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History of industrial arts in the public schools of Davenport, Iowa

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HISTORY OF INDUSTRIAL ARTS IN THE PUBLIC SCHOOLS OF DAVENPORT, IOWA

by

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I. INTRODUCTION AND PURPOSE OF THE STUDY

There are several things which prompted the investigator to undertake this piece of research. It was thought at the onset of this research that if the history of industrial arts in the public schools of Davenport, Iowa could be traced from its inception to the present time, the content therein would prove to be invaluable to the Davenport Industrial Arts Department. It would be invaluable in that the content would reveal not only a discernible trend in course offerings, but also a suggestion as to the merits of the total industrial arts program when related to the entire school curriculum as reviewed by school policy makers and administrators.

Before this research was undertaken, the investigator had knowledge of a distinct sentiment on the part of a certain segment of the general public insofar as the value of industrial arts in the public schools is concerned. This sentiment relegates industrial arts courses to a decidedly inferior position in the entire school curriculum. Therefore, a review of material which may support or deny the foregoing assertion appears in order.

Furthermore, since there has been nothing done with regard to writing a chronology of industrial arts in the schools of Davenport, Iowa, this opportunity to produce a beginning, however modest, is a singular challenge to the investigator.

Therefore, the primary purpose of this work is to verbally and graphically represent the movement of industrial arts in the public schools of Davenport, Iowa from its inception to the present time.

II. REVIEW OF LITERATURE

A. The Early Beginnings

Probably the most inclusive and lucid review of the history of industrial arts is that given by Bennett (2, p. 11). With reference to the honorable position given to hand work in times past, he states:

> Many of the manual trades are very close to the primary necessities of life. This idea has long prevailed among the royal families of Europe. Even after generations of luxury, it has persisted, and for this reason princes have been taught handicrafts. But the idea itself, more or less developed, dates back beyond recorded history. A realization of the fact that skill of hand is an advantage to its possessor goes back to the time when primitive man taught his son all the crafts he knew, and when the exceptionally skilled worker was regarded as possessing super-human power.

As a contrast with the foregoing Bennett (2, p. 15) reveals that Greece, in the days of Socrates, regarded the work of the handicraftsmen as being worthy of nothing but scorn. The grounds for relegating the work of the handicraftsmen to a position of inferiority were based on the presumption that this kind of work robbed men of intellectual growth, and that it prevented them from investing their interest in the state.

Klemm (39, pp. 18-19) brings his research to illuminate Greek thought as it relates to the position given to technology. He says:

> The Greek was in fact the first Man of Theory. His life was devoted to and in a higher sense formed by, scientific understanding. Technology generally ranked in the Greek world below pure science. Platonic realism, in particular, regarded as 'Reality' the distant and changeless realm of Ideas rather than the objects of our mundane sphere, which were considered as but shadows and therefore of lesser rank. For this reason, experiment was of little import among the Greeks.

There appeared in the sixteenth and seventeenth centuries the beginning of two central ideas of manual arts: first, the idea that sense perceptions are the bases of knowledge, and second, the idea that manual manipulation is an unusually promising medium through which learning is promoted (2, p.30).

Of the thinkers who made significant contributions in the sixteenth and seventeenth centuries, Jean Jacques Rousseau stands as a cornerstone of educational philosophy. Of Rousseau, Bennett (2, p. 81) has said, "His recognition of the fact that manual arts may be a means of mental training marked the beginning of a new era in education."

Johann Heinrich Pestalozzi has been called "the father of manual training." This title has been awarded to Pestalozzi because of his numerous attempts to assist the children of the poor to become competent in some agricultural activity for their own economic and intellectual development.

In a series of educational ventures which blossomed and then all but died, Pestalozzi underscored the importance of a teaching sequence which proceeded from things to words rather than from words to things (2, pp. 107-119).

Phillip Emanuel von Fellenberg was a contemporary of Pestalozzi. Fellenberg's Hofwyl experiment was a school for children from all social levels. The primary medium of instruction was through agricultural practices, although the mechanic arts were well represented. Bennett (2, pp. 128-138) says:

> In order to supply the needs of his institution Fellenberg employed mechanics representing several different trades, and each of these has a shop or place to work. Among the skilled workmen were one or more of each of the following: blacksmith, wheelwright, carpenter, cabinet maker, turner, brass worker, shoemaker, harnessmaker, tailor, lithographer, bookbinder. This afforded an exceptional opportunity for a young man to select a trade. So it came about that when a boy was old enough to become an apprentice, instead of continuing at farm work, he was allowed to select a trade which he would follow during his hours for the remainder of his life at Hofwyl.

Wilhelm Augustus Froebel, whose employment experiences were similar to Rousseau and Pestalozzi, opened the first school known as a kindergarten. In his school Froebel capitalized on the concept of self-activity. Through this concept he produced the system of gifts and occupations; the former referring to playthings in the form of geometric solids, the latter referring to materials whose form could be readily changed. In short, the gifts were symbolic of things which could not be changed, whereas the occupations were symbolic of things which could be changed (2, pp. 161-165).

B. The Emergence of Industrial Arts Teaching

According to Bennett (3, pp. 14-19) there seems to be little evidence of a systematic approach to the teaching of the mechanic arts prior to 1868. It was to the credit of Victor Della Vos and his associates that the then prevailing apprenticeship method of teaching mechanic arts gave way to a studied, sequential, and time-saving plan.

The Imperial Technical School, Moscow, Russia was the setting in which Della Vos and his shop instructors conceived their plan. The central purpose of the school was to train various kinds of engineers, draftsmen, and foremen.

The main principles of the plan were as follows:

(1) Each art or distinct type of work has its own separate instruction shop; e.g., joinery, wood turning, blacksmithing, locksmithing, etc.

(2) Each shop is equipped with as many working places and sets of tools as there are pupils to receive instruction at one time.

(3) The courses of models are arranged according to the increasing difficulty of the exercises involved and must be given to the pupils in strict succession as arranged.

(4) All models are made from drawings. Copies of each drawing are supplied in sufficient number to provide one for each member of a class. The drawings are mounted on cardboard (or, for the blacksmith shop, on wooden boards) and

varnished.

(5) The drawings are made by the pupils in the class for elementary drawing, under the direction of the teacher of drawing with whom the manager of the shop comes to an agreement concerning the various details.

(6) No pupil is allowed to begin a new model until he has acceptably completed the previous model in the course. He must receive at least a grade of three, which is considered good.

(7) First exercises will be accepted if dimensions are no more than approximately correct; later exercises should be exactly to dimensions; therefore, the same marks given a student at different periods during his course do not express the absolute but the relative qualities of his different pieces of work.

(8) Every teacher must have more knowledge of his specialty than is necessary merely to perform the exercises in the course of instruction. He must keep constantly in practice so that his work may be an example of perfection to his pupils. Such dexterity increases the authority of the teacher.

The schedule which was followed in the plan of instruction was in three phases. First, the students became familiar with the names of tools, how to use and care for them, and the properties of the materials employed. Secondly, a variety

of joints were executed as the students continually referred to their experiences in the first phase. Thirdly, a fund of related information, in conjunction with the materials and processes utilized, was established as a necessary part of the students' mental equipment.

The system of sloyd, says Bennett (3, pp. 53-68), took on aspects quite different from those of the Russian plan. Sloyd, as practiced by the northern European countries of Finland, Sweden, Norway, and Denmark, was a family activity consisting in the making of articles needed by family members and for the operation of the farm. The boys would assist their father in the making of axe and hammer handles, benches, tables, and forks and spoons. The girls would help their mother in the necessary spinning, weaving, knitting, and sewing.

It was early recognized by national leaders that sloyd tended to promote responsible character as well as skill on the part of boys and young men.

The first sloyd schools were conceived of as an economic proposition. The quantity and type of articles produced were based on the demand. The person in charge of the class in such a school was more of a production foreman than a teacher.

Uno Cygnaeus was, perhaps, the originator of the teaching of sloyd in the elementary schools of Finland. Having become familiar with the pedagogical concepts of Pestalozzi and

Froebel, Cygnaeus was convinced that "...handwork in the folk schools should lead toward future practical efficiency, yet such a school should not become a technical or trade school."

Otto Salomon of Sweden extended the beginning made by Cygnaeus. Salomon developed what he called educational sloyd whose general characteristics consisted of (1) producing objects of utility, (2) analysis of operations, and (3) educational approach.

In Salomon's The Theory of Educational Sloyd, the author indicates his aims in terms of (1) formative and (2) utilitarian, which are as follows:

Formative Aims

1. To instill a taste for, and a love of, labor in general.
2. To instill respect for rough, honest, bodily labor.
3. To develop independence and self-reliance.
4. To train in habits of order, exactness, cleanliness, and neatness.
5. To train the eye and sense of form.
6. To cultivate habits of attention, industry, perseverance, and patience.
7. To promote the development of the physical powers.

Utilitarian Aims

1. To directly give dexterity in the use of tools.
2. To execute exact work.

C. Recent Historical Reviews of Industrial Arts

The investigator located two reviews of industrial arts which seem to be relevant for this study.

Angelbeck (1, pp. 14-15) writes that industrial arts in Milwaukee, Wisconsin received substantial support from a

protest by a large segment of Milwaukee citizens over the school curriculum. It appeared that these people were alarmed at the prospects of their children being displaced on the labor market by the influx of skilled European workers. What further compounded the situation was that the children of these protestants were forced into the labor market at a rather early age without the benefit of having ventured into some marketable skill.

Davis (36, pp. 11-15) lists (1) the rapid expansion of industrial products, and (2) the urgent need for skilled manpower in industrial positions, as being vital factors indicating a need for manual training.

In 1883, the President of the School Board reported that the wealthy and influential people of St. Louis were beginning to look upon manual training as a valuable addition to education. Members of the School Board were convinced that if manual training were introduced into the school system, the total instruction would increase and the total school life would lengthen.

III. THE INVESTIGATION

A. Sources of the Data

Perhaps the more fruitful sources from which the information for this study was gathered were as follows: (1) minutes of the proceedings of the Davenport School Board, (2) annual reports of the Superintendent, (3) synopses of courses of study, (4) interviews with industrial arts personnel, and (5) literature bearing on the history of Davenport and Scott County, Iowa from the Davenport Public Library.

B. Presentation of the Data

1. The first phase: 1889-1899

Evidently the Superintendent of Schools, Mr. J. B. Young, had been in contact with the administrators of other schools with regard to the worth and feasibility of establishing manual training in the Davenport public schools. His contacts with these other administrators must have proven to be of considerable persuasion, because on April 15, 1889 a resolution was offered by board member Dr. Preston, and is as follows (11):

> Resolved, that manual training be introduced in the public schools with the beginning of the next school year; and that the President of the Board and the Superintendent of Schools be requested to consider a plan and report not later than the June meeting.

The resolution was adopted.

The President of the School Board and the Superintendent accomplished their task and presented their plan to the Board on June 10, 1889. The plan states (12):

> The object of the manual training herein contemplated, is not to educate the hand to the neglect of the brain; not to train in the power of doing to the detriment of the powers of thinking; not to teach a trade, but rather to teach the elementary principles of many trades. It is not intended to limit or reduce scholastic training or culture, but to supplement it and render it more thorough. Through the manual exercises to be required and the tools to be used, the purpose is not only to illustrate and explain more clearly and intelligibly than the methods of the ordinary class room have done hitherto, the principles of mechanics, geometry, drawing, and other branches of study, but also to train the hand and eye, and cultivate and develop the constructive and executive faculties, so that when the boy gets through school he will not simply know, but also be able to do. In short, the system will "seek to put the whole boy at school" and turn him out equipped with a good degree of executive ability.
>
> For executing the purposes of this work, the following recommendations are made:
>
> 1. That the work for the first year, at least, be confined exclusively to work in wood, giving practice in the use of all the ordinary tools employed in carpentry, joinery, etc. without machinery. Drawing is to form a prominent feature of the instruction - all the kinds that a systematic and workmanlike execution of the various operations involves or implies.
>
> 2. That twelve single or six double carpenter work benches, suitably constructed for the object intended be provided and placed in the upper room of the old High School building, and that twelve sets of the tools necessary for the work above indicated, be procured. Also, that the necessary drawing tables be furnished, and that any changes or repairs the room may need be made...
>
> 3. That the instruction for this year at least be confined to boys in the public schools, 14 years of age and over, attendance, however, to be optional,

but once begun, the work must be continued, except for good reasons.

