

THE ADMINISTRATION AND CONDUCT OF INDUSTRIAL ARTS
COURSES IN THE JUNIOR HIGH SCHOOL.

by

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INTRODUCTION

Purpose

This study has been undertaken in order to determine if possible, what tendencies have become apparent in the plan of organization for carrying on industrial arts in the junior high school in various states. The character and in general the content of the course of study was studied with the hope of reaching conclusions that are educationally sound.

Procedure

Answers to detailed questionnaire were obtained from fifty-three teachers, giving a fair sampling from the following states, Kansas, Missouri, Minnesota, Wisconsin and Utah. These questionnaires have been studied with a view of showing the nature of the activities, methods used, and organization for promoting industrial arts.

A review and analysis of the literature was made showing the place of industrial arts in the junior high school curriculum and the methods used in conducting industrial arts courses.

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FOREWORD

The data presented in the charts and graphs represent answers returned on a questionnaire. In case those answering the questionnaire did not give a complete answer, their replies were not represented in the data. However, this did not hinder them from figuring in the data of another graph or chart.

HISTORY OF INDUSTRIAL ARTS IN AMERICA

As a result of the manual labor movement and the exhibits of the Swedish Sloyd and Russian Manual Training shown at the Centennial Exposition in Philadelphia in 1876, and because of other social needs and influences it was easy for manual training to spread in the United States.

Dr. Finkle, President of the Massachusetts Institute of Technology, saw and studied the Russian exhibits at Philadelphia and recommended that the courses in civil and mechanical engineering be enriched by adding shops, in which

mechanical arts should be taught to all young engineers.

In 1879, Dr. Woodward at St. Louis established the first manual training school of secondary grade in the United States. It was opened in 1880, admitting boys fourteen years of age or over to a three year course of study.

During the period of 1880 to 1900 various forms of hand-work or vocational education, as it was called, were introduced into the public school system. This movement was fostered by persons who for the most part had no very clear notion as to what was needed. In a general way they believed that it would be a good thing to incorporate into the schools some practical shop-work and drawing, with the hope that such work would serve to meet the needs for vocational training and be a substitute for apprenticeship in many of the trades.

The Russian influence contributed the ideals of trade skill, teaching methods and the making use of mechanical drawings. The Sloyd influence from Scandinavia contributed better methods for child instruction, new aims of the hand-work in terms of cultural values and recognition of children's interests and desire for activity. Due to the influence of the technical and trade influence of Russia and Scandinavian Sloyd, in finishing of useful products, manual training started on a country wide expansion and growth about 1900. The foundation for the present day aims were be-

ing made. The value of interest in the work as a factor, initiative on the pupil's part became of greater importance than processes and products, also the pupil's choice in selection of problems and encouragement of original design were fostered. Because of many misconceptions, such as large vocational values to be derived from the work and many others caused manual arts to fight for its place in the curriculum.

In the beginning of the present century the vocational movement started. Its growth was steady and the government accepted it in 1917 and passed the Smith-Hughes law, which provided for federal money being used to support agriculture, trade and industry and home economics. With the acceptance of vocational education, manual arts advocates had to find the proper place in the school for their work and set up new and broader aims in harmony with the accepted principles of secondary education.

HISTORY OF THE JUNIOR HIGH SCHOOL

The junior high school movement began about 1890. The eight-four plan, eight years elementary and four years secondary, that had become a national institution was being attacked and criticized by university administrators. Their aim was to shorten the period of training for the college student who was preparing to enter professional life.

The period 1900 to 1910 was guided and influenced by public school authorities. The aim was to hold more pupils of all types in the upper elementary and secondary schools, particularly to make vocational provision for those that intended to go to work at an early age.

The period 1910 to the present aims at the discovery of individual characteristics of the pupil and tries to provide a more adequate education for each particular child in whatever grade he may happen to be.

GENERAL AIMS OF THE JUNIOR HIGH SCHOOL

According to Smith (1925) the outstanding purposes of the junior high school, representing the collective judgment of the foremost leaders in the junior high school movement, are:

1. To provide a suitable educational environment for children approximately twelve to sixteen years of age, embracing:

- (1) An enlarged experience background involving especially, (a) enriched curricula and courses of study; (b) improving facilities by way of laboratories, shops, libraries, assembly halls and gymnasiums; (c) superior teachers, including a large per cent of men, with new methods of teaching social control; and (d) a distinctive school atmosphere.

(2) Ample provision for common socialized integrating education.

(3) Abundant facilities for the progressive discovery and experimental direction of pupils' interests, aptitudes and abilities, involving especially, (a) exploratory activities in varied occupational fields; (b) general and survey courses in the major academic fields; (c) individual and social diagnoses; (d) flexibility in curriculum organization and administration; and (e) educational and vocational guidance.

(4) Adequate provision for individual differences, involving especially, (a) enriched curricular and extra-curricular offerings; (b) opportunities for gradual curricula differentiation; (c) flexibility in methods of promotion; (d) provision for varying rates of progress; and (e) vocational training for those who must leave school early.

(5) Increased opportunities for genuine socialization, involving especially, (a) an adequate program of extra-curricular activities; and (b) extensive provision for pupil participation in school government.

2. To democratize the school system, through, (a) provision for a gradual transition from elementary to secondary education in such matters as (1) content, (2) methods of teaching, and (3) social and administrative control; (b) to

3. To effect economy of time in education, largely through, (a) the elimination of waste from the seventh, eighth and ninth grades.

