THE EFFECTS OF THE INDUSTRIAL REVOLUTION

ON INDUSTRIAL ARTS

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THE EFFECTS OF THE INDUSTRIAL REVOLUTION 
ON INDUSTRIAL ARTS

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LIST OF ILLUSTRATIONS
CHAPTER I

INTRODUCTION

From the beginning of time when man first discovered the value of the sharp-edged flint, he has slowly developed his tools, implements and products of all sorts used by him in work, play and war. Thus, industry, the manufacture of these items, developed. At first the acquisition and transmission of these skills involved in its execution was usually through the process of unconscious imitation. The organization of family life being such that the child observed his parents, later played imitative games of adulthood, and, upon acquiring sufficient strength and knowledge in the skills, naturally began practicing them.

As new skills developed and economic conditions became more complex, a conscious effort was made by the father to teach his son his special skills. This was the beginning of a simple type of apprenticeship. As the rigid hereditary social and economic stratifications of society became more democratic and flexible, and it was found necessary for a father to have more help in the practice of the occupation than his own sons could give him, the father took into his home the sons of others and taught them his craft secrets.
and skills. This method of teaching then became a recognized institution.

It is generally accepted that the adoption of sons by artisans referred to in the Code of Hammurabi (B.C. 2285-2242) was at least a transition stage in the development of apprenticeship from the father-to-son method of passing down handicrafts to the genuine apprenticeship involving a written indenture and a definite period of training, after which the boy is released by the master to practice the craft independently.¹

At a much later date there is no doubt that a clear-cut type of apprenticeship was practiced. The discovery of written, legal indentures in the tombs and piles of ancient rubbish in Egypt establishes the existence in Egypt of a genuine apprenticeship almost identical to that of the medieval period in Europe. A contract will be given in the following chapter.

Little is known of apprenticeship as a legal institution from the early part of the Christian era until the eleventh century when craft guilds made their appearance.

Through a very slow process of evolution the craft gilds, in the fourteenth and fifteenth centuries, became powerful in city affairs. It was at this time that indentured apprenticeship assumed an important part in economic life. It was a most effective restraining and socializing agency during a period of European history when the social and political life was loosely organized. It was extremely effective as a means of training for the skilled crafts, and served to protect the gilds for many years against the encroachment of the new domestic system of production which finally destroyed them. The institution of apprenticeship not only outlived the gilds but also continued to exist for a time after the machine, quantity production and the modern factory organization made its existence impossible.

**Statement of Problem**

The problem of this study is to consider the development of various educational means using handicrafts from the period prior to the industrial revolution, in which the apprenticeship method was the only method employed. Since the industrial revolution there have been several distinct types of schools used with more or less success. Several of these during the late seventeenth and early eighteenth centuries will be discussed in a later chapter.
The real problem, so far as this thesis is concerned, is to present the position of industrial arts as one of these later distinct types of training in the public schools of the United States.

Purpose of the Study

Since the Industrial Revolution in Europe took industry out of the home, where the apprenticeship method was employed and placed it in the factory, thus eliminating the old apprenticeship method to a great extent, man has been searching for a new means of education.

It is the purpose of this study to determine, so far as possible, the standing or success of industrial arts as a better type of training to fit the present generation for successful living in the industrial society of the present day.

Delimitations of the Study

This study is limited to a discussion of the various educational means employing handicrafts from the period prior to the industrial revolution in Europe, when the old apprenticeship method began its decline, through the development of industrial arts as they are taught in the secondary schools of the United States today. Several of the methods used will be discussed briefly as a background in discussing the industrial arts.
Sources of Data

The data of this study are taken from articles in professional educational magazines, books written on the industrial revolution by the better authorities, bulletins, books of general and economic histories, and unpublished materials.

Method of Procedure

To carry out this study it was necessary to use the historical method of research. The original sources were utilized in the collection of the data wherever possible. Much valuable information was selected from professional educational magazines, books of education, general and economic histories, bulletins and unpublished materials in our local libraries.

The study is divided into six parts: Chapter I presents the introduction, which states the problem, gives the purpose of the study, the source of data, the delimitations, outlines the method of procedure and discusses the recent and related studies. Chapter II reviews briefly the history of apprenticeship and the economic and social background of the industrial revolution. The industrial revolution is presented in Chapter III. Attention is given in Chapter IV to the efforts to prepare children for their future life in an industrial society. In Chapter V the industrial arts since 1900 are discussed and Chapter VI presents a concise summary of the study.
The above is briefly mentioned to familiarize the reader with the scope of the study and to suggest the nature of the remainder of the present report.

