, Stanley J., and Schmidt, Fred J., State Supervision of Industrial Arts, American Vocational Association, Inc., Washington, D. C., page 3.

CHAPTER III

HISTORY OF INDUSTRIAL ARTS TEACHER EDUCATION

The history of industrial arts teacher education as it is known now is rather short. Industrial arts is less than fifty years old, but was developed from manual arts and manual training which were established in the United States in the latter part of the nineteenth century (1879).[10] The manual arts movement was developed very early in Europe and was introduced in America in naming the Macy Manual Arts Building of Teachers College in New York City by Charles A. Bennett, who was one of the outstanding leaders in this movement in America. The Russian system of education was introduced by Runkle in the establishment of a School of Mechanic Arts at Boston in 1878.

A new concept and nature of the purpose of what is now known as industrial arts, was first expressed by Dean James E. Russell and Frederick G. Bonser in 1909. This new concept was largely confined to the elementary school level, but later spread through the secondary level to the teachers colleges.

Development of Industrial Arts Teacher Education

The term and concept of industrial arts teacher education has followed the introduction of new philosophies of manual training, manual arts and industrial arts introduced in the public schools of America. The conception of industrial arts teacher education has been a gradual evolution as the needs of the teachers in the schools have changed. Many school

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[10] Friese, John F., Course Making in Industrial Education, The Manual Arts Press, Peoria, Illinois, 1946, page 46.

administrators still refer to industrial arts as manual training or manual arts. The public must be educated to the new names and concepts in education and this change has not become general as yet.

History of Manual Training and Manual Arts. One of the earliest institutions for the training of teachers for the new manual training movement in the United States was established by Calvin M. Woodward in 1879 at Washington University in St. Louis. This was not intended to be a teacher training school for it was founded on the secondary school level. None the less, the graduates of this institution did go into teaching. Anderson[11] states an example of this, for instance:

> In Omaha, the high school was retained with all its features, a manual training department being simply added, the exercises of which all the high school pupils were permitted to attend.
>
> A graduate from the Manual Training School attached to Washington University, St. Louis, was secured as a teacher.

Oswego Training School was established in New York in 1861, and five years later became a new state normal school. From the earliest days some handwork was included in the school activities and in 1880 a "crude shop was fitted up in the basement",[12] with the help of the janitor, Frederick H. Cyrenius, who instructed the students in making school laboratory equipment. No regular class was established until 1893.

As early as 1881 an industrial arts laboratory for woodworking was operated at the State Normal School at Bridgewater, Massachusetts.

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11 Anderson, Lewis F., History of Manual and Industrial Education, D. Appleton & Co., New York, 1926, page 164.

12 Bennett, Charles A., History of Manual & Industrial Education from 1870 to 1917, The Manual Arts Press, Peoria, Illinois, 1937, page 464.

As the manual training movement spread through the United States many colleges and normal schools added a shop program to their curriculum. In 1883, the State Normal School at Whitewater, Wisconsin, and the Cook County Normal School added instruction in woodworking. In 1884, manual training instruction was begun at the State Normal Training School in New Britain, Connecticut; in 1890, at the State Normal School, San Jose, California; and in 1891, at the State Normal and Model School at Trenton, New Jersey. Need for manual training led to the establishment of the Teachers College of Columbia University to train manual training teachers. Nicholas Murry Butler, the president of Columbia University, exerted a great deal of influence to establish the Manual Training School. Perhaps no other institution was so completely equipped for the training of teachers of the industrial, domestic and fine arts.

Manual arts was evolved from manual training with the emphasis on the arts. The simple hand training with disconnected exercises was supplanted by the introduction of the "educational project". The change of course was slow as the leaders in the movement recognized the advantages of the addition of the arts in the general education, yet retaining the same hand processes formerly employed or taught.

History of Industrial Arts. From the development of manual training and manual arts the present concept of industrial arts was evolved. Dean James E. Russell and Professor Frederick G. Bonser were the leaders of this new concept or theory for the general education of the student. Through the use of tools, materials and related information on the arts and industries with consumer values receiving a controlling purpose, industrial arts was at first confined to the elementary school level, but soon

became a part of the secondary school program and then was included at the college level.

Professor Charles R. Richards,[13] director of the manual training at Teachers College, Columbia University, was probably the first to expound the theory that "handwork, is a medium of expression in terms of form, color and material; in its relation to social life, it is essentially a means of interpreting art and industry". These are the principles on which the modern industrial arts program is founded. The principles expressed by Richards were expanded further by Bonser and Russell to develop their theory and philosophy on the concept of industrial arts.

History of Industrial Arts Teacher Education in Selected Institutions Studied

Included in the questionnaire, which was sent to the directors or heads of the industrial arts teacher education department in the fifty-one selected institutions, was a request for the history and development of the department of industrial arts teacher education in the institution.

The statements of the respondents will be given alphabetically by states to show the age and history of the different departments. Fifty-one questionnaires were sent and thirty-seven were returned. Thirty-five of the respondents answered the question on the history and development of their respective departments.

> Arizona, Arizona State College. 1910 as Department of Manual Training. The department has kept up with the trend of industrial arts over the country. We have attempted to lead the trend in our state and have succeeded in many respects. Francis C. Osborn

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[13] Bennett, Charles A., History of Manual & Industrial Education from 1870 to 1917, The Manual Arts Press, Peoria, Illinois, 1937, page 453.

California, University of California, Santa Barbara College. Santa Barbara Normal School for Manual Arts and Home Economics founded in 1910. Grew into Teachers College with varied program four-year course, 1921. Became State College, 1934, became campus of University of California, 1944. Industrial arts department grew from twenty-four majors in 1925, to 365 in 1949, and again to 350 after the war. Now 350 regular four-year majors. E. E. Ericson

Colorado, Colorado A. and M. College. Industrial Arts Education started in 1928, in the Education Department. in 1948 placed in the Engineering Division and called the Industrial Arts Department. George F. Henry

Connecticut, Teachers College of Connecticut. Department opened in 1936. Now approximately 130 majors in Industrial Arts Education. Housed in separate building in 1947. Only college in Connecticut that prepares industrial arts teachers. We receive loyal support from our State Supervisor of Industrial Arts. Paul N. Wenger

Georgia, University of Georgia. Began 1942. No tradition to change. We are growing. Now have about 80 majors. O. S. Harrison

Illinois, Northern Illinois State Teacher College. Industrial Arts Department founded in 1910, by Samuel J. Vaughn, who continued as head of the department until 1920. Since that time Milo T. Oakland has been in charge of the department.

Since July, 1921, when Northern Illinois State Normal School became Northern Illinois State Teachers College, the four-year curriculum leading to the degree of Bachelor of Education has been available. However, the two-year diploma course was available until 1929. In June, 1944, the title of the degree was changed to Bachelor of Science in Education.

A well equipped Industrial Arts Building was dedicated in 1928. The building costing at that time, approximately $150,000. The department now has five full-time teachers and 150 majors. The department has graduated more than five hundred students and these graduates are teaching in practically all states and in a number of foreign countries. The equipment for use of the department is valued at approximately $150,000.

Illinois, Bradley University. Our department was started fifty-one years ago by Charles A. Bennett and has had several well known leaders on its staff. Our graduates have done well and many have attained leadership in various fields. Fred Strickler

Indiana, Ball State Teachers College. The Industrial Arts Department in our school is approximately 29 years old. Two wars have cut our enrollment materially. Since World War II, we have outgrown our present building. Barring hard luck we should be in our new plant September, 1949. When we get into our new plant we shall reorganize our course work. F. J. Schmidt, Jr.

Iowa, Iowa State College, Ames. Started as part of the Engineering Division. Work was taught by engineers. In 1925, it became known as industrial arts. In 1939, it was known as industrial education in our Division of Agriculture. T. H. Hippaka

Iowa, Iowa State Teachers College, Cedar Falls. Started first in 1902. State legislation action. Elementary emphasis. 1907, secondary emphasis; 1940, plans for complete program; 1949, building and program in operation. Harold G. Palmer

Kansas, Kansas State Teachers College Pittsburg. Founded in 1903 under name of Kansas State Manual Training Normal School. Main purpose was that of preparing teachers in the practical arts. Has had steady growth and development. Granted first degree in 1913. Now grants M. S. Otto A. Hankammer

Louisiana, Northwestern State College. Department originated in the summer of 1945. Second teacher added 1946. Part-time teachers added thereafter. Approximately 90 majors; 50 pre-engineers. Equipment secured from Army surplus, including reconstructed building. Few schools in Louisiana offering industrial arts. Most schools desire to add industrial arts. William H. Bliss

Massachusetts, State Teachers College. 1909 - Major emphasis was practical arts. The department has always been strong. Our building is only 15 yeard old and from that time on we have grown in strength and prestige as the industrial arts center of the state. We hope to continue to expand within the range of our present program. Our graduate program needs additional staff and breadth of scope. James J. Hammond

Minnesota, University of Minnesota. Courses as early as 1910-1915. First curriculum 1925, after I spent a full year in the schools of the state and presented the picture in a report bulletin. Curriculum revised in 1930-1932-1938-1940-1942-1946-1948. Department was formally opened in 1919. Masters work began under departmental advisership in 1924, but there had been several theses before that under advice of more general College of Education men. Homer J. Smith

Minnesota, State Teachers College, Bemidji. Industrial Arts Education Department was formed in September, 1927, by Calvin H. McClintock. First major was graduated in June, 1932. Developed from wood and drawing to a 4-area shop. New laboratory school building will have a 6-area model general shop in addition to the present college shop. C. H. McClintock

Minnesota, State Teachers College, St. Cloud. Began as an elective within a normal training curriculum (2 years), around 1900; Bachelor of Education (4-year degree) 1925; B. S. in 1940. Raymond H. Larson

Missouri, Northwest Missouri State Teachers College. Founded about 1920. Rather rapid development from 1930 to 1940. Increased enrollment from 40 in 1930 to 225-250 in 1940. 20,000 square feet floor space in department in special department building. Donald N. Valk

Nebraska, State Teachers College. Program started in 1908, when our college was known as the Nebraska Normal College. It was located in the basement of an old boys dormitory. The complete layout cost $1,760.00. No power machinery was provided. In 1910 power machinery was purchased as a means of expanding the program. In 1915 the Nebraska Lagislature appropriated $100,000 with which to erect the present Physical-Industrial Building which now houses our present department. In 1936 a general shop was added to the department along with another staff member. This year, 1948-49, we have added the third member to our staff and included Driver Education in our course offerings. R. A. Schreiner

New Jersey, New Jersey State Teachers College. Developed in 1924. 2-year diploma. In 1929 raised to 4-year level. C. E. Frankson

New Mexico, New Mexico Highlands University. Founded in 1938. Started with six students. Built to 40 at 1942. Closed 1942 to 1945, no students. Opened in 1945; now have 72 majors and minors. We also have a vocational department with 320 students. H. K. Brandt

New York, New York State College for Teachers. Founded in September, 1912. I. C. Perkins

New York, State Teachers College. Established in 1886 and legalized in 1888 by legislative enactment. Probably the first school to be legalized for the training of industrial arts teachers. Gordon O. Wilber

North Carolina, North Carolina State College. Organized in 1924 at which time all shop work offered by the Engineering Department. Ivan Hostetler

North Dakota, University of North Dakota. 1942 - 1 to 5 graduates, 30 to 60 students. 1942 - 46. Stored and inactivated. 1946 - 49. Reopened, new building, new program, 120 students. M. F. Poyzer

Pennsylvania, State Teachers College. Founded in 1930. First graduating class in 1934. One instructor; now seven. Two teachers colleges specialize in industrial arts. Burl N. Osborn

Pennsylvania, The Pennsylvania State College. Mechanic arts (land-grant institution 1882) Teacher preparation in mechanic arts 1908. Manual training, 1909. First summer session, 1910. Industrial Education, 1913. Work transferred from Engineering to Education School, 1923. In 1944, two separate curricula established in the department (1) Curriculum in Industrial Arts, (2) Curriculum in Vocational Industrial Education. Grants masters and doctors degrees

with majors in industrial arts. S. Lewis Land

Oklahoma, Oklahoma A. and M. College. First classes, Summer, 1916. First 2-year course, 1920. First 4-year course, 1928. First Master's Degree courses, 1930. First Master's Degree graduate, 1933. 26 B. S. Degree graduates in 1948. 18 M. S. Degree graduates in 1948. DeWitt Hunt

Oklahoma, Northeastern State College. Work begun in September, 1909, by Emil F. Kranguist. Only a few teachers trained until 1919 when C. O. Halley had charge of the department. M. E. Franklin took charge in September, 1921. There are now three men in the department. Ten to twenty major graduates now complete the work each year. M. E. Franklin

Tennessee, Middle Tennessee State College. The first courses in industrial arts were offered in 1911. Woodworking and mechanical drawing were the only courses for a number of years. Now courses are offered in machine shop, sheet metal, welding, plastics, ornamental iron, art metal, electricity, house wiring and radio. Delbert Dyke

Texas, The Agricultural and Mechanical College of Texas. Founded in 1928, to accompany T. and I. which is still a part of the department. Chris H. Groneman

Texas, Southwest Texas State Teachers College. Originated in 1911, we think. Had first full major. Became active as 4-teacher department, 1946. Victor L. Bowers

Vermont, University of Vermont and State Agricultural College. Started in conjunction with engineering department in 1939, but had no enrollment until divorced in 1947. H. J. Patterson

Washington, Eastern Washington College of Education. Founded in 1902, as a one-year course. Bachelor of Education in 1933. B. A. in Education, 1947. Master of Education, 1948. Edward L. Dales

West Virginia, West Virginia Institute of Technology. This institution established a program for training industrial arts teachers in 1934. The students at that time were required to take 35 semester hours of shopwork for their major. In 1942 a new modern two story arts and crafts building was erected. This building provides more than 25,000 square feet of floor space and houses some 2 million dollars worth of equipment. During the war years this building was used for National Defense training programs, and also by the U. S. Army for an electrical training school. In 1946, there were only 34 students majoring in industrial arts which reflects the effects of the war and a turnover in departmental staff members. In 1947, a new pattern sheet was worked out and adopted which raised the requirements from 35 semester hours to 45 semester hours for the major. Courses and laboratories were added, such as: ceramics, plastics, photography, etc. The new program was based on the belief

that a broad training program is of more value to the industrial arts trainee and also to a person entering industry than is a limited specialized training. Our department has increased its enrollment to better than one hundred students at the present time. The building and facilities for industrial arts training are second to none in this section of the country. The program offerings are in keeping with local and national needs of schools and industries; as indicated by a demand for graduates, and also by the approval of the program by consultants in both fields. Much work lies ahead in publicizing, building course content and our instructional staff. K. L. McFarland

Wisconsin, State Teachers College. About 40 years old. Developed and expanded greatly last three years. New building. Harry Pederson

The founding of the industrial arts teacher education departments in the selected institutions varies from 1886 to 1945. The average year of founding is about 1920 or just after the end of World War I. The departments usually started with a two-year program and later changed to the four-year program. New York State College at Oswego was the first of the selected institutions to offer work in teacher preparation in Manual Training.

The history of the industrial arts teacher education departments of the selected institutions should help to explain the offerings and requirements in industrial arts teacher education. The catalogs from these institutions and a questionnaire were utilized to analyze the curriculum in industrial arts teacher education.

CHAPTER IV

CATALOG STUDY

This chapter includes the analysis of the industrial arts curriculums in fifty-one selected colleges and universities. These schools are representative in their respective states of the industrial arts teacher education programs provided in these states. The catalog study analyzes the offerings and requirements in the technical or shop and drawing courses; in the industrial arts professional courses; and in the general education courses. The findings will be presented in the form of tables with limited interpretations to show the variations in offerings and requirements in the selected institutions.