AIMS AND OBJECTIVES OF INDUSTRIAL ARTS COURSE

Industrial Arts Courses Common to Junior High School

From the study of Chart 1 we find a large number of courses offered the students. In the seventh and eighth grades, we find that over seventy-eight per cent of the schools require woodworking. The reason usually given is that hardly any other craft uses as many distinct tools as does woodworking. Moreover, there is probably no other working agent which will at this stage of industrial arts work, permit the boy to express himself through the medium of tools and material in a better way than does wood. The training, meager as it may be, will find practical application in the performance of unspecialized activities about the home. This may be true and it may be just a hangover from the old manual training school that has not been discarded. Exploration should not be narrowed to the working of one material or one industrial group. According to the general aims of the junior high school exploration should involve activities in varied occupational fields. The idea is to give the pupil a bird's-eye view of the workings of

School	Seventh Grade		Eighth Grade		Ninth Grade	
	Required	Elective	Required	Elective	Required	Elective
1					1-8	1
2	3		3			
3	2		1		1-8	4
4		4		4		
5					1	5-6-3-7
6	6		3-0			
7	1		2		1-8	1-8-9-10
8				1-8-9-10		
9	1		1		1	
10						2-11
11						12
12	1-8		1-2			1-8-13
13	1-8-9		1-2-9-14A			2-5
14	1-8		1-8			5-14A
15						1-17
16						
17	1-8-14A-16		1-8-14A-16			
18	1		1		16	
19	1-8		1-8-17		1-8-16-18	
20	1-8-14A-15					1-2-9-12-14A
21	1-8					2-19
22	2		1			1-2-20
23	1-8	80		1-2-20		3-5-7-14A
24	3-5-14A-19		3-5-6-16			3-8-11-18
25	1-8-14A-19		1-8-19-14-16			11-20
26	12-19		20			1-2-11-20
27	19		19-20			

School	Seventh Grade		Eighth Grade		Ninth Grade	
	Required	Elective	Required	Elective	Required	Elective
28	1-19			1-8-14	1-14A	
29	1-19			14-20	1-8-11-18-20	
30	1-14A-16-20		8-18		18	
31	1-7-14			16-20	1-8	
32	1-16		8-20-14A		1-8-14A-16-20	
33	2-1-14A-16-20-21)		1-8-14A-16-20)		18	
34	1-14A-20		1-14A-20		1-14A-20	
35		1		1	1	
36	1		1-8-16		1-8-12-16	
37	12		18		18	
38	1-12		1-18		1	
39	1-8		1-8		1-8	

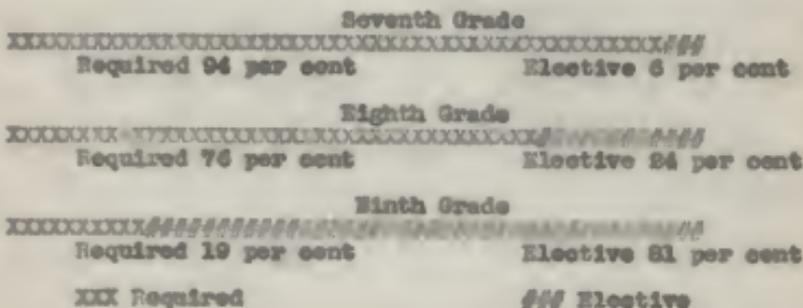
Chart 1 - Showing Industrial Arts Courses Both Required and Elective, Offered in the Junior High School

- | | |
|------------------------|-----------------------------|
| 1. Woodwork | 11. Auto Mechanics |
| 2. Mechanical Drawing | 12. General Shop |
| 3. Carpentry | 13. Art Fiber |
| 4. Building Trades | 14A Sheet Metal (B) Forging |
| 5. Cabinet Making | 15. Leather and Bind Work |
| 6. Pattern Making | 16. Electricity |
| 7. Turning | 17. Art Craft |
| 8. Card-Board Drafting | 18. Concrete and Masonry |
| 9. Food Finishing | 19. Home Mechanics |
| 10. Upholstering | 20. Printing |
| | 21. Vocational Information |

industry. The youth at this age has changing interests, but he wants to know the why and the how of the fields that hold his interests. These interests should not be looked on with disfavor but should be guided in such a way that the pupil will find himself in the life work that will give him satisfaction and joy, in so doing society is strengthened and the public good conserved. The pupils of the eighth grade are given more of a choice in their work than those of the seventh grade, the choice probably being group electives.

The courses offered in the ninth grade are largely elective. This is in harmony with the aims of the junior high schools and marks the choice of a vocation and the beginning of specialization.

Of the industrial arts offered in the three grades, Graph 1 shows percentage of required and elective courses.



Chief Objectives of Industrial Arts Courses of the Junior High School

William H. Kilpatrick gives us what he considers the present-day philosophy of education, which he calls the new philosophy of experience. Reduced to simple terms, this philosophy teaches:

1. "That we learn by experience."
2. "That some experiences are more educative than others and life is more enriched when experiences are most educative."
3. "That a teacher's part in education is to guide children into and through the best experiences."

Bruce's 1929 Specification Annual: One of the main objectives in the junior high school is educational and vocational information and guidance. First, general knowledge pertaining to the use and care of tools, machines, materials, operations, and principles involved; second, the vocational knowledge pertaining to the work, qualifications and training of the worker, labor conditions, health problems, future opportunities and studies, which will help in laying a basis for the intelligent choice of an occupation, are important objectives in the industrial arts courses in the junior high school.

We find the work taught to pupils from twelve to four-

teen or fifteen years of age, both for cultural and general educational values. It is the period of life where the pupils are changing from childhood and approaching manhood and with the changing comes the thoughts of a vocation. The psychological changes accompanying the physiological transition are even more marked. There is a general restlessness and a beginning of social consciousness. This restlessness must have an intelligent outlet. The more formal manner of conducting school work is changing and we are attempting to make the school fit the boy's interests rather than make the boy fit the school. This should be one of the chief aims of the early junior high school industrial arts course, namely, let the boy make or do something that he wants to do. Secondly, there is a great means of enriching the curriculum by manipulation and information in such a way that the pupil will have many thoughts of his future vocation. However, there seldom is any relationship between the expressed interests of the pupils, their intelligence level and aptitudes, their social or economical status, the opportunities in the vocation, and possibilities of getting the education or training necessary to enter the vocation.

