

A STREAMLINED CURRICULUM FOR INDUSTRIAL ARTS EDUCATION
AT MCPHERSON COLLEGE - A LIBERAL ARTS COLLEGE

by

ALVIN E. WILLEMS

B. S., McPherson College, 1950

A MASTER'S THESIS

submitted in partial fulfillment of the

requirements for the degree

MASTER OF SCIENCE

Department of Education

KANSAS STATE UNIVERSITY
Manhattan, Kansas

1962

TABLE OF CONTENTS

INTRODUCTION.....	1
INDUSTRIAL ARTS IN A LIBERAL ARTS COLLEGE.....	5
INDUSTRIAL ARTS TRENDS AND ALLIED FACTORS WHICH SUGGEST CURRICULUM CHANGE.....	13
INDUSTRIAL ARTS CROSS SECTION-COURSE OF STUDY ANALYSIS.....	25
THE EMERGING CURRICULUM; OBJECTIVES, PRE-REQUISITES AND SEQUENCE.....	31
THE STUDENT IN THE EMERGING CURRICULUM.....	41
ACKNOWLEDGMENT.....	46
REFERENCES.....	47

INTRODUCTION

The principle aim of this study was to re-establish and to re-evaluate the place of industrial arts in the McPherson College curriculum and to set forth collectively the curriculum changes necessary for its adequate and efficient functioning. As a substantial part of the industrial arts program at McPherson College involves industrial arts teacher education, special consideration was given to this phase and its curricular implications. Industrial arts as a field of study, by virtue of the fact that it is geared to that phase of our modern life which is most dynamic, our industrial society, must be cognizant of developments in its field. This recognition cannot take the form of adding a new course each time a new industrial process is developed. Thus, this was basically a search for a core curriculum for industrial arts.

The need for a compact industrial arts course of study is probably greater at McPherson College as McPherson is a small liberal arts college which cannot justify a vastly extended program. Thus, the objectives of this study may be written as follows:

1. To determine the place of industrial arts in a liberal arts curriculum.
2. To determine the implications of certain discernable trends in industrial arts education to be considered in streamlining the industrial arts curriculum.
3. To determine if a basic core of industrial arts subjects is represented in the cumulative teacher training curriculums of colleges and universities.

4. To determine the proficiency requirements for teachers of industrial type subjects in the approximate area served by McPherson College.
5. To determine the compact course of study needed to fulfill the requirement along with the proper prerequisites and sequence.

It is anticipated that the findings of this study will be useful to the industrial arts department of McPherson College and the administration of McPherson College in determining the direction of industrial arts. It is hoped that other industrial arts departments attempting curriculum revision in recognition of rapid industrial changes will be able to use these findings.

Procedure

This work could not proceed without this author first digesting many pertinent books and scores of magazine articles by authors writing with authority on these various phases of the industrial arts curriculum. The second step involved the close examination of every readily available college catalog where such colleges had an applicable program. The third step was the procuring and the subsequent study of state industrial arts curriculum guides representative of the central United States. The final step was that of organizing this information into a formal body of facts which could be interpreted as suggesting the course of the curriculum streamlining action.

Literature Review

Someone has said that the close scrutiny of the professional journals representative of any given educational field is the most

reliable method for determining the pulse of that field. Industrial Arts and Vocational Education has served the industrial arts field in this capacity since 1914. Anyone desiring to become acquainted with industrial arts as a field of study and progress made in this field of study from its humble beginnings could benefit by indulging in a study of Industrial Arts and Vocational Education. It should be noted that a new concern for progress in industrial arts education is evident since the appointment of John L. Feirer as editor of Industrial Arts and Vocational Education.

No study pertaining to industrial arts can progress without the writings of early leaders in the field. It must be said that their insights into the problems of industrial arts in general education and their recognition of possible contributions of industrial arts to general education are noteworthy. The reference here is to the published works of men like Charles A. Bennett, William T. Bawden, Robert W. Selvidge, William L. Hunter, Homer J. Smith, Arthur B. Mays, and their contemporaries. These men set up objectives for industrial arts that stand today. Any curriculum study in industrial arts can profit by the documented experience of these early industrial arts leaders.

As this study was basically concerned with the industrial arts curriculum in a small liberal arts college it would not be complete without a close look at the liberal arts viewpoint. The liberal arts literature available is vast, and varying views as to what truly constitutes liberal arts is presented. For

the purpose of this study only that phase of the liberal arts question which concerns itself with the inclusion of industrial type subjects within the liberal curriculum was considered. Some very good literature on liberal arts makes no mention of industrial arts, home economics, and similar curricula. One can only assume that the author does not consider these subjects suitable additions to the liberal curriculum. Other literature is almost vehement in support of industrial arts within the liberal curriculum. Thus, the two divergent views are well represented. The author noted one instance in which a small liberal arts college known to have industrial arts within its curriculum was presented as a pure liberal arts college without industrial arts in its curriculum. How often this lack of recognition of industrial arts takes place is not known.

The industrial arts curriculums presented by the college catalogs reviewed served to substantiate the industrial arts core curriculum suggested by writers in the industrial arts field. This analysis of what college industrial arts curriculums offer suggests that there is more uniformity in the industrial arts curriculums than the casual observer would suspect. Likewise, the curriculum guides suggested a united front as far as industrial arts in the general high school curriculum is concerned. There was some evidence of exceptional parallelism of material presented in these curriculum guides although these guides were published at different times, and the states represented were nonadjacent to each other.

INDUSTRIAL ARTS IN A LIBERAL ARTS COLLEGE

Until the end of the 19th century the general prevailing opinion regarding liberal arts education was that for education to be liberal it had to be classical. Philosophy and the classics were thought to be the best tools for sharpening the minds of free men. Thus, the ancient literary declarations of Athens and Rome were the basis of liberal arts education.

In this country the intensified study of the classics in college education fell into disfavor early in the present century. Natural science and the ramifications of natural science were the ascendants. Very soon the natural sciences were somewhat on the defensive, their position threatened by the rapid rise in popularity of the social sciences even though the attitude of many educators toward this new science was that it was not science at all. Two wars, depressions and recessions have also had their effect. American society is a dynamic society. The American's affinity for the practical and impatience for the impractical are largely responsible for the change of the liberal arts picture. At times the typical American pragmatic approach deals even the modern concept of liberal arts a severe blow. Traditional subjects have been supplanted by what someone called the "cafeteria complex" of modern education. In the meantime the traditionalists have continually affirmed that philosophy is the crown of all the studies in liberal education.

Modern liberal arts colleges have deviated from the early

American standard. Nor has the problem of a suitable standard curriculum been resolved. One needs only to examine a liberal arts bibliography to sense the widely divergent views on the matter. Such titles as Education at the Crossroads, Liberal Education Re-examined, Liberal Education Reconsidered, are typical and point out that not all think alike on this matter. This is wholesome since when all think alike there is not much thinking.

Traditionally the college has been spoken of as the agency for liberal education, the root meaning of liberal being "that which befits or helps to make free men". General education is general since it is the education that all citizens in a free society should have. This description of general education brings up the question whether there is any real difference between it and what for centuries has been called liberal education. Since general and liberal education have the same fundamental goals, why make a distinction between the two?