Technical Courses

The reference to technical courses in this study will consist of: (1) all shopwork subjects which are taught in theory classes, in both theory and laboratory classes and in laboratory classes; (2) those academic courses which are definitely applied or technical, such as applied mathematics; and (3) drawing courses, taught in theory classes, theory and laboratory classes, and laboratory classes. These courses provide the means of furnishing the future instructor with the technical information necessary to teach industrial arts in the public schools. The mastery of technical courses results in the development of the skills required in the use of tools and materials and in an extensive knowledge about the materials used.

Technical Courses Offered. A great variety of technical courses is offered in the selected colleges and universities. These courses offered

TABLE II

TECHNICAL COURSES OFFERED IN SELECTED INSTITUTIONS
WITH NUMBER OF SCHOOLS OFFERING EACH COURSE

	Name of Course	Number of Schools Offering Course
1.	Aerial Navigation	1
2.	Aeronautical Ground School & Aerodynamics	1
3.	Aeronautical Meterology	1
4.	Aircraft Construction	2
5.	Aircraft Education Workshop I	3
6.	Aircraft Education Workshop II	2
7.	Aircraft Engines	3
8.	Aircraft & Engine Mechanics	2
9.	Art Fibre & Rustic Design	1
10.	Arts & Crafts I	15
11.	Arts & Crafts II	2
12.	Automobile - Diesel & Internal Combustion Engines	5
13.	Automobile - Electrical Equipment	7
14.	Automobile - Engine Testing	3
15.	Automobile - Garage Practice I	3
16.	Automobile - Garage Practice II	2
17.	Automobile Mechanics I	12
18.	Automobile Mechanics II	5
19.	Automobile Mechanics - Management	1
20.	Automobile Mechanism	2
21.	Automotive - Theory & Practice	2
22.	Blacksmithing	1
23.	Boatbuilding	1
24.	Bookbinding I	7
25.	Bookbinding II	2
26.	Bookbinding III	1
27.	Bookbinding for School Librarians	1
28.	Bricklaying I	1
29.	Bricklaying II	1
30.	Cabinet Making I	45
31.	Cabinet Making II	28
32.	Cabinet Making III	12
33.	Cabinet Making IV	5
34.	Care of Shop Equipment I	15
35.	Care of Shop Equipment II	4
36.	Carpentry I	15
37.	Carpentry II	3
38.	Carpentry III	1
39.	Cement & Concrete Work	7
40.	Ceramics I - Pottery	9
41.	Ceramics II - Pottery	3
42.	Crafts, Creative I - Metal & Plastics	4
43.	Crafts, Creative II - Metal & Plastics	3
44.	Crafts, Creative I - Wood & Leather	3
45.	Crafts, Creative II - Wood & Leather	1

TABLE II (Continued)

	Name of Course	Number of Schools Offering Course
46.	Crafts, Elementary	8
47.	Craftwork - Integrated for Children	1
48.	Descriptive Geometry I	13
49.	Descriptive Geometry II	3
50.	Design - Furniture	6
51.	Design - Furniture & Casework	1
52.	Design - Essentials	2
53.	Design - Industrial Arts I	23
54.	Design - Industrial Arts II	4
55.	Design - Printing & Graphic Arts	2
56.	Design - Metalcraft	1
57.	Drafting - Aircraft I	3
58.	Drafting - Aircraft II	1
59.	Drawing - Architecture Appreciation	1
60.	Drawing - Architecture I	32
61.	Drawing - Architecture II	18
62.	Drawing - Architecture III	5
63.	Drawing - Architecture IV	2
64.	Drawing - Architecture V	2
65.	Drawing - Architecture, Building Materials	2
66.	Drawing - Architectural Detailing	3
67.	Drawing - Architecture, Estimating	1
68.	Drawing - Architecture, Heating & Ventilating	1
69.	Drawing - Architecture, House Planning	3
70.	Drawing - Architecture, Perspective	1
71.	Drawing - Architecture, Projects	1
72.	Drawing - Blueprint Reading	3
73.	Drawing - Engineering I	11
74.	Drawing - Engineering II	7
75.	Drawing - Engineering III	2
76.	Drawing - Engineering IV	1
77.	Drawing - Freehand	8
78.	Drawing - Freehand & Design	3
79.	Drawing - General I	2
80.	Drawing - General II	1
81.	Drawing - Industrial Illustration	1
82.	Drawing - Lettering & Sketching	3
83.	Drawing - Machine I	26
84.	Drawing - Machine II	15
85.	Drawing - Machine III	7
86.	Drawing - Machine IV	3
87.	Drawing - Machine Details	1
88.	Drawing - Mechanical I	38
89.	Drawing - Mechanical II	33
90.	Drawing - Mechanical III	13
91.	Drawing - Manuscript Writing I	2
92.	Drawing - Manuscript Writing II	1
93.	Drawing - Pictorial	1
94.	Drawing - Power Plant Design	1

TABLE II (Continued)

	Name of Course	Number of Schools Offering Course
95.	Drawing - Sheet Metal Pattern	3
96.	Drawing - Supervision & Teaching of Handwriting	1
97.	Drawing - Topographic	2
98.	Electricity I	32
99.	Electricity II	21
100.	Electricity III	5
101.	Electricity IV	1
102.	Electricity - Air Conditioning & Refrigeration	1
103.	Electricity - Communications	1
104.	Electricity - Electronics	3
105.	Electricity - Industrial	5
106.	Electricity - International Morse Code	1
107.	Electricity - Motor Test & Repair	3
108.	Engineering Calculations	1
109.	Farm Shopwork I	3
110.	Farm Shopwork II	1
111.	Flight Practice	1
112.	Foundry I	7
113.	Foundry II	2
114.	Foundry - Brass & Alloy	1
115.	Furniture - Historic	2
116.	Furniture Reproduction	1
117.	General Shop I	29
118.	General Shop II	8
119.	General Shop III	3
120.	General Shop IV	3
121.	Glider Construction	2
122.	Graphic Arts I - History of Topography	6
123.	Graphic Arts II - Silk Screen Printing	5
124.	Heat Treatment of Metals	3
125.	Home Mechanics I	11
126.	Home Mechanics II	1
127.	House Planning & Construction	2
128.	Industrial Mechanics I	1
129.	Industrial Mechanics II	1
130.	Jewelry Making	2
131.	Lapidary Work	1
132.	Leather Work	5
133.	Machine Shop I	30
134.	Machine Shop II	24
135.	Machine Shop III	11
136.	Machine Shop IV	6
137.	Machine Shop V	2
138.	Machine Shop VI	1
139.	Materials - General, Supplementing Wood	1
140.	Materials of Industry	5
141.	Mathematics - Applied	1
142.	Mechanics - Applied, Statics	2
143.	Mechanisms - Elements	2

TABLE II (Continued)

	Name of Course	Number of Schools Offering Course
144.	Metals - Soldering & Brazing	1
145.	Metals - Technology	1
146.	Metals - Toolmaking	1
147.	Metallurgy I	2
148.	Metallurgy II	1
149.	Metal - Aircraft Sheet	1
150.	Metal - Aircraft Sheet	1
151.	Metalwork - Art I	16
152.	Metalwork - Art II	2
153.	Metalwork - General I	35
154.	Metalwork - General II	16
155.	Metalwork - General III	3
156.	Metalwork - General IV	2
157.	Metalwork - Ornamental Iron	7
158.	Metalwork - Sheet I	28
159.	Metalwork - Sheet II	11
160.	Metalwork - Sheet III	2
161.	Metalwork - Sheet IV	1
162.	Metalwork - Toolmaking, Jigs, & Fixtures	1
163.	Millwrighting	1
164.	Millwork	3
165.	Model Making	1
166.	Pattern Making I	14
167.	Pattern Making II	4
168.	Photo Lithography	1
169.	Photography I	7
170.	Photography II	3
171.	Photography - Cinematography	1
172.	Plastics in the School Shop	7
173.	Play Equipment	1
174.	Printing I	21
175.	Printing II	14
176.	Printing III	9
177.	Printing IV	6
178.	Printing V	4
179.	Printing VI	3
180.	Printing VII	2
181.	Printing VIII	2
182.	Print Shop Management	4
183.	Print Shop Mechanics	1
184.	Print Shop Supervision	1
185.	Printers Cost Accounting	3
186.	Printing - Advertising Essentials	1
187.	Printing Design	1
188.	Printing - Industrial	1
189.	Printing - Linotype Mechanism	1
190.	Printing - Linotype Operating I	3
191.	Printing - Linotype Operating II	1
192.	Printing - Linotype Operating III	1

TABLE II (Continued)

	Name of Course	Number of Schools Offering Course
193.	Printing - Offset Lithography I.	1
194.	Printing - Offset Lithography II	1
195.	Printing Problems I.	2
196.	Printing Problems II	1
197.	Printing - School Publications	1
198.	Printing - Typographic Design.	1
199.	Radio I.	8
200.	Radio II	5
201.	Radio Telephony Elements	1
202.	Radio & Television	1
203.	Safety Education	4
204.	Shop Activities for Atypical Children.	1
205.	Shop Planning.	9
206.	Shop Practice for Engineering Students	1
207.	Sportscraft.	1
208.	Stage Craft & Stage Construction	1
209.	Textiles	3
210.	Toy Making	3
211.	Transportation Shop.	3
212.	Upholstery I	10
213.	Upholstery II.	1
214.	Upholstery - Fiber Furniture Weaving	1
215.	Welding I.	21
216.	Welding II	5
217.	Wood Carving	3
218.	Wood Finishing I	18
219.	Wood Finishing II.	2
220.	Wood Finishing & Upholstery.	3
221.	Wood Turning I	19
222.	Wood Turning II.	10
223.	Wood Turning III	1
224.	Woodworking - Elementary I	18
225.	Woodworking - Elementary II.	4
226.	Woodworking - For Women.	1
227.	Woodworking - General I.	5
228.	Woodworking - General II	1
229.	Woodworking - Hand I	41
230.	Woodworking - Hand II.	10
231.	Woodworking - Hand III	1
232.	Woodworking - Production I	6
233.	Woodworking - Production II.	4
234.	Woodworking - Production III	2
235.	Woodworking - Production IV.	1

include courses which are either required or elective in the curriculum of industrial arts education, and also service courses for other departments of colleges in the institution. In tabulating the courses offered, the

course is recorded by the title which best describes the content of the course, rather than the title by which it was listed in the various catalogs. The courses listed I, II, etc., are subjects in which a sequence of courses is offered and in each case later courses are of the advanced type.

In the fifty-one selected colleges and universities studied, 235 separate technical courses are offered by the industrial arts teacher education or industrial education departments in these institutions. Table II includes the titles of the courses offered with the number of

TABLE III

A LIST OF FIFTEEN TECHNICAL COURSES OFFERED THE GREATEST NUMBER OF TIMES WITH THE NUMBER OF SCHOOLS OFFERING THE COURSE AND THE PERCENTAGE OF INSTITUTIONS THAT OFFER THE COURSE

Rank	Name of Course	Number of Schools	Percentage
1.	Cabinet Making I	45	88.3
2.	Hand Woodworking I	41	80.5
3.	Mechanical Drawing I	38	74.6
4.	General Metalwork I.	35	68.7
5.	Mechanical Drawing II.	33	64.7
6.	Electricity I.	32	62.8
7.	Architectural Drawing I.	32	62.8
8.	Machine Shop I	30	58.8
9.	General Shop I	29	56.9
10.	Cabinet Making II.	28	54.9
11.	Sheet Metalwork I.	28	54.9
12.	Machine Drawing I.	26	51.0
13.	Machine Shop II.	24	47.1
14.	Printing I	21	41.2
15.	Welding I.	21	41.2

schools which offer each course. For example, Cabinet Making I is offered in forty-five of the fifty-one institutions, or in 88.3 percent of the institutions studied. This course is offered the greatest number of times of any other technical course offered in the institutions studied. The fifteen technical courses which are offered in the greatest number of

institutions, the number of schools that offer each course, and the percentage of institutions which offer each course are included in Table III.

There are forty technical courses which are offered in ten or more of the institutions studied. Many of the courses offered at one or two schools may be offered because of a special local need. Photography and cinematography are offered mostly in the institutions on the west coast where there is a local demand for photographic experience.

TABLE IV

A LIST OF FIFTEEN TECHNICAL COURSES REQUIRED THE GREATEST NUMBER OF TIMES WITH THE NUMBER OF SCHOOLS REQUIRING THE COURSE AND THE PERCENTAGE OF INSTITUTIONS THAT REQUIRE THE COURSE

Rank	Name of Course	Number of Schools	Percentage
1.	Mechanical Drawing I.	43	84.3
2.	Hand Woodworking I.	39	76.5
3.	Cabinet Making I.	38	74.5
4.	General Metalwork I	36	70.6
5.	General Shop I.	31	60.8
6.	Electricity I	27	53.0
7.	Mechanical Drawing II	26	52.0
8.	Machine Shop I.	26	51.0
9.	Architectural Drawing I	24	47.3
10.	Cabinet Making II	19	37.1
11.	Graphic Arts I.	19	37.1
12.	Industrial Arts Design I.	19	37.2
13.	Machine Drawing I	14	27.5
14.	Freehand Drawing I.	13	25.5
15.	Industrial Finishing.	13	25.5

Technical Courses Required. In the fifty-one institutions, 235 separate technical courses are offered. (See Table II) Of these courses offered there are eighty-one technical courses which are required in the industrial arts teacher education curriculums. Table IV includes the titles of the required technical courses with the number of schools which require each course. For example, Mechanical Drawing I is required in forty-three of the fifty-one selected institutions or in 84.3 percent of

the schools studied in the survey. No doubt, mechanical drawing courses are offered in the other eight schools, but either under another name or in an omnibus type course. The fifteen courses which are required in the greatest number of institutions, the number of schools that require each course, and the percentage of institutions that require each course are included in Table IV.

These courses represent the basic technical courses which are required. Some of the offerings and requirements are restricted at the present. New courses or subjects such as plastics working have not been added to the curriculum of many of the institutions. Plastics working as a separate subject is required in five of the institutions and is offered in two additional institutions studied in the survey. Many of the colleges have plastics working taught, but it is taught in the general shop program as an area or subject of the general shop. It was reported in the questionnaire study that in four institutions plastics working is being added as a unit of separate courses in the near future.

Referring to Table V, it is seen that twenty-three courses listed in Table V are required in only one institution. Five of the courses are required by two institutions. Twenty-four of the eighty courses in Table V are required in ten or more of the institutions studied.

Table VI includes the titles of the required technical courses with the number of semester hours of credit for each subject. This table combines the individual courses into subjects or unit fields. For example, at the Middle Tennessee State College the requirements are Mechanical Drawing I, two semester credits; Mechanical Drawing II, two semester credits; and Mechanical Drawing III, two semester credits. These have

been combined to give six semester credits in mechanical drawing. Forty-three technical subjects are required in the selected institutions.

The institutions which have 1/3 or 2/3 credits listed for various subjects are schools that operate on the quarter or term system. These quarter or term credits are evaluated as equal to two-thirds of a semester credit, thus receive two-thirds of a credit for one credit on the semester plan.

