Is Industrial Arts Benefitting a Representative Population of Kalamazoo Central High School Boys?

D. John Lucas

Follow this and additional works at: https://scholarworks.wmich.edu/masters_theses

Part of the Art Education Commons

Recommended Citation
https://scholarworks.wmich.edu/masters_theses/5076
IS INDUSTRIAL ARTS BENEFITTING A REPRESENTATIVE POPULATION
OF KALAMAZOO CENTRAL HIGH SCHOOL BOYS?

A Thesis Submitted to the Graduate Faculty of the
School of Education as Partial Fulfillment of the Requirements
for the Degree of Master of Arts.

By
D. John Lucas

University of Michigan
July, 1950
Ann Arbor, Michigan
ACKNOWLEDGEMENTS

The author wishes to express his appreciation to all who helped make this study possible—to Mr. Archie P. Nevins, supervisor of industrial arts of the Kalamazoo Public Schools, for his counsel; to Mr. Eugene Thomas, Principal of Kalamazoo Central High School, for his permission of access to students' personal records; to Dr. George Mallinson of Western Michigan College for his aid in formulating plans for this study; and to Dr. Deyo Fox for his direction and advice.
# TABLE OF CONTENTS

<table>
<thead>
<tr>
<th>CHAPTER</th>
<th>INTRODUCTION—EXPLANATION OF THE PROBLEM.</th>
<th>PAGE</th>
</tr>
</thead>
<tbody>
<tr>
<td>I</td>
<td>INTRODUCTION—EXPLANATION OF THE PROBLEM.</td>
<td>1</td>
</tr>
<tr>
<td>II</td>
<td>EXPLANATION OF PROCEDURES AND METHODS OF STUDY.</td>
<td>16</td>
</tr>
<tr>
<td></td>
<td>Selection of Subjects</td>
<td>16</td>
</tr>
<tr>
<td></td>
<td>Explanation of Variables.</td>
<td>19</td>
</tr>
<tr>
<td>III</td>
<td>THE SINGLE VARIABLES ANALYZED</td>
<td>24</td>
</tr>
<tr>
<td></td>
<td>Chronological Age</td>
<td>24</td>
</tr>
<tr>
<td></td>
<td>Intelligence.</td>
<td>25</td>
</tr>
<tr>
<td></td>
<td>Academic Achievement.</td>
<td>27</td>
</tr>
<tr>
<td></td>
<td>Socio-Economic Status</td>
<td>32</td>
</tr>
<tr>
<td></td>
<td>Vocational Ambitions.</td>
<td>41</td>
</tr>
<tr>
<td></td>
<td>Personality Rating.</td>
<td>44</td>
</tr>
<tr>
<td></td>
<td>Family Life</td>
<td>50</td>
</tr>
<tr>
<td>IV</td>
<td>SUMMARY OF THE STUDY</td>
<td>52</td>
</tr>
<tr>
<td>V</td>
<td>INDUSTRIAL ARTS—AN ESSENTIAL ELEMENT IN THE GENERAL EDUCATION OF ALL BOYS</td>
<td>55</td>
</tr>
<tr>
<td></td>
<td>It is a Definite Part of General Education.</td>
<td>55</td>
</tr>
<tr>
<td></td>
<td>It Meets Students' Needs in a Democratic Industrialized Society</td>
<td>63</td>
</tr>
<tr>
<td></td>
<td>The Need for Recognition of Industrial Arts As a Part of the Regular Curriculum.</td>
<td>65</td>
</tr>
<tr>
<td></td>
<td>Industrial Arts Gaining in Prestige.</td>
<td>70</td>
</tr>
<tr>
<td></td>
<td>Factors Affecting the Standing of Industrial Arts in the Schools of Today.</td>
<td>70</td>
</tr>
<tr>
<td>VI</td>
<td>CONCLUSIONS AND RECOMMENDATIONS OF THE STUDY.</td>
<td>79</td>
</tr>
<tr>
<td></td>
<td>BIBLIOGRAPHY.</td>
<td>85</td>
</tr>
</tbody>
</table>
LIST OF TABLES

<table>
<thead>
<tr>
<th>TABLES</th>
<th>PAGE</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Units of Industrial Work Elected by Both Groups</td>
<td>13</td>
</tr>
<tr>
<td>2 Chronological Age in Months of Both Groups</td>
<td>24</td>
</tr>
<tr>
<td>3 Contrast of C. Q. Ratings</td>
<td>25</td>
</tr>
<tr>
<td>4 Distribution of C. Q. Ratings</td>
<td>26</td>
</tr>
<tr>
<td>5 Distribution of Grades for the Groups in United States History I and II and in English V and VI</td>
<td>29</td>
</tr>
<tr>
<td>6 Occupations of Fathers in Both Groups</td>
<td>36</td>
</tr>
<tr>
<td>7 Residential Distribution According to City Rental Areas</td>
<td>39</td>
</tr>
<tr>
<td>8 Vocational Ambitions of the Two Groups</td>
<td>42</td>
</tr>
<tr>
<td>9 Distribution of Ratings in Personality Traits</td>
<td>46</td>
</tr>
<tr>
<td>10 Number of Children in Families of Each Group</td>
<td>50</td>
</tr>
</tbody>
</table>
# LIST OF FIGURES

<table>
<thead>
<tr>
<th>FIGURE</th>
<th>PAGE</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Units of Industrial Arts Elected</td>
</tr>
<tr>
<td>2</td>
<td>Distribution of C. Q. Ratings</td>
</tr>
<tr>
<td>3</td>
<td>Distribution of Eleventh Grade English Marks</td>
</tr>
<tr>
<td>4</td>
<td>Distribution of Marks in United States History</td>
</tr>
<tr>
<td>5</td>
<td>Intelligence Classification of Fathers' Occupation</td>
</tr>
<tr>
<td>6</td>
<td>Residential Distribution According to City Rental Areas</td>
</tr>
<tr>
<td>7</td>
<td>Vocational Ambitions</td>
</tr>
<tr>
<td>8</td>
<td>Distribution of Ratings in Personality Traits</td>
</tr>
<tr>
<td>9</td>
<td>Distribution of Ratings in Personality Traits</td>
</tr>
<tr>
<td>10</td>
<td>Distribution of Ratings in Personality Traits</td>
</tr>
</tbody>
</table>
CHAPTER I

INTRODUCTION—EXPLANATION OF THE PROBLEM

Statement of the problem.--It has long been the desire of the author to discover for himself and for others whether or not the beneficial experiences of industrial arts, as taught in the Kalamazoo Central High School, are being enjoyed by a typical cross section of the total number of boys enrolled in the school. Is industrial arts benefitting boys who are representative of the total population, or is it proving of benefit to a number who are characteristically different from those not electing it? This problem is one of concern not only to the author but to other fellow teachers and administrators as well. It is one that is immediate and important to the professional planning and attitude of the teachers and also to the welfare of all the male students.

Definition of industrial arts. Industrial arts, as it will be considered in this paper, is defined as "those phases of general education which deals with industry, its organization, materials, occupations, processes, and products, and with the problems resulting from the industrial and technological
nature of society.\textsuperscript{1}

It is a curriculum area rather than a subject or course, being in this respect comparable to the language arts. It has a definite place and function in public schooling, and is an essential part of general education.

As a part of general education, industrial arts has objectives identical with the accepted objectives of any good high school program— that of educating the whole child into a useful, happy, and successful citizen. It supplements and aids general education "by providing experiences which will fit the individual through his knowledge, skills, attitudes, and accomplishments to be more useful as a producer, more appreciative as a customer, and more valuable as a citizen".\textsuperscript{2}

It contributes to complete living because it meets needs that are real and satisfies impulses that are inherent. It contributes in a unique and wholesome way to social awareness and morale. The learnings come through the pupil's experiences with tools and materials, and through his study of the resultant conditions in life. Reading, discussion, observation, and experiments are combined with participation in activities which


permit the discovery and development of creative and artistic abilities.

Plan of Kalamazoo Central High School for boys participating in industrial arts. It is the established plan for all those entering Kalamazoo Central High School as sophomores, to have a tentative program of classes planned and set up, with the guidance of home-room teachers in the various junior high schools in the city. This is done prior to the students' actual entrance into Central High. For grades eleven and twelve, students are advised by their respective home-room teachers concerning their future course of study. Subjects are chosen in accordance with the academic and vocational plans a student might have. Students planning to attend college take the academic course, which requires two majors (one of which must be English), consisting of three units each, and two minors, consisting of two units each. A unit comprises one full year of work. It is necessary that the minors be in the field of science, mathematics, social science, or language.

In addition to the academic course, there is also the business course, and the general course. The general course consists for the most part of either home economics or industrial arts subjects. Every student is obliged to take English V and VI and United States History I and II regardless of the course he pursues. Twelve units are required for graduation.
It can be seen then that industrial arts is an elective subject; is not absolutely required of any student; and is, for the most part, elected by those pursuing a general course. The public schools have been so organized that not much choice in studies is possible before the senior high school, but, beginning with the tenth grade, fundamental cleavages make their appearance. Ambitions, interests, aptitudes, administrative practices, home influences, and the like, begin to manifest themselves in whatever choice of subject matter or courses is permitted.

Background of the problem. The practice being to offer industrial arts on an elective basis, the group taking it becomes self-selective. This fact presents a question to administrators, curriculum committees, and industrial arts teachers. Does this self-selected group of boys form a cross section of the senior high school population? One might ask, "Are they typical of the 'general run'?" For several years, the investigator has had a personal opinion to the contrary. It has been his feeling that the industrial arts department has served as a "dumping ground" for the misfits, the mal-adjusted, and for those boys of below average intelligence. This opinion, candid and brusque as it may seem, is not one of hasty formulation, but is one that has been building up
during several years of teaching in the department and through various experiences with the students themselves.