A controversy now rages among advocates of liberal education in the undergraduate college. It involves the culturalists versus the vocationalists. Unfortunately, industrial arts, home economics and similar subjects are often involved in this controversy as these have a vocational connotation in the minds of many. How worthy is our earlier definition of liberal and general education? Another aspect of the controversy centers around the teacher training programs offered by many liberal arts colleges. This is surely vocational but it is not entirely new. It has become commonplace to say that the American liberal

arts college was originally founded for a vocational purpose--namely, the preparation of men for the ministry of the church.¹

The controversy may be best represented by pointing out the divergent views of Robert Maynard Hutchins and Howard Mumford Jones. Hutchins said, "The thing to do with vocational education is to forget it."² Jones took the extreme opposite viewpoint in saying:

The amalgamation of the work of departments giving professional or vocational training with this general education should begin in the freshman year and be continuous throughout college,---a problem of administration that will require great tact and skill.³

This from a professor of literature at Harvard! The second view is presented by another author in this statement:

The assumption that the cultural and vocational are mutually exclusive is absurd. If they cannot coexist in education how can they coexist in life itself, of which education, after all, is but a part. The real antagonism is between a culture remote from life which despises work, and a vocational training which has no time for culture. Culture, like every other phase of direct preparation for life, should at each stage of education parallel specialization and be paralleled by it.⁴

The importance of work accompanying the education of the mind during the high school and college training is more and more recognized. There is no place closer to man than a work-

¹ Henry M. Wriston, The Nature of the Liberal College, p. 165.

² From a Rectorial Address, "The Outlook for Education," University of Dubuque, 1944.

³ Howard Mumford Jones, Education and World Tragedy, p. 12.

⁴ A. D. Yokum, Culture, Discipline and Democracy, p. 143.

shop, and the intelligence of a man is not only in his head but also in his fingers. All work has dignity if it is honest work, but from the educational point of view and for the sake of our complex industrial and technological age, it is craftsman's labor that should constitute the vocational training that has a legitimate place in liberal arts education.

It is interesting to note that many defend the position that the two types of education must go on together. Jacques Maritain, while formulating his third fundamental rule, "The whole work of education and teaching must tend to unify," observed further that, "The dignity of work will probably be more clearly recognized in the world of tomorrow."⁵ The dichotomy between liberal and vocational is too obvious to be ignored.

Inherent then in liberal arts education is a responsibility to produce liberally educated men and women. A special task of the liberal college is to develop leadership. Training teachers does not violate this principle. Thus, the problem at hand is that of teaching liberal subjects with a vocational flavor since the whole work of education and teaching must tend to unify. How can the liberal quality of education be preserved when in competition with the specific concentration necessary in our pre-professional and professional courses necessary in the implementation of a teacher training program? The ideal is, of course, that even the teacher of crafts will develop a technique of liberal teaching, that is, the art of teaching men and women,

⁵ Jacques Maritain, Education at the Crossroads, p. 45.

not merely transmitting knowledge. This does not mean cutting out 10 or 15 minutes of classtime for some semi-religious sermonizing loosely connected to the course.

A problem remains, how does industrial arts fit the liberal curriculum? We see that liberal arts is interpreted by some to focus only on certain parts of the individuals total life and, therefore, to be interested in only certain academic disciplines. Under this point of view industrial arts and even certain fine arts would have no place in the liberal arts curriculum.

That point of view which accepts industrial arts as a part of the general or liberal curriculum, accepts man in his entirety rather than seeking to segment him. This viewpoint holds that a liberal education should educate not only man's intellect, but also recognize and involve his interests, his abilities, and his motivations. It should help to develop all of these so that he can live a useful and meaningful life.

While the latter viewpoint is the one under which industrial arts most frequently finds its way into the general or liberal curriculum, is it not possible that industrial arts has a reserved place in the great fields of knowledge? These fields of knowledge have been variously classified. Nicholas Murry Butler chose to refer to these as a spiritual inheritance, as a possession of every well educated person.⁶ Butler's and other classifications are best compared when placed in tabular form as shown in Table 1.

⁶ Nicholas Murry Butler, The Meaning of Education, p. 25.

Table 1. The great fields of knowledge.

The two human abilities	Man's worlds and man's works	The great fields of knowledge	Butler's "spiritual inheritance"	The academic divisions
I Thought about the sciences	Physical world	Natural science	Scientific inheritance	Mathematics and natural science
	Human world	Humanistic science	Institutional inheritance	History and social science
	Spiritual world	Philosophical science	Religious inheritance	Theology and philosophy
II Expression of the arts	The beautiful	Language arts	Literary inheritance	Language and literature
	The true	Fine arts	Aesthetic inheritance	Visual arts and music
	The good (the useful)	Applied arts		Occupational training (teaching)

The fundamental thesis is that industrial arts is at once an art and a science. As such there are several provisions for industrial arts in the preceding table but what possible reference to industrial arts is there in Butler's "spiritual inheritance"? At first it would seem none as there is no reference to the applied arts in his five-fold classification.

Intellectual insight is involved in putting ideas to work even in the case of a simple invention such as a wheelbarrow. If it is intellectual it is no longer a material entity but a spiritual one as well. If this is true one is hard pressed to explain why the application of these insights that have made the

industrial revolution a reality are not a part of our spiritual inheritance. Further application of these insights have brought us to the brink of an age so fabulous and so technical that no one can deny the fact that a social inheritance is likewise passed on to our youth in the process.

Few of the inventions that have made our way of life what it is would have become a reality were it not for the abilities represented in industrial type subjects. Even fewer of the ideas and dreams of engineer-scientist could ever materialize for behind every able scientist there stand from a few to several hundred people; men and women with technical know how and mechanical competence.

These inventions are so great in number that it would be pure folly to insist that all about these inventions should be taught in a school. It is fortunate for industrial arts that early industrial arts leaders realized that this could not be done and instituted programs that emphasized general skills and basic industrial processes. In limiting the work of industrial arts to general skills that have application in many phases of employment and all phases of our industrial society, industrial arts has been assured a position of permanence in modern education.

Industrial arts at McPherson College is 45 years old. In this period of time it has never assumed a "trade school" role, but has from time to time helped provide students with some marketable skills. Criticism has recently been leveled at modern

education for failing in this respect.⁷ This fact should not deter industrial arts from being considered a suitable college study area. Thus, industrial arts at McPherson College is basically "non-vocational" at least no more so than any other college department offering a teacher education option. Industrial arts at McPherson serves all departments of the college as an elective area in addition to offering both a teaching and a non-teaching major.

While industrial arts must always attempt to upgrade its curriculum and remain abreast of the times, it is the latter mentioned role that is the chief concern of this study.

Is industrial arts at McPherson College typical of industrial arts in small liberal arts colleges? In a study dealing with this aspect of industrial arts it was found that the median liberal arts college is located in a town of 8,000 population, has a total enrollment of 750, and has 100 students in the industrial education department. The median liberal arts college provides two shops and a drafting room. These departments were most often called industrial arts departments.⁸ These findings would indicate that industrial arts at McPherson College is typical of industrial in small liberal arts colleges.

The McPherson College student body has traditionally been

⁷ "To Improve Slum Schools," Time, October 27, 1961, p. 53.