As far as practicable the number in a class is to be limited to twelve, each class to have one lesson of from two to three hours per week.

4. That the School be opened the commencement of the next school year and continue to the close.

Louis P. Best
J. B. Young
Committee

Mr. Andresen moved that Mrsrs. Best and Burdick and the Superintendent be authorized to prepare the work room for manual labor and make such temporary arrangements in regard to the same as they deem best. Adopted.

It is of interest to note that the first estimated financial outlay for equipment and materials totaled $264.30, the breakdown of which is as follows:

1.	Six double benches.	$65.00
2.	Material for drawers.	15.00
3.	Material for drawing table.	6.00
4.	Lavatory.	30.00
5.	Tools for twelve benches.	136.00
6.	Grindstone, glue, shellac, etc.	10.00
7.	Drawing paper, pens, ink, nails, screws, oil, files, sawset, saw clamp	2.30
		$264.30

Moreover, there was a per pupil cost for drawing board materials and lumber of $.25 and $3.00 respectively.

Downer (37, pp. 940-943) provides an observation of the initial entry of manual training into the public schools and the subsequent provisions for extending its program. He sum-

marizes:

> The next year after cooking was introduced, or in 1889, instruction in manual training was offered to boys. A room was fitted up in the second story of the building at Sixth and Main with the necessary equipment. The course embraced wood-working, both bench and lathe, and mechanical drawing. This line of work elicited as much interest and popular favor as did cooking. From the establishment of manual training until the present time eight different teachers have been employed. At first instruction was given to students of the High School and those boys from the graded school who were fourteen years of age and over. Later it was limited to boys of the Ninth grade and the High School. The work broadened as the years went by, and now the Seventh and Eighth grade boys have instruction in Manual training at centers in the grade buildings which it was necessary to establish through the inability to accomodate all the pupils in one room. The utilization of these centers and the growth of the work in the High school made necessary the employment of two additional teachers. For some years there has been instruction in hand work from the primary grades upward. In both Manual Training and Cooking Davenport was a pioneer for all this region.

It is evident that the operations of the St. Louis Manual Training School had considerable influence on the formation of manual training in the Davenport schools. On April 14, 1890 a report was submitted to the Davenport School Board by the Superintendent relative to the availability of lathe turning models from the St. Louis Manual Training School. Moreover, the teacher of the Davenport Manual Training School went on record as requesting same, providing the cost of transportation be paid from school funds (13).

Insofar as shop maintenance is concerned, the first teacher of manual training in the public schools of Davenport

received assistance from the custodial department in caring for the shop machinery. The School Board Minutes of November 10, 1890 indicate that because of the additional work created by the caring for machinery in the Manual Training School, the salary of the janitor was increased $3.00 per month (14).

Mr. George Robbins, the first teacher of manual training, was cognizant of the evolving changes taking place in educational philosophy and the consequent necessity of revamping his particular course of study. On March 16, 1891 Mr. Robbins asked the Board, through Superintendent Young, that he be allowed to extend his course of study to include pattern making and moulding (15).

The committee to whom the foregoing communication was directed for their consideration, issued the following statement:

> In March last a communication was received from Mr. Robbins, Teacher Manual Training, requesting permission of the School Board to introduce pattern making and moulding as the work for the advanced class of next year; stating also that the material and complete outfit will not cost over $150.00. Your committee recommends that the suggestion of Mr. Robbins be adopted and that Mr. Geo. Robbins be herewith authorized to expend the above sum (or as much of it as may be necessary) to purchase the material and outfit as specified in his communication of March 16, 1891 (16).
>
> H. Lischer
> John C. Bills
> Comm. on Special Studies

It is not clearly stated in the will of Mr. Nicholas Kulmen as to what he had in mind insofar as course of study

content is concerned, but his proposition does provide material for speculation on how industrial arts may have been affected had not legal circumstances been what they were.

The following is an excerpt from the will of Mr. Kulmen (17):

> From the residue of my estate I give and bequeath the sum of Thirty Thousand Dollars ($30,000) toward the establishment of an Industrial School for Boys and Girls in the City of Davenport, Iowa: Conditional however, and provided that said City of Davenport or Scott County, Iowa, or Citizens thereof, or other persons, shall contribute and join to this sum at least the sum of Twenty Thousand Dollars ($20,000) for the same object and purpose, within two (2) years of the time of my demise; otherwise the said sum of Thirty Thousand Dollars ($30,000) shall remain in my estate.
>
> The expenditure and appropriation of this fund shall be under the management and control of a corporation to be formed and composed of the members of the Board of Education of the Independent School District of the City of Davenport; the Superintendent of the public schools of said city; and the Mayor of said city.
>
> All of them, or their successors, shall, by virtue of their election or appointment to said office, be members of said corporation, and they shall, or may, elect periodically some Lady members, and also some practical mechanics, to be members of such corporation the same as themselves; in order to obtain additional practical advice and suggestions in the establishment and management of said Industrial School.
>
> And it is hereby conditioned that no distinction as to nationality, color or religious belief, shall be made in the admission for pupils or scholarships in the above Schools for boys and girls, and that no religious practices shall be allowed in said School, in order to always keep it free from sectarianism, and open to all well behaved Scholars of any religious belief or disbelief.

The following is the response given by the President of the School Board to whom the task was assigned to investigate

the ramifications of Mr. Kulmen's will. With reference to a part of Mr. Kulmen's will, Mr. Bills, the School Board President, states:

> . . . It will be seen from the foregoing that this School Board, as a Board has nothing whatever to do with the matter.
>
> The persons who are at any time members of the Board, if they so desire, or any one or more of such members, or the Mayor of the city, or the Superintendent of the Schools, can organize such corporation by complying with the provisions of the laws of Iowa, and after such organization, all members of said Board, together with the Mayor of the city, and the Superintendent of the Public Schools, would be ex officio members of said corporation; provided, they were willing to serve.
>
> No one of such persons could be compelled to assume the duties of such position, simply because he became a member of the School Board or Mayor of the City.
>
> This Board in its corporate capacity, can take no action in the matter of such organization.
>
> No tax could legally be voted or levied upon the property of the district for the purpose of raising the $20,000.00 required to make the said bequest available.
>
> No tax can be legally levied for the support of a School which is not organized under the School laws of the state, and not controlled by the School Board of the District.
>
> If the $20,000.00 is to be secured, it must be done by the individual efforts of those who feel sufficient interest in the matter to undertake it.
>
> It would be useless labor and expense to organize a corporation, before the money is pledged...

The efforts of those persons who pioneered in manual training during the early years of its establishment did not go by without acknowledgment from both national and local sources.

The School Board Minutes of 1894 (18) disclose that the work being done in the Manual Training School and being ex-

hibited on various occasions was of such a caliber that an award for same was in the offing. The Board secretary writes:

> A communication from the chairman, Executive Committee on Awards, World's Columbian Commission, Washington, D. C. was presented, inclosing an official copy of an Award for good work in Manual Training and Mechanical Drawing and that in due time a diploma will be forwarded.

Superintendent Young (19) apparently regarded the work of the Manual Training School as being of some value, since in 1895 he recommended that diplomas be prepared for all the boys who completed the Manual Training Course.

2. <u>The second phase: 1900-1909</u>

Since there were no supervisory personnel connected with the Manual Training School during the first years of its existence, the manual training teacher submitted a report directly to the Superintendent of Schools for inclusion in the annual report at the end of each year.

The report submitted by the third teacher of manual training, Mr. D. W. McKenney, indicates the nature of the work accomplished and the attitude of the students toward this relatively new subject. Mr. McKenney (5, pp. 23-24) states:

> . . . The school is provided with 18 sets of carpenter tools, each consisting of a jack plane, ripsaw, cross-cut saw, back saw, quarter inch, half inch, three-quarter inch and inch chisels, try-square, marking gauge, hammer, bench-hook and mallet; also with ten double work benches, with vises, eleven wood-turning lathes with all the usual tools, carving tools, five drawing tables, combined circular and jig saw, miter saw, a five-horse power electric motor,

blueprint apparatus, and a good assortment of carpenter's tools for general use.

Sloyd was taught in the Ninth grade and in the first year of the High school. The second and third year classes of the High school did wood-turning, pattern-making and moulding. Many of the pupils made tables, tabourettes, china cabinets, and book-cases by working extra time.

The Ninth grade classes reported at the Manual Training school once in two weeks for a period of two and a half hours. Six High school classes came once in two weeks, and two once a week, each for a two and a half hour period.

The time devoted to mechanical drawing was about one third of each period. Each pupil during the first two years completed a working drawing in detail of each sloyd model. . .

The pupils like the work and are making quite satisfactory progress therein. Of course, more could be done if the recitations were more frequent, but this could not be effected without more teaching force and more room.

A breakdown of Mr. McKenney's student load and financial expenditures is as follows:

1. Total number of classes. 16
2. Total number of High school students 102
3. Total number of Ninth grade students 151
4. Total number of students in graduating class . 16
5. Total cost of material used during the year. .$88.60
6. Average cost per student for the year. . . . .$ .34

With reference to the course of study pursued by the Manual Training School during the year 1900, the following is relevant: (5, pp. 90-91)

1st Year, 9th Grade.

Drawing - Use and care of drawing instruments.
A few practice plates in mechanical drawing.
Working drawings of sloyd models.

Woodwork - Use and care of tools. Making the

models from the drawings.

2nd Year, 1st Year High School.
Drawing - Problems in geometry, such as are used in the construction of geometric forms and figures. Projections, developments. Working drawings of exercises in woodwork.
Woodwork - Bench and lathe work.

3rd Year, 2nd Year High School.
Drawing - Problems in geometry relating to the construction of screws, cams, gears. Drawings of parts of machines. Working drawings of exercises in woodwork.
Woodwork - Brush and late work, carving and cabinet making.

4th Year, 3rd Year High School.
Drawing - Isometric, architectural, and perspective drawing. Shades and shadows and working drawings of exercises in pattern making - ribbed pattern, shoe, faceplate, hand wheel, etc. Core box, crank, pulley, jack, connections, etc.

A very critical review of the preparation of manual training teachers was entered in the Superintendent's Annual Report of 1903 (6, pp. 13-14). This review also serves to re-define the objectives of manual training as they were intended at the time of the writing. The report is as follows:

> The number enrolled in this school during the year was 272, 120 being from the high school, and 152 from the ninth grade. Virtually the same lines of work were pursued as in preceding years. The change of teachers in the middle of the year interfered somewhat with the order and progress. Still a goodly interest was maintained and fairly creditable results secured. On the whole, the boys like the work. It is entirely optional and receives no credit in graduation, and yet a large per cent of the boys of these grades elect it, notwithstanding the requirements that they must at the same time keep up their class standing in their regular studies. The time they lose by engaging in it is half a day every two weeks. One of the difficulties in conducting such a department as this is that of procuring suitable teachers,

> teachers who have an intelligent conception of the scope and purpose of the work, and who as well have the teaching ability. It is a new field, and there are as yet not many schools which offer opportunities for special preparation for it, and hence well qualified teachers in it are not numerous. Furthermore, many seem to think that if they have the technical knowledge, the teaching will take care of itself. Others, on the other hand, give attention to the teaching side and are satisfied with very little knowledge or skill. At present many of the schools which profess to prepare for instruction in this line do not give a sufficiently broad technical training. A full polytechnic course is needed for the best service in manual teaching that is to reach through the high school.
>
> Then again, the tendency is to take too narrow a view of the purpose of the work. Generally it is not sufficiently realized that the intent is not simply to cultivate skill in some particular art or craft, but to train the executive faculties, and hence develop power in doing as well as in thinking. Still another end is to show the pupil the practical application of branches of study he has pursued in the class-room, and hence to increase his appreciation of their value as well as to render more complete his knowledge of them.
>
> The entire subject, however, as a subject of public school instruction, is in its infancy. Undoubtedly time and experience will suggest changes both in scope and in treatment.