TABLE V

REQUIRED TECHNICAL COURSES WITH
NUMBER OF SCHOOLS REQUIRING EACH COURSE

Name of Course	Schools
1. Applied Mathematics	2
2. Automobile Mechanics I	9
3. Automobile Mechanics II	6
4. Bookbinding I	1
5. Bookbinding II	1
6. Cabinet Making I	38
7. Cabinet Making II	39
8. Cabinet Making III	8
9. Cabinet Making IV	4
10. Care of Shop Equipment	3
11. Carpentry I	10
12. Carpentry II	2
13. Ceramics & Textiles	3
14. Concrete Construction	1
15. Crafts I	7
16. Crafts II	1
17. Descriptive Geometry	3
18. Drawing - Architectural I	22
19. Drawing - Architectural II	5
20. Drawing - Architectural III	1
21. Drawing - Engineering I	12
22. Drawing - Engineering II	5
23. Drawing - Freehand	33
24. Drawing - Industrial Reproduction	1
25. Drawing - Machine I	14
26. Drawing - Machine II	1
27. Drawing - Machine III	1
28. Drawing - Mechanical I	43
29. Drawing - Mechanical II	25
30. Drawing - Mechanical III	4

TABLE V (Continued)

Name of Course	Schools
31. Drawing - Sheet Metal I.	1
32. Drawing - Sheet Metal II	1
33. Electricity I.	27
34. Electricity II	8
35. Electricity III - Farm	1
36. Engineering Materials and Processes.	2
37. Farm Shopwork.	2
38. Forging.	1
39. Foundry.	8
40. General Shop I	31
41. General Shop II.	12
42. Graphic Arts I	19
43. Graphic Arts II.	7
44. Graphic Arts III	1
45. Home Mechanics	3
46. Industrial Arts Design I	19
47. Industrial Arts Design II.	5
48. Industrial Arts Design III - Furniture	2
49. Industrial Finishing	13
50. Leather Working.	1
51. Machine Shop I	26
52. Machine Shop II.	10
53. Machine Shop III	2
54. Machine Shop IV.	1
55. Metalwork - Art I.	12
56. Metalwork - Art II	2
57. Metalwork - General I.	36
58. Metalwork - General II	11
59. Metalwork - Sheet I.	21
60. Metalwork - Sheet II	2
61. Metalwork - Sheet, Aircraft.	1
62. Pattern Making	5
63. Photography I.	2
64. Photography II	1
65. Plastics	5
66. Shop Layout.	1
67. Shop Planning.	4
68. Transportation Shop.	3
69. Upholstery	3
70. Welding I.	8
71. Welding II	1
72. Wood Carving	1
73. Wood Turning I	10
74. Wood Turning II.	6
75. Woodworking - General I.	3
76. Woodworking - General II	1
77. Woodworking - Hand I	39
78. Woodworking - Hand II.	12
79. Woodworking - Production I	4
80. Woodworking - Production II.	1

TABLE 6

REQUIRED TECHNICAL COURSES

(SEMESTER HOURS CREDIT)

	NAME OF INSTITUTION	Applied Mathematics	Automobile Mechanics	Bookbinding	Cabinet Making	Care of Equipment	Carpentry	Concrete Construction	Ceramics & Textiles	Crafts	Descriptive Geometry	Drawing – Architectual	Drawing – Engineering	Drawing – Freehand	Drawing – Machine	Drawing – Mechanical	Drawing – Sheet Metal	Electricity	Engr. Materials & Processes	Farm Shopwork	Forging	Foundry	General Shop	Graphic Arts	Home Mechanics	Industrial Arts Design	Industrial Finishing	Leather Working	Machine Shop	Metalwork – Art	Metalwork – General	Metalwork – Sheet	Pattern Making	Photography	Plastics	Shop Planning	Transportation Shop	Upholstery	Welding	Wood Carving	Wood Turning	Woodworking – General	Woodworking – Hand	Woodworking – Production
1.	University of Alabama	3 1/3			8 2/3										2	2	2					6 2/3						2			2										2		
2	Alabama Polytechnic Institute				8					1 1/3		2 2/3										3 1/3						4 2/3			4 2/3						4 2/3						
3	Arizona State College				4	2					3			2	3			2						2	7		2	4	2		2										2	2
4	University of California – Santa Barbara												2	3	2		3												3												3	
5	Chico State College		3		3												3					3			2					3	2		2							3	3
6	Colorado State College – Greeley			5 1/3						1 1/3					2 2/3								1 1/3				4		1 1/3									1 1/3		4	
7	Colorado A. & M. College – Fort Collins				3 1/3	1 1/3			1 1/3		2											1 1/3			1 1/3		3 1/3	1 1/3	2	1 1/3										2	
8	Teachers College of Connecticut		5 1/3		2 2/3		3								5 1/3							5 1/3	5 1/3	2 2/3				5 1/3												2 2/3	
9	University of Florida				6				6		6				6							3					3	3													3	
10	University of Georgia				3 1/3										6 2/3							6 2/3		3 1/3																3 1/3	
11	Bradley University		3									2			4		3											3													3	
12	Northern Illinois State Teachers College				2 2/3				2 2/3			2 2/3			2 2/3		2 2/3					2 2/3	5 1/3					5 1/3				2 2/3								2 2/3	
13	Ball State Teachers College													2 2/3	2 2/3		2 2/3					2 2/3	2 2/3		2 2/3			2 2/3												2 2/3	
14	Indiana State Teachers College				6							3			3					3	3	3		3	3		3	3	3												3	
15	Iowa State College – Ames				2							2 2/3	2	3 1/3		2				1 1/3					1 1/3		1 1/3		2	2	2					1 1/3				2	
16	Iowa State Teachers College				1 1/3						2				3 1/3									2	1 1/3			4	2			1 1/3								2	
17	Kansas State Teachers College – Pittsburg		2		3			2	2	3					2								6	2			2	4	2	2			2							2	
18	Eastern Kentucky State Teachers College				9									3	3					2	3			2	2	6	3	3											3		
19	Northwestern State College of Louisiana										3				3		6		3			3					3	3											3		
20	Massachusetts State Teachers College		6		3							3	3		3		3					3	9					3												3	3
21	Central Michigan College				6										3		3		3			3	3		2			6				2									
22	Minnesota State Teachers – Bemidji				4						4	2			4		3 1/3					1 1/3						2	2		1 1/3						2 2/3			2 2/3
23	Minnesota State Teachers – St. Cloud							2 2/3							2 2/3		2 2/3					1 1/3						5 1/3	2 2/3											2 2/3	
24	University of Minnesota				2		2		2						4		2				2		2			2		2													2	
25	Northwest Missouri State Teachers				1 1/3				1 1/3		1 1/3				1 1/3													3 1/3										1 1/3		1 1/3	

TABLE 6

REQUIRED TECHNICAL COURSES

(SEMESTER HOURS CREDIT)

	NAME OF INSTITUTION	Applied Mathematics	Automobile Mechanics	Bookbinding	Cabinet Making	Care of Equipment	Carpentry	Concrete Construction	Ceramics & Textiles	Crafts	Descriptive Geometry	Drawing – Architectural	Drawing – Engineering	Drawing – Freehand	Drawing – Machine	Drawing – Mechanical	Drawing – Sheet Metal	Electricity	Engr. Materials & Processes	Farm Shopwork	Forging	Foundry	General Shop	Graphic Arts	Home Mechanics	Industrial Arts Design	Industrial Finishing	Leather Working	Machine Shop	Metalwork – Art	Metalwork – General	Metalwork – Sheet	Pattern Making	Photography	Plastics	Shop Planning	Transportation Shop	Upholstery	Welding	Wood Carving	Wood Turning	Woodworking – General	Woodworking – Hand	Woodworking – Production
26	Nebraska State Teachers – Wayne			3	2									4								2					2		3											2		5		
27	Nebraska State Teachers – Chadron			3	2						3			6								6			2	3			3													3		
28	New Jersey State Teachers – Newark			6				3			2		2	4		4						3	6				3	3	6													6		
29	New Mexico Highlands University			$2\frac{2}{3}$		$2\frac{2}{3}$					$1\frac{1}{3}$			6										3		$1\frac{1}{3}$		$2\frac{2}{3}$														$2\frac{2}{3}$		
30	New York State Teachers – Oswego							5						6		5						5	5					5						5							5		
31	New York State Teachers – Buffalo			$7\frac{1}{2}$		3		5			3			6		10						5	5		4		$2\frac{1}{2}$		5	5					5									
32	North Carolina State Teachers													6								12	2		2								2										
33	University of North Dakota													12								16	4				4																
34	Ohio State University									3		$5\frac{1}{3}$								2							$3\frac{1}{3}$									2								
35	Oklahoma A. & M. College				2					3	2	2	2	2						1		4			2	2	1														4		
36	Northeastern State College – Tahlequah			5	2						3			3											2	3			3													4		
37	Oregon State College			2	$1\frac{1}{3}$	2					2	4	2			2				2					2		2			2	2					2						4		
38	State Teachers College – Millersville			4							2		2	2	4	4						8	4		4			8														4		
39	The Pennsylvania State College			4				2			2	2		2	2	4				2		2	2		4		4	2	2	2						2						4		
40	South Dakota State College			$1\frac{1}{3}$		$2\frac{2}{3}$	$1\frac{1}{3}$			$1\frac{1}{3}$	$1\frac{1}{3}$	$2\frac{2}{3}$	$1\frac{1}{3}$				2		$1\frac{1}{3}$						4		$5\frac{1}{3}$		$1\frac{1}{3}$								$2\frac{2}{3}$		$1\frac{1}{3}$					
41	Black Hills Teachers College			$5\frac{1}{3}$										6																$1\frac{1}{3}$									$2\frac{2}{3}$		$2\frac{2}{3}$		
42	Middle Tennessee State College		4	6				4			6	2		6		6						2					6	$1\frac{1}{3}$	$1\frac{1}{3}$	8		$1\frac{1}{3}$			2			2		4	4	
43	The Agri. & Mech. College of Texas									3	4	3	2	1		3						5							6	3											3		
44	S.W. Texas State Teachers College			3											6							3					3		3				3								3		
45	University of Vermont		6	6				3							6	6											6																
46	Central Washington College of Education								$1\frac{1}{3}$						2														$3\frac{1}{3}$			$3\frac{1}{3}$										$3\frac{1}{3}$		
47	Eastern Washington College of Education			$6\frac{1}{3}$		$1\frac{1}{3}$				2	4	4				$1\frac{1}{3}$									$1\frac{1}{3}$		$1\frac{1}{3}$		$1\frac{1}{3}$	$1\frac{1}{3}$								$1\frac{1}{3}$	$2\frac{2}{3}$		$1\frac{1}{3}$		
48	West Virginia Institute of Technology		3	3											5	3						6	3		2		2	2		2		3	2			2					3		
49	Fairmont State College			3		3					3			3	3	3						3					3		3			3			3						3		
50	The Stout Institute			8	2	2						2	2		2	2							4		4	2		2	2											2	2	2	
51	State Teachers College – Plattville		2	2							2		2	2	2							2	4		2		4	2	2	2					2					2	2		

The number of semester hours credit of technical or shopwork and drawing courses required in the curriculum of industrial arts teacher education is included in Table XII. Fifty semester credits of technical courses are required in the curriculum of the industrial education department at the A. and M. College of Texas. This is in contrast with Iowa State College, Ames, Iowa, where only 25-1/3 semester credits are required. The difference is compensated by the greater number of required electives which the students at Iowa State College are allowed in preparation for teaching. The average number of semester credits of technical courses required for a degree in industrial arts teacher education in the fifty-one selected institutions is thirty-four and one-third credits.

TABLE VII

SEMESTER CREDITS OF INDUSTRIAL ARTS TECHNICAL AND PROFESSIONAL COURSES REQUIRED FOR A BACHELOR'S DEGREE IN INDUSTRIAL ARTS TEACHER EDUCATION

Credits	Schools
61 and over	2
56 - 60	3
51 - 55	7
46 - 50	9
41 - 45	6
36 - 40	8
31 - 35	5
26 - 30	8
21 - 25	2
16 - 20	0
11 - 15	1
Less than 10.	0

Industrial Arts Professional Courses

Teachers of industrial arts need the preparation given in professional courses which are especially planned for them. Methods used in teaching industrial arts are far different to the methods followed in teaching English or history in the junior and senior high schools. The

preparation in methods or in other professional courses needs to be specialized, with emphasis on the teaching techniques and methods used in industrial arts for a better background and fundamental understanding of the problems in this field.

The reference to professional courses in this study will include courses taught in and for industrial arts students that are non-laboratory and non-technical. These courses include studies relating to methods, organization, testing, analysis, teaching techniques, history, and the philosophy of industrial arts.

Professional Courses Offered. The titles of the fifty-one industrial arts professional courses offered in the selected institutions, with the number of schools which offer each course are included in Table VIII. Methods of teaching industrial arts is offered as a separate course in twenty-three institutions. This course is offered in nine more institutions than any other course. General Shop - Theory and History is second in rank in the number of schools offering industrial arts professional courses. This course is offered on the graduate level in many other institutions, but since this study is primarily concerned with the undergraduate curriculum these institutions cannot be included in the analysis.

Thirty of the fifty-one industrial arts professional courses are offered in only one institution. Forty-seven of the industrial arts professional courses are offered in ten or fewer of the schools.

The department of industrial education in several institutions offers both curriculums in industrial arts teacher education and in trade and

industrial education, therefore offering professional courses in vocational subjects as well as industrial arts subjects. The A. and M. College of Texas and The Stout Institute are examples of these institutions. Fourteen schools offer a course in the History of Industrial Arts Education and twelve schools offer a course in the History and Philosophy of Vocational Education.

TABLE VIII

PROFESSIONAL COURSES OFFERED
WITH NUMBER OF SCHOOLS OFFERING COURSE

	Name of Course	Schools
1.	Analysis Procedure	3
2.	Administration and Supervision of Industrial Arts	1
3.	Art Appreciation	1
4.	Arts in Recreation	1
5.	Audio-Visual Education	3
6.	Coordination in Part-Time Schools	2
7.	Course Construction	6
8.	Course Organization	7
9.	Equipment and Management	2
10.	Elementary School Industrial Arts	4
11.	Estimating and Buying of Industrial Materials and Equipment	1
12.	Expressive Activities for Early Childhood	1
13.	Field Work - Secondary Education	1
14.	General Shop - Theory and History	17
15.	General Metalshop Organization	1
16.	Graphic Presentation	1
17.	Guidance - Vocational	6
18.	History and Philosophy of Vocational Education	12
19.	History of Industrial Arts Education	14
20.	History and Practice in the Arts, Current	1
21.	Industrial Arts in Adult Education	1
22.	Industrial Conference Methods	1
23.	Industrial Instruction	1
24.	Industrial Relations	1
25.	Industrial Supervision	1
26.	Industries - Modern	1
27.	Introduction to Industrial Arts	2
28.	Instruction Aids	5
29.	Instructional Materials - Development	3
30.	Laboratory Problems - Industrial Arts	1
31.	Literature of Industrial Arts Education	1
32.	Manipulative Work for Integrated Programs I	1
33.	Manipulative Work for Integrated Programs II	1

TABLE VIII (Continued)

Name of Course	Schools
34. Methods in Vocational Education.	1
35. Methods of Industrial Organization and Management.	1
36. Methods of Teaching Industrial Arts I.	23
37. Methods of Teaching Industrial Arts II	2
38. Methods of Teaching Machine Drawing.	1
39. Methods of Teaching Mechanical Drawing	1
40. Modern Industries.	3
41. Teaching Industrial Arts	5
42. Teaching Techniques and Course Organization in Bookbinding .	1
43. Teaching Trades.	1
44. Technology in Modern Living.	1
45. Tests in Industrial Subjects	5
46. Trade and Job Analysis	7
47. Use of New Materials	1
48. Visual Education	2
49. Vocational Education	1
50. Work Experience in Industry.	1
51. Workshop in Industrial Education	1

One institution studied in the survey has no professional courses offered in the industrial arts department, but perhaps the professional courses are listed in education courses. Two institutions offer professional courses on the graduate level, and nine have only professional courses offered in the school or college of education.