Definition of Terms

For the purpose of this study certain terms are defined as follows:

Apprenticeship is a method of training in which a learner, usually a minor, enters employment for a definite period of time under an expressed or implied contract to learn a trade, craft, or business.\(^2\)

Indenture is a contract by which a person, as an apprentice, is bound to service.

Industrial revolution

...in English history may properly be confined to the initial, decisive change in England by which, in the technique of manufacturing and allied industries, power-operated machinery took the place of preeminence formerly held by the hand tool; and by which, in the organization or administration of industry, large establishments for the utilization of machinery, with an unprecedented concentration of capital and regimentation of labor, gained ascendency over the simpler home industries, handicraft shops, and putting-out system.\(^3\)

Manual Labor movement was the movement among educational institutions which utilized manual labor of the student to

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\(^2\) Stewart Scrimshaw, *Apprenticeship*, p. 3.

aid in his financial support and the support of the institutions.

Manual training is a term used to describe an early type of school shop activity which was restricted to fixed exercises in wood, metal, and mechanical drawing; strong emphasis was placed on tool exercises and manual skill.

Shop is the broad, all-inclusive term used to indicate any educational activity employing aspects of trades or industry wherein the use of tools, work stations, or machines appear.

General education is a phase of non-specialized and non-vocational education that should be the common knowledge of educated persons as individuals and as citizens in a free society.4

Mechanics' Institute Movement was a movement among the common industrial workers to obtain more knowledge of scientific nature.

Industrial Arts is one of the practical arts, a form of general education which provides learners with experience, understanding and appreciation of materials, tools, processes, and products, and the vocational conditions and requirements, generally, to the manufacturing and mechanical

industries. These results are achieved through design and constructions of useful products in laboratories or shops, appropriately staffed and equipped, supplemented by reading, investigations, discussions, films, visits, reports, and similar activities characteristic of youthful interests and aptitudes in things industrial. The program includes such industrial representation as drawing, design, metal work, wood work, textiles, printing, ceramics, automotives, foods, electricity and similar units, either as separate offerings or in various combinations.5

Swedish Sloyd was a type of school shop activity based upon the constructing of objects which were of some practical use.

Industrial-vocational education is a type of education for the training of youths and adults who have chosen an industrial occupation as their livelihood in some specialized field of industry.

Recent and Related Studies

Much material concerning this study has been published. This material varies from history books and articles published by recognized authorities in the various specific

phases of the subject, although recent studies concerning the background of this study are extremely few.

John Rowlett made a study of the ancient and medieval crafts training showing the influence of their training on our present day method of trade education. He concluded that:

1. Trade training on the job is the most effective means of trade education.

2. Trade skills cannot be mastered in the average trade school. One of the major reasons for this is the fact that the conditions that exist in industry cannot be reproduced in a school room.

3. It seems that the apprentice program advocated by the federal government is an evolution of the old guild apprenticeship. If it were supported by all parties concerned, an effective means of trade training might be found.

Wallace Myers, in his study of Trade Education and Apprentice Training in the United States, attempted to answer three questions:

1. What is the background of trade training in the United States? The study has shown that apprentice training in the United States was patterned from the old English system of apprenticeship. The early apprenticeship system declined and eventually decayed with the coming of the age of machines and mass production. Several types or trends of trade education evolved and were

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developed from 1820 to the present time. A national program of apprenticeship and several types of vocational schools now form integral parts of a nation-wide system of trade education.

2. What is the attitude of organized labor toward the training of craftsmen? Labor organizations want a program of training for skilled craftsmen. Proof of this is the fact that major trade associations have formulated basic standards for apprenticeship training providing a ratio of apprentices to journeymen agreeable to the joint labor-management committees. Other pertinent factors involving the trainees, such as duration and content of training courses, are also contained in the basic standards.