What Industrial Arts Offer Pupils

The study of Chart 2, on the following page, shows

<u>8</u>	<u>I</u>	<u>II</u>	<u>III</u>	<u>IV</u>	<u>V</u>	<u>VI</u>	
1	5	2	1	3	4	6	I. Vocational Guidance
2	3	2	6	4	1	5	II. Opportunities for develop-
3	1	4	5	2	3	6	mental experiences
4	3	5	2	6	4	1	III. Special information
5	4	3	2	6	1	5	IV. Ideals of craftsmanship
6	2	5	3	4	6	1	V. Utilizers appreciation
7	5	3	4	6	2	1	VI. Provoational training
8	3	2	6	4	1	5	S. Schools reporting
9	1	6	5	3	4	2	
10	1	5	3	2	6	4	As may be seen by a glance at
11	3	4	1	6	5	2	the chart there was a great di-
12	1	6	4	5	3	2	versity of opinion regarding the
13	5	1	2	4	6	3	importance of the six purposes.
14	2	3	4	1	5	6	The chart shows the rating of
15	3	4	5	2	6	1	the different teachers. Since
16	3	6	1	4	5	2	the purposes of most importance
17	6	5	2	3	4	1	are given the smaller numbers, a
18	4	1	6	5	2	3	composite ranking by all the
19	1	4	5	2	3	6	teachers is obtained by adding
20	<u>5</u>	<u>2</u>	<u>5</u>	<u>6</u>	<u>4</u>	<u>1</u>	each column. The least of the
	59	73	72	76	75	65	sums ranks first, the next
							smallest second, etc.

Chart 2 - The Six Purposes

"Vocational Guidance" first choice according to the teachers reporting. When a pupil participates in certain studies he discovers distinct aptitudes, as indicated perhaps by interests or distinct inaptitudes, and he is either attracted or repelled by the vocations based on such characteristics. Industrial arts would not have any vocational guidance significance to a pupil expecting to become a lawyer, a doctor or any such profession. It would be of vocational guidance suggestion to the boy expecting to become a carpenter, mechanic or other of the trades.

"Opportunities for developmental experiences," second choice, was given a prominent place in the general aims of the junior high school. The industrial arts department in the schools hopes to interest the pupil and keep him in school even though he is not interested in the other school work. This aim is important to the pupil, who because of economic or other reasons will drop out of the school system at an early age. It is a means of finding interests and aptitudes that can be guided and place the boy in a position that he can best serve society.

"Special information," third, is of assistance to young people in obtaining some fragmentary experiences with realistic machines and other processes involved in production. Much information can be gained through reading and interpretation of pictures. It may also interest the individual to

such an extent as to aid in a vocational finding for that individual.

"Ideals of craftsmanship." If a pupil working in a shop is interested in his work, he will desire to improve his manipulation and skill in that vocation. We want him to appreciate good workmanship, but it is not an objective of the junior high school to stress skill as a requirement.

"Utilizers appreciation." This is for the training of the "handy man," the boy that wants training in the unskilled jobs in his every day life. This is a phase of general education that should be required of every boy and girl. If a pupil constructs some product under careful supervision, his experiences are significant to him later when he goes to industry to buy.

"Prevocational training." All the pupils enrolled in shop courses do not get prevocational training out of the courses. In order not to waste the time of the pupils careful tests should be conducted. With these data the guidance system in the school should function so as to make the courses prevocational to as many as possible. If a boy is training to become a mechanic and takes up farming on leaving school, his training means very little to him in his chosen vocation. The overcoming of such cases mentioned is the important duty of the guidance director.

Regardless of the size of the school definite aims are

essential if the instruction is to be of any great value to the pupil. No school is so small that the instruction cannot be an aid in general education, such as acquainting the pupil with industrial life of the world and give him industrial information.

The great aim of all education is to protect society, by giving the youth training so that he can provide for himself and not become a burden on the state or nation.

We offer industrial arts to broaden the educational field for the pupil in order that he may find a vocation suitable to his interests and abilities.

Industrial Arts Courses Required of All Boys and Reasons for the Requirement

According to Chart 1 a large number of courses were given as required work in the seventh, eighth and ninth grades. Graph 1 shows that ninety-four per cent of the courses in the seventh grade are required. In the eighth grade seventy-six per cent are required and in the ninth grade nineteen per cent of the courses are required. The instructors as a class gave very miscellaneous reports as to the reason for such requirements. This would tend to show that proper aims have not been set up for the work or they are not sure that they are accomplishing the end purposes that are desirable.

The problem of the schools today is to prepare the boys and girls to meet the new demands for efficient service as members of families and of vocational and civic groups. Industrial arts, manual arts or the so-called prevocational courses are attempting to give insight and general acquaintance with actual conditions in the industrial world. They look on the future wage-earner as a consumer as well as a producer, and are giving education to help them consume intelligently and utilize the hours of leisure more wisely.

Edgerton,(1922). "The main objective is to help all pupils regardless of their social status or possible life work, to develop industrial intelligence and thinking power in connection with life situation. "Therefore, each activity not only includes contact with typical materials, tools and machines, but also is organized with the intention of (1) giving broader appreciation of economic production and demanding more respect for the various workers and their work; (2) preparing for more intelligent judgment and use of industrial products and service; (3) helping to develop insight and to promote more efficient production; (4) offering opportunity for testing the interests and aptitudes of students both in positive and negative ways, in order that worthy needs and capacities may be developed through specific training."

In the United States seventy-eight per cent of the male population and twenty-one per cent of the female population, over ten years of age, are engaged in gainful occupations. A knowledge of the kinds of work in which these workers engage is an essential part of a truly liberal education. Beside the value which such knowledge of the world's workers and their work may have in providing a background for the selection of one's life career, there is a distinct advantage on the social side. A knowledge of how others live is an important factor in breaking down social barriers and promoting a true spirit of democracy. The intellectual value of any study should be determined largely by the special information, habits, interests, aptitudes and ideals which it produces. Industrial arts contribute to these values to such an extent that it would warrant the requirement of some courses in the junior high school curriculum. Especially those courses dealing with manipulation in the unskilled jobs about the home and other explanatory courses given in the seventh and eighth grades for industrial insight.