TABLE IX

INDUSTRIAL ARTS PROFESSIONAL COURSES OFFERED IN THE GREATEST NUMBER OF INSTITUTIONS WITH THE NUMBER OF SCHOOLS OFFERING EACH COURSE AND THE PERCENTAGE OF THE SCHOOLS STUDIED

Rank	Name of Course	Schools	Percent
1.	Methods of Teaching Industrial Arts I.	23	. . . 47.1
2.	General Shop - Theory and History I.	17	. . . 33.3
3.	History of Industrial Arts Education I	14	. . . 27.4
4.	History and Philosophy of Vocational Education . .	12	. . . 23.5
5.	Trade and Job Analysis	7	. . . 13.7
6.	Course Organization.	7	. . . 13.7
7.	Course Construction.	6	. . . 11.7
8.	Guidance - Vocational.	6	. . . 11.7

The industrial arts professional courses which are offered in the

greatest number of institutions in the survey are included in Table IX. The other industrial arts professional courses listed in Table VIII are offered in five or less institutions of those studied.

Professional Courses Required. Fifty-one industrial arts professional courses are offered in the selected institutions. (See Table VIII) Of these fifty-one industrial arts professional courses offered, twenty-three courses are required in the industrial arts teacher education curriculums. Table X includes the title of the industrial arts professional course required, the number of schools which require each course, the percentage of the institutions studied that require each course, and the approximate year in which the student takes the course. If the courses may be taken in either the junior or senior year, this will be listed as 3 or 4.

TABLE X

INDUSTRIAL ARTS PROFESSIONAL COURSES REQUIRED WITH NUMBER OF SCHOOLS REQUIRING EACH COURSE, PERCENT OF INSTITUTIONS, AND APPROXIMATE YEAR REQUIRED IN THE CURRICULUM

Rank	Name of Course	Schools	Percent	Year Required
1.	Practice Teaching	48	94.0	4
2.	Methods of Teaching Industrial Arts	41	80.4	3-4
3.	Organization and Administration of Industrial Arts	26	51.0	3-4
4.	General Shop - Theory and History	16	31.4	3-4
5.	School Shop Planning	13	25.5	4
6.	Guidance	13	25.5	3-4
7.	Theory of Course Construction	10	19.6	3-4
8.	Audio-Visual Education	8	15.7	3
9.	Trade and Job Analysis	8	15.7	3-4
10.	Tests in Industrial Arts	5	9.8	2-4
11.	Developing Instructional Aids	5	9.8	3-4
12.	History of Industrial Arts	3	5.9	3
13.	Buying and Management of Equipment	3	5.9	2-3
14.	History and Philosophy of Vocational Education	2	3.9	2-3

TABLE X (Continued)

Rank	Name of Course	Schools	Percent	Year Required
15.	Methods of Teaching Drawing. . . .	2	3.9	3
16.	Industrial Arts in Elementary Schools.	1	1.9	3
17.	Introduction to Industrial Arts. .	1	1.9	1
18.	Principles of Industrial Arts. . .	1	1.9	3
19.	Teaching Aids.	1	1.9	4
20.	Modern Industries.	1	1.9	4
21.	Project Analysis	1	1.9	3-4
22.	Problems of Industrial Arts Teacher	1	1.9	4
23.	Practices in Vocational Education.	1	1.9	2

In some of the institutions, courses are required which combine the material in several of the courses listed into one course. For example, The Teachers College of Connecticut requires Methods of Teaching Industrial Arts, Organization and Administration of Industrial Arts, Practice Teaching and History of Vocational Education. School shop planning is taught as a part of the course in Organization and Administration of Industrial Arts instead of as a separate course.

The titles of the required industrial arts professional courses and the number of semester credits of each course required in the industrial arts teacher education curriculums in the selected institutions are included in Table XI. For example, The University of Vermont requires Methods of Teaching Industrial Arts, 2 credits; Trade and Job Analysis, 2 credits; Practice Teaching, 2 credits; and Theory of Course Construction, 2 credits. Thus eight credits of industrial arts professional courses are required.

The average number of semester credits of industrial arts professional courses required in the selected institutions is fourteen credits, which includes practice teaching.

TABLE XI

TITLES OF THE REQUIRED INDUSTRIAL ARTS PROFESSIONAL COURSES AND SEMESTER CREDITS OF EACH COURSE

INSTITUTION	Methods of Teaching Industrial Arts	Organization and Administration of Industrial Arts	Trade and Job Analysis	Practice Teaching	School Shop Planning	General Shop Theory and History	Audio-Visual Education	Theory of Course Construction	Buying and Management of Equipment	Test in Industrial Arts	Guidance	Introduction to Industrial Arts	History of Industrial Arts	History and Philosophy of Vocational Education	Principles of Industrial Arts	Developing Instructional Aids	Teaching Aids	Modern Industries	Project Analysis	Problems of Industrial Arts Teachers	Practices in Vocational Education	Methods of Teaching Drawing	Industrial Arts in Elementary Schools
1. University of Alabama				3 1/3																			
2. Alabama Polytechnic Institute	3 1/3	3 1/3		3 1/3	3 1/3	3 1/3																	
3. Arizona State College	3	3		5		3													3				
4. University of California, Santa Barbara	2			6	2		2				3												
5. Chico State College		2	2	8							2												
6. Colorado State College, Greeley		2 2/3		5 1/2-10 2/3		2 2/3																	
7. Colorado A. and M. College, Fort Collins	3 1/3			6		1 1/3					2						3 1/3						
8. Teachers College of Connecticut	2 2/3	2 2/3		16									2 2/3										
9. University of Florida				20																			
10. University of Georgia	3 1/3	3 1/3				3 1/3									3 1/3								
11. Bradley University	2			5																			
12. Northern Illinois State Teachers College	2 2/3	2 2/3		10 2/3	2 2/3																		
13. Ball State Teachers College	2 2/3			5 1/3				3 1/3			3 1/3					3 1/3	3 1/3	3 1/3		2			
14. Indiana State Teachers College	2 2/3			5 1/3		2 2/3																	
15. Iowa State College, Ames	2	2	2	3 1/3	2	2	2	2	2	2	2					2							
16. Iowa State Teachers College	1 1/3	2		4-8	1 1/3						2												
17. Kansas State Teachers College, Pittsburg	3	3	3	3			3																
18. Eastern Kentucky State Teachers College	2	2		10								2								2			
19. Northwestern State College of Louisiana	3	3		6																			
20. Massachusetts State Teachers College	4	4		8																			
21. Central Michigan College				8		2																	
22. Minnesota State Teachers College, Bemidji	2	2		5 1/3		1 1/3		2															
23. Minnesota State Teachers College, St. Cloud	2 2/3			4	2 2/3		2 2/3																
24. University of Minnesota	2	1 1/3	1/3-2	6				2		2	2			1 1/3							1 1/3		
25. Northwest Missouri State Teachers College	1 1/3	1 1/3		4																			

TABLE XI (Continued)

INSTITUTION	Methods of Teaching Industrial Arts	Organization and Administration of Industrial Arts	Trade and Job Analysis	Practice Teaching	School Shop Planning	General Shop Theory and History	Audio-Visual Education	Theory of Course Construction	Buying and Management of Equipment	Test in Industrial Arts	Guidence	Introduction to Industrial Arts	History of Industrial Arts	History and Philosophy of Vocational Education	Principles of Industrial Arts	Developing Instructional Aids	Teaching Aids	Modern Industries	Project Analysis	Problems of Industrial Arts Teachers	Practices in Vocational Education	Methods of Teaching Drawing	Industrial Arts in Elementary Schools
26. Nebraska State Teachers College, Wayne	2			2 1/2																			
27. Nebraska State Teachers College, Chadron				6																			
28. New Jersey State Teachers College	3			6	3		3				3												
29. New Mexico Highlands University	2			3 1/3				2 2/3															
30. New York State Teachers College, Oswego	6			15																			
31. New York State Teachers College, Buffalo	2	2		15		5		2															
32. North Carolina State College	2			4	2		2	2			2					2							
33. University of North Dakota	3	2	3	3					2														
34. Ohio State University	3 1/3			4 1/3-8		2																1 1/3	1 1/3
35. Oklahoma A. and M. College	3	3		6																			
36. Northeastern State College, Tahlequah	2			8																			
37. Oregon State College	2	2	2	6	2	1 1/3										2							
38. Pennsylvania State, Millersville	3			12				4															
39. Pennsylvania State College	3			9	3		3					1											
40. South Dakota State College	2			3 1/3							2												
41. Black Hill Teachers College						1 1/3																	
42. Middle Tennessee State College		2		2																			
43. The A. and M. College of Texas	3	2		8		2		3			3											4	
44. Southwest Texas, San Marcos		3		3	3																		
45. University of Vermont	2		2	2				2															
46. Central Washington College of Education	1 1/3			3 1/3																			
47. Eastern Washington College of Education	2	2		10		1 1/3				1 1/3			2										
48. West Virginia Institute of Technology	3	2		5		3				3	3			2									
49. Fairmont State College																							
50. The Stout Institute	2	2	2	4	2			2	2	2	2												
51. Wisconsin State Teachers College, Plattville	3			10	2																		

Most of the industrial arts professional courses are required in the junior and senior years of the curriculum. One course, Introduction to Industrial Arts is required at The Pennsylvania State College in the freshman year. This course serves as a freshman orientation experience in industrial arts.

In answering the inquiry in the questionnaire concerning the industrial arts professional courses required, Professor Homer J. Smith, of the University of Minnesota said, "So many students with B. S. Degrees return for Master's Degrees, that we feel content to reserve certain courses for that level, when experience is helpful." The professional courses listed in Table XI are included in the catalogs of practically all schools where an advanced degree is offered. In many cases the professional courses are made available only to graduate students.

General Education Courses

A teacher of industrial arts in the public schools should have the same cultural education as the academic teachers. The industrial arts teacher actually teaches, in his courses, some basic English, science, mathematics and history, with the emphasis on the technical or applied subject rather than the cultural aspect of these subjects. The industrial arts teacher must teach the technical language of English and mathematics to provide the student with the understanding of arts and industries.

Subjects Required. The total individual requirements of the institutions studied in the survey are included in Table XII. The subjects are grouped into fields to facilitate their recording in the table. The fields are: English, speech, natural science, which is composed of

TABLE XII

GENERAL REQUIRED SUBJECTS WITH SEMESTER CREDITS FOR EACH SUBJECT

INSTITUTION	English	Speech	Natural Sciences	Social Sciences	Practice Teaching	Military Science	Agriculture Methods	Mathematics	Industrial Arts Technical	Industrial Arts Professional	Education Professional	General Required	General Electives	Secondary Teaching Field	Total Credits for Bachelor's Degree
1. University of Alabama	12		10	12⅞	3⅓	4		6⅔	30		12		42⅔	L	133⅓
2. Alabama Polytechnic Institute	13⅓		20	13½	3⅓				33⅓		20		39⅔		140
3. Arizona State College	6	3	8	12				6	44	6	2	8	30	L	125
4. University of California, Santa Barbara	9		9	15	6				40	11	8	11	11		120
5. Chico State College	3	3	12	18	8			3	36	6	10	2	19		120
6. Colorado State College, Greeley	2⅔		5⅓	21⅓	10⅔				20	8	18⅔	4	37⅓	L	128
7. Colorado A. and M. College, Fort Collins	8	1	16⅔	20	6	6		5⅓	24⅔	14⅔	9⅓	3⅓	35⅓		140
8. Teachers College of Connecticut	8	2⅔	5⅓	18⅔	5⅓			5⅓	42⅔	8	13⅓	5	21⅓		135
9. University of Florida			8	30	30			8	36		18			L	130
10. University of Georgia	12	3⅓	3⅓	16	10	6⅔		3⅓	23⅓	3⅓	19⅓	6	24	L	130⅔
11. Bradley University	6				5				16	41	17	4	35	L	124
12. Northern Illinois State Teachers College	8	2⅔	10⅔	18⅔	5			2⅔	34⅔	10⅔		10	25⅓		128
13. Ball State Teachers College	8		8	13⅓	5⅓				45⅓	2⅔	5⅓	2⅔	37⅓	L	128
14. Indiana State Teachers College	5	5	5	8	5⅓			2⅔	32	5⅓	13⅓	13⅓	33	L	128
15. Iowa State College, Ames	8	2	8	15		4		6⅔	25⅓	2	2	2	59⅔	L	134⅔
16. Iowa State Teachers College	10	1	14⅔	12	5⅓				33	4⅔	9⅓	4	30		124
17. Kansas State Teachers College, Pittsburg	6	3		6	6			5	45	6	6	7	34	L	124

TABLE XII (Continued)

INSTITUTION	English	Speech	Natural Sciences	Social Sciences	Practice Teaching	Military Science	Agriculture Methods	Mathematics	Industrial Arts Technical	Industrial Arts Professional	Education Professional	General Required	General Electives	Secondary Teaching Field	Total Credits for Bachelor's Degree
18. Eastern Kentucky State Teachers College	12		16	6	10			6	44	6	9	10	13		132
19. Northwestern State College of Louisiana	12		12	15				6	27	3	15	7	27	L	124
20. Massachusetts State College, Fittchburg	12		6	23	8			6	48	10		10	9		132
21. Central Michigan College	16	2		20	8			4	32	2	10	5	21	L	120
22. Minnesota State Teachers College, Bemidji	12	2	14	20	8			8	22 2/4	9 1/3	7 1/3	11 1/3	13 1/3	L	128
23. Minnesota State College, St. Cloud	8		5 1/3	21 1/3	4			5 1/3	25 1/3	2 2/3	10 2/3	5 1/3	40	L	128
24. University of Minnesota	6		10	25 1/3	6			2 2/3	32	15 1/3	8 2/3	6	12		124
25. Northwest Missouri State Teachers College	3 1/3	2	8 1/3	16 2/3	4			1 2/3	19 1/3	3 1/3	6 2/3	4	57 2/3		127
26. Nebraska State Teachers College, Wayne	6			3	10				29	2	11	48	16	L	125
27. Nebraska State Teachers College, Chadron	9		10	12	6				30		12	6	40	L	125
28. New Jersey State Teachers College	12		8	23	8			8	55	6	15	9			144
29. New Mexico Highlands University	6		8	18	6 2/3				20	6 2/3	9 1/3	8	45 1/3		128
30. New York State Teachers College, Oswego	6	6	12	12	15			6	45		9		17		128
31. New York State Teachers College, Buffalo	9	3	12	12	15			6	45	9			17		128
32. North Carolina State College	12		16	25		8		8	24	12	12	4	32		153
33. University of North Dakota	6	2	16	13		6			38	11	11	4	28	L	135
34. Ohio State University	6		6 2/3	14		8			58			4 2/3	29 1/3	L	126 2/3

TABLE XII (Continued)

INSTITUTION	English	Speech	Natural Sciences	Social Sciences	Practice Teaching	Military Science	Agriculture Methods	Mathematics	Industrial Arts Technical	Industrial Arts Professional	Education Professional	General Required	General Electives	Secondary Teaching Field	Total Credits for Bachelor's Degree
35. Oklahoma A. and M. College	6	3	16	17	6	8	2	6	41	9	6	3	7		130
36. Northeastern State College, Tahlequah	6		8	20	6		2		36		15	7	24		124
37. Oregon State College	8	4	8	11⅓	6	8			43½	7⅓	12	4	23		135
38. Pennsylvania State, Millersville	9	3	3	15	12			3	46	7	9	6	15		128
39. Pennsylvania State College	9	3	9	15	9	6		4	40	12	4	4	18		133
40. South Dakota State College	10	2⅔	24	18½	3⅓	4		6⅔	30	8	6	4⅔	18		136
41. Black Hills Teachers College	10		10	38	6⅓				24		8⅔	12	18⅔		128
42. Middle Tennessee State College	12		8	12	4				42		23	4	27		132
43. A. and M. College of Texas	13	1	12	12	8	4		6	50	16	3	1	15		144
44. Southwest Texas State Teachers College	12	3	8	12				3	24	9	6	6	41	←	124
45. University of Vermont	6	6	16	12	3			10	30	24	11	12	9		139
46. Central Washington College of Education	5⅓	1⅓	10	13⅓					30		⅔	18	48⅔	←	128
47. Eastern Washington College of Education	9	3	15	23					39	6			25		120
48. West Virginia Institute of Technology	6	2	14	24	5			6	43	7	9	5	7		128
49. Fairmont State College	12	4	12	15				4	36			11	34		128
50. The Stout Institute	12	4	13	18	4			7	42	2	18	1	5		126
51. Wisconsin State Teachers College	8	2	10	18	10			9	38	8	8	3	15		129

chemistry, physics, biology, biological science and all other natural sciences; social science, which includes history, political science, psychology, sociology and economics; practice teaching; military science; agriculture methods; mathematics; technical, which includes shopwork and drawing; industrial arts professional; education professional; general required courses, which includes physical education, art appreciation and orientation; required shop electives; and general electives. In the next to the last column, the X's indicate the institutions in which a secondary teaching field is required. The last column shows the total semester credits required for a bachelor's degree in each institution.