3. What has management done in order to maintain a body of skilled workmen? One of management's most valued assets, is its skilled workmen. This is emphasized by the fact that certain leading companies have initiated training programs. The management included in this study has made an effort to maintain a body of skilled workmen by operating training programs.7

Owen T. Shipp in his study of the Influences of the Manual Labor Movement on Industrial Arts states:

that Manual Labor Movement was merely a cog in the wheel, or a stepping stone to our present day efforts to train better tradesmen and more skilled workers.8

Morgan Clay Moses, in his study of the American Apprenticeship and its Contribution to Industrial Arts, concluded with the statement:

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that industrial arts, with general objectives patterned after apprenticeship principles, is a vital stepping stone in the present day efforts to train better tradesmen and more skilled craftsmen through apprenticeship.9

In his study of the development of vocational education in Texas, Samuel A. Blackburn describes the early movement toward the establishment of manual labor in public schools. Concerning the public opinion of this movement, Blackburn states:

While conditions in Texas following the Civil War should have been strongly conducive to encouragement of some scheme of practical education, yet the white leaders had not yet reached the stage of recognizing that they and their children might be forced to use their hands as well as their brains in the process of earning a living. It was this attitude toward manual labor, the point of view which could see in such activity only humiliation, which prevented any organized steps to provide any instruction in manual training for white children. Courses of that type were suited, from the southern point of view, only to Negroes, and it was in Negro schools that practical courses were first introduced.10

Wayne Matthews formed the following conclusions concerning the growth of industrial arts in the secondary schools of Texas from 1927 through 1948:

1. The growth of industrial arts has been rather consistent throughout the twenty-one year period covered in this study.


2. Woodwork and mechanical drawing have had the largest number of affiliated units, enrolled the largest per cent of industrial arts students, and had the largest per cent of teachers with professional training in their field of work.

3. Outside factors apparently affecting the growth of industrial arts were the depression from 1931 to 1934 and World War II. During these two periods there was some retarding of the growth in the numbers of affiliated units and in the number of teachers having professional training in industrial arts.

4. During the latter years of the survey there was a wider variety of industrial arts subjects offered in the Texas high schools; however, the wider variety of subjects was mostly in the large schools.

5. Standards and regulations set by the State Department of Education have failed in the uniformity of the industrial arts subjects offered in Texas high schools.11

In order to determine changes wrought by the industrial revolution, the economic, social, and educational conditions prior to its beginning form a logical starting point for a presentation of facts and findings dealing with these changes. The history of domestic apprenticeship will be given to show in what ways it was affected and to give a background for subsequent educational movements.

CHAPTER II

THE EDUCATIONAL AND ECONOMICAL BACKGROUND
OF THE INDUSTRIAL REVOLUTION

Apprenticeship, as a method of training young persons in the skills and mysteries of an art or occupation, existed long before recorded history. Its evolution will be given as a background for the discussion of those educational means which replaced it following the industrial revolution so that a better understanding of the present status of the industrial arts can be obtained.

The earliest customs and laws pertaining to apprenticeship are found in the Code of Hammurabi (B.C. 2285-2242) in which is stated, among several laws regarding adoption,

if an artisan has taken a son to bring up and has caused him to learn his handicraft, no one has any claim. If he has not caused him to learn his handicraft, that nursing shall return to his father's house.

This is generally accepted as at least a transition stage in the development of apprenticeship from the father-to-son method of passing down handicrafts, to the genuine

apprenticeship involving a written indenture and a definite period of training.

Simple apprenticeship began when the father began making a conscious effort to teach his son the skills of his trade. The father-to-son relationship is illustrated in the following quotations from the Bible:

And King Solomon sent and fetched Hiram out of Tyre. He was a widow's son of the tribe of Naphtali, and his father was a man of Tyre, a worker in brass; and he was filled with wisdom, and understanding, and cunning to work all works in brass.²

And now I have sent a cunning man, endued with understanding, of Huram my father's, the son of a woman of the daughters of Dan, and his father was a man of Tyre, skilful to work in gold, and in silver, in brass, in iron, in stone, and in timber, in purple, in blue, and in fine linen, and in crimson; also to grave in any manner of graving, and to find out every device which shall be put to him, with thy cunning men and with the cunning men of my lord David thy father.³

Freeman, in discussing the attitude held by Plato and Aristotle that actual work is degrading, states that

A large number, however, from among the poorer classes were compelled to work with their own hands; so these, as well as the slaves, required technical instruction. Some indications survive as to the manner in which this was imparted. Trades were mostly hereditary; the sons of the craftsmen learn their fathers' trade, so far as their fathers and their friends of the same trade can teach it. But others might also learn. Xenophon mentions such cases. 'When you apprentice a boy to a trade,' he says,
'you draw up a statement of what you mean him to be taught,' and the fees were not paid unless this agreement was carried out. The *Eleitosophon* mentions as the two functions of the builder or the doctor the practicing of their profession and the teaching of pupils. The *Republic* says: 'If owing to poverty a craftsman is unable to provide the books and other requisites of his calling, his work will suffer, and his sons and any others whom he may be teaching will not learn their trade so well.'