A noticeable lack of fundamental learning in spelling, English, simple arithmetic, and reading helped substantiate this opinion. A seeming unconcern and indifferent attitude toward any school work on the part of many, and the admitted fact of going to school "to put in time" by others, were additional factors that added to the opinion. The avowed dislike by a great number for any so called "academic" subject whatsoever and the hearty dislike for "written work", made the author wonder if all students were of similar nature, or if industrial arts boys were different from the rest. Another contributing factor that added to the aforesaid opinion was the experience of having students, now and then, who were so called "drop outs" from the academic course, referred to the author for inclusion in some one of his classes. Why should they always be referred to industrial arts? How many such students, unable to do academic work, were now taking industrial arts? Exactly what kind of students do industrial arts teachers strive to teach? Are they the sub-standard type as presupposed, or are they like most of the other boys in the high school? Is industrial arts attracting a certain type of student, or is it serving a representative group? These were questions that were troublesome and which needed answering by means of some con-
clusive evidence. Fellow teachers, noting repeatedly that industrial arts students were frankly referred to as "the kind you have", were concerned also, but there seemed no available answer. All were of the same opinion that on the surface it appeared that industrial arts was benefitting only a certain type of student, but none had real evidence to validate the sentiment.

The hypothesis—**that differences actually do exist between those electing industrial arts and those not electing it.**—In attempting to solve this momentous and vexing problem, the investigator assumed the hypothesis that a representative population of high school boys do not benefit from industrial arts experiences offered and that there are actual factors that differentiate those who elect industrial arts from those who do not. This hypothesis was based on the above mentioned personal observations of himself and other teachers as well as other significant contributing factors among which is the nature of the subject itself and its status in the curriculum.

Being mostly manipulative in character, often times industrial arts is assumed to be for those "who can work with their hands but not with their heads". However, it appears that this is an outmoded theory. There is the supposition that work with tools and materials is only for practical, materialistic aims, and for vocational purposes, while study
through the media of books is for those with more lofty ambitions. The time-honored, well established academic fields seem to be a powerful influence in the curriculum, and consume a large part of the students' time. They tend to crowd out the industrial arts subjects because they have greater esteem not only with students, but also with parents and teachers. For the most part, industrial arts subjects may be erroneously considered as "special", having no part in general culture and citizenship training. They are traditionally and falsely assumed to be less honorable and to constitute an independent area of study.

College recommendations greatly influence the choice of subject selection. To follow the academic course rigidly, gives little if any opportunity to elect an industrial arts course, even if the student sincerely desired to do so. Even more than the recommendations it sets up, the influence of the college goes further. It exerts enormous prestige; the pattern of education it represents has the respect of many. Consequently, students, even though they have no serious aim of entering college, follow a similar pattern of college preparatory education for the so-called "nobility" it represents, even if it fails to meet their immediate and vital needs. Academic over-emphasis has eliminated the opportunity of enjoying the benefits of industrial arts experiences.
Further and more precise study needed. All the foregoing observations as to the status of industrial arts in the high school program and its relation to other subjects, combined with the apparent though not conclusive opinion that only a "certain type" of student elects it as a subject, surely seemed to warrant further and more precise study—a study of those pursuing industrial arts as an area of study and those following the requirements of other curricula.

A comparative study of each of the groups seemed logical and feasible. A comparison of the academic accomplishments of each group, together with the homelife factors of each, seemed to offer some assurance of gaining a more positive picture of how the two groups were alike or were different. So it was determined to establish on the basis of various measurements if it actually was possible to differentiate those boys electing industrial arts from those not electing it. Was there a marked all-around difference that could be pointed out by actual comparative study or was the supposed difference just a false misleading assumption?

Significance of the study. The results of such a comparative study could have a far reaching effect. Its findings could determine the future place of industrial arts in the school curriculum. Were enough taking industrial
Arts to justify its outlay of expensive equipment and its staff of trained teachers? If those taking industrial arts were found to be essentially "different", was industrial arts offering them what they needed for good all around citizenship training? Were those not taking industrial arts finding comparable beneficial experiences in some other area of study or should they be required to take some industrial arts subjects for the benefits it would give them? If industrial arts was found to be appealing to just a certain type, what could be done to attract other types of boys to the field?

The welfare of all the boys themselves also seemed at stake, for if the characteristics of the industrial arts students were essentially different, perhaps not only the attitude of the teachers should be changed, but also their methods and teaching devices should be altered so as to better develop the aptitudes, abilities, and habits of the boys they were wont to teach. Perhaps a special understanding of their students' peculiar problems and behavior mannerisms would need to be cultivated. If the basis was established that industrial arts catered to a group not representative of all the boys, the non-industrial arts boys' well-being would also need to be considered and some means developed
whereby they too could profit by industrial arts experiences and develop certain desirable ideals, habits, and accomplishments that industrial arts provides in a unique way.

Statement of procedure.--In the investigation of the hypothesis that the two groups can be differentiated, the method in general was to decide upon the differentiating factors to be considered and then to decide upon the comparative studies that would measure these factors fairly and objectively.

The normative-survey method of research was used in the treatment of the problem. As common to this type of research, there was a gathering of data regarding conditions which prevailed in the two groups chosen for study. The status of each group was indirectly observed and carefully studied through means of tests, lists, rating scales, and score cards.

There are many traits and characteristics in which industrial arts boys and non-industrial arts boys might possibly differ. However, it must be realized that to study any great number of them would hardly be possible in a single research project of reasonable length. The present investigation, therefore, is limited to a study of the following variables:

- chronological age
- intelligence
- personality rating
- academic achievement
- socio-economic status
- vocational ambitions
- family life
The male graduates of June 1948 and of June 1949 were the boys selected for the comparative study of those electing industrial arts and those not electing it as a school curriculum.

Limitations confronted in the study.—There were some specific limitations which faced the author in his study. One of these was the restriction of certain variables which promised to be interesting and of significance in comparing the groups, but which could not be used because of their apparent invalidity. One such variable, was that concerning the extra-curricular activities and hobbies of the boys in each group. It was discovered that there was a scarcity of information concerning this factor. Data of this nature were found for only a small minority of boys in both groups.

Educational plans of boys in each group also seemed revealing in discovering a possible difference between the two groups. Here, too, there was lack of sufficient information. The educational plans of most of the boys could not be found in the data examined.

The factors of school attendance, truancy, and "drop-outs" appeared to offer still other sources of comparative study, but in these also, there were limitations that could not be surmounted. Many of the truancy and "drop-out" cases
did not become graduates and so were not the boys which had been selected for study. Furthermore, attendance information was found on records other than those used in obtaining the rest of the data, and since names of the boys selected for study were not tabulated, it was impossible to match the records.

There were still other variables which had to be discarded in comparing the two groups. One of these was the California Test of Personality which measured a pupil's total personality adjustment, and the other was the Under Preference Test, which measured a pupil's aptitudes and interests in nine different vocational fields. It was found that a majority of the students had taken these two tests, but they had checked the scores themselves. The scores were found to be most confusing and unreliable; some were scored on the percentile basis, while others were scored on the raw score basis, and either way, many were found to be very inaccurate. As a result, these two tests could not be used in the study.

In the study of the socio-economic status of the boys, where a comparison was made of the residential distribution according to city rental areas, some of the homes of the boys could not be classified because they were not within the city limits. There were also limitations in comparing the intelligence classification of the fathers' occupations which came under the same area of study. Where there was not sufficient
information regarding the type of work done in a stated concern or factory, the occupation could not be classified.

The records of some of the boys had to be discarded altogether because of incomplete data. A considerable number of graduates, having been in the armed forces, took a prescribed mental achievement test upon their discharge. If passed satisfactorily, the test could be used as a waiver for some regular high school courses, thus hastening the time of graduation, and restricting the amount of information on the records.

**The need for delimiting the study.**—Because of time and circumstances, the author had to delimit the study in several ways. In the first place the number of boys selected for study was confined to the 1948 and 1949 June graduates. This number was considered sufficient for comparative study. A number much greater, than that used, would have resulted in unwieldy groups, difficult to study carefully. In addition, if graduates prior to the years of 1948 and 1949 had been selected for study, there would have been the likelihood of not giving a true picture of the boys' high school career, due to the adjustment problems of the immediate post-war years.

Only the data found in personal cumulative record
folders were used. Since the subjects were all graduates, no personal interviews could be given. Furthermore there were no follow-up questionnaires sent. Although it may have been interesting to further compare the groups in their adaptation to life outside of school, time would not allow this technique of further study.

There were additional ways in which the author found it necessary to delimit his study. One of these was a comparative investigation of the boys electing industrial arts as a school curriculum in other high schools of similar size, to determine if the situation at Kalamazoo Central High School were representative of other high schools or were peculiar to itself. There could also have been an investigation of the average practice of boys electing industrial arts, not only in schools of similar size, but also of smaller size and in towns of different population and make-up.

The opinion of educational experts as to the significance of the study had to be eliminated from the study, as well as full recommendations in terms of a concrete working program to help solve the problem here with presented.