The Annual Report of 1903 (6, pp. 96-97) reveals a course of study similar to the one of 1900 with some revisions and additions. The 1903 Manual Training School course of study outline is as follows:

FIRST YEAR - NINTH GRADE

Drawing

> Practice plates, involving scaling, parallel lining, ruling, plain lettering, etc., introducing use and care of drawing instruments.
>
> Working drawings of special models.

Wood-Working - Bench

> Exercises introducing use and care of tools and illustrating principals of dressing from the rough, working side and edge, gauging scribing, sawing,

chiseling, etc.
Special models involving application of above exercises.

SECOND YEAR - FIRST YEAR HIGH SCHOOL

Drawing

Working drawing of special models, geometrical problems and their application to construction - projections and development of simple surfaces.

Wood-Working - Bench

Exercises illustrating simple joinery. Special models involving the application of above with simple inlaying, carving, and finishing.

THIRD YEAR - SECOND YEAR HIGH SCHOOL

Drawing

Determining curves of intersection; geometrical construction of screws, cams, and gears. Mechanical conventions in common use. Isometric and perspective drawing, introducing shades and shadows. Drawing of machine parts.

Wood-Working - Lathe

Exercises introducing use and care of tools, illustrating principals of cutting cylinders, beads, grooves, irregular curves, vases, spheres, etc.
Special exercises involving application of above principals.
Introductory principals of pattern making and moulding.

FOURTH YEAR - THIRD YEAR HIGH SCHOOL

Drawing

Drawing of machine parts. Architectural drawing, tracing, and blue printing.

Wood-Working

Exercises in simple pattern making. Special exercises in cabinet work, inlaying, and carving.

Foundry

Moulding of simple patterns.
Core box, crank, pulley, gears, etc.

In order to get some idea of how the manual training teacher of 1903 ranked in terms of salary and, as a consequence, in terms of prestige, the following table is submitted indicating the range of salaries from the Superintendent to the truant officer.

Table 1. Salaries of school personnel for the year 1903 (6, p. 100)

Position	Salary
Superintendent	$2,400
High school principal	1,800
Teachers' Training School principal	1,300
High school teachers	900 to 1,100
Grade school principals	1,000 to 1,200
Ninth grade teachers	650
Eighth grade teachers	575
Seventh grade teachers	550
Sixth grade teachers	525
Second, third, fourth, and fifth grade teachers	500
First grade teachers	550
Teachers of German	500 to 550
Physical culture teacher	1,100
Assistant	450
Manual training teacher	1,000
Drawing teacher	1,000
Music teacher (part time)	750
Truant officer	600

Mr. C. A. Gesell[1], who taught manual training in the early 1900's, relates that manual training for grades seven and eight was first organized in September 1908.

Of the fifteen grammar schools, five were equipped with the necessary benches and tools, and were strategically located in order to serve the seventh and eighth grade students of all but three schools. The combinations of schools and centers to which the students were to report were as indicated:

1. Tyler classes reported to the Tyler shop.
2. Fillmore classes reported to the Fillmore shop.
3. Harrison classes reported to the Fillmore shop.
4. Polk classes reported to the Fillmore shop.
5. Jefferson classes reported to the Fillmore shop.
6. Buchanan classes reported to the Buchanan shop.
7. Monroe classes reported to the Buchanan shop.
8. Van Buren classes reported to the Buchanan shop.
9. Taylor classes reported to the Taylor shop.
10. Jackson classes reported to the Taylor shop.
11. Pierce classes reported to the Pierce shop.
12. Washington classes reported to the Pierce shop.

The ninth grade classes reported to the high school as did the seventh and eighth grade classes of Adams, Lincoln,

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[1]Gesell, C. A., Davenport, Iowa. Information on the teaching of manual training. Private communication. 1961.

and Madison.

A sample of the projects in grades seven and eight follows:

Grade seven	Grade eight
1. plant label	1. cross stand
2. line winder	2. tool rack
3. match striker	3. teapot stand
4. door wedge	4. trellis
5. flower stick	5. coat hanger
6. plant stand	6. shelf
7. sandpaper block	7. nail box
8. whisk broom holder	8. dish drainer
9. match holder	9. corner bracket
10. flat ruler	10. kite
11. wind mill	11. cutting board
12. necktie rack	12. candle stick

From 1908 to 1910, Mr. Gesell taught grades seven and eight at the five centrally located schools. Later, shops were established at Madison, Harrison, Polk, and Monroe schools.

It took seven school days in order to make the complete circuit so that each school met once during that period of time.

There were four classes each day; the morning classes meeting from 9:00 to 10:30 and from 10:30 to 12:00, and the

afternoon classes meeting from 1:30 to 2:45 and from 2:45 to 4:00. The enrollment of classes ranged from ten to thirty-one, the average of which was about eighteen.

Mr. Gesell's students were required to make a simple sketch of the project prior to beginning construction. Practice exercises on various wood joints were done before the project was started; however, these exercises were intended to contribute toward the assembly of the project which was to follow, not to serve as ends in themselves. A grade was given for each project, the standard for which was a model made by the shop teacher. There were no tests given at this level of manual training. The course was not set up permanently but was subject to change as new ideas developed, in order to better train the hand and mind in learning the various tools and materials.

Figures 1 and 2 show the kind of arrangement provided for the students of the 1900's. These photographs were taken at the turn of the century.

3. The third phase: 1910-1919

The High School Yearbook of 1909-1910 (43, pp. 12-14) gives an outline of the course of study and a further verbal account of the details of manual training. It states:

> This course is designed to give students a thorough and practical knowledge of the care and use of tools, wood turning, cabinet making, pattern making, and designing. The outlines for the last

Figure 1. Mechanical drawing and bench woodwork

Figure 2. Woodturning lathes

two years of the course are subject to future modification but are presented as indicating the general plan of the work. It will be observed that ten hours a week are given to the manual training, including mechanical drawing, and that three other studies are listed, one of which is optional.

It is not the purpose of this course to prepare for college entrance, and students planning to attend college are not advised to select it, although with a proper choice of electives it offers sufficient preparation for admission to technical schools.

FIRST YEAR

1. English
2. Algebra
3. German or Botany
4. Mechanical Drawing, Bench Work, Wood Turning

SECOND YEAR

1. English
2. Plane Geometry
3. German or History
4. Mechanical Drawing, Cabinet Making, Pattern Making

THIRD YEAR

1. Physics
2. Solid Geometry and Trigonometry
3. History, or English, or French, or German
4. Machine or Architectural Drawing, Foundry Practice, and Hand Work in Metal

FOURTH YEAR

1. American History
2. English
3. Chemistry, or Advanced Algebra, or German, or French
4. Machine or Architectural Drawing, Machine Shop Practice, and Machine Construction

FIRST YEAR

The work offered is practically a continuation of that begun in the ninth grade, but more attention is given to theory. Text-books on joinery are used for reference and a limited amount of recitation work. Pupils are required to make working drawings of all exercises and to keep an account of time spent on each and the cost of material.

The second semester is spent in wood turning.

Instruction in the care and operation of the wood lathe, the use of tools and the turning of ten fundamental exercises occupies the first twelve weeks. The remainder of the time is devoted to face plate work on napkin rings, boxes, and other useful articles. Each pupil is required to leave with the school two finished tool handles.

Three days in the week are devoted to shop work and two are scheduled for mechanical drawing throughout the year.

SECOND YEAR

The first semester is devoted to cabinet making. A simple piece of furniture is selected by each pupil. A neat working drawing to scale and a bill of material in proper form is required. A record is kept of time spent and material used and the cost of the piece is found by allowing a reasonable rate per hour for the time. The cost of the material is paid by the pupil.

The second semester is devoted to pattern making. Instruction in the course aims to give the pupil a working knowledge of the correct construction of simple wooden patterns, the draft, shrinkage, and finish, moulding in sand, the core, and finally the cast. The last part of the year is devoted to making patterns for some piece of machinery designed in the drafting room and to be finished in the machine shop.

Three days in the week are scheduled for shop work and two for mechanical drawing throughout the year.

THIRD YEAR

The work of the first semester in foundry practice contemplates practical exercises on the moulding floor. The purpose is to show the close connection of the drafting room, the pattern shop, and the machine shop. Castings in brass and soft metals are to be made, using patterns made the previous year.

In the second semester the work in forge practice aims to familiarize the student with the processes and limitations in the working of wrought iron, steel, and sheet metal. The exercises cover bending, twisting, upsetting, drawing, punching, shaping, and welding, sheet metal work, steel riveting, hardening and tempering.

FOURTH YEAR

The first semester will include practice in the use of the lathe, drill press, shaper, and milling machine. Direct connection with the drafting room is maintained. Shop visits and lectures are an essential feature of the work of this semester.

In the second semester the construction of simple machinery for the shop and individual work on gasoline engines, small dynamos, and similar projects complete the course.

The High School Yearbook of 1912-13 (44, pp. 9-10) reveals a manual training course of study similar to that of 1910. However, there is an excellent description of mechanical drawing and its relationship to the various shops of the time. The Yearbook states:

> The aim of the work is to give a knowledge of mechanical drafting and of general drawing room practice, also to familiarize the student with those methods which are necessary to the practical draftsman.
>
> The work deals with problems in the use of instruments and construction so that designs may be produced rapidly, economically, and accurately. This elementary training covers the first two years. At the beginning of the third year a choice of machine or architectural drawing is offered. The machine drawing deals with sketches and drawing of machine parts, with computations for proportions. Elementary principles of machine design leading to the construction of steam engines, gas engines, etc. complete this branch of the course. The architectural drawing embraces the study of the principles of perspective, house details of walls, windows, cornices, stairs, etc. The last year the student makes sketches, plans, elevations, details, perspective, and specifications for a residence, bungalow, garage, or other building.
>
> The practice in drawing is supplemented by recitations and special blackboard demonstrations. The purpose is to make the drawing room as nearly an industrial office as possible. The wood shop, pattern shop, foundry, and machine shop requirements are observed, and all drawings are made to conform to standard practice.
>
> The course without connection with the shop work

is open to boys of the third and fourth years. It may be substituted for any of the electives. Five periods weekly are required. Two credits toward graduation are allowed for two years' work.

In colleges and technical schools credit is given for the elementary drawing, and the skill attained with instruments, as well as the knowledge of mechanisms, make the course particularly valuable to students contemplating any of the engineering courses.

The Synopsis of Courses of Study for the year 1914-1915 (20, pp. 7-9) reveals that manual training was offered in grades six, seven, and eight in the grammar schools. The length of class meetings was short. The sixth grade had one lesson of 1 1/2 hours per week, the seventh grade had one lesson of 1 1/2 hours per week, and the eighth grade met one full afternoon every two weeks. This schedule remained constant throughout the years of this phase with the exception of the year 1918-1919, when one lesson of 1 1/2 hours was included in grade five.

Some alterations are apparent in the high school course of study for the year 1916-1917 (21, pp. 14-15). Students enrolled in the manual training course who were anticipating college entrance were required to take at least one year of history, two years of German or French, and all the mathematics. The arrangement for that year is as follows:

FIRST YEAR

9B Class	9A Class
English	English
Algebra	Algebra
Manual Training	Manual Training
Choice of one: German, Botany, or Arithmetic	Choice of one: German or Botany

Mechanical Drawing throughout the year. Bench work the first semester, Cabinet Making the second.