**Industrial Arts Courses that are Elective in the Tenth
Grade Senior High School, and the Purpose for Such
Options**

The senior high school offers the student an opportunity to specialize in the course or courses that he has pursued in the junior high school. The equipment of the shops

and the instruction given must be practical and conform to the standards of industry or the training will not aid the pupil when he leaves school and is "on the job." If the pupil has not "found himself" in his work in the junior high school, or has not had a chance to "find himself" industrial arts courses may be offered for exploratory purposes even in senior high school. There will be a much larger proportion of the pupils, who will have made a definite selection of a vocation than were found in the junior high school. These pupils should be encouraged to make further study of the occupation chosen and of their capacities and interests with reference to success in that line of work. All pupils should be made to understand the seriousness of making a permanent choice of a life work, and should not come to a definite decision until they have tried out and investigated and thought through for themselves.

The training in the senior high school must be given with a view of entering a vocation. Skills must be stressed, where in the junior high school they were a by-product. The information must take on a more technical nature. The training given should be practical enough that upon finishing the course the boy could ask the school for an apprenticeship card and have it recognized by industry in that vocation.

ORGANIZATION AND ADMINISTRATION OF INDUSTRIAL ARTS COURSES

In general industrial arts courses in the junior high schools are organized and administered under four forms of try-out courses. Payne (1928) in his book entitled "Organization of Vocational Guidance", has the following to say regarding the try-out courses:

Russell-Bonser Plan. "Dean Russell and Dr. Bonser of the Teachers College, New York City, give this form of try-out course for the junior high school industrial arts courses. This plan calls for a general shop, with one teacher and in this shop is equipment for performing operations and carrying on projects in various vocations, such as printing, woodworking, concrete work, mechanical drawing, electrical work, metal work, etc. The boys working in this shop are given a choice, within limits, of making anything they want to and an opportunity to participate in those activities which appear to them to be the most attractive."

Ettinger Plan. "Former Superintendent Ettinger of New York City gives this form of try-out course for the junior high school industrial arts courses. This plan calls for separate shops and each shop in charge of a teacher. The students are routed through four or more of these shops the first two years of the junior high school, and the third year they are supposed to specialize for the entire year in

the shop they like best. This plan has an advantage in that the teachers are especially qualified in the shop in which they teach."

Gary Plan. "Under the Gary Indiana plan of pre vocational work or try-out course a mechanic is hired as a teacher. He is given an order for some equipment or some repair work about the school. He starts the work and at various class periods the pupils come in to work with him and are assigned by him to various tasks."

The Pittsburg Combination Plan. "This type of try-out course is a combination of the Russell-Bonsor and the Ettinger plans. During the first year the pupils are assigned to a general industrial shop, organized on the basis of the Russell-Bonsor plan. The second year they are routed through three or more of the pre vocational special shops organized on the Ettinger plan, and the third year they are to choose and specialize in one of these shops."

The teachers of industrial arts as a group show that they are not familiar with these four types of try-out courses. The self-discovery or try-out type of guidance developed as one of the functions of the junior high school. By giving a wider range of experiences with the business world, it was thought that the pupils would be better able to make wiser choices in their life work.

The teachers by showing a lack of knowledge of this aim of the junior high school show that they were trained in the old school. Their teaching aim seems to be to impart skills of a vocation, rather than to give training along manipulative and non-manipulative lines as recognized by the junior high school.

The Pittsburg combination plan of try-out gives a good idea of organization of the courses in the junior high school. In the seventh grade they are permitted to follow their own interests in selecting vocations in which to work. They may spend a period of about six weeks exploring one vocation and then they go to another until they have explored five or six different vocations. The next year they are given a try-out in three or more of the vocations that have been of special interest to them during their exploratory experiences in the seventh grade. The third year they must make a choice of one of the vocations that they have experienced in an explanatory and try-out way, beginning a specialization lasting the entire year, with a view of entering that vocation as a life work.

Evaluation of Type Plans. Each of the plans has advantages and disadvantages. The Russell-Bonser plan or the general shop plan is adaptable to the smaller schools because of the limited tax dollar. The teacher is not a specialist but has general knowledge in several vocations.

The Ettinger plan is adaptable in the larger communities where separate shops can be provided. The teachers are all specialists in the shop in which they teach.

The Gary plan calls for very little shop space. The teacher, being a mechanic, is strong in manipulative technique of the trade and has had his training in industry, giving him practical methods. He is short, however, in the professional tools of a teacher and must give the instruction as he received it, by the apprenticeship method.

The Pittsburg plan is probably the best organized plan of the four but is only adaptable to the very large communities where there is not the financial handicap of the small school.

It is essential to have the correct aims in view in presenting the industrial arts courses and it is equally important to have the work organized in order that the desired end purposes will be acquired on finishing the course.

End Purposes in Mind in the Try-Out Courses

Chart 3 shows the end purposes in mind in the try-out courses. "Discovery of interests" and "Discovery of abilities" are given the first two places as end purposes of the courses. This is the general aim of all junior high school work and the specific aim of the exploratory courses of the

<u>S</u>	<u>I</u>	<u>II</u>	<u>III</u>	<u>IV</u>	<u>V</u>	<u>VI</u>	<u>VII</u>	<u>VIII</u>	<u>IX</u>	
1	7	9	5	3	2	4	1	6	8	S. Schools
2	4	9	3	2	3	5	1	6	7	I. Discovery of interests
3	6	5	4	2	3	9	1	8	7	II. Discovery of abilities
4	4	8	7	2	3	1	9	6	5	III. Prevocational training
5	9	8	7	1	2	3	6	4	5	IV. Development of handyman
6	1	6	5	2	3	4	7	9	8	V. Utilisers appreciation
7	5	9	3	1	2	7	4	8	6	VI. Training of hand and eye
8	5	4	3	2	1	6	7	8	9	VII. Development of economic and civic values
9	7	8	3	1	2	4	5	6	9	
10	5	9	3	1	2	6	8	4	7	VIII. Correlation with abstract studies
11	4	7	6	1	2	3	9	8	5	
12	7	9	1	2	3	6	4	8	5	IX. Learning a trade
13	4	9	5	1	2	3	6	8	7	
14	6	9	5	1	2	4	3	7	8	
15	5	5	4	2	1	6	9	8	7	
<hr/>										
77	114	99	84	38	71	80	104	105		
<hr/>										

Chart 3 - Showing End Purposes

(The columns were added and the one having the least number was first, the one with the next smallest number second, etc)

seventh grade. This shows that the teachers of industrial arts are following out the aims of guidance in that they are attempting to put the "one best person on the job" in order that society will have more efficient service. This is in contrast to the schools previous to 1910. We are now trying to fit the curriculum to the needs of the individual where before we were attempting to make the pupil fit the curriculum.