The fields or subject areas with the number of schools that require courses in these subjects are included in Table XIII. Technical subjects are the only subjects which are required in all of the fifty-one selected institutions studied. Agriculture Methods is required in only two institutions. This subject is required by state law for all teachers who teach in the public schools of that state.

TABLE XIII

SUBJECT AREA IN GENERAL EDUCATION WITH THE NUMBER OF SCHOOLS THAT REQUIRE EACH SUBJECT AREA

Subject Areas	Number of Schools	Percentage
1. English	50	98.0
2. Speech	30	58.8
3. Natural Science	47	92.2
4. Social Science	50	98.0
5. Practice Teaching	41	80.4
6. Military Science	12	23.5
7. Agriculture Methods	2	3.9
8. Mathematics	34	66.6
9. Technical Subjects	51	100.0
10. Industrial Arts Professional Subjects	50	98.0
11. Education Professional Subjects	45	88.2
12. General Required	45	88.2
13. General Electives	49	96.1

Secondary Teaching Field Requirements. Twenty of the selected institutions require a secondary teaching field. This provides the industrial arts teachers in small high schools an additional teaching field when there are not enough students to warrant a full time shop or drawing teacher.

Nebraska State College requires that one major and two minors, other than education, be chosen. A major consists of twenty-four credits and a minor, sixteen credits. With the industrial arts major, the student would graduate with two majors and two minors.

Northwestern State College of Louisiana requires twenty-four semester credits in the industrial arts major and eighteen credits in a subject other than industrial arts for a minor.

Bemidji State Teachers College requires one major other than education and two minors other than education. The major will consist of no fewer than twenty-one and one-third semester credits and the minor no fewer than thirteen and one-third semester credits.

The University of Georgia requires one minor with thirteen and one-third credits and the major in industrial arts.

At most of the institutions studied, it is possible to major in an academic subject such as mathematics, languages, or science, and complete a minor in industrial arts as a secondary teaching field.

Total Requirements. The total number of semester credits for a bachelor's degree in industrial arts education, with the number of schools that require these credits, is included in Table XIV. One institution

requires 153 semester credits for a degree in industrial arts education. The least number of semester credits required for a bachelor's degree in industrial arts education is 120 credits. Four of the institutions studied in the survey require 120 credits for graduation. The average number of semester credits required for a bachelor's degree in industrial arts education in the fifty-one selected institutions is 128 credits.

TABLE XIV

SEMESTER CREDITS REQUIRED FOR A BACHELOR'S DEGREE

Credits	Schools
146 and over	1
141 - 145	2
136 - 140	4
131 - 135	10
126 - 130	20
121 - 125	10
116 - 120	4
less than 115	0

Degrees Awarded. Ten different titles are given to the bachelor's degrees awarded in industrial arts education in the selected institutions studied. A few of the schools offer as many as three different bachelor's degrees in industrial arts teacher education. Arizona State College offers a Bachelor of Science Degree, a Bachelor of Science in Education Degree, and a Bachelor of Arts Degree, all in industrial arts education. The requirements are very similar for all three degrees.

Table XV shows the distribution of bachelor's degrees awarded by the fifty-one selected institutions studied in the survey. Fourteen institutions offer the Bachelor of Science Degree, with no designation as to the nature of the degree. Fourteen institutions studied offer the

Bachelor of Science in Education Degree. One school awards a Bachelor of Science in General Science. In this school the industrial arts department is under the supervision of the Department of General Science. Eight of the institutions studied award the degree of Bachelor of Science in Industrial Arts Education.

TABLE XV

DEGREES AWARDED

	Degree	Schools
1.	Bachelor of Science in Industrial Arts Education.	8
2.	Bachelor of Science	14
3.	Bachelor of Science in Education, Major in Industrial Arts Education.	4
4.	Bachelor of Science in Education.	14
5.	Bachelor of Science, with major in Industrial Arts Education	1
6.	Bachelor of Science in General Science.	1
7.	Bachelor of Science in Secondary Education.	1
8.	Bachelor of Arts.	6
9.	Bachelor of Arts in Education	1
10.	Bachelor of Arts in Industrial Arts Education	1
		51

The catalog study presents the analysis of the industrial arts technical courses, the industrial arts professional courses, and the general education courses that are offered and required in the industrial arts teacher education curriculums in the selected institutions. The questionnaire study will show the reasons for some of the offerings and requirements. The questionnaire study analyzes the institutional data as to staff members and departments, and investigates further the kinds of practice or directed teaching programs offered. The general shop is further discussed as to subjects and content.

CHAPTER V

THE QUESTIONNAIRE STUDY

The questionnaire study was conducted to find the answers to the questions about the curriculum, institutional data, and historical data which were not readily available or clearly interpretable from the catalogs of the fifty-one selected institutions. The questionnaire has value in this study also to determine the courses which are needed and wanted by the staff of the industrial arts teacher education departments in the selected institutions. Fifty-one questionnaires were sent and thirty-seven returned completed, for a 72.4 percent return.

The inquiry form or questionnaire which was used in this study was restricted to three pages in order to conserve the time of the respondents in answering the form, but still be of sufficient length to obtain the necessary information to complete the survey. The questionnaire collected information on the departmental status and instructional staff with a history of the industrial arts department of each institution. Information on the methods employed for directed teaching and freshman orientation was asked, industrial arts professional courses offered, and courses that the staff of each department proposed to add to the curriculum, the influences which affect the courses and the curriculum. A copy of the questionnaire and the letter that accompanied the questionnaire will be found in the appendix. A list of the institutions, their locations, and the name of the head or chairman of the industrial arts department in the institutions, is also included in the appendix.

Institutional Data

The institutions studied in this survey vary widely in scope and size. The schools vary in size from a staff of two in the industrial arts department in a small teachers college to a large university with a staff of thirty-two in the industrial arts department. Included in this chapter are tables that analyze the names of departments in which industrial arts teacher education courses are administered and the college or division of the institution that supervised these departments.

TABLE XVI

TITLES OF DEPARTMENTS THAT TEACH INDUSTRIAL ARTS TEACHER EDUCATION AND NUMBER OF SCHOOLS

	Title of Department	Schools
1.	Industrial Arts Department.	21
2.	Division of Industrial Arts	6
3.	Department of Industrial Education.	6
4.	Industrial Arts Education	6
5.	Department of Industrial Arts Education & Engineering Shop-work.	1
6.	Division of Industrial Education.	2
7.	Industrial Arts and Vocational-Industrial Education Department.	1
8.	Industrial Arts Department of the College of Education. . .	1
9.	Engineering Shops	1
10.	Department of Industrial Arts and Industrial Education. . .	1
11.	Department of Vocational Education.	1
12.	Industrial Education.	1
13.	Department of Industrial Arts and Trades and Industries . .	1
14.	Department of Industrial Engineering and Industrial Arts. .	1
15.	Division of Engineering Shops	1

Titles of Departments. The departments in which industrial arts teacher education work is administered are classified under fifteen titles in the fifty-one selected institutions. The greatest number, or forty-one percent of the departments are titled, "Industrial Arts Department". Twenty-one of the institutions included in the survey use this

designation or title. The titles of the departments and the number of schools that are classified under these names or titles are included in Table XVI.

Departmental Status. The industrial arts teacher education departments in the selected institutions studied are under the supervision of seventeen different colleges or divisions in the various institutions. Twelve institutions, a majority of which are teachers colleges or state colleges, reported that the Industrial Arts Education Department is a separate division of the college. They have equal standing or rating with the other departments in the institutions.

TABLE XVII

SUMMARY OF DIVISIONS WHICH SUPERVISE THE INDUSTRIAL ARTS TEACHER EDUCATION AND THE NUMBER OF SCHOOLS IN EACH DIVISION

	Name of Division	Number of Schools
1.	General Science.	1
2.	Arts and Science	1
3.	Liberal Arts College	1
4.	The Technical College.	1
5.	Department of Vocational Education	1
6.	College of Education	10
7.	Secondary Education.	1
8.	Division of Arts and Music	1
9.	School of Education.	8
10.	Practical Arts Division.	3
11.	School of Education and Nursing.	1
12.	Applied Science and Arts Division.	1
13.	Division of Fine and Applied Arts.	1
14.	Teachers College	2
15.	Division of Engineering.	5
16.	Division of Industrial Education	1
17.	Industrial Arts Education.	12

Ten institutions reported that they are supervised by the College of Education. Eight schools are supervised by the School of Education. These

may be combined, but for clarity it will be best to analyze the two separately. One department is supervised by the school or division of General Science. Graduates in this department receive the degree of Bachelor of Science in General Science. Table XVII shows the analysis of the supervising divisions and the number of schools in the survey which are supervised by these divisions.

Departmental Staffs. The survey includes colleges of many different sizes. The greatest percent of the schools have a staff of ten or less in the industrial arts teacher education department. Table XVIII shows the number of teachers in the industrial arts department of the thirty-six institutions. For example, five schools have four industrial arts teachers, two have eight, etc. This table is based on thirty-six of the institutions.

TABLE XVIII

THE NUMBER OF STAFF MEMBERS IN THE INDUSTRIAL ARTS DEPARTMENTS OF THIRTY-SIX OF THE FIFTY-ONE SCHOOLS BEING STUDIED

Number of Teachers	Schools	Number of Teachers	Schools
32	1	15	1
31	0	14	0
30	0	13	1
29	0	12	1
28	0	11	0
27	0	10	1
26	0	9	0
25	1	8	2
24	0	7	2
23	0	6	2
22	0	5	4
21	1	4	5
20	0	3½	1
19	0	3	7
18	1	2	4
17	1	1	0
16	0		

The average number of teachers in the industrial arts departments in the selected schools that are included in Table XVIII, is five.

The academic rank of the teachers and the number of schools that have this number of each rank is reported in Table XIX. In one institution which is included in the survey, the staff members have no academic rank, except that they are all classified as instructors and thus could not be included in this table. In the thirty-six institutions represented, there are 273 teachers. Included in these 273 persons are fifty-one professors, forty-seven associate professors, eighty-four assistant professors, and ninety-one instructors. Eight schools have part-time student instructors to teach classes. One school has graduate assistants that teach or assist with classes.

TABLE XIX

RANK OF TEACHERS IN THIRTY-SIX OF THE SELECTED INSTITUTIONS WITH NUMBER OF EACH RANK

Number of Teachers of each Rank in each Institution	12	11	10	9	8	7	6	5	4	3	2	1	½	0	Total
Professors	0	0	0	0	0	0	2	1	1	3	2	17	0	9	. . 51
Associate Professors	1	0	0	0	0	0	0	2	0	1	8	11	0	12	. . 47
Assistant Professors	0	0	0	0	2	0	1	3	3	1	9	14	0	2	. . 84
Instructors	1	1	0	1	2	0	0	0	3	5	3	11	1	8	. . 91
													Total		. .273

Directed Teaching

The practice of directed teaching is possibly one of the most important courses or subjects that the industrial arts student completes during the preparation for teaching in the public schools. The school levels at which directed teaching is conducted varies from the elementary school to college classes. The school classes and groups used for practice teaching include public and private schools both on and off the campus, and boy's or civic clubs. The subject areas available for directed teaching include

all shop or industrial arts subjects and academic subjects.

School Levels of Directed Teaching. Directed teaching in the thirty-seven institutions is conducted to the greatest extent in junior and senior high schools. Thirty-six institutions reported student teaching in the junior high schools and thirty-five institutions reported practice teaching in the senior high schools. Table XX includes the school levels of directed teaching with the number of institutions that employ each level.

Subjects Utilized for Directed Teaching. Nine subject areas are reported to be available to the thirty-seven institutions for directed teaching. The unit shop and mechanical drawing both hold prominent places in the number of institutions that employ different subjects for teaching situations. The general shop is utilized by thirty-two institutions and holds third place in the percentage of subjects used. It is interesting to note that four schools have available, driver training for a subject for a directed teaching situation.

TABLE XX

SCHOOL LEVELS OF DIRECTED TEACHING AND THE NUMBER OF SCHOOLS USING THESE LEVELS

School Levels	Number of Schools
1. Elementary	15
2. Junior High	36
3. Senior High	35
4. College	2
5. Sub-normal	2
6. Vocational	5
7. Adult Evening School	5
8. Junior College	1

Ten schools reported that academic subjects were used in the directed

teaching program. In a survey made by Dr. Verne C. Fryklund[14] of Wayne University, a question was asked, "Can industrial arts men be graduated on academic directed teaching alone?" Twenty percent of the respondents answered "Yes", and eighty percent answered "No". The question was not included in the questionnaire for this study, so it may be concluded that Dr. Fryklund's conclusions that industrial arts teachers should be trained and directed teaching in industrial arts subjects is a valid assumption.

The subjects utilized and the number of schools that employ each subject is included in Table XXI with the percentages of the schools that use each subject.

TABLE XXI

SUBJECT AREAS USED FOR PRACTICE TEACHING
WITH NUMBER OF SCHOOLS AND PERCENTAGES USING EACH AREA

Subject Area	Number of Schools	Percentage
1. Academic	10	27.0
2. Unit Shop	34	92.0
3. General Shop	32	86.5
4. Mechanical Drawing	34	92.0
5. Community Shop	1	2.7
6. Farm Shop	1	2.7
7. Driver Training	4	10.8
8. Arts and Crafts	1	2.7
9. Photography	1	2.7

Kinds of Schools Utilized for Directed Teaching. Six different kinds of schools are available for directed teaching in the thirty-seven institutions. Public schools have the greatest number reported in the questionnaire returns with thirty-five institutions employing public schools for

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[14] Fryklund, Verne C., Industrial Arts Teacher Education in the United States, McKnight and McKnight, Bloomington, Illinois, 1941, page 65.

their directed teaching program. Seventeen institutions apply campus training schools and college classes for directed teaching. These figures overlap because many of the institutions have available two or three kinds of schools for practice teaching. Two institutions have private schools for practice teaching. Three institutions are reported to avail themselves of the facilities provided by the Y. M. C. A., civic clubs, or boys' clubs as a teaching situation.

Table XXII reports the kinds of schools utilized and the number of institutions which have each kind of schools available for directed teaching.

TABLE XXII

KINDS OF SCHOOLS UTILIZED FOR DIRECTED TEACHING AND NUMBER OF INSTITUTIONS USING THESE SCHOOLS

Schools Used	Number of Schools
1. Campus	17
2. Public	35
3. Private	2
4. Civic	1
5. Y. M. C. A.	1
6. Boys' Clubs	1

The General Shop

Included in the questionnaire is a study of the general shop to determine the courses offered, those that are required, and the courses that should be required in the general shop of the selected institutions. The number of schools that use the general shop as a freshman orientation or introduction to industrial arts course were considered to determine the number of institutions that have a freshman orientation course. A small percent of the schools have a freshman orientation period in the general

shop and others use theory courses for indoctrination in industrial arts.