SECOND YEAR

10B Class	10A Class
English	English
Plane Geometry	Plane Geometry
German or Ancient History	German or Ancient History
Manual Training	Manual Training

Mechanical Drawing throughout the year. Wood Turning the first semester, Pattern Making the second.

THIRD YEAR

11B Class	11A Class
Physics	Physics
Solid Geometry	Advanced Algebra
Manual Training	Manual Training
Choice of one:	Choice of one:
English History	English History
French	French
German	German
Printing	Printing

Mechanical Drawing throughout the year, Machine or Architectural. Foundry Work the first semester, Forge Work the second.

FOURTH YEAR

12B Class	12A Class
American History and Government	American History and Government
English	English
Manual Training	Manual Training
Choice of one:	Choice of one:
Chemistry	Advanced Algebra
French	French
Trigonometry	German
German	Printing
Printing	

Mechanical Drawing, Machine or Architectural, throughout the year. Machine Shop practice the first semester, Machine Construction the second.

In February of 1919, the three junior high schools, Smart, Sudlow, and Young, opened their doors for the seventh, eighth, and ninth grade students. At this time, the seventh

and eighth grades were taken from the grade schools and the ninth grade was taken from the high school.

4. The fourth phase: 1920-1929

The high school Manual Training Course of 1922 (7, p. 10) indicates only slight changes in content as compared to past years. The outline of course content for 1922 is as follows:

10B	10A
Manual Training	Manual Training
Plane Geometry	Plane Geometry
English	English
Choice of one:	Choice of one:
Ancient History	Medieval History
French	French
Latin	Latin
Public Speaking	Public Speaking
Printing	Printing

11B	11A
Manual Training	Manual Training
Solid Geometry	Physics
Physics	Algebra
Choice of one:	American History
Modern History	Choice of one:
Public Speaking	Public Speaking
Printing	Printing
English	English
French	French

12B	12A
Manual Training	Manual Training
English	English
American History	Civics
Choice of one:	Choice of one:
Chemistry	Chemistry
Trigonometry	Advanced Algebra
Public Speaking	Public Speaking
Printing	Printing
French	French

A Junior High School boy, John Cantwell (4), writing in the school newspaper of November 1922, gives somewhat of a

negative view of the work which was assigned.

The investigator suspects that, although incidences similar to those that follow did in fact happen, the writer of the article is stating his case in exaggerated terms apparently for the purpose of humor. He says:

> The 8A Manual Training class is getting along alright, except for a few burnt and cut fingers. The cookie cutters, the tin cups, and the scoops are covered with solder and look more like solder than what they are supposed to be. The cookie cutter would probably cut cookies and the cup hold water and the scoop scoop but I am not sure I want to use them. The dust pan will probably come along better. We have made plans for the quart pail under Mr. Holliday's directions and we expect it will hold a gallon anyway...

According to The Davenport Democrat and Leader (40) the lack of space in the junior high shops of 1923 was considered a critical matter. This status was assessed just four years after the junior high schools opened. The record is as follows:

> With but six manual arts shops in the three intermediate schools, or two to each of these schools, for the accommodation of a total of approximately 1,000 boys, the Manual Arts department of the Davenport Public schools finds itself confronted with a situation which is practically insurmountable.
>
> According to the estimate of Supervisor W. C. Wood of the department, at least six more shops for each of the intermediate schools are needed in order to accommodate the growing needs of this highly popular and utile branch of the educational work for the young men of Davenport.
>
> The Manual Arts department starts with the pupils in the early grades, gives them manual training; passes them to the intermediate schools where they learn practical electricity, sheet metal work, and advanced manual training; and thence to the Manual Arts branch of the high school.

It is only this last department that is adequately provided for in the matter of room. Eight shops comprise the high school's building situated south of the high school building.

Of all the courses given at the high school in manual arts, that in machinist work is the most popular, and were it not for the fact that mechanical drawing must be done in connection with machinist work more young men would take the course.

This department is excellently equipped with six lathes, two milling machines, a shaper, two drill presses, one power saw, wet and dry grinders, all operated by overhead shafting instead of by individual motors. This equipment, purchased for approximately $6,000 could not be duplicated for a much larger sum.

Regular shop practice is used, even to the matter of the tool room, where each tool is carefully checked out and in as used or returned. A young man who has taken the one-year course in machinist work is able to secure a position easily in any plant operating machines, and a man who desires to learn the machinist's trade of four years can get credit as a rule for one and one-half years instead of one year for the time spent at the high school.

Evidence of the popularity of manual arts branches is seen, for instance, in the increased enrollment in the printing department. Four years ago, but four enrolled for the course, whereas there were 90 enrolled last semester. The department practically pays for itself. Many tickets, cards, and other small jobs are taken care of by the students at a saving to the city which offsets the cost of operating the shop.

Other branches taught in the manual arts department of the high school are forge work, foundry work, pattern making, and wood turning. In addition to the supervisor, there are twelve instructors.

"We have seen our graduates well placed in positions in a large number of instances," Supervisor Wood said Tuesday afternoon. "In fact, there are such great demands for high school graduates in places where they can utilize what they have learned in the manual arts department, that they can not be filled."

"We are handicapped most, however," he continued, "by the lack of room in the intermediate schools, where we have in some cases to use portable houses instead of permanent buildings. We shall of course be obliged to resort to the purchase of portable buildings in all the intermediate schools if the bond

> issue does not gain the popular vote, but in that event, the houses would be a loss on our hands, for they will eventually be replaced with permanent buildings adequate for our needs."

Mr. W. S. Rosing[1] relates that during the years of 1925-1929, the Manual Training Course was anything but easy. Six semesters of mathematics, six semesters of manual training, a year of physics, and the subjects of social studies and English were required. Subjects offered under the manual training heading were: machine shop, pattern making, wood turning, foundry work, blacksmithing, printing, mechanical drawing, and architectural drawing. The graduates from this course were in demand upon graduation by the various industries in the community. Mr. Rosing further states that he has had the occasion of meeting his former mechanical drawing students and that, without exception, they all hold very fine jobs.

One person who had extensive experience in teaching manual training during this phase was Mr. R. McKig[2]. Mr. McKig began his teaching at Sudlow Junior High in 1924 and remained at that school until his retirement in 1958.

When Mr. McKig began his teaching in 1924, he received a salary of $2200.00 for ten months' employment. A point of

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[1]Rosing, W. S., Davenport, Iowa. Information on the teaching of manual training. Private communication. 1960.

[2]McKig, R., Davenport, Iowa. Information on the teaching of manual training. Private communication. 1961.

interest arises when the teachers' salary plan becomes known. This called for a maximum salary of $2500.00 for all teachers who held Bachelor of Science or equivalent Degrees and who were teaching high school grades. Since grade nine was considered to be in high school, and since Mr. McKig did, in fact, teach grade nine, he was therefore eligible to receive the maximum salary for that year. Eventually in 1928 this discrepancy was rectified through the efforts of the Sudlow principal in talking with the Superintendent. Apparently, the only explanation to be given for this oversight in salary was due to the fact that Mr. McKig was the first manual training teacher in Davenport to hold a Bachelor of Science Degree.

Manual training in grades seven and eight was required, whereas it was elective in ninth grade. The seventh and eighth grade students met three days per week, and the ninth grade students met five days per week.

A further point of interest is Mr. McKig's response to the question of the quality of students electing manual training in grade nine. He indicated that on occasion, the mentally slow enrolled in his classes. He suggests that there is a connection between this decision on the part of the student and the thinking of some school personnel that "you don't have to know very much to do shop work."

The Synopsis of Courses of Study for 1926-1927 (22, pp. 31-32) lists the textbooks in use by the various high school

departments. In mechanical drawing classes these books were used: (1) Mechanical Drawing, Books I and II by Armeling, Fisher, and Green; (2) Practical Problems in Architectural Drawing by Elwood. Books utilized by the manual training classes were: (1) Course in Wood Turning by Milton and Wohlers; (2) Wood Pattern Making by Hanley; (3) Elementary Forge Practice by Harcourt; (4) Machine Shop Practice by Pratt.

These books represent some of the first texts made available to drawing and shop students on the basis of individual possession. At this time, the high school sold textbooks to students in all the courses in which they were enrolled.

In addition to the texts named, the Courses of Study of 1929 (8, p. 17) lists the following books as being relevant for printing: (1) Progressive Lessons in Printing by Bohrer; (2) The Practice of Printing by Polk.

5. The fifth phase: 1930-1939

Manual training in the elementary grades continued to be offered in grades five and six. Manual training in grade four was eliminated.

The outline of course work for the junior high schools from 1930 to 1932 is as follows (23, pp. 13-16):

1. Electrical Work and Mechanical Drawing. 7B

2. Joinery and Mechanical Drawing 7A

3. Sheet Metal and Mechanical Drawing 8B

4. Sheet Metal and Mechanical Drawing 8A

5. Cabinet Making and Mechanical Drawing. 9B

6. Cabinet Making and Mechanical Drawing. 9A

There was a shift in junior high course work and the years in which it was offered beginning in 1935 (24, pp. 12-15). The following is a list of course work and the grade level at which it was offered.

1. Elementary Woodwork. 7B

2. Electrical Work. 7A

3. Elementary Cabinetwork 8B

4. Iron Work. 8A

5. Cabinet Making 9B

6. Sheet Metal Work 9A

A student reporter, Robert Tuell (41), records in 1935 this revision of manual training at Sudlow Junior High School. The reason for these changes is not, he states:

> ...to make it easier for girls to take manual training, as some seem to think; nor is it that the 7th graders aren't capable as they used to be. The real reason is that 2 years ago manual training was discontinued in the grade schools; thus the 7th graders have had no previous training in the handling of tools and so must necessarily start with simpler projects.

The high school Manual Training Course was to bow out of existence sometime between 1932 and 1935. Up to 1935 the high school course of study was almost identical to courses

of study in the late 1920's. The courses available and the grade level at which they were offered in 1935 (24, pp. 17-19) follow:

1. Wood Turning and Pattern Making 10B
2. Mechanical Drawing I 10A
3. Forge and Foundry 11B
4. Mechanical Drawing II 11A
5. Machine Shop 12B
6. Mechanical Drawing III 12A

Although printing is not listed specifically as being a part of manual training it could be elected as a sequence from I-IV in grades ten and eleven.

Frasier (38, p. 126) made a survey of Davenport in 1939 in cooperation with the State Board for Vocational Education in order to determine the type of content which should be taught in the vocational shops. In this report there are both explicit and implicit conclusions relative to industrial arts.

Table 2, as reported by Frasier, represents the enrollment in industrial arts classes of the Davenport High School of 1929 and 1939. The figures in the enrollment columns mean the number of hours of enrollment for a given course in one year. The figures in the per cent column mean the ratio between the number of hours of enrollment of a given course and the number of hours of enrollment in the total school cur-

Table 2. Enrollment in industrial arts classes in the Davenport High School of 1929 and 1939

	1929 enrollment	Per cent	1939 enrollment	Per cent	1929-30 per cent of gain or loss
Woodwork					
Cabinetmaking	49	.39	116	.78	.39
Patternmaking	49	.39	58	.39	.00
Metal Work					
Forge	47	.37			-.37
Foundry	47	.37			-.37
Machine Shop	62	.49	48	.32	-.17
Mechanical Drafting					
Machine Drafting	120	.95	137	.92	-.03
Architectural Drafting	34	.28	66	.44	.16
Printing	206	1.64	216	1.45	-.19
Total Hours of Enrollment	614	4.88	641	4.30	-.58

riculum in one year.

With reference to the course of study of 1935 (38, p. 131) the survey entered a sharp criticism of the junior high course content. After a review of course offerings the review concluded that: "It would seem that too few industrial materials are represented in these courses and that little attention is given to a specific study of industrial machines, products and workers."