Plan of study.—The following chapter will outline more completely reasons why the subjects selected were so chosen, and will tell how they were divided and equated into
industrial arts and non-industrial arts groupings. It will also explain the reasons for choosing the particular variables that were selected, give more pertinent facts concerning each, and tell how and where the data were found.
CHAPTER II
EXPLANATION OF PROCEDURES AND METHODS OF STUDY

Selection of Subjects

Boys selected for the study. -- In order to obtain a clear and recent picture of the entire course of senior high school boys, it was decided to select for study the 1948 and the 1949 June graduates. The information concerning the boys was found in the school files, where pertinent data on each student is kept in cumulative record folders and is treated in a most confidential manner.

Basis for grouping. -- The graduates were classified as industrial arts students or as non-industrial arts students, according to the number of units of shop work they pursued. If a boy elected four or more units of shop work, he was placed into an industrial arts group; if a boy elected three or less units, he was placed into a non-industrial arts group. (One unit comprises one year of work).

This arbitrary classification seemed a valid one, since the academic student in order to fulfill the curriculum requirements, must take 10 out of 12 units in English, history, science, or mathematics, being allowed only two units of elective work, or possibly three if he chose to take five subjects
one year. Thus, a boy pursuing more than three elective subjects would be recognized as not following the academic course. Besides eliminating the academic student, the four, or more, unit category gave a true basis for industrial arts interest, indicating a student's genuine desire for industrial arts work and not a mere happenstance of selection in a sort of general mixture of subjects.

It was found that of all the male graduates' courses of study examined, more than twice as many were non-industrial arts as industrial arts. It was discovered that less than one third could be classified as industrial arts. For the most part, a boy was found to be either an academic or an industrial arts student; there were very few who elected business courses or a "hodge-podge" of subjects.

Groupss equalized in number.---To equalize the groups, for a proportionate picture of each, the non-industrial arts group was made equal to the industrial arts group. In alphabetical arrangement, every other record of the non-industrial arts students was selected for more careful study. There were found to be 123 industrial arts students; therefore, 123 non-industrial arts records were chosen at random to equate the numbers.

Comparison of industrial arts units elected.---In the industrial arts group, it was discovered that the average
number of units elected in industrial arts work was six and nine-tenths, or approximately seven units per student. This is significant when one realizes that the total number of units taken in senior high school is twelve, or possibly thirteen or fourteen by special permission.

On the other hand, non-industrial arts boys elected an average of three-fourths of a single unit of industrial arts work per student. Almost fifty-eight per cent of them elected none whatsoever.

Of all 246 boys in both groups, fewer took three or four units than any other number, another indication of the validity of the arbitrary division of the two groups at this point.

Table 1 gives the distribution of units of industrial arts work elected per student in each group. Figure 1 presents these data in graphic form.

| TABLE 1 |

UNITS OF INDUSTRIAL ARTS WORK ELECTED BY BOTH GROUPS

<table>
<thead>
<tr>
<th>Units of work</th>
<th>Number of students</th>
<th>Percentage of group</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>71</td>
<td>57.6</td>
</tr>
<tr>
<td>1</td>
<td>22</td>
<td>17.9</td>
</tr>
<tr>
<td>2</td>
<td>19</td>
<td>15.4</td>
</tr>
<tr>
<td>3</td>
<td>11</td>
<td>8.9</td>
</tr>
</tbody>
</table>

Average .75 or 3/4 unit per student
PERCENTAGE OF EACH GROUP

- INDUSTRIAL ARTS
- NON INDUSTRIAL ARTS

FIG. 1 | UNITS OF INDUSTRIAL ARTS CREDIT
Table: Industrial arts group

<table>
<thead>
<tr>
<th>Units of work</th>
<th>Number of students</th>
<th>Percentage of group</th>
</tr>
</thead>
<tbody>
<tr>
<td>4</td>
<td>13</td>
<td>10.5</td>
</tr>
<tr>
<td>5</td>
<td>16</td>
<td>13.0</td>
</tr>
<tr>
<td>6</td>
<td>23</td>
<td>18.7</td>
</tr>
<tr>
<td>7</td>
<td>23</td>
<td>18.7</td>
</tr>
<tr>
<td>8</td>
<td>20</td>
<td>16.2</td>
</tr>
<tr>
<td>9</td>
<td>22</td>
<td>17.9</td>
</tr>
<tr>
<td>10</td>
<td>6</td>
<td>4.9</td>
</tr>
</tbody>
</table>

Average 6.9 or approximately 7 units per student

Explanation of Variables

Reasons for choice.—In the investigation of the hypothesis that the two groups can be differentiated, the first decision was to select the variables to be studied. It was decided to select those variables, information concerning which could be procured from the cumulative records. They were factors which were easily obtainable, were from reliable sources, and were representative of the various phases of a student's school and home life.

As stated before, there are, no doubt, many traits and characteristics, in which the two groups might differ; however, in a research paper of reasonable length, it would be hardly possible to study any great number. The investigation was confined, therefore, to a study of seven variables.

Chronological age.—The first of these variables for study was chronological age. That there might be a difference in the age average of the two groups seemed possible. The
exact information about the ages of the subjects was found on the record sheets and was figured in terms of months.

Intelligence.--Another single variable deemed of importance in contributing to the differentiation was intelligence. A uniform measurement of that trait was the Terman-McNemar test given to all tenth graders on their arrival in Central High School by Mr. Russell Doney, Director of Research and Guidance for the Kalamazoo Public Schools.

Academic achievement.--Academic achievement seemed another variable which tended to further mark the difference in the two groups. It was decided to measure this factor in the two subjects required of all high school students for graduation, namely, English V and English VI, comprising one unit, and United States History I and United States History II, comprising one unit of work, both usually taken in the eleventh grade. These are the only two subjects required by every high school student and so seemed a fair basis for comparing academic ratings, especially when it is considered that all high school students are divided into "x, y, or z" ability groupings for class study of basic, required subjects.

Personality traits.--That there might be a differentiation of the two groups as determined by personality traits seemed possible. Consequently, the various personality characteristics as judged by the individual home-room teachers
were carefully analyzed and tabbed. Each student was rated as high, average, or low in the following traits of personality: cooperation, dependability, executive ability, emotional control, industry, initiative, integrity, perseverance, and personal appearance. These qualities, rated one, two, or three, were tabbed and a comparison made of the degree of excellence of both groups.

Socio-economic status.--Economic conditions often strongly influence educational choices, and it seemed highly probably that economic conditions might be a variable of considerable influence in the election or non-election of industrial arts. The father's economic condition was chosen as a good index of a boy's socio-economic status, giving some idea of a parent's position on the social scale as well as a fair indication of his economic earnings.

The home address also appeared as a telling factor in revealing the socio-economic standing of a family. Each home address was charted on a large city map and classified according to the various zoning and rental areas.

Vocational ambitions.--It seemed a reasonable assumption that the occupation which a boy would be likely to follow might directly or indirectly influence him in choosing between industrial arts and some other school subject. For example,
a boy may elect industrial arts because he believes the subject will have some prevocational value. On the other hand a boy's chosen vocation may require a college preparatory course which permits little choice for industrial arts subjects. The influence of occupational choice and its possibilities as a differentiating factor led to the selection of this variable for study. The answers to the choice of occupations were found in a questionnaire filled out by all pupils taking the course in "Vocations" offered the seniors and strongly recommended for all graduates.

Family life.—A comparison of the family life of each group promised to be an additional study of interest to determine if it too could be a factor in contributing to the differentiation of the two groups. The number of children in the family, and the fact of the parents being separated or not, were two factors studied to decide the family life status. The race factor was also considered in this category. The number of negro students in each group was counted to see if there were a greater percentage in one group than the other.
CHAPTER III
THE SINGLE VARIABLES ANALYZED

It has already been implied that various single factors do contribute to the differentiation of the industrial arts boys and the non-industrial arts boys. A discussion of the results obtained from the analysis of the factors selected for study follows.

Chronological Age

That age might be one of the discrimination factors in the comparison of the industrial arts group and the non-industrial arts group has been suggested in the previous chapter. The date of birth of each boy was procured and the age calculated in months. Table 2 gives the mean age of each group. The industrial arts group averaged 6.8 months more in age than the non-industrial arts group.

<table>
<thead>
<tr>
<th>TABLE 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>CHRONOLOGICAL AGE IN MONTHS</td>
</tr>
<tr>
<td>---------</td>
</tr>
<tr>
<td>Industrial arts</td>
</tr>
<tr>
<td>n=123</td>
</tr>
<tr>
<td>Mean</td>
</tr>
</tbody>
</table>
Intelligence

The intelligence variable was based upon the C. Q. score rated on the Terman-McNemar test. This proved to have a most pronounced degree of influence in discriminating the two groups. Table 3 gives the distribution of each group scoring over 120 or below 80; while Table 4 gives the distribution of the C. Q. ratings for each group. Figure 2 presents these data in graphic form. The mean score for the industrial arts group was 92.4, whereas the mean score for the non-industrial arts group was 111.4. The marked difference between the two groups was as great as 19.0 points. From these findings, therefore, it is inferred that the population of the industrial arts and the non-industrial arts are truly different in intelligence.

TABLE 3

CONTRAST OF C. Q. RATINGS

<table>
<thead>
<tr>
<th></th>
<th>Industrial arts n=116</th>
<th>Non-industrial arts n=123</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ratings below 80</td>
<td>20 or 17.2%</td>
<td>3 or 2.4%</td>
</tr>
<tr>
<td>Ratings above 120</td>
<td>1 or 0.86%</td>
<td>32 or 26.0%</td>
</tr>
</tbody>
</table>
### TABLE 4.