⁸ Einar E. Siro, "Preparation and Upgrading of Industrial Education Personnel," Industrial Arts and Vocational Education, June 1951, p. 225.

service oriented. The strength of this service orientation is apparent as a large percentage of the graduates enter the teaching profession and other service fields including several types of volunteer service of world-wide scope. As young Americans assume greater roles in helping under-developed countries, the demand for some specific instruction in industrial arts type subjects will not diminish. It is this service aspect which in the words of one McPherson College administrator "makes industrial arts a vital if not crucial part of the McPherson College curriculum".⁹

The President of McPherson College outlined the place of industrial arts in the McPherson College curriculum in the following way.¹⁰

Fine arts, both appreciation for them and some exploration of possibilities of expression in them, should be included in total education. In a similar manner, industrial arts and man's long record of discovery and invention in these necessary parts of life have a place in total education.

Both the appreciation of the developments in the field of industrial arts and the discovery of some abilities which he himself might have or develop can well be included. Thus, he may develop additional avocations which in time of increasing leisure can be very important to him.

INDUSTRIAL ARTS TRENDS AND ALLIED FACTORS WHICH SUGGEST CURRICULUM CHANGE

A trend is a prevailing tendency or inclination. It is

⁹ Wayne F. Geisert, Ph.D., Dean of the College, McPherson College, from an interview with author, April 2, 1962.

¹⁰ D. W. Bittinger, Ph.D., President of McPherson College, from an interview with author, April 9, 1962.

interesting to note that from the time of its beginning, there have been certain discernable trends in industrial arts.

Eighty six years have passed since a display of technical work at the Philadelphia Exhibition provided the spark for a program of "manual training", the forerunner of modern industrial arts. Industrial arts has grown from a few isolated wood shops to fifty thousand industrial arts facilities and at least as many teachers serving four million young Americans each year.¹¹

One trend almost immediately apparent in any study of the industrial arts field is the seemingly never ending search for an appropriate curriculum. All too often the tone of the searchers is apologetic, a virtual admission of weakness. One industrial arts educator in an apparent mood of exasperation noted, "In no other pahse of education is there more confusion and less clarity than is found in the field of industrial arts education."¹²

The problem is understandable. Industrial arts is allied with that phase of our national image for which we are best known, our industry. Industry is so vast and so complex that it almost defies human imagination. Add to this the implications of the space age for industrial arts. How then can any

¹¹ John L. Feirer, "Editorial," Industrial Arts and Vocational Education, September 1959.

¹² Ward L. Myers, "The Next 20 Years in Industrial Arts," Industrial Arts and Vocational Education, October 1951, p. 317.

teacher of industrial type subjects know all about industry, much less teach all about industry? To pretend that this is possible is vain and any attempt to do this will surely end in failure.

The industrial arts curriculum should be changed then to include that material which is basic to industry. The analysis technique has some merit in determining course content for industrial arts. There is no other way of wading into the unexplored future. Analysis of past industrial arts activities and areas may serve several purposes. First, certain areas of industrial arts education stand out as basic and will probably never die. These seem to be drafting, woodworking, all areas of metal work, power mechanics, electrical work, and of late, electronics. These are significant the world over. These could well serve as a core curriculum for industrial arts. One writer chooses to call these the "solids" of industrial arts. McGovern lists these five solids in the order of their importance or usage in industry:¹³

1. Technical drawing.
2. General metalworking.
3. Electricity and electronics.
4. General (or power) mechanics.
5. General woodwork.

Eight other writers are in close agreement with McGovern as indicated by Table 2. This makes industrial arts appear less

¹³ Troyce D. McGovern, "Selecting Industrial Arts Solids from Industry," Industrial Arts and Vocational Education, June 1960, p. 17.

Table 2. How 9 writers rank industrial arts courses in order of importance.

McGovern's order	Times ranked first by 8 other writers*
Technical drawing	4
General metalwork	2
Electricity (and electronics)	0
Mechanics (power)	1
General woods	1

*From eight articles on the subject selected at random.

formidable and may serve to circumnavigate certain pitfalls common to industrial arts, especially those resulting from trying to cover too many areas in too short a time with too little room and inadequate equipment. If industrial arts is to represent industry to students, it is imperative that we have a workable, manageable curriculum to present.

One aspect of the curriculum problem would have been helped had industrial arts started earlier in a few of these areas. The industrial arts curriculum at the turn of the century was almost universally woodwork and mechanical drawing with a minor trend toward home mechanics. The fact that automobiles were roaring to life everywhere did not appear to suggest to many that we were on the verge of becoming a nation on wheels. The space age is here. The implications for industrial arts are apparent.

Another discernable trend in industrial arts is the movement away from the "hand and eye" philosophy. While the training of the hand and eye was a worthy objective and still is, educators feel that all physical and mental faculties respond

to training in industrial type subjects. The fruits of such a movement have been slow in materializing. The following are phrases from articles pertaining to this problem in industrial arts and should be noted.¹⁴

The average industrial arts student of today has almost no mathematics or science.

It is high time to have an industrial arts program for the above average student.

Industrial arts needs to increase the emphasis on problem solving.

We need more science in the industrial arts program.

Industrial arts programs are too often planned for the slow learner.

The design element is too often lacking in industrial arts.

With more emphasis on science in our educational program it is only reasonable to assume that this picture will change shortly. Fewer of the students enrolling in industrial arts will have these deficiencies. Our industrial arts curriculum will need to be upgraded and updated to accomodate this "new breed". It may well be that some teachers of industrial arts will be hard pressed to keep up with their students. The future industrial arts student will be more proficient in the sciences. The realm of possibilities for industrial arts will reach new heights in the "soaring sixties".

The "hand and eye" philosophy of early leaders in industrial arts resulted in an unfortunate choice of name for the

¹⁴ From articles appearing in Industrial Arts and Vocational Education from 1948 to 1958, selected at random.

term "manual training" has a connotation that makes it rather unpalatable to traditionalists in education. "Manual training" has a vocational ring, and yet the definition of industrial arts indicates that it is a phase of general education. Unfortunately, the term has been hard to live down, and this has been used and is still used as a flail by those traditionally against including industrial arts in the general education curriculum.

As the design element became an inseparable part of manual training the term "manual arts" came into use. In 1893, this term was used at Teachers College, New York City, to designate a building expressly for art and manual training--The Macy Manual Arts Building.¹⁵ Not long after this, in 1904, Richards, in an editorial in the Manual Training Magazine suggested that the term "industrial arts" be substituted for manual training or manual arts.¹⁶

In sixty college catalogs selected at random, thirty two designated the department which housed this particular curriculum the industrial arts department. Twenty two other departments in this group of sixty chose to be known as industrial education departments. Not once was the term manual used.

Almost from the beginning, industrial arts philosophy called for representation of broad areas of industry rather than a sampling of a few specialized fields of hand work. Irish

¹⁵ Charles Alphens Bennett, History of Manual and Industrial Education, 1870 to 1917, p. 441.

¹⁶ Ibid., 453.

states that there was a "call for diversity rather than a specialization of skill".¹⁷ As is typical, philosophy precedes practice by a number of years. Diversity is compatible with the general education theory whereas specialization of skill would more nearly fit the vocational education picture.

The change in industrial arts philosophy over the past 75 years is more evident as early objectives for industrial arts are compared with present day objectives. Early objectives were grouped around four main headings---avocational, exploratory, consumer knowledge, and handyman abilities.¹⁸ While these were good the now generally accepted list of objectives indicate a tendency to be more specific. In their abbreviated form they are as follows:

1. Interest in industry.
2. Appreciation and use.
3. Self-realization and initiative.
4. Co-operative attitudes.
5. Health and safety.
6. Interest in achievement.
7. Orderly performance.
8. Drawing and design.
9. Shop skills and knowledge.