Since the discovery of written, legal indentures in the tombs and ancient rubbish piles in Egypt, all possible doubt of the existence in Egypt of a genuine apprenticeship almost identical with that of the medieval period in Europe has been removed. The following contract found in Westerman's study of ancient vocational training was issued in 183 A.D.

Ischyron, son of Heradion and . . . of Oxyrhyynchus, son of Sarapion also called Leon, son of Heracleides, his mother being . . . of said city, weaver, agree with each other as follows: Ischyron on the one part that he has apprenticed to Heracles . . . Thonias, a minor, to be taught the art of weaving for a period of five years starting with the first of next month, Thaophi, and will produce him to attend the teacher for a stipulated period every day from sunrise to sunset, performing all the orders that may be given to him by the said teacher on the same terms as the other apprentices, and being fed by Ischyron. For the first two years and seven months of the third year Heraclas shall pay nothing for the boys wages, but in the remaining five months of said third year Heraclas shall pay the wages of the said apprentice twelve drachmae a month, and in the fourth year likewise for wages sixteen drachmae a month, and fifth year likewise twenty-four drachmae a month; and Heraclas shall furnish for the said apprentice in the present twenty-fourth year a tunic worth sixteen

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drachmae, and in the coming twenty-fifth year another tunic worth twenty drachmae, and likewise in the twenty-sixth year another tunic worth twenty-four drachmae, and in the twenty-seventh year a tunic worth twenty-eight drachmae. The boy shall have twenty holidays in the year on account of festivals without any deduction from his wages after the payment of wages begins; but if he exceeds this number of days from idleness or ill health or disobedience or any other reason, Ischyrlon must produce him for the teacher during an equivalent number of days, during which he shall remain and perform all his duties, as aforesaid without wages, being fed by the said Ischyrlon because the contract has been made on these terms. Heraclas on the other part consents to all these provisions, and agrees to instruct the apprentice in the aforesaid art within the period of five years as thoroughly as he knows it himself, and to pay the monthly wages as above, beginning with the eighth month of the third year. Neither party is permitted to violate any of the aforesaid provisions, the penalty for such violation being a fine of one hundred drachmae to the party abiding by the contract and to the Treasury an equal sum. This agreement is valid. The twenty-four years of the Emperor Caesar Marcus Aurelius Commodus Antonius Augustus Armeniacus Medicus Parthicus Sarmaticus Germanicus Maximus, Thoth 25.

I, Heraclas, son of Sarapion, also called Leon, have made this contract and consent to all the aforesaid provisions. I, Thonis, also called Morous, son of Harthonis, wrote for him as he was illiterate.

Although little information is available pertaining to apprenticeship from the early Christian era until the thirteenth century, there can be no reason to doubt its existence, for it is found in reading of the historical development of the English craft gilds that the common requirement in the earliest gild statutes was that the man

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wishing to carry on a particular industry should have his ability testified to by some known members of the craft.

But usually full membership and influence in the gild was reached as a matter of course by the artisans passing through the successive grades of apprentice, journeymen, and master. As an apprentice he was bound to a master for a number of years, living in his house and learning the trade in his shop. There was usually a signed contract entered into between the master and the parents of the apprentice, by which the former agreed to provide all necessary clothing, food, and lodging, and teach to the apprentice all he himself knew about his craft. The latter, on the other hand, was bound to keep secret his master's affairs, to obey all his commandments, and to behave himself properly in all things. The term of apprenticeship varied considerably, but the custom of London, as in most English boroughs, eventually fixed it at a period of not less than seven years. This term was often exceeded. For example, it is found in Salzman's study of apprenticeship that a boy of fourteen, in 1462, was apprenticed to a haberdasher for the rather exceptional term of twelve years; but in this case the master had agreed to provide him with two years' schooling, the first year and a half to learn "grammar" and the next half year to learn to write. It is found that a goldsmith's apprentice, in 1494, agreed to serve ten years provided his master would keep him one year at a writing school. A certain amount of teaching, apart from technical training, was usually stipulated for

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indentures of apprenticeship, and among the goldsmiths fines were inflicted for failing to have apprentices taught to read and write.\(^7\)

After the expiration of the time agreed upon, the apprentice became free of the trade as a journeyman, or a full workman. As a journeyman he served for wages in the employ of a master. In many cases he saved enough money to set up an independent shop, where, as a full master artisan or tradesman, he might take part in all the meetings and general administration of the organized body of his craft, might hold office, and would probably have one or more journeymen in his employ and apprentices under his guardianship.