A thorough review of industrial arts in the elementary and secondary schools of Davenport during the 1930's is given

by the 1939 survey (38, pp. 202-207). The important elements in this review are the recommendations for changes in content and procedures. The review states:

> The following are recommendations made for industrial arts in the elementary grades, junior high, and senior high schools:
>
> Elementary Grades
>
> Training in the elementary grades constitutes the period of fundamental education, but in an industrial civilization attention should be given to the beginning concepts of industrial processes and to the interdependence of the producer and consumer. In times past, a child through observation and participation in activities in the home, on the farm or in the many small shops of the community, acquired a knowledge of industrial processes and some application of the value of their products in his life.
>
> Today opportunities for firsthand knowledge and experience are lacking. Most of the activities of production have been removed from the home; the farm has become a highly mechanized institution, and as a result of technological progress, small shops have been replaced, in the most part, by industrial establishments which are closed to the child as a participator, and in most cases as an observer.
>
> Shut off from any effectual experiences with relation to occupations in his life outside the school, public education must assume responsibility for providing such experiences. The general education of every public school pupil--his cultural development--is incomplete without concepts, understandings and appreciations of the world of work.
>
> Industrial arts as a content subject of the curriculum contributes to the education of the pupil by giving him an understanding of what is going on about him, and to his living more intelligently. It is, in the elementary school, a study of experiences of people in different ages of history, in changing materials into products to meet their needs and the needs of others, and of the influence of these experiences on the lives of people.
>
> In the elementary school opportunities in the industrial arts should be made available to both boys and girls. The work should be taught by the regular grade teacher in a regular classroom, preferably a room with some special equipment such as a sand table,

workbench, etc., and the work should be closely correlated with the regular work in art, history, geography, arithmetic, etc.

In brief, the work should be centered around how various peoples have worked with raw materials and devised ways and means of making them serve their needs for food, clothing, shelter and records; and the part which transportation and communication have played in securing them. In other words, industrial arts in the elementary school should give the pupil a broad background of knowledge of people and of things.

Junior High School

The industrial arts work of the elementary grades provides a bases for the work in agriculture, commerce, home economics and industrial arts in the junior high school. In these grades as well as in the elementary grades, work is pursued primarily for the purpose of general education and culture. These subjects should provide a period of exploration and guidance preliminary to the choice of a career and subsequent training.

The practical arts in these grades should: (1) provide information regarding the world of work (2) reveal the occupational distribution of gainful workers in the community (3) provide exploratory experiences for testing interests and aptitudes, and (4) motivate a mastery of classroom instruction by demonstrating the application of the subject matter of instruction to vocational competence and personal life related to occupations.

The following recommendations are made in regard to the practical arts subjects in the junior high school:

1. Since opportunities for exploration are limited by the types of industrial materials included in shop courses, it is suggested that a broader selection of industrial materials be used in these classes.

2. It would seem that too much attention is given to the industrial material wood and too little attention to other industrial materials.

3. Drawing, the language of the engineer and the skilled craftsman, should be given a specific allotment of time in the curriculum.

Senior High School

The value of the practical arts as a contribution to the general education of all children is being more

generally recognized by educators and the public. The exploratory experiences of the junior high school pupil are motivated by curiosity about things, how they work, how they are made, and what purpose they are made to serve.

There is, however, a gradually changing emphasis to meet the shifting interests of boys and girls as they approach adolescence and continue toward adulthood. These interests begin to crystallize into desires that are more definitely vocational as the pupils advance to higher educational levels. Consequently, we find the pupil evaluating each school subject in terms of use in a very practical world. Therefore, the practical arts shop or classroom in the senior high school must answer satisfactorily questions as to practical value related to occupational life, if it is to hold the interest of high school pupils.

By this time some pupils will have decided to enter vocational training in preparation for a wage earning occupation. Many others, however, will prefer to continue with a more general program of high school subjects including the practical arts, and to defer their vocational training until a later date; others will, of course, prefer to pursue a strictly college preparatory curriculum.

In light of the above, the following recommendations are made in regard to practical arts courses in the senior high school:

Industrial Arts

1. Industrial arts courses should serve the needs of three groups of pupils: (1) vocational trade and industrial preparatory pupils, (2) technical preparatory pupils--engineers, etc., and, (3) pupils who wish to develop hobby interests and handyman abilities.

2. A larger proportion of all male pupils enrolled in the senior high school should be directed toward industrial arts courses.

3. The general education and exploratory values of industrial arts rather than vocational values should be stressed.

4. Opportunities should be made available for the exploration of a larger number of shop activities which are indicative of occupations in the community.

5. To broaden the scope of exploratory experiences it is suggested that the following courses be added to the industrial arts curriculum:

Machine woodwork--carpentry, cabinetmaking
Metal work--sheet metal, acetylene welding, arc welding, plumbing
Electricity--House wiring, motor winding, radio
Auto mechanics--auto mechanics, auto electrics

6. A three years' sequence of courses in metal work, woodwork and mechanical drawing, and at least a two years' sequence of courses in electricity and auto mechanics should be included in the industrial arts curriculum.

7. If the eight-class-hour day is to be maintained, double periods should be arranged for shop courses.

8. At least two semesters of mechanical drawing in the senior high school should be required of all pupils taking shop courses.

9. Arrangements should be made whereby pupils may enroll in more than one shop course during the same semester.

It was during the latter part of this phase that the phrase "industrial arts" began to supplant "manual training."

6. The sixth phase: 1940-1949

Mr. R. S. Fawver[1], a veteran industrial arts teacher at J. B. Young Junior High School since 1942, relates that the course content of the industrial arts department from 1942 to 1949 did not go through any substantial revision.

In 1945 the "A" and "B" system of graduating two separate groups of students in one year was discontinued.

There were no basic textbooks for industrial arts in the junior high schools at this time, nor were the prospects of acquiring them in the immediate future especially bright.

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[1]Fawver, R. S., Davenport, Iowa. Information on the teaching of industrial arts. Private communication. 1961.

In reply to a question about what he thought of the quality of students that he received in his ninth grade classes, Mr. Fawver stated that although parents of his students sensed a need for industrial arts in the curriculum, some of the students apparently thought that industrial arts was a convenient time for a rest period.

Table 3 represents the first of the recorded annual reports submitted by the directors of industrial and adult education relative to the enrollment of industrial arts and the various courses offered in the junior and senior high schools.

Mr. L. E. Wass (9) was quite aware of possible repercussions World War II would have on all education departments in general and the industrial arts department in particular. He states:

> Knowing that in the Post War period each educational department will be examined minutely by the public; a sincere effort is being made by the Industrial Education Department to establish the following:
>
> 1. An agreement on aims and objectives to be attained.
> 2. An effective program of evaluation.
> 3. A logical method of selecting subject matter and the activities themselves.
>
> In the second instance, we are examining our offerings by making a study of the activities in which pupils participate in out- of- school hours, and their avocation, hoping to recognize a pattern which will be sufficiently clear to permit us to aid effectively in the explorational avenues indicated.
>
> We are not content to accept that which we are doing as final for all time. The exploratory experience of the pupil must be examined and re-examined constantly to assure us that our offerings are serving

Table 3. Industrial arts enrollment for the year 1944-1945 (9, pp. 1-2)

School	Subject	Grade	No. enrolled	
Junior High				
Smart	Woodwork	7	116	
	Electricity - Metal	8	120	
	Woodwork	9	55	
	Metal	9	55	
Young	Woodwork	7	105	
	Electricity - Metal	8	111	
	Woodwork	9	41	
	Metal	9	44	
Sudlow	Woodwork	7	111	
	Electricity - Metal	8	90	
	Woodwork	9	47	
	Metal	9	39	
			934	Total
Senior High	Drawing			
	Mechanical Drawing I	10B	74	
	Mechanical Drawing I	11B	31	
	Mechanical Drawing II	11A	1	
	Mechanical Drawing III	12B	10	
	Mechanical Drawing IV	12A	4	
	Architectural Drawing I	11B	12	
	Architectural Drawing II	11A	5	
	Architectural Drawing III	12B	5	
	Combustion Engine		91	
	Printing	10B	82	
	Printing	10A	33	
	Printing	11B	23	
	Printing	12B	7	
	Printing	12A	7	
	General Shop I	10B	109	
	Machine Shop I	10B	139	
	Machine Shop II	10A	11	
			644	Total
			1578	Grand Total

as effectively as possible.

Teacher interests often prompts a certain type of explorational training to remain constant. Our investigation may prove that we are correct and if so, we will be fortified in knowing that our courses are correct. In those which our examinations indicate incorrectness, adjustments will be made at once.

In all tables of industrial arts enrollment that follow, the numbers that appear under the heading "Number enrolled" reflect the number of students enrolled in a given subject for the entire year. This number may likely include the same students twice since, as in the majority of junior high school cases, the number given is a total of two semesters which means that students of the first semester transfer their numerical status to the same or related subject of the second semester.

The information in Table 4 indicates a consolidation of the senior high offerings as compared to the previous year. It is evident that the "A" and "B" system has been replaced with a single class system.

With respect to school shop safety, Mr. L. E. Wass (42) made a study of the safety conditions of the Davenport shops in 1946. The study included three identical electrical shops, three identical general metal shops, and three identical bench woodwork shops of the three junior high schools. Further shops inspected were foundry, machine, tool and die, graphic arts, automotive, welding, and printing in the high school.

Table 4. Industrial arts enrollment for the year 1945-1946 (26, p. 11)

School	Subject	Grade	No. enrolled	
Junior High				
Smart	Woodwork	7	128	
	Electricity - Metal	8	107	
	Woodwork	9	109	
	Metal	9	95	
Young	Woodwork	7	84	
	Electricity - Metal	8	96	
	Woodwork	9	65	
	Metal	9	69	
Sudlow	Woodwork	7	96	
	Electricity - Metal	8	90	
	Woodwork	9	35	
	Metal	9	37	
			1011	Total
Senior High	Mechanical Drawing I	10	23	
	Mechanical Drawing II	10	51	
	Architectural Drawing	11-12	11	
	Machine Details	11-12	20	
	Combustion Engine	11-12	89	
	General Shop I	10	21	
	General Shop II	10	126	
	Machine Shop I	10	71	
	Machine Shop II	10	146	
	Printing I	10	24	
	Printing II	10	78	
	Printing IV	11	31	
			691	Total
			1702	Grand Total

A general shop of the part-time school was inspected also.

The criteria used as measurements were: (1) the School section of the Iowa Code, (2) the Industrial section of the Iowa Code, (3) the Wisconsin Industrial Code, and (4) the

Industrial Safety Standards, commonly known as Insurance Regulations.

Mr. Wass concludes:

> The survey indicated that under the School section of the Iowa Code there were probably no substandard conditions in the Industrial Education Shops of Davenport. However, the Industrial section of the Iowa Code designates 58 substandard conditions, but 88 were recognized under the Industrial Code of Wisconsin. The Insurance Regulations pointed to 291 observed substandard conditions. Under the Iowa Code it is regrettable that higher standards are required to be maintained in industry than in school shops. If the same installations were operated by private industry the 291 substandard conditions would require correction before full insurance coverage could be secured.
>
> A comparison of the substandard conditions shown by the three codes and the Insurance Regulations indicate that the Insurance Regulations are the more critical, specific, and restrictive. The School sections of the Iowa Code should be rewritten to conform to Insurance Regulations. Until they are rewritten school administration should recognize the Insurance Regulations as operative standards. The 291 substandard conditions should be corrected.

The investigator was unable to locate any change of law relative to the citation made by Wass. Neither the Iowa Code published in 1958 nor the Acts and Joint Resolutions of the Fifty-Eighth General Assembly published in 1959 indicate the type of revision Wass recommended.