**DISTRIBUTION OF C. Q. RATINGS**

<table>
<thead>
<tr>
<th>C. Q. Rating</th>
<th>Industrial Arts n=119</th>
<th>Non-industrial arts n=123</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>50-54</td>
<td>1</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>55-59</td>
<td>2</td>
<td>4</td>
<td>6</td>
</tr>
<tr>
<td>60-64</td>
<td>7</td>
<td>2</td>
<td>9</td>
</tr>
<tr>
<td>65-69</td>
<td>6</td>
<td>1</td>
<td>7</td>
</tr>
<tr>
<td>70-74</td>
<td>6</td>
<td>5</td>
<td>11</td>
</tr>
<tr>
<td>75-79</td>
<td>17</td>
<td>4</td>
<td>21</td>
</tr>
<tr>
<td>80-84</td>
<td>22</td>
<td>6</td>
<td>28</td>
</tr>
<tr>
<td>85-89</td>
<td>22</td>
<td>9</td>
<td>31</td>
</tr>
<tr>
<td>90-94</td>
<td>12</td>
<td>11</td>
<td>23</td>
</tr>
<tr>
<td>95-99</td>
<td>11</td>
<td>19</td>
<td>30</td>
</tr>
<tr>
<td>100-104</td>
<td>3</td>
<td>15</td>
<td>18</td>
</tr>
<tr>
<td>105-109</td>
<td>4</td>
<td>9</td>
<td>13</td>
</tr>
<tr>
<td>110-114</td>
<td>2</td>
<td>17</td>
<td>19</td>
</tr>
<tr>
<td>115-119</td>
<td>9</td>
<td>9</td>
<td>18</td>
</tr>
<tr>
<td>120-124</td>
<td>4</td>
<td>6</td>
<td>10</td>
</tr>
<tr>
<td>125-129</td>
<td>4</td>
<td>6</td>
<td>10</td>
</tr>
<tr>
<td>130-134</td>
<td>4</td>
<td>6</td>
<td>10</td>
</tr>
<tr>
<td>135-139</td>
<td>2</td>
<td>2</td>
<td>4</td>
</tr>
<tr>
<td>140-144</td>
<td>4</td>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td>145-154</td>
<td>4</td>
<td></td>
<td></td>
</tr>
<tr>
<td>150-155</td>
<td>4</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Mean**  

| Industrial Arts | 92.4 | Non-industrial arts | 111.4 | Difference | 19.0 |
FIG. 2 DISTRIBUTION OF C.Q. RATINGS
**Academic Achievement**

The grades of the two groups as based on teachers' marks in English V and VI and United States History I and II, both required of all students in the eleventh grade, are highly significant in discriminating the two groups. Since academic achievement depends to some extent on intelligence, a difference in favor of the non-industrial arts group was to be expected. However, the difference found in this study cannot be entirely accounted for in this way. All students in Kalamazoo Central High School are classified into homogenous groupings so that pupils of similar intelligence ratings are placed together in such basic required subjects as English and history. Under such a system, each student is graded in competition with those of like ability and not with those superior or inferior to him. It must be realized that teachers' grades as such, can be biased and influenced by personal opinion; and yet both industrial arts and non-industrial arts pupils came under instruction of the same group of teachers and so the grades should be fairly representative of a pupil's achievement as rated by these same instructors.

Whereas, there were fourteen failing grades among the industrial arts students, there were only six among the non-industrial arts. On the other hand, an even greater contrast
was found in the number of boys earning the grade of "A". Seven industrial arts boys merited the grade of "A" in both subjects; while eleven times as many or seventy seven non-industrial arts boys were given "A's" in the same two subjects. The grade of "C" with two exceptions, was earned by the greatest percentage of both groups. In all cases, more than twice as many industrial arts boys earned "D's" as earned "B's". In contrast, with one slight exception, "B's" were earned by twice as many non-industrial arts boys as were "D's".

Figure 3 and Figure 4 shows the percentage of boys earning the various grades in each subject. Table 5 gives not only the exact percentage but also the actual number earning each grade.

From the data on the teachers' mark then, it is evident that although intelligence as an influencing factor is ruled out, the industrial arts group failed to achieve as well academically as the group which did not elect industrial arts.
### TABLE 5

**DISTRIBUTION OF GRADES FOR THE TWO GROUPS IN UNITED STATES HISTORY I AND II AND ENGLISH V AND VI**

<table>
<thead>
<tr>
<th>Subject and Grade</th>
<th>Industrial arts</th>
<th>Non-industrial arts</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Number</td>
<td>Percentage</td>
</tr>
<tr>
<td>English V</td>
<td></td>
<td></td>
</tr>
<tr>
<td>A</td>
<td>1</td>
<td>.8</td>
</tr>
<tr>
<td>B</td>
<td>13</td>
<td>10.5</td>
</tr>
<tr>
<td>C</td>
<td>54</td>
<td>43.5</td>
</tr>
<tr>
<td>D</td>
<td>53</td>
<td>42.7</td>
</tr>
<tr>
<td>F</td>
<td>3</td>
<td>2.4</td>
</tr>
<tr>
<td>English VI</td>
<td></td>
<td></td>
</tr>
<tr>
<td>A</td>
<td>5</td>
<td>3.8</td>
</tr>
<tr>
<td>B</td>
<td>23</td>
<td>17.8</td>
</tr>
<tr>
<td>C</td>
<td>48</td>
<td>37.2</td>
</tr>
<tr>
<td>D</td>
<td>50</td>
<td>38.8</td>
</tr>
<tr>
<td>F</td>
<td>3</td>
<td>2.3</td>
</tr>
<tr>
<td>U. S. History I</td>
<td></td>
<td></td>
</tr>
<tr>
<td>A</td>
<td>1</td>
<td>.8</td>
</tr>
<tr>
<td>B</td>
<td>12</td>
<td>9.6</td>
</tr>
<tr>
<td>C</td>
<td>56</td>
<td>44.8</td>
</tr>
<tr>
<td>D</td>
<td>49</td>
<td>39.2</td>
</tr>
<tr>
<td>F</td>
<td>7</td>
<td>5.6</td>
</tr>
<tr>
<td>U. S. History II</td>
<td></td>
<td></td>
</tr>
<tr>
<td>A</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>B</td>
<td>17</td>
<td>14.3</td>
</tr>
<tr>
<td>C</td>
<td>53</td>
<td>44.5</td>
</tr>
<tr>
<td>D</td>
<td>48</td>
<td>40.3</td>
</tr>
<tr>
<td>F</td>
<td>1</td>
<td>.8</td>
</tr>
</tbody>
</table>
FIG. 3 DISTRIBUTION OF 11th GRADE ENGLISH MARKS
FIG. 4 DISTRIBUTION OF MARKS IN U.S. HISTORY
Socio-Economic Status

Do the boys who elect industrial arts come from about the same type of homes as the boys who do not elect industrial arts? The answer to this question was sought through a study of the occupations of the fathers and a classification of the homes in accordance with city rental zones.

Fathers' occupations.--The occupations were rated on a scale devised by the authors of the California 1947 Short Form Test of Mental Maturity for the help of employers who use the test for pre-service and in-service personnel, for more satisfactory employee selection, employee placement, and employee adjustment. Two hundred and twelve occupations were classified in the scale. They were divided into six categories of intelligence:

1. Those requiring very superior intelligence (for those persons who are engaged in the highest quality of creative and directive activity such as lawyer, judge, surgeon, or expert chemist et c.

2. Those requiring superior intelligence (for those persons who must exercise excellent judgment and arrive at logical conclusions regarding a course of action in fairly
complicated and involved situations such as accounting, banking official, druggist, clergyman, teacher, etc.).

3. Those requiring high average intelligence (for those persons dealing with technical supervision, abstract classification and details, and the carrying out of previously arranged plans such as appraiser, draftsman, building contractor, insurance agent, printer, small business manufacturer etc.).

4. Those requiring low average ability (for those persons dealing with specific processes in which directions are relatively simple and the making of decision as to plans is not involved, but requiring good judgment and some discretion such as cabinet maker, filing or stock clerk, machinist, auto mechanic, electrician, plumber, plasterer, general painter etc.).

5. Those requiring inferior ability (for those persons whose duties require that they follow simple and specific directions with little necessity for making significant plans or decisions such as boilermaker, bricklayer, deliveryman, janitor, mail carrier, paper hanger, roofer, truck driver etc.).

6. Those requiring inferior ability (for those persons whose assignments require practically no judgment and who follow simple and specific directions usually under close
supervision such as chamber maid, scrub woman, ditch digger, garbage collector, track layer, etc.)

In a few instances in both groups the father is reported dead. The number of deceased fathers in both groups was about equal. In some cases, the exact occupation was not listed, there being merely an indication of the place of work but not the type of work engaged in. These instances were disregarded and no occupation listed since there might be a score of various occupations possible within the listed concern.

The fathers' occupations proved to be an important variable in differentiation of the two groups. The rating showed that the occupations followed by the fathers of the industrial arts boys indicated a lower degree of intelligence than those of the fathers of the non-industrial arts group.

Table 6 shows the distribution of fathers' occupations according to the six categories of intelligence. It is evident that there is a consistent difference between the two groups throughout the table. For each of the categories, one, two, or three (occupations requiring very superior, superior, and high average intelligence) the non-industrial arts group's percentage is greater, while for each of the categories four, five, and six (occupations requiring low average, inferior,
and very inferior intelligence) the industrial arts group's percentage is greater.

Figure 5 shows the percentage of fathers in both groups pursuing each occupation category.