As almost all industries were carried on in the dwelling-houses of the craftsmen, no establishment could be of very considerable size, and the difference of position between master, journeyman, and apprentice could not have been great.\(^8\)

The craft gilds were an outgrowth in the latter part of the thirteenth century of a group of organizations in each town which were spoken of as crafts, fraternities, gilds, mysteries, or often merely by the name of their occupation. They seem to have grown up in response to the needs of handicraft much as the gild merchant had grown up to regulate trade.

\(^7\)L. F. Salzmann, *English Industries of the Middle Ages*, pp. 229-230.

\(^8\)Cheyney, *op. cit.*, p. 66.
The weavers seem to have been the earliest occupation to be organized into a craft gild; but later almost every form of industry which gave employment to a handful of craftsmen in any town had its separate fraternity. Since even allied trades, such as the glovers, girdlers, pocket makers, skinners, white tawyers, and other workers in leather; or the fletchers, the makers of arrows, the bowmen, the makers of bows, and the stringers, the makers of bowstrings, were organized into separate bodies, the number of craft gilds in any one town was often very large. At London there were by 1350 at least as many as forty, at York, some time later, more than fifty.

The craft gilds, like the gild merchant, combined close social relationship with a distinctly recognized and enforced regulation of the trade. This regulation provided for the protection of members of the organization from outside competition among members; it supported the interests of the full master members of the craft as against those in the journeyman stage, and enforced the custom of the trade in hours, materials, methods of manufacture, and often in prices.

The officers were usually known as masters, wardens, or stewards. Their powers extended to the preservation of order among the master members of the craft at the meetings, and among the journeymen and apprentices of the craft at all times; to the supervision either directly or through deputies, of the work of the members, seeing that it conformed to the rules and was not false in any way; to the craft; to the administration of its charitable work; and to the representation of the organized body of the craft, before town or other authorities.

Colonial America

It is generally accepted that one of the characteristics of all the early colonies was the attempt to establish in the new country the institutions which were familiar in their old country. The ordinary practices and activities of private life, the procedures of social and economic intercourse and

the practice of apprenticeship, as it was found in England at the time, had been merely transplanted from England to North America. Although the Statute of Artificers of 1562 and the Poor Law of 1601, which controlled apprenticeship in England at the time of the founding of the American Colonies, were not continued as statutes by the Colonies, the types of apprenticeship and relief of the poor fostered by the English laws were generally used by the colonists.  

While the apprentice in early New England was usually a person born in the Colonies, the indentured servant was usually an immigrant serving his time to pay for his passage. "Besides being a method of education and poor relief, apprenticeship was frequently used as a penalty for idleness or as a punishment for debt."  

Before the beginning of the free public schools, apprenticeship was used by all who could not afford to educate their children in private schools. The poor and the indigent were almost forced to follow this course in obtaining for their children education for sufficient livelihood.  

The exploitation of poor children, as well as poverty-stricken men and women in the history of apprenticeship caused a stigma difficult to outlive. The system can hardly be classified as apprenticeship as many were indentured servants who were given little or no opportunity to learn a trade. The practice of indenturing servants, some of whom were undesirables, took place mostly in the Southern states, where workers were needed on the plantations. They worked off the cost of their transportation by serving as so-called apprentices.

An example of this type of apprenticeship is seen in the 1640 indenture quoted below:

Know all men that I, Thomas Millard, with the consent of Henry Wolcott of Windsor unto whose custody & care at whose charge I was brought over out of England into New England, doe bynd myself as an apprentice for eight yeares to serve William Pynchon of Springfield, his heires & assigns in all manner of lawful employment unto the full ext of eight yeares beginning the 29 day of Sept 1640 & the said William doth condition to find the said Thomas meat drinks & clothing fitting such an apprentice & at the end of his tyme one new suite of apparell & forty shillings in mony; subscribed this 28 October 1640.13

The following statement was found at the foot of the indenture:

Tho Millard by his owne consent is released & discharged of Mr. Pynchons service this 22. of May 1648 being 4 months before his tyme comes out, in Consideration whereof he losses the 40s in mony wch should have bin pd him, but Mr. Pynchon giveth him one New suite of Aparell he hath at present.14

13 United States Department of Labor, Apprenticeship Past and Present, p. 11.
14 Ibid., p. 12.
It is seen from this indenture that in return for his devoted services to his master for "eight yeeres" all this apprentice received as compensation was "meat, drinks and clothing." During the following two centuries, as this exploitation of unfortunates was finally erased by regulative acts brought about by public sentiment, a more just indenture of apprenticeship developed. A photostatic copy of one of these indentures is found on the following page.