In his annual report of 1946-1947 (27, pp. 10-11), Mr. Wass further spelled out in what directions he thought industrial arts should lead. This commentary serves as a continuation and conclusion to the latter parts of the previous report. He relates:

Modern industry and its products are the most pervasive and ubiquitous aspects of life. To make boys and girls intelligent about their environment, in order that they may deal with it effectively, the Industrial Arts should teach the whole area in any offering. It is not sufficient to cover only certain phases of an area.

We have striven in the past to serve the pupils by simply following tradition in Industrial Arts as in the academic fields such as some woodworking, metalwork, mechanical drawing, etc. A definite measure for answering the question of what industries and what materials should go into the Industrial Arts program is the decision "What is basic industry?"

Basic industries were defined as those industries which if they had not existed our modern civilization would be very different from what it is today. The basic industries were determined to be: (1) Metals and all its ramifications, (2) Wood, (3) Power, (4) Textiles, (5) Graphic Arts, (6) Transportation, (7) Communications, (8) Ceramics, (9) Mining, (10) Chemicals, (11) Leather, (12) Plastics, (13) Foods.

Industrial Arts is under obligation to teach all thirteen of these either through shopwork, visual education, class visits, talks, library assignments, etc.

The question of how far we should go next arose. It was decided that no offering should be made except at a level which we can demand first class work.

The following criteria were decided for selection and placement of areas: (1) ability at pupil's age, (2) School facilities, (3) Equipment, (4) Time available, limitation and scheduling, (5) Education value, accuracy, concentration, etc., (6) Cost. The foregoing six measures would rule our transportation but phases such as automotive mechanics and model aircraft could be offered in shops supplemented by studies of the whole, etc.

Study is now being done to review our offerings with a view to emphasis and expansion.

The enrollment for 1946-1947 revealed that 279 seventh grade boys, 281 eighth grade boys, and 291 ninth grade boys took industrial arts. In high school, a total of 695 boys

took industrial arts. The grand total for this year was 1546.

The information contained in Table 5 indicates that drawing, especially in the junior high schools, was becoming an important aspect of industrial arts courses. Up to this year drawing had been offered only on the senior high level.

Table 5. Industrial arts enrollment for the year 1947-1948 (28, p. 23)

School	Subject	Number enrolled		
Junior High		7th	8th	9th
Smart	Woodwork-Drawing	192		91
	Electricity-Drawing		104	
	Bench Metal-Drawing		103	
	Sheet Metal-Drawing			81
Young	Woodwork-Drawing	188		71
	Electricity-Drawing		85	
	Bench Metal-Drawing		85	
	Sheet Metal-Drawing			67
Sudlow	Woodwork-Drawing	213		75
	Electricity-Drawing		91	
	Bench Metal-Drawing		93	
	Sheet Metal-Drawing			74
	Totals	593	561	459
Senior High	Machine Shop I	170		
	Machine Shop II	204		
	Combustion Engine	305		
	General Shop	290		
	Graphic Arts I	81		
	Graphic Arts II	53		
	Mechanical Drawing I	97		
	Mechanical Drawing II	81		
	Machine Drawing	48		
	Architectural Drawing	55		
	Total	1384		
	Grand Total	2997		

The information in Table 6 indicates that General Shop II is an additional course in high school over the previous year. Drawing remains a strong emphasis throughout the entire secondary course of study.

Table 6. Industrial arts enrollment for the year 1948-1949 (29, pp. 21-22)

School	Subject	Number enrolled		
Junior High		7th	8th	9th
Smart	Woodwork-Drawing	214		105
	Electricity-Drawing		83	
	Bench Metal-Drawing		87	
	Sheet Metal-Drawing			108
Young	Woodwork-Drawing	183		71
	Electricity-Drawing		96	
	Bench Metal-Drawing		94	
	Sheet Metal-Drawing			74
Sudlow	Woodwork-Drawing	212		77
	Electricity-Drawing		96	
	Bench Metal-Drawing		95	
	Sheet Metal-Drawing			74
	Totals	609	551	509
Senior High	Machine Shop I	191		
	Machine Shop II	159		
	Combustion Engines	253		
	General Shop I	148		
	General Shop II	113		
	Graphic Arts I	67		
	Graphic Arts II	51		
	Mechanical Drawing I	80		
	Mechanical Drawing II	83		
	Machine Drawing	39		
	Architectural Drawing	48		
	Total	1232		
	Grand Total	2901		

The information in Table 7 indicates that courses in Electricity I and II, and Printing I and II are new for this year on the high school level.

7. The seventh phase: 1950-1960

Although the junior high schedule remains constant (Table 8) as compared to last year, the senior high eliminated combusion engines and substituted Automotives I and II. Furthermore, Electricity III and IV, and Graphic Arts III and IV were added to extend the content of these courses.

Table 9 shows the industrial arts enrollment for the year 1952-1953.

On the high school level, crafts and welding appear as new additions to the course of study in 1954-1955 (Table 10).

The information in Table 11 indicates that, as compared to 1954-1955, Printing, and Pattern and Foundry have been reduced on the high school level.

Data for the industrial arts enrollment for 1959-1960 are given in Table 12.

Mr. A. M. Sarchett[1] points out that the late 1950's were productive years for industrial arts.

Up to the fall of 1957, the junior high program was "teacher centered" in that the teacher delegated few re-

[1]Sarchett, A. M., Director of industrial and adult education, Davenport, Iowa. Information on the teaching of industrial arts. Private communication. 1961.

Table 7. Industrial arts enrollment for the year 1949-1950 (30, pp. 25-26)

School	Subject	Number enrolled		
		7th	8th	9th
Junior High				
Smart	Woodwork-Drawing	202		100
	Electricity-Drawing		101	
	Bench Metal-Drawing		108	
	Sheet Metal-Drawing			65
Young	Woodwork-Drawing	165		67
	Electricity-Drawing		91	
	Bench Metal-Drawing		91	
	Sheet Metal-Drawing			73
Sudlow	Woodwork-Drawing	218		77
	Electricity-Drawing		107	
	Bench Metal-Drawing		108	
	Sheet Metal-Drawing			75
	Totals	585	606	457
Senior High	Machine Shop I	185		
	Machine Shop II	163		
	Combustion Engines	297		
	Graphic Arts I	57		
	Graphic Arts II	44		
	Mechanical Drawing I	126		
	Mechanical Drawing II	84		
	Machine Drawing	43		
	Architectural Drawing	43		
	Pattern-Foundry I	94		
	Pattern-Foundry II	83		
	Electricity I	129		
	Electricity II	111		
	Printing I	23		
	Printing II	21		
	Total	1503		
	Grand Total	3151		

Table 8. Industrial arts enrollment for the year 1950-1951 (31, pp. 29-30)

School	Subject	Number enrolled		
		7th	8th	9th
Junior High				
Smart	Woodwork-Drawing	235		82
	Electricity-Drawing		123	
	Bench Metal-Drawing		119	
	Sheet Metal-Drawing			80
Young	Woodwork-Drawing	196		71
	Electricity-Drawing		95	
	Bench Metal-Drawing		92	
	Sheet Metal-Drawing			73
Sudlow	Woodwork-Drawing	257		98
	Electricity-Drawing		114	
	Bench Metal-Drawing		111	
	Sheet Metal-Drawing			95
	Total	688	654	499
Senior High	Architectural Drawing	27		
	Automotive I	130		
	Automotive II	111		
	Electricity I	130		
	Electricity II	105		
	Electricity III	22		
	Electricity IV	22		
	Graphic Arts I	99		
	Graphic Arts II	65		
	Graphic Arts III	15		
	Graphic Arts IV	13		
	Machine Drawing	34		
	Machine Shop I	205		
	Machine Shop II	166		
	Mechanical Drawing I	99		
	Mechanical Drawing II	85		
	Pattern-Foundry I	61		
	Pattern-Foundry II	82		
	Printing I	24		
	Printing II	28		
	Total	1523		
	Grand Total	3364		

Table 9. Industrial arts enrollment for the year 1952-1953 (32, p. 30)

School	Subject	Number enrolled		
		7th	8th	9th
Junior High				
Smart	Woodwork-Drawing	256		100
	Electricity-Drawing		110	
	Bench Metal-Drawing		111	
	Sheet Metal-Drawing			101
Young	Woodwork-Drawing	252		71
	Electricity-Drawing		108	
	Bench Metal-Drawing		104	
	Sheet Metal-Drawing			73
Sudlow	Woodwork-Drawing	250		101
	Electricity-Drawing		127	
	Bench Metal-Drawing		125	
	Sheet Metal-Drawing			72
	Totals	758	685	518
Senior High	Architectural Drawing	69		
	Automotive I	113		
	Automotive II	80		
	Basic Electricity I	148		
	Basic Electricity II	129		
	Electricity III	36		
	Electricity IV	36		
	Graphic Arts I	85		
	Graphic Arts II	40		
	Graphic Arts III	5		
	Graphic Arts IV	1		
	Machine Drawing	34		
	Machine Shop I	195		
	Machine Shop II	163		
	Mechanical Drawing I	97		
	Mechanical Drawing II	83		
	Pattern-Foundry I	83		
	Pattern-Foundry II	61		
	Printing I	21		
	Printing II	19		
	Total	1498		
	Grand Total	3459		

Table 10. Industrial arts enrollment for the year 1954-1955 (33, p. 26)

School	Subject	Number enrolled		
Junior High		7th	8th	9th
Smart	Woodwork-Drawing	211		110
	Electricity-Drawing		110	
	Bench Metal-Drawing		114	
	Sheet Metal-Drawing			113
Young	Drawing			63
	Woodwork-Drawing	238		78
	Electricity-Drawing		106	
	Bench Metal-Drawing		105	
	Sheet Metal-Drawing			77
Sudlow	Woodwork-Drawing	300		79
	Electricity-Drawing		144	
	Bench Metal-Drawing		140	
	Sheet Metal-Drawing			75
	Totals	749	719	595
Senior High	Architectural Drawing	45		
	Automotive	223		
	Electricity I and II	247		
	Electricity III and IV	53		
	Crafts	48		
	Graphic Arts I and II	145		
	Graphic Arts III and IV	23		
	Machine Drawing	18		
	Machine Shop I and II	327		
	Mechanical Drawing	179		
	Pattern and Foundry	93		
	Printing	57		
	Welding	134		
	Woodwork I and II	44		
	Woodwork III and IV	152		
	Total	1788		
	Grand Total	3851		

Table 11. Industrial arts enrollment for the year 1957-1958 (34, pp. 28-30)

School	Subject	Number enrolled		
		7th	8th	9th
Junior High				
Northwest	Woodwork-Drawing	120		103
	Electricity-Drawing		58	
	Bench Metal-Drawing		58	
	Sheet Metal-Drawing			99
Smart	Woodwork-Drawing	201		78
	Electricity-Drawing		113	
	Bench Metal-Drawing		113	
	Sheet Metal-Drawing			78
Young	Woodwork-Drawing	234		45
	Electricity-Drawing		113	
	Bench Metal-Drawing		112	
	Sheet Metal-Drawing			44
Sudlow	Woodwork-Drawing	251		51
	Electricity-Drawing		127	
	Bench Metal-Drawing		130	
	Sheet Metal-Drawing			50
	Totals	806	824	548
Senior High	Automotive	254		
	Crafts	77		
	Drafting:			
	Architectural	40		
	Machine	60		
	Mechanical	256		
	Electricity I and II	342		
	Electricity III and IV	57		
	Graphic Arts I and II	55		
	Graphic Arts III and IV	26		
	Machine Shop I and II	335		
	Pattern and Foundry	21		
	Printing	66		
	Welding	212		
	Woodworking I and II	67		
	Woodworking III and IV	115		
	Total	1983		
	Grand Total	4161		

Table 12. Industrial arts enrollment for the year 1959-1960 (35, pp. 4-9)

School	Subject	Number enrolled		
Junior High		7th	8th	9th
Williams[a]	Woodwork-Drawing	306		81
	Electricity-Drawing		154	
	Bench Metal-Drawing		154	
	Sheet Metal-Drawing			86
Smart	Woodwork-Drawing	317		85
	Electricity-Drawing		121	
	Bench Metal-Drawing		121	
	Sheet Metal-Drawing			77
Young	Woodwork-Drawing	368		42
	Electricity-Drawing		120	
	Bench Metal-Drawing		146	
	Sheet Metal-Drawing			45
Sudlow	Woodwork-Drawing	328		49
	Electricity-Drawing		145	
	Bench Metal-Drawing		149	
	Sheet Metal-Drawing			50
	Totals	1319	1110	515
Senior High	Automotive	273		
	Crafts	85		
	Drafting:			
	Architectural I and II	45		
	Architectural III and IV	6		
	Machine I and II	47		
	Machine III and IV	16		
	Mechanical	239		
	Electricity	316		
	Machine Shop I and II	333		
	Printing	54		
	Radio and Electronics	49		
	Welding	164		
	Woodworking I and II	223		
	Woodworking III and IV	20		
	Total	1870		
	Grand Total	4814		

[a]Previously Northwest Junior High.

sponsibilities to the students. In the fall of 1958 after considerable testing, demonstrating, and checking, students were allowed to operate shop machinery. Thus the shift was from heavy dependence upon the teacher to what may be termed a "student centered" arrangement.