The prime purpose or objective of industrial arts courses according to definition officially adopted by the American Industrial Arts Association is as follows:¹⁹

¹⁷ Josie Clinton Irish, Developmental Study of Comprehensive General Shop, p. 9. Unpublished Master's Thesis, Colorado A. and M. College, Ft. Collins, Colorado, 1949.

¹⁸ Ibid., p. 45-46.

¹⁹ American Vocational Association, A Guide to Improving Instruction in Industrial Arts, p. 18.

To define, stimulate, coordinate and strive for the ideal form of industrial arts education as a vital aspect of general education on all levels, elementary, secondary, and adult, nationally and internationally.

Taking the curriculum, the definition, the objectives, and the philosophy together, the trend appears to be toward a general program of industrial arts more carefully planned to include many more materials. This will provide the future teachers of industrial arts with countless hours of work.

In addition to the major trends already noted several others have significance. While some of these may seem mundane, they do indicate progress in industrial arts, the value of which cannot be denied. These are best presented in the following table.

Table 3. Industrial arts trends, late 19th century to present.

Trend	Early	Last 10 years
1. Lighting in industrial shops	Natural light as low as 15 foot candles at bench height	50 foot candles at bench height, 100 foot candles recommended for drawing
2. Display of industrial arts products	Few, the products had little of the appeal they now have, due perhaps to the areas represented in industrial arts at that time	More all the time, located in main hallways and corridors, many facilities now have show rooms
3. Shop location	Separate from main education facility or in basement	Shop borders on quadrangle when campus type school plan is used or it is in a wing of the main building on ground floor
4. Shop space	Less than 50 square feet	100 square feet, but 125 square feet per pupil now recommended

Table 3. (concl.)

Trend	Early	Last 10 years
5. Shop color, motif	Drab	Bright, color dynamics used, motif suggests a departure from dual standards where industrial arts came out second best
6. Safety	Too often there was a complete lack of safety, no emphasis on safety	Much more in safety education, every aspect of safety considered vital, shows awareness of human worth
7. Equipment	Cumbersome, industrial type, central power with line shafts, hand tools	Light weight, boy proof, portable, safety features--enclosed v'belt drives, single purpose
8. How work is	Through the hand tool media, some machines	Hand work in orientation courses, otherwise a decreasing amount of work done by hand, an increasing amount of machine work
9. Publicity	Unfavorable by 1962 standards	Some very good, industrial arts still seems to have an affinity for unfavorable publicity
10. Toward a national curriculum	None	Some, not much verbal agreement on what should be taught, a study of the curriculum pattern indicates more of a "united front" than most would suspect; the common question is, "Should there be a common or unified body of subject matter for industrial arts?"
11. Agitation for a national industrial arts curriculum	None	More each year since the late 40's

These are the trends which suggest themselves as one attempts to survey progress in industrial arts through the media of pertinent and timely articles. When any one practice seems to leave the picture and when a more worthwhile one enters is difficult to say. To whom credit should be given for the progress made is likewise difficult to determine. Certainly the educators in the field are deserving of much credit. One research revealed a tendency for more and more school executives to accept the industrial arts concept and to recognize it as a phase of general education.²⁰ Without this, most of the progress would have been impossible. As late as 1926 convention resolutions demanded recognition of industrial arts as a suitable subject area.

It cannot be said that there is no concern on the part of state departments of education as to what goes on in the typical high school industrial arts program. All but eleven states have some form of curriculum guide or industrial arts bulletin that is available without cost to interested persons within the state. Some are available without cost to educators in the industrial arts field elsewhere as a professional courtesy. This fact alone indicates a concern for a greater cooperative effort.

One element not to be discounted here is a change to a more wholesome attitude toward a worker in industry. No longer is an industrial worker considered a mere appendage to a machine.

²⁰ Robert O. Hall, "Evolution of and Trends in Industrial Arts Education in the Secondary School," p. 1. Unpublished Master's Thesis, Kent State University, Kent, Ohio.

Human engineering is a term applied to the art of helping workers in industry into a place of self-determination, self-realization and satisfaction. Industrial arts has a contribution to make here.

Technicians who work with engineers and scientists have been one of the fastest growing occupational groups in recent years. There is every indication that these occupations will continue to grow in the years ahead. Who can say how many of these technicians developed an interest in these various fields while active in an industrial arts course. Table 4 illustrates the magnitude of this field.

Table 4. Technicians in industry by occupational group, January 1959 and January 1960, and percent change.*

Occupational group	January 1959	January 1960	Percent change
All groups	549,400	593,600	8.1
Draftsmen.....	195,200	210,000	7.6
Engineering and physical science technicians.....	205,000	284,600	13.7
Medical, agricultural, and biological technicians.....	16,100	16,100	0.2
Other technicians.....	87,800	82,900	-5.9

*Totals and percentages have been calculated on the basis of unrounded figures and therefore may not correspond exactly with rounded figures shown.²¹

As has been stated earlier, industrial arts is a vital, if not crucial part of the educational picture at McPherson College. A large percentage of McPherson College graduates

²¹ National Science Foundation, "Scientific and Technical Personnel in Industry," 1960 (National Science Foundation 61-75).

enter the teaching profession, a much larger percentage than the national average.²² What are the implications of these findings for industrial arts at McPherson College? Briefly noted they are:

1. Industrial arts teachers of the future will have to be better oriented, better educated generally, better trained in the industrial area if they are to be competent in space age industrial arts.
2. This involves streamlining the industrial curriculum to fully encompass the industrial arts "solids" which in turn involves merging some courses and eliminating others. The only "solid" missing from the present curriculum offerings is electronics but a great deal of unbalance exists otherwise. Too wide and too flexible a curriculum choice is confusing to the student. Sixty six hours of industrial arts are possible at McPherson College, only 24 hours are required for a major. A staff of two cannot adequately cover 65 hours.
3. Candidates to the teacher training program will have to be identified early, screened carefully, and counseled properly to insure the fact that prospective teachers have the proper balance between native and academic ability.
4. More careful consideration will have to be given in the area of updating and modernizing space and equipment. Too many teacher training institutions are attempting to train industrial arts teachers with poorly equipped laboratories.²³ There is no reason why McPherson College should be one of them.
5. The industrial arts teacher has an obligation to fulfill. To do this properly may require a training curriculum which is the most challenging one a prospective teacher could choose.
6. All course work in the teacher training curriculum should be based on the simple axiom that the teacher

²² For the 5 year period, 1956 to 1960, this was 68%. Industrial arts majors have averaged 8% of the graduating class in the past 5 years.

²³ Chris H. Groneman, "Effective Training of Industrial Arts Teachers," Industrial Arts and Vocational Education, April 1954, p. 127.

will need to know more about a given subject than the student he is aspiring to teach.

7. Industrial arts education is challenging enough and the area is vast enough to virtually promote itself if the path is but cleared of barriers to normal and reasonable progress, barriers which too often are all too evident. This can be summed up pointing out the "dual standard" which exists when industrial arts departments compete with other departments for the things necessary to conduct an educational program. McPherson College is not entirely free from this.

The trend in industrial arts is definitely toward the generalized program with much more emphasis being placed upon planning to include work in many materials, such as various metals and alloys.²⁴ There has been a gradual move, more evident in recent years, to include more art and applied science in the industrial arts curriculum. Industrial arts of 1962 is at once an art and a science.