Just to what extent the "mystery" of the printing craft was revealed to the apprentice named in that indenture cannot be determined by the provisions set forth. The master, Daniel S. Glackens, had, however, a wealth of knowledge to reveal; and, judging from accounts, was in all probability usually thorough for those days in passing on his knowledge to the youth. He had been engaged in the printing business for many years and was an exceptional craftsman. Much of the craftsmanship and artistic ability demonstrated by the next two generations of the Glackens family apparently stemmed to a considerable extent from this printer and publisher.¹⁵

Two factors are largely responsible for the success of the apprenticeship system. The first of these is the close personal relationship and identity of interest existing between master and apprentice; and second, the supervision

¹⁵Ibid., p. 9.
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of master and apprentice by the craft guilds. These factors, fostered by the social and economic conditions of the Middle Ages, passed away under the changed economy of modern times.

To the loss of personal relationship and identity of interest existing between master and apprentice, and to the lack of adequate supervision over this relationship is partially due the decay of the apprenticeship system.16

With the expansion of industry in Europe and America following the industrial revolution, the apprenticeship system was revolutionized for application to the new machine age. Even though the apprentice-master relationship continued to some extent, after the industrial revolution was under way, "domestic apprenticeship," as the early system is appropriately labeled, gradually disappeared as a result of the size and impersonality of industrial plants and the enactment of public education laws.17

Population and Distribution

Before 1760 the old industrial system was employed in England. None of the great mechanical inventions had been introduced; the agrarian changes were still in the future. It is this industrial England which we will contrast with the England following the industrial revolution. As there was no official census before 1800, there are no accurate


17 United States Department of Labor, Apprenticeship - Past and Present, p. 18.
means for determining the population of that time. The computations most generally accepted are those made by Finlaison and published in the Preface to the Census Returns of 1831. As these are based on an examination of the registers of baptisms and burials of the eighteenth century, these data are deficient in three respects:

- because the number of people existing at the date when the computation begins is a matter of conjecture;
- because in some parishes there were no registers; and
- because the registration, being voluntary, was incomplete.18

According to Finlaison, the population of England and Wales was 6,039,684 in 1750. In 1801 the population of England and Wales was 9,187,176, showing an increase of 3,000,000 or more than 52 per cent in the second half of the century. This difference in the rate of increase is a significant great contrast in the two periods. In the former period England, though rapidly increasing in wealth due to her extended commercial relations, still retained her old industrial organizations; the latter period is the age of transition to the modern industrial system and to the improved methods of agriculture.

In considering the distribution of population, a great difference will be found between the two periods. In 1750 the counties north of Trent, about one third of the total

area of England, comprised less than one third of the population, while in 1881, they contained more than two fifth of the population. In 1700 the most thickly peopled counties were the manufacturing districts of the west; the seats of the Midland manufactures; and the agricultural counties of Herts and Bucks, all of them being south of Trent. The most suggestive fact in the period between 1700 and 1750 is the great increase in the seats of the cotton and coarse woollen manufactures, potteries and hardware, and the two northern counties with their coal fields. The west, or England's woollen districts, on the other hand, though they had grown also, showed nothing like so great an increase. The population of the eastern counties had increased very little, although Norwich was still a large manufacturing town, and there were many smaller towns engaged in the woollen trade scattered throughout Norfolk and Suffolk. Among the few agricultural counties which showed a marked increase during this period was Kent, the best farming county in England at that time.19

Another point to be considered is the relation of rural to urban population. According to Gregory King, writing in 1696,

19Toynbee, op. cit., pp. 7-12.
London contained 530,000 inhabitants, other cities and market-towns, 870,000, while villages and hamlets numbered 4,100,000. Arthur Young, seventy years later, calculated that London contained one-sixth of the whole population, and remarked that, 'in flourishing counties, as England, 'the half of a nation is found in towns.' Both estimates are very unreliable, apart from the fact that both, and especially that of Arthur Young, overestimate the total number of the population, but the contrast between them justly indicates the tendency of towns even then to grow out of proportion to the rural districts. That disproportion has, of course, become even more marked since Arthur Young's day. In 1881 the total urban population was 17,285,026, or 66.6 per cent, while the rural was 8,683,026, or 33.3 per cent.