According to the data on fathers' occupations, then, it may be concluded that the industrial arts boys come on the average from lower economic and social strata than do the non-industrial arts boys. This finding is supported also by data obtained from another source which will be examined next.
<table>
<thead>
<tr>
<th>Occupational Classification</th>
<th>Industrial Arts n=94</th>
<th>Non-industrial arts n=102</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. High professional and executive</td>
<td>0 0</td>
<td>4 3.9</td>
</tr>
<tr>
<td>2. Lower professional and business</td>
<td>4 4.2</td>
<td>22 21.6</td>
</tr>
<tr>
<td>3. Technical, clerical, and supervisory</td>
<td>18 19.1</td>
<td>37 36.3</td>
</tr>
<tr>
<td>4. Skilled tradesman and low grade clerical</td>
<td>35 37.2</td>
<td>33 32.4</td>
</tr>
<tr>
<td>5. Semi-skilled and unskilled occupations</td>
<td>37 39.3</td>
<td>6 5.8</td>
</tr>
<tr>
<td>6. Very unskilled occupations</td>
<td>0 0</td>
<td>0 0</td>
</tr>
</tbody>
</table>

Grouped in two categories: 1, 2, and 3 requiring very superior, superior, or high average intelligence

4, 5, and 6 requiring 72 low average, inferior, or very inferior intelligence

72 76.5 43 38.2
FIG. 5 INTELLIGENCE CLASSIFICATION OF FATHERS OCCUPATION
Classification of homes in rental areas.—Each boy's home address as found on his personal record sheet was copied down and located with precise care on a large map of the city of Kalamazoo. On this map were traced the five various rental areas as drawn up by the City Planning Commission. These areas were classified in accordance with the amount of rent paid for houses. The number of boys from both groups who lived in each area were counted and tabulated.

The results from this part of the study further indicated that industrial arts boys do tend to come from homes of lower economic and social strata. It was discovered that more industrial arts students lived in the lowest fifth rental zone than any other area, and that only a little over four per cent live in the highest fifth rental area. On the other hand, among the non-industrial arts boys, the greatest percentage lived in the highest fifth rental area; in fact, a total of seventy-three percent of them lived in the upper three areas. As a contrast, almost eighty-seven per cent of the industrial arts boys lived in the lowest three areas. There were several from each group who lived outside the city limits. They, of course, could not be counted in the rental classification.

Table 7 shows the numbers and percentage of boys' homes located in each rental area. Figure 6 indicates the residential distribution for both groups.
TABLE 7
RESIDENTIAL DISTRIBUTION ACCORDING TO CITY RENTAL AREAS

<table>
<thead>
<tr>
<th>Rental Classification</th>
<th>Industrial arts n=69</th>
<th>Non-industrial arts n=78</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lowest fifth</td>
<td>25--36.2%</td>
<td>8--10.2%</td>
</tr>
<tr>
<td>Next to lowest fifth</td>
<td>11--15.9%</td>
<td>13--16.7%</td>
</tr>
<tr>
<td>Middle fifth</td>
<td>24--34.8%</td>
<td>19--24.4%</td>
</tr>
<tr>
<td>Next to highest fifth</td>
<td>6--8.7%</td>
<td>15--19.2%</td>
</tr>
<tr>
<td>Highest fifth</td>
<td>3--4.3%</td>
<td>23--29.5%</td>
</tr>
</tbody>
</table>

Grouped in 3 categories:

The lower two areas: 36--52.1%  21--26.9%
The middle area: 24--34.8%  19--24.4%
The higher two areas 9--13.0%  38--48.7%
FIG. 6 RESIDENTIAL DISTRIBUTION ACCORDING TO CITY RENTAL AREAS
Vocational Ambitions

Those boys who took the course in "Vocations" in their senior year, made a study of various occupations and indicated a choice of the one they would like to pursue. These choices were used in this study of vocational ambitions to see if in this area also there might be found a difference between the two groups.

Forty-five industrial arts and fifty-eight non-industrial arts boys had taken the course, not a majority in either case, but a representative enough group to get a fair sampling as to what type of work the boys would choose and where their interests lay. The same Occupational Rating Scale as that used to classify the fathers' occupations was used.

It can be noted from Table 8 and Figure 7 that the occupations chosen by the industrial arts boys indicate performance by those of a lower degree of intelligence than those chosen by the non-industrial arts boys. The percentage for the industrial arts group is greater for each of the lower three categories which require low average, inferior, or very inferior intelligence. Conversely, the percentage for the non-industrial arts boys is greater for each of the upper three categories, which require high average, superior, or very superior intelligence.
### Table 8

**Vocational Ambitions of the Two Groups**

<table>
<thead>
<tr>
<th>Occupational Intelligence Classification</th>
<th>Industrial arts</th>
<th>Non-industrial arts</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Number</td>
<td>Percent</td>
</tr>
<tr>
<td>1. High professional and executive</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>2. Lower professional and business</td>
<td>1</td>
<td>2.2</td>
</tr>
<tr>
<td>3. Technical, clerical, and supervisory</td>
<td>17</td>
<td>37.8</td>
</tr>
<tr>
<td>4. Skilled tradesman, low grade clerical</td>
<td>17</td>
<td>37.8</td>
</tr>
<tr>
<td>5. Semi-skilled and unskilled occupations</td>
<td>10</td>
<td>22.2</td>
</tr>
<tr>
<td>6. Very unskilled occupations</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

**Grouped into two categories:**

1, 2, and 3 requiring very superior, superior, and high average intelligence

4, 5, and 6 requiring low average, inferior, or very inferior intelligence

---

Number Percent Number Percent
18 40 52 89.6
27 60 6 10.3
FIG. 7 VOCATIONAL AMBITIONS
**Personality Ratings**

In addition to the academic, economic, social, vocational, and age differences already cited, there is still another factor differentiating the non-industrial arts student from the industrial arts. That difference lay in the ratings in personality given by each homeroom teacher for all students in his homeroom at the end of each year. Those ratings of the senior year were the ones studied and tabulated. All students were rated as high, average, or low on the nine different traits selected as indicative of his personality. A score of "1" was given for high, a "2" for average, and a "3" for low.

It was discovered that a far higher percentage of non-industrial arts boys rated high than industrial arts boys; on the other hand, a far smaller percentage rated low. One third or more of the non-industrial arts boys rated high on eight traits out of the nine. As a contrast, one third of the non-industrial arts boys rated high on only three traits out of the nine. With the exception of one trait, there were not more than one-tenth of the non-industrial arts students who rated low on any trait, while over one tenth of the industrial arts students rated low on all traits but three. In all traits the non-industrial arts boys excelled considerably in the "high" rating.
Table 9 depicts the percentage of each group scoring "high", "average" or "low" on the nine different traits. Figures 8, 9, and 10 show the scores in graphic form.
**TABLE 9**

**DISTRIBUTION OF RATINGS IN PERSONALITY TRAITS**

<table>
<thead>
<tr>
<th>Personality Trait</th>
<th>Percentage Ratings</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>High I.A.</td>
</tr>
<tr>
<td>Cooperation</td>
<td>34.9</td>
</tr>
<tr>
<td>Dependability</td>
<td>33.0</td>
</tr>
<tr>
<td>Executive-ability</td>
<td>1.9</td>
</tr>
<tr>
<td>Emotional Control</td>
<td>17.6</td>
</tr>
<tr>
<td>Industry</td>
<td>12.5</td>
</tr>
<tr>
<td>Initiative</td>
<td>6.9</td>
</tr>
<tr>
<td>Integrity</td>
<td>40.1</td>
</tr>
<tr>
<td>Perseverance</td>
<td>22.8</td>
</tr>
<tr>
<td>Personal Appearance</td>
<td>19.1</td>
</tr>
</tbody>
</table>

*Industrial arts and Non-industrial arts*
FIG. 8 DISTRIBUTION OF RATINGS IN PERSONALITY TRAITS
FIG. 9 DISTRIBUTION OF RATINGS IN PERSONALITY TRAITS
FIG. 10 DISTRIBUTION OF RATINGS IN PERSONALITY TRAITS
Family Life

Aside from the rental classification and the fathers' occupations, already discussed, it was thought that one or two other factors might give added information relating to the family life of each group, to discover if still other differences could be found between them.

The number of children in each family as given on the record cards was tabulated. There were 123 families from each group examined. In the families of the industrial arts boys, the number of children averaged three and six-tenths; while in the non-industrial arts families, the average was two and seven-tenths children. While the results of the study do not appear significant, they do indicate another variable that separates the groups. It was found that while twenty five families of the non-industrial arts group had over four children, fifty seven families of the industrial arts had over four. Table 10 shows the results of the study in tabulated form.

TABLE 10

NUMBER OF CHILDREN IN FAMILIES OF EACH GROUP

<table>
<thead>
<tr>
<th>Number of Children</th>
<th>Number of Families</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Industrial Arts</td>
</tr>
<tr>
<td>1, 2, or 3 children</td>
<td>66</td>
</tr>
<tr>
<td>4 or more children</td>
<td>57</td>
</tr>
</tbody>
</table>
A count was also taken of the separated homes in each group as well as the number of negro students. These studies both proved insignificant since they showed no difference in the groups. There were eleven separated parents among the industrial arts boys, and ten among the non-industrial arts. There were two negro students found in each group.

As a result of this study, any preconceived notion that a majority of the boys from broken homes, as well as a majority of the negro students, were in the industrial arts group was discarded. It was interesting to note that the examination of these two factors showed that they were the only ones of those selected which did not in any way discriminate the groups.
CHAPTER IV
SUMMARY OF THE STUDY

In this study, the industrial arts group, 123 in number, consisted of male graduates of June 1948 and June 1949 of Kalamazoo Central High School, Kalamazoo Michigan. The non-industrial arts group, likewise numbering 123, were graduates of the 1948 and the 1949 June classes selected at random.