INDUSTRIAL ARTS CROSS SECTION- COURSE OF STUDY ANALYSIS

At an earlier point in this study it was brought out that certain industrial arts areas stand out in such a way as to suggest an industrial arts core curriculum. How did these bear up as industrial arts "solids" when compared with college industrial arts curriculums?²⁵ Was there a relationship?

²⁴ George K. Wells, "Education Confused," Industrial Arts and Vocational Education, January 1947, p. 16.

²⁵ In the overall industrial arts picture, secondary schools would "swing more weight". There are many more secondary school industrial arts departments than there are college industrial arts departments, 517 in Kansas.

Obviously the colleges offering an industrial arts teaching degree were found to have courses not only in the basic areas but also "methods" and professional courses in these areas.

College industrial arts departments as a whole present a rather diversified program of studies. Not all are engaged in teacher training. Those that are not so engaged seem to enjoy some educational extras that teacher training departments cannot afford. Some of these undoubtedly serve local needs.²⁶

In the examination of college catalogs it was discovered that college industrial arts departments vary considerably in the area of programs offered. The following table is significant.

Table 5. Nature of services offered by college industrial arts departments in the United States (total number represented).*

Category of service	Number of schools listing	Percent of total
1. Industrial arts education as a teaching field, for general education (electives for all departments) service areas for other departments (this combination)	82	51.25
2. Specifically mention industrial arts teacher education	77	48
3. Offer industrial technology as part of the industrial arts program	44	27.5
4. Have some form of trade training in addition to general industrial arts	44	27.5

²⁶ Jewelry, handicrafts, dry cleaning, bookbinding were listed as were individual phases of various crafts courses.

Table 5. (concl.)

Category of service	Number of schools listing	Percent of total
5. A non-teaching industrial arts program specifically mentioned	26	16.25
6. Serve engineering departments as part of their industrial arts program	25	15.5
7. Industrial arts service areas only (no major)	23	14.3
8. Offer driver education (driver education teacher training program)	18	11.25
9. Serve agriculture departments	7	4.3
10. An industrial arts teaching option as a part of a technical program	1	.6

*Based on an analysis of 160 college general catalogs where the college had an applicable program. Also used was the 1961-1962 Industrial Teacher Education Directory.

Thus, we see that college industrial arts has a strong teacher training flavor when viewed nationally. The same was found to be true for Kansas. Of nine four year colleges in Kansas that have an industrial arts curriculum, eight offer an industrial arts teaching major. The one college in this category that did not offer such a major serves in an elective capacity.

The second part of this analysis deals with the curriculum of those college industrial arts departments that list as one of their specific purposes the training of teachers for the industrial arts education program. This involved the first two categories of Table 5. The purpose of this phase of the analysis

was to determine if a parallel existed between those industrial arts solids before mentioned and the typical industrial arts teacher training curriculum. The following table reports the results of these findings.

Table 6. Relationship between industrial arts solids and typical industrial arts teacher training curriculum.*

Category	Number of schools	Percent of schools
1. Schools listing solids specifically (no more--no less)	8	8%
2. Schools listing solids plus one additional area	29	18.25
3. Schools listing solids plus two or more areas	29	18.25
4. Schools listing five or more areas but not all solids	57	35.6
5. Schools listing less than five areas	37	23.1

*Solids being technical drawing, general metalwork, electricity (and electronics), power mechanics, and general woods.

It was further found that the first additional area in category 2 (Table 6.) was either printing or graphic arts. The second additional area was most often arts and crafts, handy crafts, crafts, and similar course titles appropriate to this general area. Notable was the fact that the general crafts trend was stronger in the western part of the United States.

Most industrial arts departments falling into category 4 had only one deficiency. Most often it was power mechanics. Electricity was usually the deficiency when power mechanics

was listed.

The following data sums up the industrial arts picture in Kansas:

1. Three Kansas college industrial arts education departments offer courses in the five solids.
2. Three Kansas college industrial arts education departments offer courses in the five solids areas plus one or two more areas.
3. Two Kansas college industrial arts education departments offered courses in less than the five solids areas.

No great gulf separates industrial arts teacher education curricula in any group of contiguous states. A greater variation was evident as non-adjacent states were compared. The influence of twelve or fifteen years of agitation for a national industrial arts curriculum on the part of some national leaders in industrial arts education was evident.

What was more evident was the fact that curriculums for industrial arts teacher education are under revision in most departments. A 1940, 1950, or even a 1956 industrial arts curriculum does not fit 1962 industrial arts. The large number of methods, professional and student teaching opportunities listed in the various curriculums indicate that teacher training in industrial arts is gaining momentum.

A most important function of any industrial arts teacher training department is that of supplying qualified teachers for industrial arts departments of secondary and elementary schools. This analysis would not be complete without looking into the industrial arts picture at that level. The organization of

industrial arts in most states is presented in the form of curriculum guides, study guides and instructional guides available at the offices of the state departments of education.²⁷

From an analysis of twelve such industrial arts guides or bulletins, the following observations are noteworthy.

1. Course content most often included the areas of wood-working, metalworking, electricity, drawing (elementary drafting), and transportation or power mechanics. It should be observed that these represent the solids referred to in Table 2. Woods and metals were the areas most frequently mentioned and most instructional available is in these two areas.
2. Several state guides were very specific as to the amount of college credit necessary in the various areas before teacher certification could take place.
3. Some regional variations in industrial arts instructional programs were evident, such as the addition of farm mechanics in states that are strongly agricultural in nature and the inclusion of crafts in the western United States.
4. Most state guides to industrial arts instruction leave the impression that organizational problems exist. The standard objectives are listed but there is some question as to whether these can be realized when the content is organized around the nature of the materials.

While these observations are judgmental in nature, they do, nevertheless, indicate that a sixth important area of study in the industrial arts curriculum is the area of professional courses. As clearer definitions emerge and as objectives lose some of their abstract qualities and vagueness, some of these problems will undoubtedly diminish.

²⁷ Ten states do not have any form of industrial arts curriculum guide for elementary and secondary schools. A few of these, however, are in the process of formulating one.

Resistance to progress in industrial arts education at McPherson College and elsewhere comes from the fact that teacher education in industrial arts is an expensive program. A small liberal arts college that does not have such a program probably could not afford to get one. If the general teacher education program at McPherson College is vital, as the percentage of graduates going into the teaching profession would seem to indicate that it is, and since a good percentage of each graduating class are industrial arts teacher education majors, more of the industrial arts curriculum at McPherson College will have to be geared to this end. The total McPherson College industrial arts curriculum holds up well when compared to the areas suggested as the solids. The questions regarding the McPherson College industrial arts curriculum are:

1. Could the industrial arts curriculum benefit by requiring the introductory course in all five solid areas?
2. Could the industrial arts curriculum benefit by requiring appropriate prerequisites to certain courses as would insure maximum desired achievements?
3. Are the facilities to carry out such a program adequate?

THE EMERGING CURRICULUM; OBJECTIVES, PREREQUISITES AND SEQUENCE

A unique problem of education from generation to generation is the constant shift in emphasis. Industrial arts, by virtue of its close alliance with industry is even more dynamic. It goes without saying that we cannot offer and expect many students to take all the courses and subjects that various groups

will advocate. No course of study, regardless of the breadth represented in its preparation is applicable to all the programs in which the student teacher could one day find himself.