"Prevocational training" is a worthy objective but unless the schools are large enough to offer a large number of try-out courses and have them well organized, prevocational training or specialization cannot be practical enough to be looked upon as an end purpose.

"Development of handyman" and "Utilizers appreciation" represent the manipulative and non-manipulative aims of the junior high school industrial arts courses. These two end purposes are essential in the first two years of the junior high school and work as an aid in the general educational values each child should know.

"Training of hand and eye", "Development of economic and civic values," and "Correlation with abstract studies." Of the three "Development of economic and civic values" is important in fitting the individual for his life work. "Training of hand and eye" and "Correlation with abstract subjects"

are hold overs of the old manual training under the theory of formal discipline.

"Learning a trade" is last and probably functions the least of the nine end purposes mentioned. The junior high school courses are not organized with this end purpose in view. The try-out courses attempt to find out the pupils' interests and abilities along industrial lines. Skill is looked on as a by-product in the junior high school. The few trade processes are fundamental and elementary. In the senior high school the purpose of the training is for entering the trade, here the acquirement of skill is one of the important objectives.

Assistant professor of vocational education, A. H. Edgerton, of Indiana University, found in a study of 303 schools the following reasons given as end purposes in offering industrial arts:

1. "Contributing to the general experience, allround development and industrial intelligence."
2. "Aiding in the intelligent selection of industrial occupations, without encouraging early choices."
3. "Enriching the school experience of the pupil through concrete situations."
4. "Preparing for entrance into industrial vocations in the school and through cooperation outside."

In a well organized junior high school shop unit the end purposes change according to the development of the pupil. As has been shown the seventh grade work is exploratory, the eighth, try-out and the ninth, prevocational. The prevocational training is the harder end purpose to carry out of the three. First, because it is hard to carry out industrial practices in a shop with limited equipment. Second, the teachers have not had the training necessary to give practical industrial methods.

Percentage of the Curriculum given to Industrial Arts

Chart 4 shows the percentage of the curriculum devoted to industrial arts. It is evident from their study that the administrators of the junior high schools recognize the value of industrial arts for the adolescent youth, especially the exploratory value for the seventh grade. Returns from the study of the chart show for the seventh and eighth grades an extreme range, running from a minimum of five per cent to a maximum of seventy-five per cent. Five per cent would be a very limited value even as a check on interests and abilities of the pupils to aid in the guidance program of that school. Seventy-five per cent on the other hand would show too much time devoted to industrial arts and not enough time given to the tool subjects of the curriculum.

This amount of time should never be permitted only in the case of the junior high school acting as a finishing school for pupils nearing the end of compulsory school age and expecting to enter a vocation as a life work. In the case mentioned, it probably would be better to divide the time and give fifty per cent of the time to the tool subjects and fifty per cent to the industrial exploratory and try-outs. The mean of the seventh and eighth grades runs around twenty per cent. This would seem a good division of the time for the seventh grade but it seems that it might be raised to around thirty per cent in the eighth grade. The pupils are going to be given manipulative experiences in the three or four different vocations that they have shown an interest in and if the correct values are going to be received more time must be given to the course.

In the ninth grade the mean is twenty-eight per cent and shows that more weight is given to the course in this grade. The pupils are now making a choice of a vocation and are taking training in preparation for entering that vocation as a life work.

We have never given up the idea of sending every student through the junior high school into senior high school and from the senior high school on to college. In our guidance we hesitate in advising a pupil to go into a trade as a life

<u>5</u>	<u>7th</u>	<u>8th</u>	<u>9th</u>				
1			25				<u>Seventh Grade</u>
2	10	10					Mean 20.635
3	10	10	25				Median 17.50
4			25	Range 0-15	16-30		31-
5	8	8	17	7 schools	10 schools		2 schools
6	8	5	20				
7	10						<u>Eighth Grade</u>
8	75	75	50				Mean 20.83
9			50				Median 18.33
10	8 1/3	8 1/3	16 1/3	Range 0-15	16-30		31-
11	33 1/3	33 1/3	53 1/3	6 schools	10 schools		2 schools
12	16 2/3	16 2/3	16 2/3				
13	20	20	25				<u>Ninth Grade</u>
14	18	18	25				Mean 23.45
15	18	18	25				Median 26.363
16	16 2/3	20	20	Range 0-15	16-30		31-
17	15	15	26	0 schools	17 schools		4 schools
18	16	16	16				
19	20	20	25				
20	16 2/3	16 2/3	20				
21	20	20	50				
22			25				
23	20	20	20				

Chart 4 - Showing Percentage of Curriculum Devoted to Industrial Arts

work and for the same reason we hesitate to devote very much of the curriculum to the study of industry. The junior high school is new and the industrial arts given in accordance to the junior high school aims has not been organized for a long enough time to determine how much weight it should have in the curriculum but as we get the work better organized we are going to devote more time to try-outs in preparation for entering industry.