The only estimates of occupations with which I am acquainted are again those of Gregory King in 1696, and Arthur Young in 1769. They are too vague and too inconsistent with one another, to be relied on, but I give them for what they are worth. According to the former, freeholders and their families numbered 940,000, farmers and their families, 75,000, labouring people and out servants, 1,275,000, cottagers and paupers, 1,300,000; making a total agricultural population of 4,265,000, against only 240,000 artisans and handicraftsmen.

Naturally one would expect the training of the expansion in the population to become acute and since the cause was manufacturing the new type of training called for a change in the method of training to take their places in the factory while at the same time to foster the culture of the past.

20Toynbee, op. cit., p. 12.
CHAPTER III

THE INDUSTRIAL REVOLUTION

The Industrial Revolution, which began in England, entails a complete alteration of social conditions wherever it spread. The ingredients of the Industrial Revolution are many and complex. Among them is the application of scientific methods to various phases of the economy, society, population distribution, transportation and navigation. Others are the change from the old type of industry in the home to that of the workshop or cottage industry, the factory system, the contribution of inventions, new industrial methods and equipment, the use of the machine, the application of water-power; and then of steam, to do the work which had been previously accomplished by human drudgery, or, as some referred to it, as powered by muscle. Arnold Toynbee referred to the change as substitution of competition for the medieval regulation which had previously controlled the production and distribution of wealth. For this reason it is not only one of the most important facts of the English history but Europe owes to it its growth of two great systems of thought - economic science and its antithesis, socialism.¹

¹Toynbee, op. cit., p. 64.
The industrial revolution of the eighteenth century went still further than the political revolution of the seventeenth century to gain social and political influence for the commercial classes. It succeeded in destroying the feudal but foolish idea that landowners alone were to be looked upon as the leaders of the nation. It gave the capitalists and manufacturers a new accession of power, by enormously increasing their wealth. Moreover, it helped to undermine the landed interest by making the manufacturers of England at first equal, and afterward superior, to her landowners, so that a rich mill-owner or iron master became as important as a large landowner. The monopoly of landed interest was broken by capital.  

The Breakdown of the Industrial Revolution

The Industrial Revolution was made possible by the many changes which occurred following the Middle Ages. Each system of social and political movements played its part in the development of the industrial revolution. Influences were at work in the seventeenth century in favor of the home industries. During the late seventeenth and the early eighteenth century England was second-rate in political power and in intellect, as well as in industrial organization and agricultural method.  


In trying to compete with the superior industries of other countries, such as Holland and France, the English industries tried to monopolise some raw materials, such as wool, which failed in its object, as such attempts usually do. Still it is worth noticing as an instance of what was then the universal policy of subjecting industry to various regulations, either for the benefit of those concerned in industry itself, or because it was thought that benefit might accrue to the state in general. The regulation of industry was, in fact, regarded as quite right and necessary, either for purely political purposes or to maintain the quality of merchandise.  

Transportation

The mechanical inventions which revolutionised industrial production, produced even more amazing results when applied to the improvement of transport facilities. With the excellent ocean transportation serving the needs of external commerce, the great expansion which followed the industrial revolution called for improvement of modes of internal transportation. Some slight improvement in roads and canals had been made, and others projected during the seventeenth and early eighteenth centuries. Telford, Macadam, with a few other engineers and private turnpike companies

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4Gibbins, op. cit., p. 325.
and public authorities, who engaged them, covered England with good roads in the last quarter of the century. The increased demand for coal as fuel and the prospect of opening up new beds so as to obtain a profitable return was the direct motive for the first serious attempt to improve internal communication by water. Canals were the first main internal means of transportation. The first canal was that from Worsley to Manchester, built in 1761. Within a few years a system of canals had been constructed which gave ready transportation for goods through all parts of the country.

The continuance of this development of transportation and its fundamental modifications by the introduction of railways and steamboats has been one of the most striking characteristics of the nineteenth century.\(^5\)

The improvement and important discoveries in the arts of navigation, which opened up the new over-seas markets, played one of the final important steps which lead to the Industrial Revolution. Every improvement in the means of transport caused an extension of the markets and the extension of the industries. Still another important step which we must not overlook is the fact that while over half of Europe was in war of some sort, England had only Parliamentary War, which did not disturb the industry of the country very much, for there was no sign of undue rising

\(^5\)Cheynay, op. cit., pp. 214-216.
of prices or anything else that points to commercial distress. England was free from the terrible conflicts that desolated most of Europe during this time. English industries were free and growing rapidly, trying to supply and grasp the control of the world commerce. 6

This brought about the improvement and expansion of industries from the home to the cottage, the mass employment of children under the Poor Law Apprenticeship, and the series of inventions. One of the first inventions was the cotton-spinning machinery; it was followed by other inventions in the manufacture of textiles, and eventually led to the evolution of a factory system.