It is utterly impossible to transmit through any curriculum or any combination of sequential curricula in the various phases of education, the totality of human knowledge. Such a curriculum would be pansophic--this is the era of specialization. Also, the dilution of scholarship which comes from trying to teach too many subjects in too short a time is a problem which must be solved.

It is time to re-examine old concepts and practices, to explore and to experiment with new approaches, new methods, to think in terms of new goals. One goal for industrial arts at McPherson College should be to seek new excellence in achievement. This is a worthy goal in all three aspects of the industrial arts program at McPherson College but it is crucial in the teacher education aspect of industrial arts.

Teacher education generally assumes three phases: basic liberal education, professional education (including some form of student teaching) and specialization in the field of the candidate's choice. Let us examine the first phase, basic liberal education.

The degrees granted by McPherson College are the Bachelor of Arts and the Bachelor of Science. McPherson College enforces a rather stringent distribution requirement which is in keeping with the avowed liberal arts goals. The hours required in this distribution are 61 and 54, respectively. These courses when

taken alone and early in a college career would account for most of the course work in the first two years of college. This kind of an arrangement has many proponents as many educators feel that there is no place in the first two years of college for concentration. Teacher training departments discover, however, that there is real value in spotting the potential teacher early in his college career. Potential industrial arts students should be observed in action early in their college career.

The general distribution requirements at McPherson College are listed in Table 7.²⁸ It may be observed that a student at McPherson College would get an introduction in all but four of the areas which offer a major. Industrial arts is one of these areas.²⁹ Industrial arts must follow suit by offering introductory courses which may come early in the college career. Gustave S. Wall found this to be the practice in most institutions offering industrial arts education as Table 8 would indicate.

Let us examine next the professional education situation at McPherson College. Professional courses include the methodology courses, those courses outlined by state departments of education as essential to certification, and recently, some form of student teaching. McPherson College was one of the first

²⁸ McPherson College General Catalog, Bulletin Issue, 1962-1963, p. 31.

²⁹ The other three areas offering a major but not specifically represented here are, agriculture, education, and home economics.

Table 7. The distribution requirements for the Bachelor of Science and Bachelor of Arts degrees.

Bachelor of Science	Bachelor of Arts
Humanities	
Art and/or music.....3 hours	Art and/or music.....3 hours
Literature.....3 hours	Literature.....6 hours
Bible.....6 hours	Bible.....6 hours
Elective in humanities.....3 hours	Foreign language.....6 hours
	Philosophy or history of thought.....3 hours
Social Science	
History.....3 hours	History.....6 hours
Sociology.....3 hours	Sociology.....3 hours
Economics.....3 hours	Economics.....3 hours
Electives in social science.....3 hours	Electives in social science.....3 hours
Physical and Biological Science	
Biological and physical science.....10 hours	Biological and physical science.....10 hours
Electives in science and /or mathematics.....5 hours	
Special Skills and Understandings	
Written communications.....6 hours	Written communications.....6 hours
Oral communications.....2 hours	Oral communications.....2 hours
Health and physical education...4 hours	Health and physical education...4 hours

Table 8. Year in which shop training should begin in industrial arts teacher education.³⁰

Year	Group opinion	Practice	Jury opinion
1	94.38%	97.19%	100.00%
2	4.98%	1.87%	0.00%
3	0.62%	0.00%	0.00%
4	0.00%	0.93%	0.00%

colleges in Kansas to offer student teaching in a form known as the "student teaching block". Under this system the student teacher actually teaches in a cooperating public school under the guidance of experienced public school teachers. The length of the student teaching period is nine weeks and involves the entire school day during this period.

The implementation of the "block" type of professional teaching experience offers another advantage. It allows those professional courses essential to certification to be taken at a time when the practical application of them is most possible, concurrently with the student teaching experience. Table 9 presents the scope of professional education at McPherson College as it relates to industrial arts education.

By totaling the distribution requirements and the professional requirements we find that from 80 to 87 of the total of 124 hours required for a degree may have been accounted for. Thirty seven to 44 college hours remain which may be devoted to electives, prerequisites, and the major area of concentration.

³⁰ Gustave S. Wall, "Dual Purpose Industrial Education at the College Level," Ph.D. Thesis, University of Minnesota, 1951, p. 263.

Table 9. Industrial arts professional education at McPherson College.
This meets Kansas requirements.

Areas of professional education	Where these courses occur		
	Within the teaching block	Department of Education and Psychology	Industrial Arts Department
Area A. 6 hours required courses toward understanding the pupil	Understanding the pupil, 6 hours		
Area B. 6 hours required courses directed toward the understanding of the function of the school as a social institution	Secondary school, 3 hours	Introduction to Education, 3 hours	
Area C. 8 hours required courses directed toward obtaining competence in instruction, 5 hours must be in student teaching	Supervised student teaching, 6 hours; (up to 8 hours available, 6 often taken to approximate a full semester load		History and methods of industrial arts, 3 hours
Area D. 4 hours departmental requirement		Driver education instructors course, 5 hours	
Total	15 hours	8 hours	3 hours

What sequential industrial arts curriculum may best be superimposed on the total curriculum to this point? The following objectives seem applicable in formulating such a curriculum.

The objectives of the streamlined curriculum shall be:

1. To enhance the general educational program of McPherson College in a manner that will not interfere with the general aim of the college which is "to offer a thorough liberal arts education".
2. To insure the fact that all industrial arts education majors will have at least a knowledge of the basic facts and principles involved in the areas of drafting, general woods, general metals, electricity, and power mechanics.
3. To provide a logical sequence of courses which will make it possible for students to fulfill the prerequisite requirements of supporting courses. Thus, these supporting courses can precede those industrial arts courses which are heavily dependent on such supporting courses. Example: General physics should precede electricity, auto mechanics, and machine tools. Algebra and trigonometry are physics prerequisites.
4. To establish a sequence of industrial arts courses which suggests continuity. Thus, drafting and knowledge gained in drafting becomes an intrinsic part of every subsequent industrial arts course. New emphasis on planning and problem solving in industrial arts can then become a realization.
5. To allow for early identification of industrial arts major students in classes where their potential can be scrutinized. This early identification is essential to effective counseling, either toward or away from a career in industrial arts teaching.
6. To provide the student in the industrial arts curriculum with an opportunity to pursue an area of special interest on an independent study basis in the last year of college.
7. To telescope the departmental offerings into 36 total hours which is 50% beyond the number of hours required for the industrial arts major. This streamlining is in keeping with the North Central Association of Colleges and Universities recommendation.

Table 10. Proposed method for streamlining present industrial arts curriculum.

Areas	Present Curriculum	Hours	Proposed Curriculum	Hours
1 Drafting	1 Introductory Engineering drawing	3	3 Engineering drawing	3 req.
	3 Engineering drawing	3	12 Machine drawing	2
	12 Machine drawing	2		
	122 Architectural drawing	3		
2 Woods	53 Woodworking	3	53 General wood-working	3 req.
	54 Woodworking	3	54 General wood-working	2 req.
	106 Advanced cabinet making	3		
3 Metals	51 Bench metal	3	General metalwork	2 req.
	52 Bench metal	3	General metalwork	3 req.
	57 Arc Welding	1		
	59 Acetylene welding	1		
	158 Advanced welding	1		
	161 Metal lathe	1	161 Metal lathe	1
	164 Machine tools	1		
4 Electricity	60 Practical electricity	3	160 Practical electricity	3 req.
5 Power mechanics	66 General mechanics	3	168 Auto mechanics	3 req.
	168 Auto mechanics	3		

Table 10. (concl.)