Also in 1958 the junior high program underwent a change in terms of the primary teaching vehicle of industrial arts, the project. Before 1958 junior high students were required to follow a schedule of fixed projects wherein everyone made the same object. During 1958 the earlier concept was replaced by another which gave the students a choice of projects, all of which incorporated the experiences the teacher thought relevant to a particular phase of the course.

In the senior high prior to 1958, only those students enrolled in beginning electricity and drafting had textbooks. During 1958 textbooks were secured for students enrolled in all phases of industrial arts. Moreover, the influence of testing found its way into the industrial arts program at this time on a far greater basis than it had known previously.

One further significant event of 1958 was the preparation of an outline of courses of study for the senior high school. In 1959 a similar effort was made by staff personnel toward the development of a junior high school outline of courses of study. In 1960 the senior high school outline of

courses of study was revised. Both the senior and junior high school outlines appear in the Appendices of this thesis.

On March 23, 1959 a newly formed organization, the Industrial Education Advisory Committee, met for the first time. This organization was established as a liaison between school and community and had vocational considerations as its primary concern. The organization was composed of persons representing phases of industry in addition to members of the industrial education staff.

During the September 28, 1959 meeting of the Industrial Education Advisory Committee, Mr. Sarchett went on record in stating that the junior high program is not exploratory. The program at this level is designed to teach basic skills, industrial processes, and the economic aspects connected with goods and services such as pricing, marketing, and sales.

One further significant point was raised in the question period which followed. The advisory members seemed appalled at the low budget for industrial arts, and also at the teachers' salaries.

Davenport's new West High School opened its doors in the fall of 1960, thereby extending the industrial arts facilities in the school system. The course of study at this high school was similar to that of Central High. With few exceptions the equipment at the new school was the finest available.

In order that the reader may secure a measure of ap-

preciation of the facilities at both the West High and Central High Schools, the following photographs of industrial arts courses (Figures 3 - 10) are submitted.

Figure 3. Electricity

Figure 4. Radio and electronics

Figure 5. Woodworking

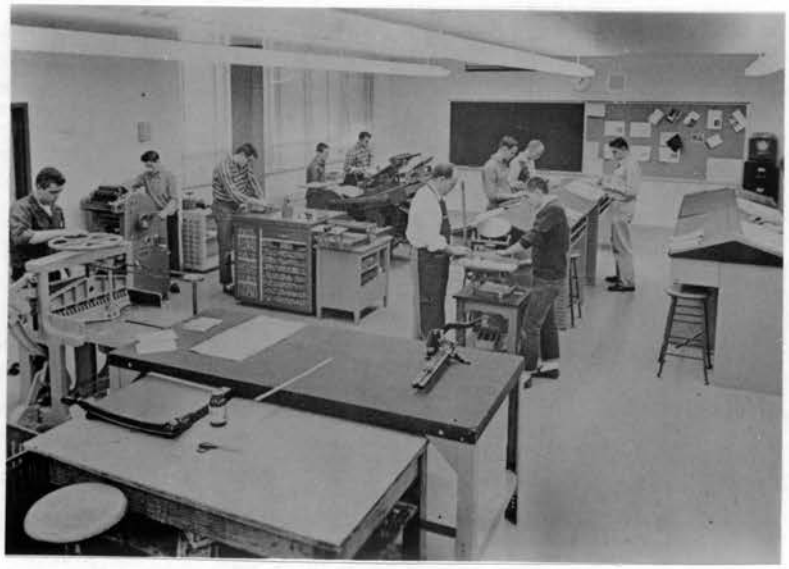
Figure 6. Metalwork

Figure 7. Drafting

Figure 8. Machine shop

Figure 9. Auto mechanics

Figure 10. Printing



IV. SUMMARY

Industrial arts in Davenport, Iowa had a very modest beginning. In its infancy in 1889, it was received by the Superintendent, School Board, and the lay public as being a valuable addition to the total curriculum.

The basis upon which manual training was allowed to begin its operations in Davenport was the thought that this sort of instruction would coordinate the lessons of the mind and the hand. Moreover, manual training would render the abstractions of geometry and mechanics more meaningful than could any of these courses as they stand alone.

The Manual Training School was physically separate from the high school and students who took classes in manual training had to make up the time they missed in order to qualify for credit toward graduation. Manual training was, in effect, somewhat of a novelty; new enough so that credit toward graduation was not given.

The medium through which the Manual Training School began its work was wood. Boys who were fourteen years old or older were eligible for enrollment. However, after several years boys of the ninth grades and high school were the only ones permitted to enroll in this work. Still later, in the early 1900's, shops were set up in strategically located grammar schools in order to accomodate boys of grades seven and eight. Eventually, boys of grades five and six

participated in manual training classes.

A radical change took place in 1919 with the advent of three junior high schools. Grades seven and eight were shifted from the grammar schools to the new buildings as was the ninth grade from the high school. Course content was enlarged at this time to include various kinds of metal-working. Manual training now was considered an integral part of the total school curriculum and those who enrolled were given credit toward graduation. In grades seven and eight manual training was required. In grade nine manual training was elective. Throughout grades ten, eleven, and twelve manual training was elective. This arrangement holds up to and including the present time. The course of study for those enrolled in the high school Manual Training Course was a challenge. Six semesters of mathematics, six semesters of manual training, a year of physics, and the usual social studies and English were required in 1925.

Rapid strides in increased course content were being made in the 1930's. The high school Manual Training Course gave way to a complete revision of the high school curriculum which took place between 1932 and 1935. Manual training in the grammar schools was eliminated altogether in 1933.

It was during the late 1930's that the phrase "industrial arts" began to replace the phrase "manual training" in the literature relevant to these years.

The early years of the 1940's brought some apprehension to the personnel of the industrial arts department. This was due, in part, to the backwash of World War II and its implications for all educators. As a result, the industrial arts department performed a studied review of the courses offered in order to determine what needed culling and what needed to be encouraged.

In the junior high schools, the courses offered were in combinations, the subject common to all combinations being drawing. The courses were: (1) Woodworking-Drawing, (2) Electricity-Drawing, (3) Bench Metal-Drawing, and (4) Sheet Metal-Drawing. This schedule reveals the conclusion of the value of drawing.

In the high school classes in machine shop, combustion engines, graphic arts, mechanical drawing, machine drawing, and architectural drawing were offered.

In the 1950's the course content was similar to that of the previous decade. One notable addition to the high school list was electricity. This course was injected at the high school level in order to provide a sequential arrangement for students coming from the junior high schools, and for those students who had not the opportunity to secure such instruction in grades seven, eight, and nine.

In general, the enrollment totals for each table in the last phase indicate a gradual increase of students in in-

dustrial arts courses.

With the opening of a fourth junior high and a second senior high school during this period, needed space was made available for the increasing population of industrial arts students.

V. DISCUSSION

A major difficulty that arose during the course of preparing this work was the inability to secure information which would give the final results an historical continuity. For example, the superintendent's annual report between 1904 and 1943 could not be located. Courses of study for the period between these years were relied upon heavily.

It appears that manual training, as first introduced, served as a supplement to classes such as geometry and mechanics. Initially, school policy makers reviewed the innate value of manual training with sufficient doubt as to prevent those who enrolled from receiving credit toward graduation. However, this doubt was gradually replaced with acceptance as manual training began to demonstrate its own distinct contributions.

It may be said that industrial arts was received cautiously by school officials at first, but gained increased respect through the years. There is no evidence given to support the assertion that the general public has a negative attitude toward industrial arts.

From the standpoint of future work the investigator wishes to inject the recommendation that a study be conducted solely to ascertain the sentiment of school administrators and the lay public on the question of the relative importance of industrial arts courses in the total school curriculum.

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VIII. APPENDIX A: JUNIOR HIGH SCHOOL INDUSTRIAL ARTS COURSE OF STUDY OUTLINE (10)

General Objectives of Junior High School Industrial Arts

A. To develop an appreciation for good workmanship, design, and value of industrial materials and products

B. To develop in each pupil the habits of self-reliance and initiative in meeting practical situations

C. To develop desirable interests, attitudes, habits, and character traits through participation in co-operative work

D. To develop in each pupil desirable attitudes and practices with respect to health and safety

E. To develop in each pupil a feeling of pride in his ability to do useful things and to develop worthy leisure time interests

F. To develop in each pupil the habit of an orderly, complete, and efficient performance of any task

G. To develop in each pupil an understanding of planning and designing and how it can be used to express ideas

H. To develop in each pupil a measure of skill in the use of common tools and machines and an understanding of the problems involved in common types of construction and repair

SEVENTH GRADE DRAFTING

I. Course Objectives

A. To develop the ability to make basic orthographic projection drawings
B. To develop the ability to make basic isometric drawings
C. To develop the ability to make basic dimensional sketches
D. To develop basic lettering skills
E. To develop the ability to read and interpret sketches and drawings

F. To acquaint the student with the function of drafting in everyday living

II. Course Content

A. Orientation to drafting
B. Lettering
C. Sketching
D. Orthographic projection
E. Dimensioning
F. Pictorial
G. Related information

SEVENTH GRADE WOODWORKING

I. Course Objectives

A. To learn to read working drawings (the world language) used in woodworking
B. Provide experience in using the common woodworking tools and machines
C. To help students develop better use of leisure time
D. To learn about the characteristics and uses of common woods
E. To develop the habits of careful planning and methodical procedure in wood construction
F. To develop consumer knowledge in buying wood products
G. To develop safe working habits
H. To introduce related occupations to woodworking

II. Course Content

A. Working drawings
B. Hand tools
C. Power machines
D. Finishing
E. Related information

EIGHTH GRADE ELECTRICITY

I. Course Objectives

A. To teach the basic principles of electricity
B. To teach safety precautions related to the electrical field
C. Create interest in avocational activities related

to electricity
D. To provide exploratory activities for the student in the field of electricity
E. To evaluate electrical products from the consumers' standpoint

II. Course Content

A. Nature of electricity
B. Magnetism
C. Sources of electricity
D. The flow and measurement of electricity
E. Principles of electromagnetic induction
F. Motors
G. Circuits
H. Communications
I. Safe electrical practices
J. Related information

EIGHTH GRADE METALWORKING

I. Course Objectives

A. Acquisition of an understanding and an appreciation of basic industrial processes required in production of metals and their fabrication
B. Development of skill in the safe use of common tools and simple machines normally employed in the construction of metal projects
C. Exploration to determine the relationship between one's interests and abilities and those professions and/or vocations in the metalworking field
D. Develop consumer knowledge of metal objects and appliances

II. Course Content

A. Planning and laying out
B. Working with metals (mild steel, tool steel and alloys, aluminum, brass, copper, pewter in rods, bars, flats, and sheets)
C. Related information