The purpose of the study was to determine if it is possible on the basis of various measurements to differentiate groups of boys electing industrial arts, including four or more units of work, from those who did not elect it as a school curriculum.

A number of variables was used in gathering data about the two groups and in every study the definite conclusion was reached that there is a distinct difference marking the two groups.

The answer can now be given to the question as asked at the outset, as to whether industrial arts is proving of benefit to a comparatively unrepresentative small group of boys. It was found that those electing industrial arts made up less than one third of the total high school population of boys, and that they are not representative of a true cross section of all the boys in the school.
In summary, it can be said that the data from the seven variables selected for study indicate that the group who elects industrial arts consists in large part of:

1. Boys whose ages average about a half year more than the ages of the non-industrial arts group.
2. Boys who have a rather narrow range of intelligence and whose average intelligence is considerably below that of the other group.
3. Boys whose academic achievement is not only below that of the other group, but also below that which their intelligence would lead one to expect.
4. Boys whose backgrounds are more often those of the lower economic and social strata.
5. Boys who are planning for an occupation requiring only average or inferior intelligence.
6. Boys who come from comparatively large families.
7. Boys who are rated for the most part as average or low in personality characteristics.

In review, it seemed to the writer that the variables studied might be listed in the following order according to their rank of discriminating importance:

1. Intelligence
2. Socio-economic status
3. Academic achievement
Others making contribution are the following:

(1) Personality rating
(2) Age
(3) Vocational ambitions
(4) Family life
CHAPTER V

INDUSTRIAL ARTS—AN ESSENTIAL ELEMENT
IN THE GENERAL EDUCATION OF ALL BOYS

It is a Definite Part of General Education

Provides certain fundamental experiences.--From the foregoing study, it has been pointed out that the values received from the study of industrial arts in Kalamazoo Central High School are confined to a limited few students who are characteristically different from those not electing it. This is an undesirable situation, for the assertion that industrial arts carries with it certain fundamental, inherent values is an undisputed fact. A good industrial arts program contributes its full share to the education of the whole student. In industrial arts, "the subject matter, the teaching methods, and the activities in which pupils engage, all together provide some of the finest situations for developing ethical character, creating a sense of good citizenship, promoting thrift, developing a keen appreciation for fine things produced by good craftsmen, and for building a clear understanding of the problems which confront those who do the manual work of the world."1

Industrial arts is not a so-called "special" subject, but is a definite part of general education. It offers a real contribution to the attainment of general education objectives. In fact, as a phase of general education, it has the same legitimate objectives as general education. It is the special function of industrial arts to provide those experiences which will develop certain traits, habits, and points of view which have been neglected in other phases of general education.

The primary purpose of general education is to develop young people into useful and successful citizens. A happy and useful life possesses certain ideals, habits, and accomplishments which must be cultivated by certain experiences. Industrial arts provides those experiences. "It aids in the development and growth of each student to his fullest potentialities so that he may participate successfully in the society which he created and in which he lives". ¹ John R. Friese in his book enlarged this fact when he said, "Industrial arts constitutes a group of school experiences which embrace the most fundamental procedure in education, namely, learning through a combination of seeing, hearing, thinking and doing".² He goes through a combination of seeing, hearing, thinking and doing.


on to say that the learning and developmental experiences in industrial arts, not other wise available, are essential to the complete social education of every boy.

Is related to the Seven Cardinal Principles of General Education. — Dean M. Schweickhard in his book, Industrial Arts in Education,¹ has carefully pointed out how work in industrial arts contributes to each of the famous Seven Cardinal Principles of General Education, which were set up in 1918 by the National Education Association and have long been accepted by the secondary schools as applying to their various purposes.

He has explained that the industrial arts student learns about health by learning to conserve and gain strength through manual activities, by becoming familiar with occupational health hazards and dangers, by learning safety precautions, and first aid.

He learns the fundamental processes in innumerable situations in applying arithmetic and written and oral English. In the shop, he has offered to him an insight into, and a stimulus for, solving fundamental problems that will be faced in actual life outside the school.

He is fitting himself for worthy home membership by recognizing the quality, appropriateness, and value of industrial products in the home, by learning to appreciate the

skill and labor required to establish a home, and by learning to properly care for industrial products for full serviceability.

A student taking industrial arts surely becomes acquainted with vocations and discovers his own interests and probably capabilities by means of experiences in typical manipulative activities. He also acquires skills and abilities correct for later training, and learns to appreciate the significance of the various vocations to the community.

Civic and social education are developed in an industrial arts pupil by the establishment of habits of cordial cooperation in social undertakings and by the realization of the necessity of right relationships between various vocational groups.

Right attitudes and habits are developed for leisure and recreation by the fostering of skill in manipulative interests, by development of love for that which is beautiful and by promoting a desire for that which is artistic and harmonious.

Good ethical character is instilled in a pupil by emphasis on the honor of work, responsibility for a task well done and the integrity of work.

Contributes to the Purposes of Education in American Democracy.—Not only is industrial arts helpful in attaining
the goals of the Seven Cardinal Principles, it also has a
definite part to play in achieving objectives set forth in
1938 by the Educational Policies Commission of the National
Education Association and the American Association of School
Administrators in their book entitled, The Purposes of Educa-
tion in American Democracy. In this book, are described the
four aspects of educational purpose; one area describing the
educated "person"; another describing the educated "member of
the family and community group", a third, of the educated
"producer or consumer"; and a fourth, the educated "citizen".
While industrial arts can be shown to offer contributions to
the objectives of each area, it is especially in the third
area which describes the educated "producer or consumer", that
it, as a course of study, contributes the most.

In this area, the objectives of economic efficiency are
discussed. These objectives relate to those activities which
have to do with the creation and the use of goods and services,
both of which are equally important, are closely related to
each other, and are equally dependent upon education for ef-
ficiency. The first of the eight objectives under this third
goal, that for the education of a consumer and producer, is
stated thus: "The educated producer knows the satisfaction of
good workmanship". Surely industrial arts offers invaluable
contribution to this goal by teaching students to respect and
enjoy work and by providing work opportunities as part of his education. It might be interesting and well in keeping with the problem in this study to note that the Educational Policies Commission believes that this objective is slowly adopted because of the unwillingness to recognize that there can be "educational values occurring outside the classroom study and book-centered recitation. Many believe that a student cannot spend time away from Latin declensions and geometry theorems in order to learn the value of useful work."¹ The commission suggests that every effort should be made to determine the activity that has the maximum educational value for each child.

The second objective in this area is that "the educated producer has selected his chosen vocation". Industrial arts contributes to this goal by teaching the opportunities and requirements for various jobs. In former days of relatively simple economic conditions, occupational information was easily acquired outside the schools. The boy learned farming from his father and on visits to town watched the blacksmith, the business men, and representatives of other occupations at their work. Now, of course, all that is changed. There are more specialized

occupations, less opportunity for learning on the job, and a constantly greater need for assistance in the school. In that assistance industrial arts can be of inestimable value.

The third goal of occupational efficiency, whereby the educated producer succeeds in his chosen vocation, can also be aided by industrial arts as it helps prepare for vocational training, the difference being the emphasis in the individual student's purposes. If industrial arts is pursued for the purpose of developing skills and competence in a trade, it may well be vocational, but the very same activities, studied mainly to discover or develop interests and abilities and enrich living become non-vocational.

Objective number four for educating the consumer and producer deals with occupational adjustment. Industrial arts plays a part in satisfying this goal also, first by developing attitudes and abilities in a student that will make him recognize his own vocational fitness in a field as related to the work of other fields. It also helps him by extending a worker's insight into the social utility and significance of his work, his relation to other workers, and what his work means to other people. "On the whole, Americans have been free from the old world concept that no "gentlemen" can follow an occupation other than that of scholar, priest, or soldier. A democracy will not separate its work and its culture; it will not regard
one who works as inferior nor set false distinctions between occupations. Work in industrial arts helps to promote these ideals.

The last four goals under the educational purpose of fitting a person for economic efficiency, have to do with the "consumer" side of the educated person. Under these objectives, the educated consumer plans the economies of his own life, he develops standards for guiding his expenditures, is an informed and skillful buyer, and takes appropriate measures to safeguard his interests. While it could be shown in detail just how industrial arts specifically aids in fulfilling each of these objectives, the writer will take neither time nor the space to dwell on them. It would seem fairly apparent to any educator that work in industrial arts teaches a prospective consumer what makes an article good and what makes it bad for his own individual enjoyment and purposes.

The general end of education in America is the fullest possible development of the individual within the framework of our present industrialized democratic society. The full attainment to this end, in the creation and use of material wealth under the objective of economic efficiency, can be in-

---

1Ibid, page 100
increased greatly by training in the industrial arts.

It Meet Students' Needs
In A Democratic Industrialized Society

An analysis of the American way of life shows it to be highly industrial and technological. It appears, therefore, that some subject such as industrial arts should be included in the school curriculum of every boy to teach him how to live in a highly industrialized society. "The increased mechanization of life in general creates a need on the part of all high-school students to get some first hand contact with materials, manufactory processes, power driven machinery, and appliances", so says Emanuel E. Ericson in his book, Teaching Problems in Industrial Arts.¹

A similar viewpoint is given by Newkirk and Johnson when they state that

It is the task of the school to supply the type of instruction necessary so that the youth will not have its hands shackled in relation to commonplace situations resulting from the development of the machine age. Adjustment to modern conditions of living demands the same kind of knowledge that our forebears gained through their hands. But that knowledge is no longer to be gained at home. It has become instead one of the essentials of modern education in modern schools where complete preparation for life is the ultimate objective. If children are to receive education that will be satisfying to them in their future living, educators must supply

them subjects which will allow for all-around growth of the individual. 