Areas	Present Curriculum	Hours	Proposed Curriculum	Hours
6 Professional	130 History and methods of industrial arts	3	130 History and methods of industrial arts	3 req.
Independent study	189-190 Problems in industrial arts	1-3	Advanced independent study in wood finishing, machine tools, power mechanics, drafting	2 req.
Other areas (service areas)	45 Arts and crafts	3	45 Arts and crafts	3
	46 Arts and crafts	3	46 Arts and crafts	3
	145 Arts and crafts	3		
	146 Arts and crafts	3		
	141 Wood and metal finishing	3		
	101 Industrial arts lab maintenance	2		
	65 Farm mechanics	3	65 Farm mechanics	3
			Industrial arts seminar	0 req.
	Total	66		36
	Required	24		24

The curriculum proposed in Table 10 places new responsibilities on the content in any given course. One obvious benefit of the "new look" is in the area of eliminating repetition. It is also obvious that with a more compact industrial arts curriculum the student's choice of areas of study is limited except in the area of independent study. The student may of course take additional hours beyond the major requirement.

Some of the deleted courses have an obvious relationship to courses in the compact curriculum. The streamlined curriculum is not complete unless those deletions which are essential to industrial arts are absorbed in another course. The following changes in emphasis and course content are essential to the successful implementation of the compact curriculum.

1. All courses become methods courses inasmuch as the student will be required not only to demonstrate skill in the orderly performance of the task at hand but also to demonstrate such skills to fellow classmen on a class assignment basis. Future teachers, industrial personnel going into industry, and students taking industrial arts as an elective can profit equally by this.
2. All courses must emphasize problem solving in a new and dramatic way. The early engineering drawing experience must become a continuing experience, finding a practical application in all subsequent industrial arts courses.
3. All courses must require the use of basic instructional material and written assignment. This could serve as a means of interjecting the large amount of related information which is a vital part of industrial type subjects.
4. McPherson College industrial arts should be alert in pointing out that industrial arts is basically applied science and art, and no effort should be spared in applying scientific and physical principles in every pertinent way.

5. Wood and metal finishing becomes a part of general wood, general metals, and other subsequent courses of this nature.
6. All lab maintenance problems dealing with the machines and equipment necessary in the orderly procedure of the laboratory experience become a part of that laboratory experience.
7. The general metals area must be expanded to include the welding experience.

In applying the streamlined industrial arts curriculum and its prerequisites it may be seen that the student is in contact with the department in all semesters of his college career. It may be observed also that all prerequisites to the electronics course (Physics 107) are complete, thus affording the student this additional educational opportunity. Thus, the third phase of teacher education, specialization, would occupy the industrial arts education major as shown in Table 11.

It may be observed that although the curriculum revision is substantial those general courses which have appeal to college students interested in electives in industrial arts have not lost their identity. They may actually serve better in these capacities.

THE STUDENT IN THE EMERGING CURRICULUM

Various new curriculum patterns have been developed in colleges and universities for the preparation of industrial arts teachers. None of these could get off the ground without qualified candidates. The potential for teaching and learning that is inherent in industrial arts facilities has never been fully recognized or utilized. The same upgrading that is appar-

Table 11. Distribution of required industrial arts courses with prerequisites and sequence.

1st semester	Hours	2nd semester	Hours
Freshman Year			
General college chemistry	5	General woodworking	3
Engineering drawing	3	Trigonometry	3
General woodworking	2		
Algebra	3		
Sophomore Year			
General physics	4	General physics	4
General metals	2	General metals	3
Junior Year			
Electricity	3	History and methods of	
Introduction to education	3	industrial arts	3
Senior Year			
Teaching block	15	Auto mechanics	3
Industrial arts seminar	0	Independent study	2

ent in other areas of study must take place in industrial arts. This is not to say that the responsibility of the college or the industrial arts teaching staff is lessened but the responsibility of the student to the industrial arts department and the general profession must be more clearly defined.

At the outset it should be made explicitly clear to all potential industrial arts education majors that a proper balance of academic ability and a unique native skill, and interest in the realm of studies encompassed by industrial arts is essential for maximum proficiency in industrial arts education. It is the author's frank opinion, such opinion formulated by twelve years of observation of future teachers in various phases of

development, that too often the minimum requirement is the future teacher's major preoccupation. Most industrial arts candidates have genuine interests in this field; some are found in this curriculum because of some momentary lapse in the counseling procedure.

It is possible that industrial arts has at times left the mistaken impression that this field of study is offered "in lieu of" rather than "in addition to" the traditional college curriculum. Some really successful industrial arts candidates could do equally well in several areas but prefer industrial arts. Industrial arts is extra or in addition to that which is expected of the average college student making his way from classroom to classroom.

The question as to whether industrial arts is "hard" or "soft" has been raised with some degree of regularity in recent times. It is the author's opinion that no one would take the initiative in posing the question if there were not something in the history of industrial arts that would indicate that it has been soft. In the past industrial arts has too often been focused in the direction of the slow learner. Let the industrial arts education student take note of the fact that industrial arts will be hard whenever and wherever the job is properly done. The question is, "Has anyone ever achieved perfection?" As long as no one has achieved this level of attainment there is work to be done. Industrial arts education is assured of a never ending task.

One of the objectives of providing for shop work in the freshman and sophomore year is to allow the instructor to observe a prospective industrial arts candidate in action. It may well be that a student who cannot successfully complete even a simple project in wood will occasionally find his way into the woodworking class. (He may build a bird house, but no self-respecting bird would live in it.) It is difficult, indeed impossible, to visualize such a student assuming professional attitudes toward industrial arts. Some degree of skill and the successful demonstration of such skill is a responsibility of the student. A professional attitude cannot precede this.

The curriculum may provide for the essential elements in the area of professional courses. This suggests another problem; is professional growth a terminal thing or is it a continuous process? Too often the student's first introduction to this vital aspect of industrial arts is in the student teaching experience. The formulating of professional attitudes is an inseparable part of all industrial arts courses and should continue after commencement. One educator lists the lack of a professional attitude as number one in his list of causes of industrial arts teacher failure.³¹

It may become necessary in the near future to extend the industrial arts education curriculum and other education cur-

³¹ Armin F. Gimbel, "Summary of a Study on the Granting of Credit for Manipulative Work," Industrial Arts and Vocational Education, May, 1954, p. 164.

riculums beyond the customary four years. The addition of even a few new requirements could make this a necessity. The student should not assume that a contract to properly prepare him to teach in four years exists.

Assuming that the student has completed the college curriculum to the satisfaction of all concerned, is he assured of nomination to a teaching position in the field of his choice? Most state industrial arts curriculum guides list three teacher qualifications as essential; a broad cultural and academic background, a high degree of skill and craftsmanship, and the ability to teach. Save for the last item (college training can only provide guidance in this area) these are the qualifications the industrial arts teacher training departments insist that the students have. It may be said then that for the most part, industrial arts teacher training institutions and those agencies which are concerned with the employing of the products of these departments do present a "united front".

The responsibilities of the industrial arts student in the industrial arts curriculum have not been lessened by the streamlining action. It may be said that the streamlining was a necessary accomodation to him, an accomodation which allows him to become a better educated person in the liberal sense. The student thus becomes free to pursue a very difficult task.

ACKNOWLEDGMENT

The author wishes to express his sincere appreciation to the many persons who have in one way or another contributed in the preparation of this work.