NINTH GRADE DRAFTING

I. Course Objectives

A. To continue the development of the abilities listed in the objectives of the course outline for seventh grade drafting
B. To develop the ability to make working drawings related directly to projects that will be constructed in the ninth grade shop
C. To develop an understanding of fundamental architectural and machine drafting
D. To develop an understanding of the function of drafting in industry

II. Course Content

A. Orientation
B. Lettering
C. Sketching
D. Orthographic
E. Dimensioning
F. Pictorial
G. Pattern development
H. Architectural
I. Related information

NINTH GRADE METALWORKING

I. Course Objectives

A. To review the course content that was taught in the eighth grade metalworking
B. Acquisition of an understanding and an appreciation of basic industrial processes required in production of metals and their fabrication
C. Development of skill in the safe use of common tools and machines normally employed in the construction of metal projects
D. Exploration to determine the relationship between one's interests and abilities and those professions and/or vocations in the metal working field
E. Develop consumer knowledge of metal objects and appliances

II. Course Content

A. Planning and laying out
B. Working with metals (mild steel, tool steel and alloys, aluminum, brass, copper, pewter in rods, bars, flats, and sheets)
C. Related information

NINTH GRADE WOODWORKING

I. Course Objectives

A. To review the course content that was taught in the seventh grade woodworking
B. To learn to read working drawings (the world language) used in woodworking
C. Provide experience in using the common woodworking tools and machines
D. To help students develop better use of leisure time
E. To learn about the characteristics and uses of common woods
F. To develop the habits of careful planning and methodical procedure in wood construction
G. To develop consumer knowledge in buying wood products
H. To develop safe working habits
I. To inspire vocational interests

II. Course Content

A. Working drawings
B. Hand tools
C. Power machines
D. Finishing
E. Related information

IX. APPENDIX B: SENIOR HIGH SCHOOL INDUSTRIAL ARTS COURSE OF STUDY OUTLINE (25)

General Objectives of Industrial Arts

1. To develop in the student an active interest in industry and industrial life
2. To develop in the student habits, attitudes and ideals of health and safety that are consistent with the best interests of himself and society
3. To develop in each student skill and manipulative ability in using tools and machines
4. To develop in each student the ability to select wisely, care for and use properly the things he buys or uses
5. To develop in each student a knowledge of and appreciation for good workmanship and good design
6. To provide experience which can be used by the student in leisure time and avocational pursuits
7. To provide the student with experiences which will be helpful to him as he selects his occupation
8. To encourage each student to express himself creatively, using tools and materials of industry
9. To provide opportunity for the student to develop socially, improve his general attitudes and develop his judgment and sense of values

DRAFTING

I. Objectives

A. Mechanical Drafting I

1. To develop the ability to make and interpret sketches and working drawings
2. To develop a reasonable amount of skill in the essential fundamentals of drafting
3. To develop the ability to recognize and comprehend the symbols common to the machine trades
4. To develop an increased amount of consumer knowledge
5. To develop sufficient background information to enable the wise choice of a vocation
6. To develop a knowledge of shop procedures and how the drafting room ties in with the shop

B. Machine Drafting I

1. To develop an appreciation of the advanced principles of drafting common to engineering problems
2. To develop a basic background suitable for college preparation in engineering
3. To develop an understanding of the practice in the elements of the machine trades
4. To develop attitudes necessary for success in industry, either after high school or college
5. To develop pride in draftsmanship for future uses

C. Machine Drafting II

1. To develop an appreciation and knowledge of design points in metals and machines
2. To develop the understanding of the atmosphere of the industrial drafting room
3. To develop pride in perfecting salable skills for future application
4. To develop an appreciation of the engineer and the designer

D. Architectural Drafting I and II

1. To develop, without any vocational objectives, reasonable factors to be wise home selectors or owners for future satisfaction in life
2. To develop the fundamentals of architectural drafting for exploratory and practical uses
3. To develop an understanding of the architect's office
4. To prepare students for possible work in an architect's office
5. To develop pride in perfecting salable skills for possible application

II. Course Outline

A. Mechanical Drafting I (Elected in grades 10, 11 and 12 - no prerequisites) Use of instruments in making drawings and understanding the graphical language used in industry and everyday life. This course includes the study of lettering, sketching, orthographic projection, sectioning, pictorial drawing, auxiliary projection, sheetmetal development and revolutions

B. Machine Drafting I (Elected in grades 11 and 12 - mechanical drafting I is a prerequisite) - Advanced

drafting specializing in descriptive geometry (secondary auxiliaries, piercing points, intersections, revolutions), screw threads and fasteners, cams, gears, exploded drawings, piping and welding diagrams. Experience is gained in the use of the drafting machine, sliding parallels, proportional dividers, and various reproduction processes

C. Machine Drafting II (Elected in grade 12 - machine drafting I is a prerequisite) - Machine drafting II (1st semester) is composed of advanced drafting practices specializing in actual working mechanisms, making a complete set of working drawing. (Details, sections, assembly and exploded dimetric pictorial drawings) The machine drafting II (2nd semester) student is placed in the position of an engineer and draftsman in designing and drawing a complete set of plans for a jig, fixture or die

D. Architectural Drafting I (Elected in grades 11 and 12 - mechanical drafting I is a prerequisite) - Advanced drawing specializing in symbols, conventions, footings, foundations, supports, sills, masonry and frame walls, cornices, roofs, stairs, and fireplace construction. Architectural drafting I specializes in designing and drawing a set of plans for a small, basementless home, lodge, cottage. Experience is gained in drawing a perspective by the "measured line method"

E. Architectural Drafting II (Elected in grade 12 - architectural drafting I is a prerequisite) - Advanced study in planning, designing and drawing a residence with basement and garage. Architectural drafting II (second semester) includes perspective drawing by the direct method and a model of the home designed in architectural drafting II (first semester)

ELECTRICITY I, RADIO, AND ELECTRONICS

I. Objectives

A. To help the student learn the basic electrical principles that are the basis for all electrical and electronic equipment and circuits

B. To provide the student with a good foundation in electrical principles and theory

C. To acquaint the student with the tools, materials and test equipment pertaining to the field of electricity

D. To acquaint the student with the trade and profes-

sional opportunities in electrical and electronic occupations

II. Course Outline

Electricity I

A. An introduction to the field of electricity
B. Electric circuits
C. Effects of an electric current flowing through electrical devices (Theory and principles involved)
D. Study of electrical equipment to show how electrical principles apply to their operation
E. Building and studying of radios for six to nine weeks during electricity II. The radios that are built help the students learn what the various parts in the radios do to make them operate. The students start with the simplest of radios and gradually add to them until they become better and more powerful
F. Additional electronic circuits (for the students that progress more rapidly). Some of these circuits are capacity operated relays, photoelectric relays, oscillators, etc.

Radio and Electronics

A. A practical application course in which the theory and principles learned in electricity I and II are applied to actual appliances
B. Familiarization and use of test equipment that is used by electronic technicians
C. Analyzing and solving problems
D. Advanced circuits used in industrial electronic equipment

MACHINE SHOP I

I. Objectives

A. Vocational guidance in exploring aspects of the machine trades
B. To provide students with related information in blueprint reading, micrometer and other related sciences in the field of the machine trades
C. To develop some degree of salable skills to help students secure a position in industry after graduation
D. Avocational interest
E. To serve as an entry course for vocational machine shop

F. To give students a better understanding of materials, processes and machining involved in manufacturing products made from metal
G. To help the student to understand and appreciate how machinists, tool makers and machine operators serve our industrial world

II. Course Outline

A. Operation of metal-working machines
B. Use of hand tools
C. Related information

METALWORK I

I. Objectives

A. To provide vocational guidance in exploring the aspects of the metal trades and industries
B. To provide students with related information and sciences in the field of the metal trades and industries
C. To give the student an understanding of the importance of metals in our modern industrial world
D. To give students a better understanding of materials, processes, and machining involved in manufacturing products made from metal
E. To provide shop activities similar to those found in industry which will develop cooperative work habits and other desirable character traits
F. To help the student become a better informed consumer with regard to metal products
G. To develop some degree of salable skills to help students secure a position in industry after graduation

II. Course Outline

A. Introduction
B. Bench Metal
C. Sheet Metal
D. Art Metal
E. Machine Shop
F. Welding
G. Forging and Heat Treating
H. Foundry

MOTOR MECHANICS I

I. Objectives

A. To give the student a fundamental understanding of power theory and development
B. To acquaint the student with the automobile industry, its working conditions and its vocational opportunities
C. To further develop the student's knowledge and ability in the proper care and operation of the automobile
D. To study the progress of motor transportation, mass production, and the relationship of the automobile industry to many other industries
E. To provide the student an opportunity to develop basic skills in the repair and maintenance of automotive equipment
F. To develop intelligent consumers for the products used in automobiles
G. To develop the student's knowledge and appreciation of the automobile as a mechanical means to more effective living
H. To develop understanding of the basic principles underlying automobile construction, service and repair

II. Course Outline

A. Shop practice
B. Fundamental principles and theory of internal combustion engines
C. Engines (2-cycle and 4-cycle)
D. Combustion engine systems
E. Transmission
F. Steering
G. Clutches
H. Overdrives
I. Rear axles and differentials
J. Automotive springs and suspension
K. Brakes
L. Tires
M. Air conditioning
N. Servicing

PRINTING I

I. Objectives

A. To help the student to become more fully acquainted with the method of production work with a printer's point of view
B. To give the student a better appreciation of good printing and become a more intelligent consumer of artistic printing
C. To develop habits of doing things properly in all interests of safety and hygiene for oneself and for others
D. To provide opportunities for developing independence in planning wisely and following through to successful completion the projects necessary to complete the course
E. To instill within the student general information regarding industries associated with the printing field
F. To brief the student on opportunities within the printing field and how an individual goes about receiving advancements in the various progressive steps which make up this field
G. To form good work habits and foster appreciation of a job well done
H. To give a basic course in printing preparatory to taking vocational printing

II. Course Outline

A. Type case layout and history
B. Printer's system of measurement
C. Printing terms
D. Spacing materials
E. History of printing
F. Paper manufacturing
G. Kinds of paper
H. Description of linotype
I. Tools used in lock-up for press
J. Parts of a press (hand press)
K. Stereotype casting
L. Metal sawing
M. Types of presses and general description
N. Manufacture of inks
O. Kinds and uses of various printing inks
P. How to figure and cut stock
Q. Bindery operations and their purpose in printing

R. Offset printing includes: Platemaking, press theory, camera work, and stripping operations
S. Printing products, their use and general value
T. The printing industry, employment possibilities, wage scales, union affiliations, hours, types of work offered, promotion possibilities, and general working conditions
U. Skills taught

1. Composition
2. Presswork

WOODWORKING I AND II

I. Objectives

A. To learn to read a working drawing or blueprint
B. Experience in using the common woodworking tools and machines
C. To help develop interest in the cabinet making or carpentry trades
D. Plan and construct projects
E. Learn about the characteristics and uses of the common woods
F. A consumer knowledge about the buying of woodworking equipment, wood products, furniture, etc.
G. To help some students develop a better use of leisure time

Woodworking I

II. Course Outline

A. An introduction to the field of woodworking
B. Kinds of wood, their characteristics and uses
C. Designing and planning the project
D. Hand woodworking tools and their uses
E. Woodworking machines
F. Construction of the project
G. The finishing and preserving of wood products
H. Safety as it applies to each unit, machine and tool
I. Personnel system (Each class organized to carry on shop duties from day to day)

Woodworking II

A. Review the principles involved in the use of hand tools and power woodworking equipment

B. Greater emphasis on planning and designing of projects
C. Development of advanced skills in the operation of woodworking machines
D. Construction of project
E. Finishing procedures and materials
F. Safety as it applies to the use of tools, machines and general shop practices
G. Woodworking as related to carpentry and millwork