Still another educator gives his belief as to the value of industrial arts in our modern society when he writes,

The first outstanding demand arises from the increasing failure on the informal part of education. . . . The child of fairly well-to-do parents has little first hand acquaintance with essential economic processes. The home is not the educational influence it once was as an agency either for introducing the child into industrial activity or for giving him an insight into industrial activity or for giving him an insight into basic economic processes for building in him those cooperative and social attitudes and habits that underlie life.²

Schooling should not be a thing apart, detached from the experiences and influences that play upon the student. It should include a variety of typical situations found outside the school if it is to be effective. The tools and skills needed for abundant living must be multiplied far beyond the "3 R's" that once sufficed. In his famous book, Democracy and Education, John Dewey made this clear when he wrote

Study of mental life has made evident the fundamental worth of native tendencies to explore, to manipulate tools and materials, and to construct. . . . When these exercises which are prompted by these instincts are a part of the regular school program, the artificial gap between life in school and out is reduced. . . . With-


²W. H. Kilpatrick, Education for a Changing World, page 63-64.
out something of this kind, it is not possible to secure the normal estate of effective learning. Aside from the fact that active occupations represent things to do, not studies, their educational significance lies in the fact that they may typify social situations.\(^1\)

F. G. Bonser in Life Needs and Education emphasizes this view even more emphatically when he asks,

> Have we not very largely neglected in schools to give children experiences in the real activities of life and therefore failed to develop in them any connection between the things we require them to learn and the activities in which they are useful? . . . We violate the laws of learning and of human nature and then wonder why children come out of school uneducated.\(^2\)

The student in an industrial arts program takes part in a real life situation and has those experiences that he will meet in life outside of the school.

The Need for Recognition of Industrial Arts As a Part of the Regular Curriculum

Industrial arts, which so well meets the needs of students in a democratic and industrial society and which has such worthy contributions to the aims of general education, must be an integral part of any well-rounded high school program and must be treated as a regular subject. That is the

---

\(^1\) Pages 228 and 229.

first step in establishing it in its proper place in the school. Industrial arts should be as much a part of the program as English or mathematics. The Harvard Report supports this idea when it states that "the direct contact with materials, the manipulation of simple tools, the capacity to create by hand from a concept in the mind—all these are indispensable aspects in the general education of everyone."\(^1\)

Aides in the coordination of the student.—The old view that education was principally for the training and disciplining of the mind no longer holds. The all around growth of an individual, the three sides of his nature, must be cultivated—the physical, the intellectual, and the emotional. All educators have expressed their thought in similar words. Complete development is impossible without satisfying these three sides. Traditional education, as language, and history, may be presented in such a way as to appeal the emotions as well as intelligence of a student. Anyone, however, can advocate that type of work for its development. Industrial arts, on the other hand, when presented, involves all three sides of the pupil's nature, thus providing for growth in all three respects.

It is the assertion of T. R. Bawden and others in their book, *Industrial Arts in Modern Education*, that industrial arts' experiences are especially important, if not indispensable in coordinatating the three sides of the individual. An illustration is given to prove this point when a typical illustration is drawn up from everyday experiences in which a boy makes a project in the shop. He makes or uses a working drawing, estimates the quantities of the various materials needed, gets out the materials, lays out and follows an orderly plan of procedure, makes application of tools and manipulative processes to consciously chosen and predetermined ends, and finally feel the satisfaction of worthy achievement. The authors feel that the boy who enjoys such a cycle of physical, intellectual, and emotional experiences, all woven together, is given opportunity for "complete coordination and symmetrical growth".¹

*Stimulates creative action.*—A further argument for the inclusion of industrial arts in the high-school curriculum of every boy, and for the recognition of it as being comparable

comparable in value to any other subject, is given by a committee of the Industrial Arts Section of the American Vocational Association in 1934 in its book, Standards of Attainment in Industrial Arts Teaching. In this book, the committee states the basic truth that "creative thought is essential to man's progress, while creative doing is essential for his life and comfort."¹ The committee seems to believe that one of the most important duties of a teacher is to develop a student's ability in planning and doing through such experiences as involve these activities. It goes on to point out that the experiences in the academic field are designed primarily to encourage the acquiring of information and the development of reasoning while the experiences in the industrial arts field are designed primarily to develop the ability to plan constructively which also involves reasoning and to use tools.

Includes a broad program area on equal par with other subjects.—An eminent educator in the vocational field plainly states his opinion as to the place of industrial arts in the high school program when he writes,

Social habits and attitudes as well as practical skills and functional knowledge are important for full living. Industrial arts should be considered as an area of instruction comparable to the fine arts, the sciences, health education, and the social studies.1

Of course it seems plausible to believe that every subject and every department in our American system of departmentalized schools contributes generously to the objectives of general education. However, each department has its own specific contribution to make to the program of the school and as such industrial arts should emerge as an important part. It should not be considered a subject in the same sense as is arithmetic or woodwork, but should be recognized as dealing with a whole area comparable with that covered by such designations as the "social studies", the "sciences", "language education", and "health education". The phrase, social studies, carries implications far more significant than does the listing of such subjects as history, civics, or economics. Likewise industrial arts should mean a broad program, "the organization of economic, social, scientific, materialistic, and idealistic knowledge as such is related to the lives of pupils in an in-

It is the industrial age.  

To summarize briefly the main reasons as to why industrial arts should be included in the program of all high school boys, the writer will again quote from Bawden and others who firmly believe that

Industrial arts, contributing to education as growth of the individual as well as education as adjustment, should occupy a place in every boy's curriculum. To insure the exercise of those fundamental tendencies to explore, to manipulate tools and materials, to construct, to provide a normal setting for effective learning, and to afford an insight into basic socio-economic processes, the school must provide industrial arts experiences as an integral part of the educational program.  

Industrial Arts Gaining in Prestige

According to many studies, including the recent National Survey of Secondary Education, the non-academic subjects, among which industrial arts is prominent, have shown decided gains over academic subjects in the last thirty years. Industrial arts is now beginning to reap the fruiting of the tree of progress that has been growing for thirty-five or a full fifty years.

---


2Bawden and others, op. Cit., page 22.

In 1884, at a National Education Convention, Felix Adler in discussing "manual training" said that technical work and art work involved in that subject were elements of a broad culture which all humans should possess. He said, "They are an indispensable feature of the school system." Of course, at that time, most educators looked upon Dr. Adler's statement as radical and quite unworthy of any serious consideration.

When, John Dewey, a short time later, advocated the fact that people "learn by doing" and wrote that "wood and metal, sewing and cooking must be conceived as methods of life . . . . as instruments through which the school itself shall be made a genuine form of active community life," schoolmen considered his philosophy revolutionary and impractical. Many teachers of manual training even considered it so. Little by little, however, leaders of education have accepted his viewpoint, either as a whole or in part, until now it colors educational philosophy everywhere.

As industrial arts is becoming recognized as a legitimate part of the regular program of studies, it increases emphasis upon scientific knowledge and social habits rather than upon manual and mechanical skills as in the former days.

---


Factors Affecting the Standing of Industrial Arts in the Schools of Today

Practice, as usual, has lagged behind theory. Many educators have accepted industrial arts as a major factor in the broader concept of secondary education, namely that of developing certain attitudes, habits, and traits which contribute to a happy useful life. They can see how industrial arts offers those experiences that prove most helpful. There are others, however, who, notwithstanding the avowed objective of general education, cannot accept industrial arts on an equal basis with other subjects because they cannot see how it can be adequate and efficient in acquainting students with the "command of fundamental processes" and a certain type of factual material which they hold so dear.

Academic overemphasis.--The time-honored, well established academic fields representing "accepted logical organization of learning still are a very powerful influence in the curriculum and consume a large part of the student time".¹ Very frequently they crowd out the more practical subjects because they have more prestige with teachers, parents,
and colleges. Harold Alberty substantiates this view when he observes

It is not difficult to find schools that send only a small percentage of the graduates to college and yet will stress college preparation almost exclusively. The school is not always to blame for this condition. Frequently the cause lies deeper. The community may be traditionally minded or antagonistic to educational reform. It insists upon a type of education which contributes to upward nobility even though it fails to meet the needs of the youth.¹

The Harvard Report gives a similar opinion by stating

There is an imperative need that all courses, indeed all the wider activities of the high-school, be thought of as interdependent and equally honorable. For it is in all these courses and activities alike that the civilized work of preparing for American life takes place.²

Narrow concept of vocational education.--The concept of vocational education has been most narrow in some places and has tended, as in the case of academic over emphasis, to eliminate the opportunity of enjoying and profiting by industrial arts experiences. Some have the mistaken notion that "vocational courses are inferior, made up of inferior students, and taught by inferior teachers".³ Industrial arts courses are termed as "practical", given only for those learning for some definite trade. Of course, this is not necessarily a true supposition. For with industrial education as with academic

³Ibid., page 28.
academic education, it is "practical" only if it fills a need in a student's life. Social education, economic education, health education, or musical education are all practical when they contribute to a person's usefulness. Industrial arts education is able to stand on its own as a contribution to the education of the whole child and not on a comparative rating as to whether it is more or less "practical" than some other subject. This concept is necessary as a basic philosophy if it is to be accepted by all persons who are concerned with a good general educational program.