Special thanks are due Dr. Desmond W. Bittinger, President of McPherson College and Dr. Wayne F. Geisert, Dean of McPherson College, for their stimulating counsel and encouragement in the resolving of the question of industrial arts in the liberal curriculum. Similar thanks are due Dr. Merlin Frantz, Chairman of the Education Department, Alice B. Martin, Registrar, and Professor S. M. Dell, Chairman of the Industrial Arts Department, for access to their departmental records.

The author is especially grateful to Professor Earl G. Darby, his major professor and sponsor of this study for his time and constructive criticism.

Last but not least, the author wishes to express his deep obligation to his wife Ruthe, for her secretarial assistance and patience during the preparation of this manuscript.

REFERENCES

- 1 American Vocational Association. A Guide to Improving Instruction in Industrial Arts. Washington: American Vocational Association, 1953.
- 2 Bakamis, William A. The Supervision of Industrial Arts. Milwaukee: Bruce Publishing Company, 1954.
- 3 Baskin, Samuel. Quest for Quality. United States Department of Health, Education, and Welfare, Office of Education Bulletin 50016. Washington: Government Printing Office, 1960.
- 4 Bawden, William F., and others. Industrial Arts in Modern Education. Peoria: Manual Arts Press, 1934.
- 5 Bennett, Charles Alphens. History of Manual and Industrial Education, 1870 to 1917. Peoria: Manual Arts Press, 1937.
- 6 Better Utilization of College Teaching Resources. A report by the Committee on Utilization of College Teaching Resources. New York: The Fund for the Advancement of Education, 1959.
- 7 Cunningham, William F. General Education and the Liberal College. St. Louis: B. Herder Book Company, 1953.
- 8 Ericson, Emanuel E. Teaching The Industrial Arts. Peoria: Charles A. Bennett Company, 1956.
- 9 Feirer, John L. "Editorial." Industrial Arts and Vocational Education. September 1959, 48: 195.
- 10 Friese, John F. Course Making in Industrial Education. Peoria: Manual Arts Press, 1946.
- 11 Gimbel, Armin F. "Summary of a Study on the Granting of Credit for Manipulative Work." Industrial Arts and Vocational Education. May 1954, 43: 162-164.
- 12 Groneman, Chris H. "Effective Training of Industrial Arts Teachers." Industrial Arts and Vocational Education. April 1954, 43: 127-130.
- 13 Hall, Robert O. "Evolution of and Trends in Industrial Arts Education in the Secondary School." Unpublished Master's Thesis, Kent State University, Kent, Ohio, 1948.

- 14 Hatch, Winslow R., and Ann Bennet. Effectiveness in Teaching. United States Department of Health, Education, and Welfare, Office of Education Bulletin 50006. Washington: Government Printing Office, 1960.
- 15 Irish, Josie Clinton. Developmental Study of Comprehensive General Shop. Unpublished Master's Thesis. Colorado A. and M. College, Fort Collins, Colorado, 1949.
- 16 Jones, Howard Mumford. Education and World Tragedy. Cambridge: Harvard University Press, 1940.
- 17 Jones, Walter Benton. Problems in Teaching Industrial Arts and Vocational Education. Milwaukee: Bruce Publishing Company, 1958.
- 18 Maritain, Jacques. Education at the Crossroads. New Haven: Yale University Press, 1943.
- 19 Mays, Arthur B., and Carl H. Casberg. School Shop Administration. Milwaukee: Bruce Publishing Company, 1943.
- 20 McGovern, Troyce D. "Selecting Industrial Arts Solids from Industry." Industrial Arts and Vocational Education. June 1960, 49: 17.
- 21 Myers, Ward L. "The Next 20 Years in Industrial Arts." Industrial Arts and Vocational Education. October 1951, 40: 317-318.
- 22 National Science Foundation. Scientific and Technical Personnel in Industry. National Science Foundation Bulletin 61-75. Washington: National Science Foundation, 1960.
- 23 Reeves, Floyd W., and others. The Liberal Arts College. Chicago: University of Chicago Press, 1932.
- 24 Siro, Einar E. "Preparation and Upgrading Industrial Education Personnel." Industrial Arts and Vocational Education. June 1951, 40: 223-225.
- 25 Stowe, A. Monroe. Modernizing the College. New York: Alfred A. Knopf, 1926.
- 26 Vaughn, Samuel J. and Arthur B. Mays. Content and Methods of the Industrial Arts. New York: Century Company, 1924.
- 27 Wall, Gustave S. "Dual Purpose Industrial Education at the College Level." Ph. D. Thesis, University of Minnesota, 1951.

- 28 Wilber, Gordon O. Industrial Arts in General Education. Scranton, Pennsylvania: International Textbook Company, 1954.
- 29 Wilkins, Ernest Hatch. The Changing College. Chicago: University of Chicago Press, 1927.
- 30 Wriston, Henry M. The Nature of the Liberal College. Wisconsin: Lawrence College Press, 1937.
- 31 Yokum, A. D. Culture, Discipline and Democracy. Philadelphia: Christopher Sauer Company, 1913.

A STREAMLINED CURRICULUM FOR INDUSTRIAL ARTS EDUCATION
AT MCPHERSON COLLEGE - LIBERAL ARTS COLLEGE

by

ALVIN E. WILLEMS

B. S., McPherson College, 1950

AN ABSTRACT OF A MASTER'S THESIS

submitted in partial fulfillment of the

requirements for the degree

MASTER OF SCIENCE

Department of Education

KANSAS STATE UNIVERSITY
Manhattan, Kansas

1962

The principle aim of this study was to re-establish and to re-evaluate the place of industrial arts in the McPherson College curriculum and to set forth the curriculum changes necessary for its adequate and efficient functioning. Industrial arts as a field of study by virtue of the fact that it is geared to that phase of our modern life which is most dynamic, our industrial society, must be cognizant of developments in its field. This recognition cannot take the form of adding a new course each time a new industrial process is developed. Thus, this was basically a search for a compact curriculum for industrial arts.

Involved here is the collection of data pertinent to this manuscript. The analysis approach was used in the processing of this data. When possible, this was put into tabular form.

Literature pertaining to acceptance of industrial type subjects in the liberal curriculum was useful to that aspect of this study. The information useful to establishing discernable trends in industrial arts also serves to suggest a direction for this area of study. The analysis of college curriculums and state curriculum guides was most useful in establishing a standard curriculum. Basically, this study was the organizing of cumulative industrial arts information into a formal body of facts which would suggest a curriculum streamlining action.

This was a search for a core of industrial type subjects which stand out as basic, have significance the world over, and have withstood the test of the space age. The findings show that this unified body of industrial type subjects included

the following areas:

1. Technical drawing.
2. General metalworking.
3. Electricity and electronics.
4. General (or power) mechanics.
5. General woodwork.

The findings further show that there is close agreement on what industrial arts departments should teach. In all probability this is due to the agitation for a national industrial arts curriculum. The trend seems to be toward the including of more mathematics, applied science, planning, and artistic skill, toward the elimination of frill courses.

Most colleges and universities that offer industrial arts also offer a teaching major in this field. Most specify a thorough liberal arts background for industrial arts majors. This is the unique problem of industrial arts at McPherson College. The proposed streamlined curriculum provides for the McPherson College industrial arts student to meet the liberal education requirements, obtain the proper prerequisites, meet the departmental requirements in proper sequence, and meet the education department requirements.