General Shop Courses. Thirty-five subjects are offered as a part of the general shop in twenty-nine institutions reporting. Ten of these subjects are offered in only one school. The other twenty-five are offered in from six to twenty-two of the schools. Hand Woodworking is offered in twenty-two or seventy-six percent of the institutions reporting.

Twenty-five general shop subjects are required of the thirty-five subjects offered. Table XXIII includes the general shop subjects offered, those that are required, and the subjects that should be required in the general shop in the twenty-nine institutions that are reported in the questionnaire on this topic, with the number of schools that offer and require each subject.

Freshman Orientation. The questionnaire contained a question to determine the number of schools that use the general shop for freshman orientation or an indoctrination course in industrial arts teacher education. Eight institutions require general shop for freshman orientation in the curriculum of industrial arts teacher education. This figure is based on the twenty-nine returns on which the question on freshman orientation was answered. Oklahoma A. and M. College requires four semester hours credit in the general shop. New Jersey State Teachers College and the University of Vermont require three semester hours of general shop. West Virginia Institute of Technology employs the general shop, "for experimenting and testing as well as feeling and doing." and not necessarily as a freshman orientation course. One school had a freshman orientation course a few years ago and its reinstatement is being considered. Two institutions were reported to require shop courses in

TABLE XXIII

SUBJECT AREAS OF THE GENERAL SHOP WITH THE NUMBER OF SCHOOLS WHICH OFFER, REQUIRE, AND THOSE THAT SHOULD BE REQUIRED BY EACH SCHOOL IN THE TWENTY-NINE INSTITUTIONS REPORTING

	Subject	Subject Offered in the General Shop	Subject Required in the General Shop	Subject that Should Be Required in the General Shop
1.	Automobile Mechanics	11	5	3
2.	Bookbinding	11	5	0
3.	Ceramics	15	5	5
4.	Concrete Work	10	3	3
5.	Mechanical Drawing	20	14	5
6.	Electricity	20	12	5
7.	Forging and Wrought Iron	19	11	2
8.	Foundry	15	9	3
9.	Home Mechanics	11	5	3
10.	Leather Work	19	10	1
11.	Metalwork - Art	19	11	3
12.	Metalwork - Machine	21	14	3
13.	Metalwork - Sheet	20	13	4
14.	Photography	10	5	1
15.	Plastics	18	10	4
16.	Printing	13	9	3
17.	Upholstery	7	5	0
18.	Weaving - Reed	6	2	0
19.	Weaving - Textile	7	2	3
20.	Wood Carving	6	3	1
21.	Woodworking - Hand	22	15	5
22.	Woodworking - Machine	18	14	3
23.	Welding - Arc	13	8	1
24.	Welding - Gas	16	6	3
25.	Bicycle Repair	2	2	0
26.	Jewelry	1	1	0
27.	Crafts	1	1	0
28.	Model Building	1	1	0
29.	Freehand Drawing	1	1	0
30.	Aluminum Sheet Metal	1	0	0
31.	Metal Spinning	1	0	0
32.	Bench Metal	1	0	0
33.	Radio	1	0	0
34.	Sheet Metal Drawing	1	0	0
35.	Kerne Cement Crafts	1	0	0

separate unit shops as a freshman orientation course.

Curriculum Influences

There are a great many influences, both internal and external, which affect the offerings and requirements of the curriculums in industrial arts teacher education in the selected institutions. Most of these influences cannot be controlled or changed by the staff of the industrial arts department in the schools. The influence caused by tradition in the department can be controlled by the persons that are affected by these traditions.

The ideal requirements were expressed by one respondent who stated, "We have a free hand in offering these courses we believe will make for the best product." In the opinion of the head of the department of industrial arts teacher education in that school, the curriculum is influenced very slightly, either favorably or unfavorably, by outside influences.

Favorable Influences. Twelve requirements or controlling factors were reported in thirty-seven answered questionnaires to the effect of the curriculum of industrial arts teacher education in these institutions. The most outstanding requirement is state certification. Representatives of twenty-seven institutions reported that state certification effects the offerings and requirements in the industrial arts curriculum. Activities of state industrial arts people was second, with this influence reported by twenty respondents.

Table XXIV includes the requirements or factors that affect the offerings and requirements of the industrial arts teacher education curriculum with the number of schools favorably and unfavorably affected by each requirement.

Unfavorable Influences. Twelve influences favorably affect the offerings and requirements in the industrial arts teacher education curriculums, while only ten influences unfavorably affect the offerings and requirements. Eight schools report that the school major-minor requirements unfavorably affected the industrial arts teacher education curriculums in those schools.

TABLE XXIV

INFLUENCES THAT AFFECT THE OFFERINGS AND REQUIREMENTS IN THE INDUSTRIAL ARTS TEACHER EDUCATION CURRICULUMS OF THE SELECTED INSTITUTIONS

Requirements	Favorably	Unfavorably
1. State Certification Requirements	27	5
2. Graduate School Requirements	14	1
3. Institutional Accrediting Associations	18	4
4. Tradition Established in the Department	12	6
5. Influence of Alumni Associations	9	0
6. School Major-Minor Requirements	11	8
7. Demand for Teachers with Special Training	18	4
8. School General Curriculum Committee	8	7
9. State Education Associations	14	0
10. U. S. Office of Education	6	0
11. Activities of State Industrial Arts People	20	0
12. Tradition and Outmoded Concepts	0	1
13. Dualism in Education	0	1
14. Department	1	0
15. Nature of the Public School System	0	1

One person answering the questionnaire stated, "Not traditions, but limitations affect the curriculum." Another reported that the state certification requirements were too low.

Table XXIV includes the requirements or factors that have an unfavorable affect on the industrial arts teacher education curriculums in the selected institutions, with the number of schools affected by these requirements.

Courses to be Added to the Curriculum

A question was included in the questionnaire to determine the technical and industrial arts professional courses or theory courses that are to be added to the curriculums of industrial arts teacher education in the selected institutions. A great percent of the schools reported from one to five courses that are to be added in the future. One of the persons who returned the questionnaire reported that only technical courses would be added, and that there was "too much verbalism already."

TABLE XXV

TECHNICAL COURSES TO BE ADDED TO THE CURRICULUMS IN THE THIRTY-SEVEN INSTITUTIONS REPORTING

Course	Schools	Course	Schools
1. Power Mechanics	1	22. Leather Working	2
2. Graphic Arts II	1	23. Ceramics	2
3. Handicrafts II	2	24. Freehand Sketching	2
4. Concrete	1	25. Blueprint Reading	1
5. Brick Work	1	26. Wood and Metal Finishing	1
6. Boatbuilding	1	27. General Shop	2
7. Printing	1	28. Lapidary	1
8. Automobile Mechanics	5	29. Printing	5
9. Radio	3	30. Upholstery	1
10. Jewelry Work	2	31. Introduction to Ind. Arts	1
11. Silver Smithing	1	32. General Shop for Freshmen	1
12. General Metalwork	1	33. Home Mechanics	1
13. Driver Training	1	34. Welding	2
14. Electronics	1	35. Automotive	1
15. Industrial Arts Design	1	36. Freshman Orientation	1
16. General Crafts	1	37. Power II	1
17. Unit Textiles	2	38. Electricity II	1
18. Photography	2	39. Art Principles (applied)	1
19. Shop Maintenance	4	40. Machine Shop	1
20. Foundry	2	41. Electricity and Radio	1
21. Plastics	5		

Proposed Technical Courses. Plastics, printing and automobile mechanics are proposed to be added to the curriculum in five of the insti-

tutions reporting. Shop maintenance is to be added in four schools, and radio in three schools. Handicrafts II, jewelry work, unit textiles, photography, foundry, leather working, ceramics, freehand sketching, general shop, and welding are each to be added in two schools. The other courses listed in Table XXV are to be added in one school only. Table XXV includes the technical courses that are to be added to the curriculums of industrial arts teacher education in the thirty-seven institutions that returned the questionnaire, with the number of schools that will add each course.

TABLE XXVI

INDUSTRIAL ARTS PROFESSIONAL COURSES TO BE ADDED TO THE CURRICULUMS IN THE THIRTY-SEVEN INSTITUTIONS REPORTING

Course	Schools
1. Testing in Industrial Arts	3
2. History of Industrial Arts	3
3. Organization and Administration of Industrial Arts	4
4. Guidance and Counseling	2
5. Course Making in Industrial Arts	4
6. General Shop	2
7. Audio-Visual Aids	5
8. School Shop Planning	3
9. Safety Education	1
10. Shop Organization	1
11. Materials of Industry	1
12. Methods of Teaching Industrial Arts	1
13. Workshops	1
14. Introduction to Industrial Arts	2
15. The Place of the Arts in General Education	1
16. Tools and Materials	1
17. Field Work in Industrial Education	1
18. Philosophy of Industrial Arts	1
19. Observation of Teaching	1
20. Fine Arts	1

Proposed Industrial Arts Professional Courses. Twenty separate industrial arts professional courses are to be added to the industrial arts teacher education curriculums in the thirty-seven institutions reporting. Audio-visual aids is to be added to the curriculums of five schools.

Audio-visual aids is required in eight of the institutions at the present time. (See Table XI, page 46)

The industrial arts professional courses that are to be added to the curriculum of industrial arts teacher education in the thirty-seven reporting institutions, with the number of schools to add each course are included in Table XXVI.

The questionnaire study provided information which was not clearly stated or not included in the catalogs of the institutions. The status of the departments and staffs of industrial arts education in the schools explain the divergence in the offerings and requirements in the different institutions. Directed teaching and the methods employed in the schools for practice teaching, the orientation courses, and the industrial arts professional courses, should prove valuable in constructing an idealized program for the preparation of teachers of industrial arts in the junior and senior high schools.

CHAPTER VI

A PROPOSED CURRICULUM FOR INDUSTRIAL ARTS TEACHER EDUCATION

This chapter will present a proposed curriculum in industrial arts teacher education as a summary of the catalog and questionnaire studies. The proposed curriculum should provide the educational experience necessary for the preparation of teachers of industrial arts in junior and senior high schools. This curriculum is planned to qualify the future teacher in one specialized industrial arts subject and one academic subject. Since many industrial arts teachers begin their professional experience by teaching shopwork and some academic subject, a secondary teaching field will provide the training to secure a teaching certificate in science, mathematics, athletics, languages, or some other subject.

The student will take twenty-two semester credits of industrial arts technical courses. These courses are required general courses in all of the shopwork areas to provide a background for the special industrial arts option. Eighteen additional credits of approved shopwork or technical courses are required for a certificate in one option or specialized industrial arts field. The industrial arts option or shop major may be chosen from woodworking, general metalwork, printing, general shop, arts and crafts, machine shop, automobile mechanics, electricity, or industrial drawing.

Total Requirements

Students completing the four-year curriculum in industrial arts teacher education will have completed sufficient general education courses, in addition to their secondary teaching field courses, to teach some academic subject other than industrial arts.

The student will major or specialize in some one phase of industrial arts with sufficient general industrial arts technical courses to qualify to teach a number of different shop or drawing subjects.

The total number of 131 approved semester credits is required for graduation with a bachelor's degree in all options of industrial arts education. A summary of the requirements in semester credits is given below.

English and Speech	8	Industrial Arts Professional	19
Natural Sciences	8	Industrial Arts Technical	40
Social Sciences	15	Secondary Teaching Field	18
Mathematics	6	General Electives	11
Education	6	Total	131

This curriculum does not include special courses, such as state history, or military science, required by individual institutions.

Industrial Arts Technical Requirements. Forty semester credits in industrial arts technical courses are required. Twenty-two of these credits are required of all students majoring in industrial arts teacher education. The curriculum shown on page 77, includes the names and the number of semester credits of each of the technical courses required of all industrial arts majors. These courses serve as a foundation for the student in all the industrial arts subjects. These courses give the student practice with the different tools and materials which are used in teaching industrial arts, and tend to show the possibilities and subject matter for the shop "major" or option. The following list includes the industrial arts technical courses that are required of all industrial arts majors.

1. Drawing, Mech. I
2. General Shop I
3. General Shop II
4. Drawing, Freehand I
5. Metalwork, General I
6. Machine Shop I
7. Woodworking, General
8. Electricity I
9. Shop Planning I
10. Care of Shop Equip. I
11. Design, Ind. Arts I
12. Finishing, Industrial I
13. Welding, Gas and Arc I

Freehand and mechanical drawing are required to give the student the fundamental knowledge of drawing which will be necessary to interpret drawings and blueprints in all phases of industrial arts. Industrial arts design is required to give the student the understanding and appreciation of balance and proportion. General woodworking is required of all students except those majoring in the woodworking option. This one course in woodworking will familiarize the student with the tools, materials, procedures, and safety factors in working with wood. Care of shop equipment is required of all students to impart to the student the knowledge of the care and maintenance of tools and materials. Shop planning is required to convey to the student the basic ideas of school shop planning and shop design. Two semesters of general shop are required of all freshmen students. These two courses will serve as an indoctrination or introduction to the tools and materials which are used in all industrial arts subjects. Machine shop, general metalwork, electricity, and welding are required to provide information and the basic skills necessary to successfully conduct these courses or subjects.

The student will select a technical option in which to "major" at the beginning of the sophomore year. Three semester credits in the required shopwork or technical electives are required each semester of the sophomore, junior, and senior year. These courses may be taken at the time that best fits into the student's schedule, but should be taken through the three years and not all in one year. The student will select the technical courses for a total of eighteen semester credits for the desired option from the approved list. (page 78)

Industrial Arts Professional Requirements. Seven industrial arts

professional courses are required in the proposed curriculum. These courses are:

1. Introduction to Industrial Arts
2. Methods of Teaching Industrial Arts
3. Organization and Administration of Industrial Arts
4. Audio-Visual Education
5. Developing Instructional Aids
6. Directed Teaching I
7. Directed Teaching II

Introduction to industrial arts is a freshman orientation course to introduce the student to the history, philosophy, and position of industrial arts in the secondary schools of the state. Methods of teaching industrial arts, organization and administration of industrial arts, audio-visual education, and developing instructional aids are required to impart to the student the knowledge, methods and teaching techniques that are necessary to successfully conduct an industrial arts program. Methods of teaching industrial arts and organization and administration of industrial arts courses are required in the junior year, and precede the directed teaching that the student will do in the senior year. The seven industrial arts professional courses that are required total nineteen semester credits.

General Education Requirements. Fifty-four semester credits are required in general education courses. The following subjects are required: English and speech, eight credits; natural sciences, eight credits; social sciences, fifteen credits; education courses, six credits; and mathematics, six credits.

Two courses of English are required. English I is a course in composition and grammar. English II is a course in business English. This course is designed to teach the student the proper method of writing

business letters, bulletins, and articles for magazines and newspapers for publication. Speech I is required to give the student experience and practice in preparing and presenting speeches and demonstrations.

Two courses of natural science are required. The courses are, one course each of chemistry and physics. Biological science or some other natural science may be substituted for either the physics or chemistry course. The natural sciences will comprise a part of the student's general education, providing basic scientific information and knowledge which is necessary, to understand chemical compounds and the principles of machines used in industrial arts shops.

Two courses in mathematics are required, one in algebra and one in trigonometry to develop the student's knowledge of mathematics sufficiently to meet the needs in machine shop, physics, and other shop courses or situations.