One could hardly conceive of any program of secondary education which did not attempt to give vocational direction to the pupils who come under its influence. Spelling, writing, arithmetic, and bookkeeping could all be considered as most definitely vocational if and when they prepare a student for a job as a bookkeeper. Nevertheless, one seldom thinks of spelling, writing or arithmetic as a vocational subject unless they are definitely listed as such in a training program as preparation for specific employment. So it is with all the subjects that comprise the whole field of industrial arts. As a part of the general education of any high school, industrial arts subjects may lead into a definite vocational study or they may not.
Even if a boy were to prepare vocationally for industry, more often than not, general industrial intelligence is a greater asset than highly developed specialization in industry today. "Industry changes so rapidly and makes new and more exacting demands from time to time. A diversified program of industrial arts, fortified by other high school subjects adequately meets the demands of modern industry." 1 It also meets the needs of the great majority of high-school boys for, according to the Harvard Report, it has been estimated that ten percent of the jobs in the United States are professional or managerial, another twenty-five or thirty percent demand some technical training, but for the great remaining mass of more than one half the jobs, no previous training is necessary. The Report goes on to say that "it is of the holders of these jobs that we must be concerned". 2

Assignment of slow pupils to the shop. — Another factor which affects the standing of industrial arts in the high school program is the practice of assigning the socially ill adapted to the school shop. Of course, there is evidence, as has been indicated, that the industrial arts program is adaptable to the needs of many of these maladjusted boys, however, there is a definite danger that the presence of too many of the

1 *Industrial Arts, Its Interpretation in American Schools*, page 68. op. cit.

maladjusted pupils in a shop may create a bad impression among the more discerning and brighter pupils. After all, pupils will profit from a good industrial arts program according to their ability to learn and to work in a group. The greatest value, therefore, will go to the socially normal and average intelligent pupils. The Harvard Report has a like opinion when it says, "It is sometimes falsely assumed that students not gifted in mind are gifted in hand . . . . that is not the case".¹

In an article in the magazine, Industrial Arts and Vocational Education, there is described a teacher’s opinion regarding the success of inferior students in industrial arts work. The teacher says that it is his belief that

Difficulties and problems are encountered in the shop as well as in academic activities. A general intelligence is required of pupils who succeed in the shop as well as in other pursuits of life. The degree of success is in proportion to the intelligence of the individual. Any pupil to really achieve in the shop must possess a degree of general intelligence that will enable him to take advantage of his shop experiences.²

¹Ibid.

²"Intelligence and the Shop", Industrial Arts and Vocational Education, Vol. XVII, pages 81-83, March 1928.
College recommendations and prestige.—There is still another factor which tends to provide a drawback for educators to accept industrial arts as an integral part of every boy's program and that is the influence of the college. With the extension of the high school program so that now approximately sixty-five percent of the youth of the land attend high school, college entrance has ceased to be the aim of a large majority. Yet the program seems to be greatly influenced by college recommendations.

The colleges enjoy enormous prestige. They are the symbols of time-honored tradition of culture and scholarship. The pattern of education has the respect of the masses of people. Many parents, therefore, expect the high school to provide a similar kind of training for their children whether or not they intend to go to college, irregardless of their needs in present day living.2

The Harvard Report deals at length with the problem of college preparatory training for the majority of students when few actually go to college. It says,

Except for a small minority the high school therefore has ceased to be a preparatory school in the old sense of the word. In so far as it is preparatory, it prepares not for college but for life.

... Given the new character and role of the high school, can the interests of the three-fourths who go on to active life, be reconciled with the equally just interest of the one fourth who go on to further education?

1'Industrial Arts, Its Interpretation in the Schools, page 11, op. cit.

2Albery, op. cit. page 20
There is a need for industrial arts training for all high school students, the college preparatory student included, if there is to be well-rounded training.

Shop training is important for the general education of all. Most students who expect to go to college are now offered an almost wholly verbal type of training while hand training and the direct manipulation of objects are mainly reserved for the vocational fields. This is a serious mistake. The bookish student needs to know how to do things and to make things as much as the students who do not plan to take further intellectual training.  

1Harvard Committee, op. cit., page 8

CHAPTER VI
CONCLUSIONS AND RECOMMENDATIONS OF THE STUDY

Conclusions—

In light of the findings through this study, one may conclude that:

(1) Industrial arts courses seem to lack the prestige of other longer established and so-called academic subjects.

(2) Only one-third of the boys of the entire Kalamazoo Central High School population can be classified as industrial arts students. Over one-half of the boys take no industrial arts courses whatsoever.

(3) Many not now taking industrial arts courses would greatly profit from such an experience. Values would be received in industrial arts work that no other subject could offer.

(4) Even though approximately only twenty per-cent of the graduates go on to further education, a majority of the boys pursue the academic course.

(5) It is difficult to take industrial arts subjects and still prepare for college. Even under the College Agreement Plan whereby students are not bound to a rigid pattern of majors and minors for college entrance, certain basic recommendations must be met in regard to adequate preparation for certain college courses. Academic courses are advised
as best for meeting those recommendational

(6) Boys preparing for college need industrial arts for the training it gives in the direct manipulation of objects. They need to know how to do things and make things in hand training, in addition to the verbal training now offered.

(7) Those who are classified as industrial arts students are not like the rest of the high school boys. They do not represent the entire population of boys because they differ in a number of characteristics.

(8) Discrimination against industrial arts may lay in the fact that many students are misinformed regarding the true nature of the subject. It is described as purely "practical" for those who are looking for work in the trades and have not the ability to take the academic curricula.

(9) The predominance of maladjusted and duller pupils in the shop tends to add to the above supposition.

(10) Many teachers and advisors seem to lack a true understanding of industrial arts courses and the values inherent in them. They apparently do not realize that industrial arts is an essential element in the education of all boys whose benefits should not be confined to a limited few.

(11) Industrial arts should be included in the general curriculum of all boys because it meets students' needs in
modern industrial society, giving them experiences in school that they will meet in the real activities of life.

(12) Industrial arts contributing generously to the objectives of general education should be considered by teachers and students alike on equal par with any other course of study.

(13) Industrial arts should not be considered simply as a "subject" but should be recognized as dealing with a whole area of work pursued in a broad program.

Recommendations

As based upon the conclusions found in this study, the author would make the following recommendations:

(1) It would seem commendable for guidance and administrative officials to clear up the misconception and confused ideas many now have concerning industrial arts courses and to have less biased opinions themselves.

(2) There should be a clearer understanding by all advisors and administrators concerning the kinds of industrial arts courses offered and the values inherent in them.

(3) There should be more clear-cut information from the department of industrial arts given to all responsible for the guidance of students regarding the exact nature of industrial arts work and the outcome expected from it.

(4) There should be a goal whereby all high school boys would take some industrial arts.
(5) The unit shops which operate now in the department and which are separate shops equipped for teaching in a single field such as woodwork, metalwork, forging, and printing etc. could be continued for those boys more technically minded with the single purpose of preparing for wage-earning jobs.

(6) A general shop, which is a shop equipped for a large range of work carried on simultaneously under the direction of one teacher, would be feasible for all those more ably profiting from a series of divergent experiences.

(7) In the proposed general shops, work would continue in a general program as that now found in the Junior High Schools, only on a more advanced level. There would be activities involving more complex projects, because of the more mature interests and activities of the students.

(8) Printing, photography, art metal work, ceramics, and house planning could be among those activities included. Following much the same line of reasoning that has produced general language, general science, and the general course in the social studies, there could also come into use the general or diversified activity shop, with a great variety of industrial arts experiences.

(9) As a further solution to the problem of including industrial arts in the curriculum of every boy, a so-called
"laboratory of industries" could be promoted as recommended by the Office of Education.¹ According to this plan, pupils would be introduced to the various units of industrial arts in one composite course, either within a single shop, a couple of shops, or several unit shops. This would involve a good plan of organization for group rotation of pupils.

(10) There needs to be further study and analysis of the various types of shop organization designed to carry out the general industrial arts concept, available for those boys wanting and needing the valuable experiences of industrial arts work, but not desiring or able to take the various unit courses now offered. The kind, amount, and the quality of work accomplished, and the particular aims emphasized would all have to be considered. This would call for expert planning, careful study, and constant administration.

(11) If the present differentia continue to exist between the industrial arts group and the non-industrial arts group, the needs of the limited industrial arts group should be kept in mind. There should be more careful study of these boys as individuals, of their potentialities and interests, and of the selection of experiences which would contribute most to the development of the possibilities of each individual.

(12) It would seem wise for curriculum committees, super-

visors, and teachers to plan courses, develop methods, and per-

¹Industrial Arts, Its Interpretation in American Schools, op. cit., page 51.
fect teaching devices with attention focused on the needs of the industrial arts group.

(13) There would appear to be need of even further study of the aptitudes, special abilities, attitudes, and habits of the boys in this group.

The author has attempted to show in the study, here-p presented, that industrial arts, as a school curriculum, is not benefitting a representative population of Kalamazoo Central High School boys. Its values are confined to a limited few who are characteristically different from those not electing it. Since industrial arts carries with it certain fundamental, inherent values, and is an essential element in the general education of every boy, this is an undesirable situation and presents a challenging problem that must be met.
BIBLIOGRAPHY

Books


Magazine Articles

Beach, C. Kenneth, "Selection of Pupils in Vocational Industrial Schools", Industrial Arts and Vocational Education. XXXII November 1943. 360-2.


Hill, Lester V., "A Follow Up of 251 Graduates", Industrial Arts and Vocational Education. XXXIV, October 1945, pages 335-341.


-------- "Intelligence and the Shop", Industrial Arts and Vocational Education. XII, March 1928. pages 81-83.