PLANS AND METHODS OF CONDUCTING INDUSTRIAL ARTS COURSES

Qualifications of Teachers of Industrial Arts

Payne (1926) in his book entitled "Methods of Teaching Industrial Subjects," broadly classifies teachers of industrial subjects into three groups as follows:

1. "Teachers of practical arts subjects, such as industrial arts, manual training, mechanical arts, prevocational education, try-out courses - courses not given for specific vocational purposes and not receiving federal aid."
2. "Teachers of industrial subjects given for specific vocational purposes that do not meet the requirements for federal aid under the federal vocational law."

3. "Teachers of industrial subjects that conform to all the requirements of the federal and state boards for vocational education and receive aid under the federal law."

The teachers for the junior high school would come under the first classification of teachers.

Reports from the state superintendent of public instruction from the various states show that the requirements for teachers of industrial subjects are by no means standardized.

To teach under group one in the junior high schools of Minnesota, high school graduation and a diploma from a two year course for teachers of industrial training in an approved training institution is required as a minimum. Beginning with the school year 1929-30 a degree in industrial education will be required to teach in any senior high school.

Wisconsin grants licenses and certificates for special subjects to graduates of special courses from certified state schools.

Utah grants a certificate in special subjects to college graduates only.

Kansas grants certificates on a minimum of two years college with twenty-eight hours credit in industrial arts.

Since the reorganization of the industrial subjects in the junior high school new demands are being made on the

teachers. With the recognition of the possible exploratory values in industrial arts increased emphasis has been placed on the subject. The teacher now has the responsibility of placing himself and his work upon an equal social and educational footing with the other departments of the school. His educational qualifications must be equivalent to those of other teachers of his grade.

The training of industrial arts teachers should fall into three classes, development of manipulative skills, general or academic education and professional training. The first class is the basis upon which all industrial arts instruction rests. Academic education is needed to help place industrial arts teachers on a higher footing and on the same level as the other teachers of the school. It is also necessary to prepare the teachers in teaching the non-manipulative aims as set forth by the general aims of the junior high school.

Professional training is necessary in order to give the teacher the tools of his trade as a teacher. He must understand and be in sympathy with the adolescent and have the information and training needed to teach the pupil and his subject.

There is a tendency to lengthen the time devoted to teacher training in many of the states. In the earlier years of manual training any one could get a teaching posi-

tion that could do a little carpentering and cabinet making. Now the schools are asking for the better qualified teachers regardless of the minimum state requirements. Minnesota sees the need of lengthening the training period for their teachers. Utah requires a degree for all her industrial teachers. Although several of the states still hold to a two year minimum training requirement, with the added importance given the subject it should not be long until a degree in industrial education will be required. It is well for the forward looking teacher to realize this changing condition and prepare to meet the new requirements.

Kind of Shops in Which Courses are Offered

There are several factors conditioning the kind of shop used in a school. First, the size of the community will necessarily determine the kind of shop used in that particular school. In other words the tax dollar will determine the size and equipment and teaching force of the school. Secondly, the type of the community should be considered in determining the shop to fit its needs. A survey of the community would show the number of different industrial vocations and the number of men employed, the prospects of getting into the vocation and the economic and social status of those in the vocation. The pupils could first be given

training to fit the needs of the community and then given exploratory and try-outs in other vocations not represented in the community.

Separate Shops. Chart 5 and Graph 5 show that fifty per cent of the schools are using separate shops. The Ettinger plan of try-out course previously mentioned is the plan used in separate shop organization. The plan as carried on in New York City, provides for the rotation of a combination of nine week units in designated intermediate schools, where the boys get experience in machine work, sheet metal, printing, wood working, electric wiring, plumbing, drafting, garment design, sign painting and bookbinding. This plan is so organized that a boy who has unusual ability may receive special training without completing the cycle.

Edgerton (1922) reports that school No. 47, Buffalo, New York, includes the following activities: machine shop practice, forging, sheet metal work, pipefitting (for the seventh grade), bench woodwork, plaster casts, wood turning, pattern making and molding, electrical work (for the eighth grade), carpentry, cabinet making, wood finishing, pattern making and foundry work, concrete construction (for the ninth grade) and mechanical drawing for all grades. This work was conducted on the Ettinger plan of try-out course.

<u>5</u>	<u>1</u>	<u>2</u>	<u>3</u>		<u>5</u>	<u>1</u>	<u>2</u>	<u>3</u>
1	x				19		x	
2	x				20	x		
3		x			21	x		
4	x				22	x		
5			x		23	x		
6	x				24		x	
7		x			25		x	
8		x			26		x	
9	x				27		x	
10	x				28		x	
11		x			29		x	
12	x				30		x	
13			x		31		x	
14			x		32		x	
15	x				33	x		
16		x			34	x		
17		x			35	x		
18		x			36		x	

Chart 5 - Showing Type of Shop Devoted to Industrial Arts

5 -- Schools
 1 -- General industrial arts shop (1) 49 per cent of schools
 2 -- Separate shops (2) 50 per cent of schools
 3 -- Related shops (3) 3 per cent of schools

XXXXXXXXXXXXXXXXXXXXX#####

48 per cent of the schools
reported the use of general
industrial arts shops

XXX represents the general shops

XXXXXXXXXXAAXXXXXXXXXXXXXX#####

50 per cent of the schools
reported the use of separate
industrial arts shops

XXX represents the separate shops

XXX#####

8 per cent of the schools
reported the use of related
industrial arts shops

XXX represents the related shops

Graph 5 - Showing Percentage of Schools Using the
Different Types of Shops

This plan has its advantage in that each teacher in charge of a shop is a specialist in that one vocation and does not have to teach in any other shop. Group instruction can be carried on for the reason that every one is working with the same material and in the same vocation.

General Industrial Shop. The chart shows forty-two per cent of the schools are using the general industrial shop. The Russell-Bonser plan of try-out course is used in a general shop. The teacher in charge of the shop must have a general working knowledge of several trades. Because of the variety of work being carried on in the shop at the same time the instruction must for the most part be individual. The general shop is decidedly of junior high school level and has been tried out in cities of all sizes. The diversity of activities it possesses gives it advantages over other types of shops, especially for the smaller communities, where the organization of the department is necessarily determined by the size of the school and community.