Five courses in the social sciences are required. American history from 1492 to the present is necessary to present to the student the knowledge, history and development of the state and country. Political science is essential to provide the student with the understanding and appreciations of the local, state, and national system of government. A course in economics is required and explains to the student the principles of finance which are prevelant in America. Two courses of psychology must be included. Psychology I is general psychology which deals with intelligence, motivation and personality. Psychology II is a course in adolescent psychology which includes the growth and development of the adolescent child and the problems which are related to teaching.

Two courses in education are required. The first of these is a course in educational principles. This course explains the development and growth of the secondary school and the techniques and management of the school system. Education II is a course in methods and measurements. This course corresponds to the methods course in industrial arts, but emphasizes the methods and techniques of teaching in general academic subjects. The methods employed in Education II are essential for the students preparation in a secondary teaching field.

The complete descriptions of these courses may be found on page 80.

Proposed Curriculum for Industrial Arts Teacher Education

Freshman Year	Semester I	II
English I	3	
English II		3
Chemistry I		4
Drawing, Mechanical I	2	
General Shop I	2	
General Shop II		2
Woodworking, General I **	2	
Drawing, Freehand I	1	
Algebra I	3	
Metalwork, General I		2
Trigonometry I		3
Machine Shop I		2
Electricity I	1	
Introduction to Industrial Arts	1	
Shop Planning	1	
	16	16

Sophomore Year	Semester I	II
Speech I	2	
Care of Shop Equipment I	2	
Design, Industrial Arts I	2	
Finishing, Industrial I		2
Physics I	4	
History I	3	
Political Science I		3
Audio-Visual Education		3
Welding, Gas and Arc I		1
Shopwork Electives for "Major" *	3	3
General Electives		4
	16	16

Junior Year	Semester I	II
Methods of Teaching Industrial Arts	3	
Organization and Administration of Industrial Arts		3
Education I, Principles	3	
Education II, Methods and Management		3
Psychology I	3	
Psychology II		3
Shopwork Electives for "Major" *	3	3
Secondary Teaching Field	4	3
General Electives		2
	16	17

Senior Year	Semester I	II
Directed Teaching I	3	
Directed Teaching II		3
Developing Instructional Aids	3	
Economics		3
Secondary Teaching Field	5	6
Shopwork Electives for "Major" *	3	3
General Electives	3	2
	17	17

* The curriculum which leads to the Degree of Bachelor of Science in Industrial Arts Teacher Education requires that each student majoring in industrial arts teacher education select a shop "Major" in which to specialize. A minimum of 18 semester hours, in addition to the technical courses required in the curriculum, will be required for a "Major" in one of the nine industrial arts subjects. Suggested shopwork or drawing courses are listed for use in meeting this requirement.

** Required of all students majoring in industrial arts teacher education except those in the woodworking "Major". Students in the woodworking "Major" will substitute Hand Woodworking I.

Arts and Crafts: Arts and Crafts I; Arts and Crafts II; Bookbinding I; Ceramics I; Design, Essentials I; Design, Creative; Drawing, Pictorial; Leather Working I; Metalwork, Art I; Photography I; Plastics I; Printing I; Wood Carving I; Upholstery I.

Automobile Mechanics: Automobile Garage Practice I; Automobile Garage Practice II; Automobile Motor Testing I; Automobile Electrical Equipment; Automobile Mechanics Management; Automobile, Diesel and Internal Combustion Engines; Automotive, Theory and Practice; Automobile Chassis Repair; Machine Shop II; Sheet Metalwork I.

Electricity: Electricity II; Electricity III; Electricity and Communication; Radio; Industrial Electricity; Electricity, Motor Test and Repair; Electricity, Automobile; Electricity, Air Conditioning and Refrigeration; Electricity, International Morse Code; Sheet Metalwork I; Electricity, House Wiring.

General Metalwork. Metalwork, Sheet I; Metalwork, Sheet II; Metalwork, General II; Metalwork, Ornamental Iron I; Metalwork, Art I; Metalwork, Art II; Metallurgy; Metals, Soldering and Brazing; Machine Shop II; Machine Shop III; Metal Spinning; Forge and Heat Treatment of Metals; Foundry Practice.

General Shop: Arts and Crafts I; Automobile Mechanics I; Automobile Mechanics II; Carpentry I; Design, Printing and Graphic Arts; Drawing, Sheet Metal Design; Foundry I; Home Mechanics I; Leather Working I; Metalwork, Art I; Metalwork, Sheet I; Pattern Making I; Printing I.

Industrial Drawing. Bookbinding I; Descriptive Geometry I; Design, Furniture I; Design, Industrial Arts II; Drawing, Architectural I; Drawing, Architectural II; Drawing, Architectural Estimating I; Drawing, Blueprint Reading I; Drawing, Engineering I; Drawing, Machine I; Drawing, Machine II; Drawing, Industrial Illustration I; Drawing, Lettering and Sketching; Drawing, Pictorial; Drawing, Mechanical II.

Machine Shop. Machine Shop II; Machine Shop III; Machine Shop IV; General Metalwork I; General Metalwork II; Sheet Metalwork I; Toolmaking; Forge and Heat Treatment of Metals; Metallurgy; Foundry Practice.

Printing. Printing I, Composition; Printing II, Presswork; Printing, Topographic Design; Print Shop Mechanics; Print Shop Supervision; Printers Cost Accounting; Printing, Linotype Mechanism I; Printing, Linotype Operating I; Printing, Offset Lithography I; Printing, Offset Lithography II; Printing, Advertising Essentials.

Woodworking. Cabinet Making I; Cabinet Making II; Cabinet Making III; Carpentry I; Design, Furniture I; Drawing, Mechanical II; Drawing,

Architectural I; Foundry I; Home Mechanics I; Upholstery I; Wood Carving I; Woodworking, Hand I; Woodworking, Hand II; Wood Turning I; Wood Turning II.

Course Descriptions

The courses which are required in the proposed curriculum will be described in the following list in much the same manner that they would appear in a college catalog or bulletin. The name of the course, the number of semester hours credit, and the description of the course will be given to illustrate the way in which these courses will aid in preparing teachers of industrial arts subjects for junior and senior high schools.

Industrial Arts Professional Courses.

Audio-Visual Education. Credit 3. The use of pictures and sound. Operation of Projectors, slides and film strips as a teaching device.

Developing Instructional Aids. Credit 3. Use and development of pictures, charts, sample boards, demonstration devices, illustrations, and models.

Introduction to Industrial Arts. Credit 1. Lectures to introduce the student to industrial arts as a profession.

Methods of Teaching Industrial Arts. Credit 3. A study of the methods, teaching techniques, and organization of the subject matter for industrial arts classes.

Organization and Administration of Industrial Arts. Credit 3. Organizing the industrial arts shop with special references to courses of study, shop equipment, shop planning, supplies and their use.

Directed Teaching I. Credit 3. Observation and practice in teaching lessons and directing the use of tools and materials in the industrial arts shopwork, with special emphasis on the problems of discipline, care of materials, tools and the teaching of individual lessons.

Directed Teaching II. Credit 3. Continuation of Directed Teaching I.

General Education Courses.

Algebra I. Credit 3. Elementary algebraic operations with application to practical problems.

Chemistry I. Credit 4. Study of basic chemistry. Methods of preparation, characteristic reactions, and properties of compounds.

Economics I. Credit 3. The nature of our present economic system; fundamental elements and concepts in economic life; organization of production; value, price, and monetary system.

Education I. Credit 3. Methods and measurement; factors and techniques that have general application in all teaching effort in secondary schools. Principles of measurement in the secondary schools.

English I. Credit 3. Freshman composition and grammar. Study of the grammatical structure of the English language with effective writing, composition, and correction of themes.

English II. Credit 3. Business English. Training and effective writing of business letters, reports and magazine articles. Emphasis of the correct use of English in business.

History I. Credit 3. American history 1492 to the present. Emphasis on the development of the country physically and politically.

Physics I. Credit 4. Study of mechanics, heat, electricity, light, and sound, with application to practical problems.

Political Science. Credit 3. The development and the administration of municipal, state, and federal government.

Psychology I. Credit 3. General intelligence, personality, motivation, and the application of psychology in various fields.

Psychology II. Credit 3. Adolescent psychology. Adolescent growth and development as related to the problems of teaching.

Speech I. Credit 2. Essentials of public speaking. Practice in preparing, presenting, and criticizing speeches.

Trigonometry I. Credit 3. Trigonometric functions; theory and use of logarithms; solutions of triangles and application to problems.

Industrial Arts Technical Courses.

Arts and Crafts I. Credit 2. A study of the use of craft materials. Practice in designing and making small craft projects.

Arts and Crafts II. Credit 2. Continuation of Arts and Crafts I, with emphasis on the designing of original projects.

Automobile Chassis Repair. Credit 3. Major jobs such as repair of and adjustment of steering gear, mechanical hydraulic brakes, front axle, clutch, transmission, universal joints, drive shafts, wheels, and body repair.

Automobile, Diesel and Internal Combustion Engines. Credit 3. Study of and practice in automotive and stationary diesel and internal combustion engines, grinds valves, fits piston rings, scrapes and fits bearings, makes gaskets, etc.

Automobile Electrical Equipment. Credit 3. Modern electrical testing equipment; trouble shooting, testing, repairing, and installing all electrical units and systems.

Automobile Garage Practice I. Credit 3. Use of tests, techniques, and repair methods learned in specialized shops. All types of major and minor repair jobs.

Automobile Garage Practice II. Credit 3. Continuation of Garage Practice I.

Automobile Mechanics Management. Credit 3. Study of cost accounting, materials and maintenance in managing an automobile mechanics shop.

Automobile Motor Testing I. Credit 3. Testing methods and processes of automobile motor repair.

Automotive, Theory and Practice. Credit 3. Theory and practice of managing and maintaining an automobile mechanics shop. Emphasis on special problems of repair.

Bookbinding I. Credit 1. Theory and practice in method and materials for bookbinding.

Cabinet Making I. Credit 3. Beginning machine woodworking. Practice of using woodworking tools and machines. An individual project designed and constructed by the student is required.

Cabinet Making II. Credit 3. Continuation of Cabinet Making I. Design and construction of an acceptable piece of furniture is required.

Care of Shop Equipment. Credit 2. Principles and processes in maintenance of machines, filing saws, sharpening tools, and replacing tool handles.

Carpentry I. Credit 2. Practice in rafter cutting and elementary house construction.

Ceramics I. Credit 2. Practice of designing and moulding vases and figures. Firing and glazing of clay products.

Descriptive Geometry I. Credit 3. The projection of points, lines, and planes. Application to practical problems.

Design, Creative. Credit 2. The principles and practices of pleasing design in creating articles of household use, industrial production, and wearing apparel.

Design, Essentials. Credit 2. The principles of good design with practice of designing practical projects.

Design, Furniture I. Credit 2. Design principles applied to furniture. Study of the period styles of furniture with individual practice in creating new forms and designs.

Design, Industrial Arts I. Credit 2. Study of balance and proportion in industrial arts materials and projects.

Design, Industrial Arts II. Credit 2. Theory and practice in the design of projects used in shop courses.

Design, Printing and Graphic Arts. Credit 2. Principles and practice in design as applied to the graphic arts.

Drawing, Architectural I. Credit 2. Study of the design and construction detail of houses and buildings. A set of plans for a small house will be designed and drawn by the student.

Drawing, Architectural II. Continuation of Architectural Drawing I, with emphasis on building methods and materials.

Drawing, Architectural Estimating. Credit 2. Methods of cost accounting and estimating the construction costs in house construction.

Drawing, Blueprint Reading. Credit 2. Study of methods and techniques of drawing with practice in reproduction of drawings.

Drawing, Engineering. Credit 2. Orthographic and isometric projection, freehand lettering and sketching, tracing and blueprinting.

Drawing, Freehand I. Credit 2. Introductory course; provides experience in drawing basic geometric forms and still life objects in charcoal, crayon, pencil; study of elements of perspective.

Drawing, Industrial Illustration. Credit 2. Perspective drawing with emphasis on application to industrial production work. Use of industrial illustration for education purposes.

Drawing, Lettering and Sketching. Credit 2. Theory and practice of freehand and mechanical lettering. Use of pencil, pen, and brush techniques of lettering for poster and drawing work.

Drawing, Machine I. Credit 2. Application of the principles of engineering drawing to practical drawing room problems.

Drawing, Machine II. Credit 2. Continuation of Machine Drawing I, with special emphasis of techniques of drawing and design in modern machines.

Drawing, Mechanical I. Credit 2. Orthographic and isometric projection. Drawing of simple problems with emphasis on size and shape description.

Drawing, Mechanical II. Credit 2. Continuation of Mechanical Drawing I. Emphasis on theory and reproduction of drawings with lettering and tracing.

Drawing, Pictorial. Credit 2. Study of freehand and mechanical perspective, isometric projection, oblique projection and rendering of pictorial drawings.

Drawing, Sheet Metal Design. Credit 2. Study and practice in laying out patterns for sheet metal projects.

Electricity I. Credit 1. A study of basic electricity.

Electricity II. Credit 2. DC and AC circuits; Ohms Law, Kirchoff's Law, network amplification, power relations.

Electricity and Communication. Credit 3. Theory and practice in the use of electrical communication devices.

Electricity, Air Conditioning and Refrigeration. Credit 2. Servicing electrical equipment in refrigerators.

Electricity, Automobile. Credit 2. Theory and practice in servicing automobile electrical equipment.

Electricity, House Wiring. Credit 2. Theory and practice in wiring of houses and small buildings.

Electricity, Industrial. Credit 2. Theory and practice in wiring and servicing industrial buildings, machines and the use of testing devices.

Electricity, International Morse Code. Credit 1. Practice in using sending devices for international morse code.

Electricity, Motor Test and Repair. Credit 2. Armature winding and motor maintenance, general equipment repair.

Finishing, Industrial I. Credit 2. Finishing of wood and metal projects with experiments in the different finishing methods and materials.

Forge and Heat Treatment of Metals. Credit 2. Control of structure and physical properties of metal by forging and heat treating.

Foundry Practice. Credit 2. Making moulds and cores, pouring molten metals. Theory and practice in foundry terms and techniques.

General Shop I. Credit 2. Practice in working with the industrial arts materials in art metalwork, sheet metalwork, leather work, and mechanical drawing.

General Shop II. Continuation of General Shop I. Practice in working in printing, wood carving, electricity, and general metalwork.

Home Mechanics. Credit 2. Theory and practice in repairing household devices.

Leatherworking. Credit 2. Design and making of leather projects. Sewing, lacing, and tooling leather articles.

Machine Shop I. Credit 2. Use of the common machine shop tools and machines.

Machine Shop II. Credit 3. Theory and practice in the use of the turret lathe, milling machine, and engine lathe.

Machine Shop III. Credit 3. Advanced work in machine shop with working production jobs requiring the making of interchanging parts and job repair.

Machine Shop IV. Credit 3. Application of principles and practices in machine shop; service; mass-production methods; standards and procedures.

Metallurgy. Credit 2. Dressing and tempering high carbon and high-speed machine tools.

Metals, Soldering and Brazing. Credit 2. Principles and practice in soldering, silver soldering and brazing.

Metalwork, Art I. Credit 2. Practice in using copper and brass for the construction of artistic projects. Metal spinning, etching, and hammering.

Metalwork, Art II. Credit 2. Practice in using silver to produce artistic projects.

Metalwork, General I. Credit 2. Processes of working iron, steel, sheet materials, piping, and various forms.

Metalwork, General II. Credit 2. Continuation of General Metalwork I.

Metalwork, Sheet I. Credit 2. Theory and use of sheet metals in making pans, waste baskets, funnels, and other projects.

Metalwork, Sheet II. Credit 2. Continuation of Sheet Metalwork I.