Related Shops. Only eight per cent of the schools report a use of the related shops. One reason for this is that the larger schools are the only one that could give a wide content of industrial courses and then go farther and specialize in a group of related grades.

Length of Shop Periods

Chart 6 shows a range of forty-five minutes minimum and one hundred and eighty minutes maximum length of any one shop period.

There are three main factors determining the length of any one shop period. The age of the pupils taking the work, the subject and the type of instruction, necessarily governed by the type of shop in which the instruction is given.

In the junior high school we are dealing with the adolescent and a long period especially for the seventh grade pupil would be very tiresome and the pupil would lose interest in the subject. In the eighth grade the pupils have stronger interests and if a real try-out is to be given longer periods should be given to the work. In the ninth grade the pupils have selected one or two trades in which they are interested and in which they are planning to make a life work. If the pupil is to be given any prevocational insight, more time must be spent on the job with a near a natural setting as possible.

Many of the home mechanic courses and practical arts courses given in the first two years of the junior high school with the purpose of training in the unspecialized jobs about the home, should not be given the same amount of time as a prevocational course.

S	45	50	55	60	90	120	180	S	45	50	55	60	90	120	180
1					x			21				x			
2					x			22				x			
3				x				23				x			
4					x			24	x						
5							x	25	x						
6					x			26				x			
7			x					27				x			
8					x			28				x			
9				x				29				x			
10	x							30		x					
11			x					31						x	
12	x							32			x				
13				x				33				x			
14	x							34	x						
15					x			35						x	
16	x							36			x				
17			x					37	x						
18				x				38						x	
19							x	39						x	
20				x				40						x	

Chart 6 - Showing the Time Allowed for Industrial Arts Shop Work.

Mean 72.25 minutes
Median 62.14 minutes

46-60
93 Schools

Range 61-180
12 Schools

As has been said individual instruction as given in a general industrial shop would require more time than group instruction as given in separate shops. All these factors must be considered in deciding on the length of the shop periods best fitted for the needs of each school.

The type of students must be considered also. In the case of the junior high school acting as a finishing school for the boys that leave school, the average length of a shop period is too short judging from the schools reporting. Industrial arts can probably do more for this boy than any other part of his school work. If the work is well organized we can give the boy training in the common skills every one should possess in meeting the problems of every day life. While the junior high school does not attempt to give him skills of a trade, he can be helped in the selection of an occupation for which he shows an interest and aptitude. The few trade processes that he does learn will be fundamental even though elementary. His relations with his fellow workers, his employer and society at large will be bettered for his having studied social and economic problems closely related to industrial life.

I would agree with the 30 per cent of the schools that reported periods longer than sixty minutes. To give any real try-outs in the trades a period of ninety minutes would

not be too long for the eighth grade pupil and if any pre-vocational training is to be given in the school one hundred and twenty to one hundred and eighty would not seem too long. In many of the smaller schools, where the equipment is very scant much of their work would consist of information in industrial vocations and in these schools the forty-five or sixty minutes would be sufficient.

Basis of Offering Courses

Chart 7 shows the project method of teaching as first choice by those reporting. The project is of recent development and is one type of problem solving teaching. By project we do not mean an article made in the shop, sometimes given the name of project. We have reference to a teaching with the emphasis being placed on the learner's part instead of the teacher dominating the situation to the suppression of individual responsibility for the success or failure of the enterprise. Different degrees of importance and desirability are given for permitting the pupils to purpose and plan the projects they wish to construct. Many teachers require the pupils to work from drawings and specifications thus allowing little opportunity for them to set up purposes or objectives and develop plans for meeting the difficulties in the execution and solving of the problems they encounter.

Other teachers are trying to get away from this traditional method and allow the pupils to solve their problems and work out their manipulative tool processes required for that problem. As has been said skill is not stressed in the junior high school industrial work, however, the pupils should not be allowed to acquire their tool manipulation in a trial and error method. The teacher still controls the instruction although more indirectly than formerly.

The Project Method. The first important step in the employment of the project method of teaching is to get the pupil to see the need of something to be made or done in the shop. This gives motivation or purpose to what will be a project when it is completed. Secondly, the work must be planned. This develops initiative and responsibility in the pupil and requires creative or constructive thinking and reasoning in planning their work. This planning of the project adds interest to the purpose and helps motivate the work. Execution is the next step and is an important one to the adolescent. They must have enough experience in the manipulative tool processes in order to work out the project or they will have to have individual instruction before the work can be resumed. The fourth step is judgment on the final results. This is an opportunity that the teacher should not miss as it has a good educational value for the pupil. Question the pupil as to improvements they would make if

<u>3</u>	<u>1</u>	<u>2</u>	<u>3</u>	<u>3</u>	<u>1</u>	<u>2</u>	<u>3</u>	
1	1	3	2	18	1	2	3	Since the basis of
2	1	2	3	19	2	1	3	offering the courses
3	1	2	3	20	3	1	2	are listed 1-2-3 accord-
4	3	1	2	21	3	2	1	ing to the way they are
5	3	1	2	22	1	2	3	used in the school a
6	3	1	2	23	3	1	2	composite marking of all
7	1	2	3	24	2	3	1	the schools is obtained
8	1	2	3	25	3	2	1	by adding each column.
9	3	1	2	26	1	2	3	The least of the sums
10	3	1	2	27	3	1	2	ranks first.
11	3	1	2	28	2	1	3	
12	3	1	2	29	2	1	3	5. Schools
13	3	1	2	30	1	2	3	1. Exercise
14	3	1	2	31	3	2	1	2. Project
15	3	1	2	32	1	2	3	3. Class project
16	2	1	3	33	1	2	3	
17	1	2	3	34	3	2	1	
				35	<u>3</u>	<u>1</u>	<u>2</u>	
				76	54	80		

Chart 7 - Showing the Basis Used for Industrial Arts Courses

they were going to construct the product again. How does it compare with similar industrial products. This type of instruction gives both the manual and information and can be used in any of the grades of the junior high school to a good advantage.

A teacher in a large school can use the class project as it gives an opportunity to develop a product on an industrial basis. The classes can be divided, some assigned to piece work running the different machines, some assembling and others working in the finishing room. The work in the ninth grade could be given on a practical basis similar to the work carried on in industry.

The use of the project and the class project seems to be gaining as a basis of offering the courses in the junior high school. There are still a good many teachers using the exercise method of instruction. This would tend to show that the general aims of the junior high school and the specific aims of the present industrial arts have not been fully accepted. The schools working under the eight-four plan are many of them still teaching the work as a hand craft vocation and at least not carrying out the non-manipulative aims of the junior high school.

The Exercise Method. The exercise method is still used in many schools. If it is used to any great extent the pupils will lose interest in the shop work because the work

is not motivated. The pupils see no reason in doing the same manual operation over and over to perfect it and then turn to some other exercise and do the same thing. They like to look forward to the finished product. We see by the chart that the exercise is second choice. The exercise could be used with the project method in this way and not be a disadvantage. The pupils must have a certain amount of tool manipulation in order to work out their project. The exercises method of obtaining this tool process might be used and be motivated in that they are expecting to use the process in the work on the project.

The class project seems to be last choice. The shortage of equipment may be the reason that it is not used more as a basis of instruction. The smaller school would have this handicap in using the class project while it would not affect the individual project work.

Character of Shop Products

Chart 8 shows a decided choice for the utility products in the industrial arts courses. This probably means that the work is well motivated and of interest to the pupil. It also shows that the schools are giving training to develop the "Handyman" or train the boy to do the unspecialized jobs about the home.

Commercial products would seem to be second choice.

<u>3</u>	<u>1</u>	<u>2</u>	<u>3</u>	<u>3</u>	<u>1</u>	<u>2</u>	<u>3</u>
1		1		19		1	5. Schools
2		1		20		1	1. Toys
3		1		21	3	1	2. Utility
4	3	1	2	22	3	1	3. Commercial
5			1	23		1	2
6		1		24	3	1	2
7	2	1		25	3	1	2
8		1		26		1	
9		1	2	27	3	1	2
10		1		28	2	1	
11	1	2	3	29		1	
12	2	1		30		1	
13			1	31	3	1	2
14		1		32	3	2	1
15		1		33	2	1	3
16	2	1		34	3	1	2
17		1		35		1	
18	3	1	2	36	3	2	1
				37	3	1	2

Chart 3 - Showing the Character of Shop Products

This could be worked out in the prevocational courses in the ninth grade in the schools that have the facilities and equipment necessary to give practical industrial methods in their shop work. The courses give more industrial information than the handyman type given in the home mechanics courses of the first two junior high school grades.

The making of toys as a shop product is given last place. This may be for the reason that the work is motivated through thrift and worked out in utility products rather than toys used only for the amusement of the boys. Many of the schools use the miniature houses as a shop product. The boys build the houses according to plans, all wiring for electricity and plumbing compare to that of a large house. Besides the manual operation they get the technical, related and occupational information the same that they would encounter in a practical way in following the vocation of a contractor.

Procedure in Shop Courses

The boys usually enter a shop course with considerable enthusiasm. This enthusiasm can often be made to carry boys over the first necessary practice and drill in the fundamental tool processes. The work must be motivated and planned to keep every one busy from the first shop period

until the last, in order that the interest of the class will not be killed during this beginning period.

The teacher should tell the class the general aims of the shop courses and the specific aims of the different courses. They should be made to see the value of these aims both in school and in later life.

The beginning courses will naturally have to be elementary explanatory giving a bird's-eye view of the trade. The general aim is to give the pupil a try-out to determine interests and aptitudes. The work in the seventh grade usually is organized in such a way as to give an elementary course in five or six different trades. The work in the eighth and ninth grades is of a higher level, with more emphasis on the manipulative exploration of the former elementary one. A tie up between the manipulative processes and industry is attempted and the work is carried on in a practical method. The pupils are permitted to use the different machines to do the work that formerly they had to do by hand. As the courses progress more weight will be given to the technical, related and occupational information. The skills that are taught are fundamental in all the junior high school work. The industrial instruction given in the senior high school is more technical and skill is stressed as one of the important aims.

This type of instruction is very different than that

given previous to 1910. The trades were taught as a hand e-aft and the pupils were never given a chance to do any constructive thinking or planning on a shop product. A great part of the teaching was done by demonstration and by the use of the exercise method as a basis for the course. About the only difference between an elementary and a supposedly advanced course was that the pupils were permitted to make larger projects in the advanced course although they went through the same manipulative tool processes as in the elementary course.

CONCLUSIONS

1. The general aims of the junior high school are accepted in name only by many of the schools.
2. The specific aims of industrial arts are changing from training of hand and eye and vocational training, to general educational values and as a means of "finding" for the pupil.
3. The administrators are not sure why industrial arts are required.
4. Many schools give a very limited field to industrial exploration.
5. Industrial arts is a means of finding interests, abilities and aptitudes valuable in guidance.

6. When the industrial arts is well organized there is a tendency to make it exploratory in the seventh grade, try-out in the eighth grade and prevocational in the ninth grade.
7. Industrial arts can aid the boy that drops out of school at an early age.
8. Trade skills are not stressed in the industrial arts courses in the junior high school.
9. The project method of teaching is used as a basis for courses offered in the majority of the schools.
10. The old exercise method is still used in many of the smaller schools.
11. Teachers of industrial arts as a class are not familiar with the four general types of try-out plans. Showing that they received their training in a more or less of an apprenticeship manner.
12. The general shop is especially adaptable to the smaller schools.
13. Separate shops are used in the larger schools.
14. The length of the shop periods is too short for the eighth and ninth grade pupil.
15. The percentage of the curriculum devoted to industrial arts is very small compared to the end purposes demanded of the courses.

16. The requirements for teaching industrial subjects are being raised.
17. Many of the schools are giving training for teachers of industrial subjects without preparing them to meet the new demands of the junior high school.

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