Metal Spinning. Credit 2. Practice in designing and spinning metal projects in aluminum, copper and silver.

Pattern Making I. Credit 1. Elementary pattern making. Machine and hand processes necessary to make and finish solid, split and segmental patterns of machine parts for casting in iron, brass, and aluminum.

Plastics I. Credit 2. Practice in the use of plastics in cutting, forming, and engraving for use in projects.

Photography I. Credit 1. Theory and practice in taking, developing, and printing pictures.

Printers Cost Accounting. Credit 2. Practice in accounting; problems in cost finding. A study of the practical cost system for printing offices taken from actual records.

Printing, Composition I. Credit 2. Spacing, proportion, and balance in printing.

Printing, Presswork II. Credit 2. Introduction to platen presses; starting and taking care of different types of presses; press adjustments; hand feeding; press preparation; make-read on simple forms.

Printing, Advertising Essentials. Credit 3. History and scope of advertising; types of appeal, advertising media; construction and presentation of the ad.

Printing, Linotype Mechanism I. Credit 3. The assembling, casting and distribution mechanism of the linotype and similar slug-casting machines. Care of metal, oiling, and cleaning operations.

Printing, Linotype Operation I. Credit 3. Correct keyboard fingering, and the mechanical instruction required in operating.

Printing, Offset Lithography I. Credit 3. Principles and practices in printing with offset lithography.

Printing, Offset Lithography II. Credit 3. Continuation of Offset Lithography I.

Print Shop Mechanics. Credit 2. Principles and practice of repair and maintenance of printing equipment.

Print Shop Supervision. Credit 3. Principles and techniques of operating a printing shop.

Printing, Topographic Design. Credit 2. Principles and practice in printing design.

Radio. Credit 2. Practice in construction and repair of radio receivers.

Shop Planning. Credit 1. Drawing and making of models of the industrial arts shops and laboratories.

Tool Making. Credit 3. The finer practices applied to making and repairing of tools and instruments. Precision emphasized.

Upholstery I. Credit 2. Spring construction. Making of various stitches, such as hard, spring and roll edge; loose cushions; overstuffing of new and reupholstering of used furniture.

Welding, Gas and Arc I. Credit 1. Theory and practice of using gas and arc for welding. Practice in the use of the cutting torch.

Wood Carving I. Credit 2. Practice in the use of wood carving tools in making figures and projects in low and high relief.

Wood Turning I. Credit 1. Practice in the use of the wood turning lathe. Small projects are turned to learn the use of the different tools and methods.

Wood Turning II. Credit 1. Design and construction of turned articles and projects.

Woodworking, General I. Credit 2. Theory and use of hand tools and machines in woodworking.

Woodworking, Hand I. Credit 2. Elementary hand woodworking to and including the dado joint.

Woodworking, Hand II. Credit 2. Design and use of the mortise and tenon joint in small pieces of furniture.

Concluding Statements

The primary purposes of this study, as stated in Chapter I, are: (1) to analyze the curriculum requirements and offerings in the selected colleges and universities, (2) to find the problems affecting these requirements and offerings which tend to improve or retard the development of an idealized curriculum, and (3) to develop an idealized curriculum for the preparation of junior and senior high school industrial arts teachers.

Through the use of the catalog and questionnaire studies, the offerings and requirements in industrial arts teacher education in the selected institutions were found to vary a great deal. Some of the institutions emphasize the cultural aspect in the industrial arts curriculum while other institutions emphasize the technical courses with very little cultural or general educational preparation for the prospective teacher.

Included in the questionnaire were questions to determine the influences, both internal and external, which affect the industrial arts teacher education curriculum in each of the selected institutions. The results of this study are included in Chapter V. A great percentage of the institutions studied had many influences, both favorable and unfavorable, that affect the industrial arts teacher education curricula in these institutions. Only a small percentage of the persons who returned the questionnaire reported no unfavorable external influences affecting the curriculum in their institutions.

The curriculum which is proposed in this chapter is an idealized

curriculum to prepare teachers of industrial arts subjects in junior and senior high schools. Fifty-four semester credits in general education courses, nineteen semester credits in industrial arts professional courses, forty credits in industrial arts technical courses and eleven credits in general electives are required. These requirements total 131 semester credits which is approximately the average of the fifty-one selected institutions.

Since many industrial arts teachers begin their professional experience by teaching shop work and some academic subject, a secondary teaching field is in the proposed curriculum to provide the teacher with the knowledge of a variety of subjects. The requirements in the industrial arts technical courses will specialize the teacher in one subject or phase of industrial arts with sufficient work in all of the shop subjects to enable him to understand the principles and methods employed in the use of all industrial arts materials.

The general electives are included to enable the student to study subjects which are necessary or desirable in his preparation for teaching.

This idealized curriculum is sufficiently extensive to prepare teachers of industrial arts who will teach and inspire the students in junior and senior high schools of America.

APPENDIX A

A SELECTED BIBLIOGRAPHY

Books

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APPENDIX A (Continued)

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APPENDIX B

LIST OF SELECTED INSTITUTIONS STUDIED IN THE SURVEY WITH NAMES OF THE HEADS OF INDUSTRIAL ARTS EDUCATION

* Persons answering questionnaire used in study.
** Persons answering questionnaire, but returned too late to be included in the study.

1. Alabama

Alabama Polytechnic Institute
Auburn, Alabama
*Dan T. Jones

University of Alabama
Tuscaloosa, Alabama
R. A. Schmitz

2. Arizona

Arizona State College
Flagstaff, Arizona
*Francis C. Osborn

3. California

Chico State College
Chico, California
Russell B. Kidder

University of California
Santa Barbara College
Santa Barbara, California
*Emanuel E. Ericson

4. Colorado

Colorado A. and M. College
Fort Collins, Colorado
*George F. Henry

Colorado State College of Education
Greeley, Colorado
Kenneth F. Perry

5. Connecticut

Teachers College of Connecticut
New Britain, Connecticut
*Paul N. Wenger

6. Florida

University of Florida
Gainsville, Florida
**Walter R. Williams, Jr.

7. Georgia

University of Georgia
Athens, Georgia
*O. S. Harrison

8. Illinois	Northern Illinois State Teachers College DeKalb, Illinois *Milo T. Oakland
	Bradley University Peoria, Illinois *Fred Strickler
9. Indiana	Ball State Teachers College Muncie, Indiana *Fred J. Schmidt
	Indiana State Teachers College Terre Haute, Indiana ** Sylvan A. Yager
10. Iowa	Iowa State College Ames, Iowa *Thomas A. Hippaka
	Iowa State Teachers College Cedar Falls, Iowa *Harold G. Palmer
11. Kansas	Kansas State Teachers College Pittsburg, Kansas *Otto A. Hankammer
12. Kentucky	Eastern Kentucky State Teachers College Richmond, Kentucky N. G. Deniston
13. Louisiana	Northwestern State College Natchitoches, Louisiana *William H. Bliss
14. Massachusetts	State Teachers College Fitchburg, Massachusetts *James J. Hammond
15. Michigan	Central Michigan College of Education Mount Pleasant, Michigan George F. DePuy
16. Minnesota	State Teachers College Bemidji, Minnesota *Calvin H. McClintock
	State Teachers College St. Cloud, Minnesota *Raymond H. Larson

17. Missouri — Northwest Missouri State Teachers College, Maryville, Missouri, *Donald E. Volk

18. Nebraska — Nebraska State Teachers College, Chadron, Nebraska, Donald M. Burkhiser

State Teachers College, Wayne, Nebraska, *R. A. Schreiner

19. New Jersey — New Jersey State Teachers College, Newark, New Jersey, *Carl E. Frankson

20. New Mexico — New Mexico Highlands University, Las Vegas, New Mexico, *Harold K. Brandt

21. New York — New York State College for Teachers, Buffalo, New York, *Irving C. Perkins

State Teachers College, Oswego, New York, *Gordon O. Wilber

22. North Carolina — North Carolina State College, Raleigh, North Carolina, *Ivan Hostetler

23. North Dakota — University of North Dakota, Grand Forks, North Dakota, *Marvin F. Poyzer

24. Ohio — The Ohio State University, Columbus, Ohio, **William E. Warner

25. Oklahoma — Oklahoma Agricultural and Mechanical College, Stillwater, Oklahoma, *DeWitt T. Hunt

Northeastern State College, Tahlequah, Oklahoma, *M. E. Franklin

26. Oregon — Oregon State College, Corvallis, Oregon, George B. Cox

27. Pennsylvania

State Teachers College
Millersville, Pennsylvania
*Burl N. Osburn

The Pennsylvania State College
State College, Pennsylvania
*Lewis S. Land

28. South Dakota

South Dakota State College of Agriculture and Mechanic Arts
Brookings, South Dakota
Richard D. Anderson

Black Hills Teachers College
Spearfish, South Dakota
Michael Abraham, Jr.

29. Tennessee

Middle Tennessee State College
Murfreesboro, Tennessee
*Delbert Dyke (Not Head of Ind. Arts Department)

30. Texas

The Agricultural and Mechanical College of Texas
College Station, Texas
*Chris H. Groneman

Southwest Texas State Teachers College
San Marcos, Texas
*Victor L. Bowers

31. Vermont

University of Vermont and State Agricultural College
Burlington, Vermont
*Harry J. Patterson

32. Washington

Eastern Washington College of Education
Cheney, Washington
*Edward L. Dales

Central Washington College of Education
Ellensburg, Washington
Herbert G. Hogue

33. West Virginia

Fairmont State College
Fairmont, West Virginia
Cyril W. Johnson

West Virginia Institute of Technology
Montgomery, West Virginia
*Kenneth McFarland

34. Wisconsin

The Stout Institute
Menomonie, Wisconsin
*Clyde A. Bowman

State Teachers College
Platteville, Wisconsin
*Harry Pederson

APPENDIX C

COPY OF QUESTIONNAIRE, ACCOMPANYING LETTER AND POSTAL CARD USED IN RESEARCH OF THIS THESIS

The following is the information contained in the postal card used in this research.

Stillwater, Oklahoma
October 20, 1948

Dear Sir:

I am working on a Master's Degree Thesis entitled "Evaluation of Industrial Arts Teacher Education Courses in American Colleges".

I would appreciate very much a copy of your college catalog for assistance in this work.

Sincerely,

John B. Tate
Department of
Industrial Arts Education
and Engineering Shopwork
Oklahoma A. and M. College

Oklahoma
Agricultural and Mechanical College
DIVISION OF ENGINEERING

DEPARTMENT OF
INDUSTRIAL ARTS EDUCATION
AND ENGINERING SHOPWORK

STILLWATER

January 31, 1949

Dear Sir:

The staff of the Department of Industrial Arts Education and Engineering Shopwork of Oklahoma Agricultural and Mechanical College who are responsible for the preparation of teachers of industrial arts, are studying changes which should be made in the industrial arts curriculum. In order to study this subject it is desirable to know the requirements of representative universities and colleges in other states.

I am making this survey and collecting information for the purpose of writing a Master's Degree thesis entitled, "An Analysis of Industrial Arts Education Curriculums in Fifty-one Selected Colleges and Universities in the United States". Your college or university has been chosen as representative of your state. Much information has already been secured from your catalog or bulletin.

The enclosed questionnaire is made up of questions, the answers to which are not included or not clearly stated in your catalog. The fifty-one colleges have been selected with one university and one teachers' college from each state where possible. I have attempted to keep the questionnaire brief in order to conserve your time in answering the questions.

Your cooperation will be greatly appreciated in completing the questionnaire and returning it in the enclosed, self-addressed and stamped return envelope.

Sincerely,

John B. Tate, Instructor
Department of
Industrial Arts Education
and Engineering Shopwork
Stillwater, Oklahoma

Approved by:

_____
Thesis Adviser and Head
Department of
Industrial Arts Education
and Engineering Shopwork

AN ANALYSIS OF INDUSTRIAL ARTS EDUCATION CURRICULUMS IN FIFTY-ONE SELECTED COLLEGES AND UNIVERSITIES IN THE UNITED STATES

John B. Tate, Instructor
Department of Industrial Arts Education and Engineering Shopwork
Oklahoma Agricultural and Mechanical College
Stillwater, Oklahoma
Spring, 1949

Directions: Please fill in the blanks below as they apply to your institution.

1. Reported by _____ Position _____

   Name of Institution _____

   City _____ State _____

2. The official title of the department that prepares industrial arts teachers is _____

3. This department is a part of what college, school, or division of the institution? _____

4. Number of full-time teachers in department: Professors _____ Associate Professors _____ Assistant Professors _____ Instructors _____.

5. Does your department teach the shopwork for engineering students? _____

6. Do you use part-time student instructors? _____ How many part-time student instructors teach for your department? _____

7. What degree is conferred in the four year curriculum? (Example: Bachelor of Science in Industrial Arts Education) _____

8. What is the minimum number of year of college work required for life certification to teach industrial arts in your state? _____ Other requirements _____

9. Our practice teaching plan for Industrial Arts involves experiences as follows: (Please check one or more times in all three columns)

Levels or Types	Schools Used	Subject Areas
_____ Elementary	_____ Campus	_____ Academic
_____ Junior High	_____ Public	_____ Unit Shop
_____ Senior High	_____ Private	_____ General Shop
_____ College	_____ Others (Specify)	_____ Drawing
_____ Sub-normal	_____	_____ Others (Specify)
_____ Voc. School	_____	_____
_____ Adult Evening	_____	_____
_____ Others (Specify)	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____

10. Does your school require a freshman orientation course in General Shop? _____ How many credits? (Semester) _____ (Quarter) _____

11. The General Shop orientation course for Industrial Arts majors involves experiences as follows: (Please check in three columns)

Industrial Arts Subjects	Subjects Offered in the General Shop	Subjects Required	Subjects That Should Be Required
Auto Mechanics			
Bookbinding			
Ceramics			
Concrete Work			
Drawing - Mechanical			
Electricity			
Forging and Wrought Iron			
Foundry			
Home Mechanics			
Leather Work			
Metalwork - Art			
Metalwork - Machine			
Metalwork - Sheet			
Photography			
Plastics			
Printing			
Upholstery			
Weaving - Reed			
Weaving - Textile			
Wood Carving			
Woodworking - Hand			
Woodworking - Machine			
Welding - Arc			
Welding - Gas			
Others - - - - -			

12. Write in the names of shop and theory courses you would like to add to your curriculum which would give your graduates better preparation for teaching.

Shop	Theory

13. Professional courses required for graduation in Industrial Arts Education. Fill in the blanks which apply to your institution. Below list professional courses which you require that are not listed.

Name of Course	If Now Required, Give Answers Requested			If Not Required Now Give Answers Requested	
	No. Hrs. Credit	In What Year	Remarks	Should it be Required	In What Course Should it be Included
Methods of Teaching Industrial Arts					
Organization & Administration of Industrial Arts					
Trade and Job Analysis					
Practice Teaching					
School Shop Planning					
General Shop (Theory)					
Audio-Visual Education					
Theory of Course Construction					
Buying and Management of Equipment					
Developing Instructional Aids					
Tests in Industrial Arts					
Guidance					
Others - - - - -					

14. The offering of our department is affected by the following:

Favorably	Unfavorably	
		by state certification requirements
		by graduate school requirements
		by institutional accrediting associations
		by tradition established in the department
		by influence of alumni association
		by school major-minor requirements
		by demand for teachers with special training
		by school general curriculum committee
		by state education association
		by U. S. Office of Education
		by activities of state Industrial Arts people
		by others (specify)
		by _____

15. In the space below please give a short paragraph on the date of founding and history of your department and how Industrial Arts Teacher Education in your school has developed to its present position. Use additional sheet if necessary.

_____

_____

_____

Thank you very kindly for your cooperation.

_____

John B. Tate

Typist: Mrs. Bettylou Watson