Factories

There was no great change in the home manufactures during the early eighteenth century. Although they were beginning to develop greatly, they were still largely conducted upon the domestic system, and the small capitalist was a feature of that time. The craftsman was producing only on a small scale, since the trade was chiefly for local needs and local markets. As the methods of transportation grew, methods of industry began to change.

The rise of master-manufactures was one change that rapidly followed the improvement of transportation. These

consisted of systems in which one man would have several home manufactures working under his direction and supervision. As early as 1750 there were signs of the approach of the methods of modern capitalism, and of production on a large scale. It was becoming increasingly the custom to employ a large number of working people together under one roof, or at least under the supervision of one great manufacturer.7

These factory owners were largely dependent upon the supply of the poor law apprentices, whom they treated almost as slaves. As the steam power became more generally used, factories left the wilderness and moved into the coal fields where a condition of the poor law apprentices became more prominent before the eyes of the people. The wrongs suffered by these unfortunate became apparent to all. In 1796 the Manchester Board of Health pointed out some of the flagrant evils of the system. This report was the beginning of an agitation against the evils of the factory system which lasted for years. The first Factory Act, of 1802, limited the hours of labor to twelve, required that instruction in the three R's be given to apprentices, and included certain regulations concerning sanitation and a weak system of inspection.8 It provided that the apprentice

7Ibid. 8White, op. cit., pp. 102-106.
should be properly fed and clothed, and it abolished night work. The Act was not effective, however, for as fast as steam power replaced water power, the mills moved into the large centers of population where were found shipping facilities and cheapness of child labor without an apprenticeship agreement; and, consequently, without being required to clothe, feed, and teach the children.  

The British Parliament abolished compulsory apprenticeship in 1814, but even where the children in these factories were still called "apprentices," they were, for the most part, mere "hands" working under a system of child labor exploitation rather than a system of apprenticeship.

In 1819, as a result of the agitation of Robert Owen, who had mills of his own in which he employed no children under ten years of age, and where the twelve hours of labor included one and three-quarters hours for meals, an act was passed which forbade the employment in a cotton factory of children under nine years of age, and no young person under the age of sixteen could work more than twelve hours a day, exclusive of meals. This was beneficial but it did not

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11 White, op. cit., p. 106.
help conditions in silk, woolen, or other factories, nor did it provide for schooling for the children. No provision was made for education until the Factory Act of 1833 which "established, for the first time, the great principle that labor and education should be combined." 12

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12 Haddor, op. cit., p. 89. (As cited by Bennett, op. cit., p. 274.)
CHAPTER IV

EFFORTS TO PREPARE CHILDREN FOR LIFE'S WORK

Among the many changes following the industrial revolution, were those in domestic apprenticeship and the supply of skilled labor. As the apprentice was replaced by child labor, there were no provisions made for his education toward a livelihood. It was through the influence of such great educators as Pestalozzi, Fellenberg, and Froebel that these children were given a chance to learn a trade while at the same time, earn money toward their support.

It was in the last quarter of the nineteenth century that the Swiss reformer, Pestalozzi, basing his instruction on the subject method and insisting that the mind be supplied with ideas through sense perception, through observing and handling objects themselves, began his industrial school for the poor. He even advocated and practiced the plan of having his pupils engage in the occupations, such as farming, spinning and weaving. However, he did not realize that these tasks had any relation whatever to intellectual development. These tasks were required as a necessary part of the pupil's obligation. Fellenberg, the co-worker of Pestalozzi, greatly
elaborated on the new idea and put it into extensive operation.¹

For a more complete understanding of the methods employed in teaching by Fellenberg, an understanding of his philosophy, as projected by Pestalozzi, is necessary. His principles of education are quoted here to aid in this understanding.

The great object of education is to develop all the faculties of our nature, physical, intellectual, and moral, and to endeavor to train and unite them into one harmonious system, which shall form the most perfect character of which the individual is susceptible; and thus prepare him for every period, and every sphere of action to which he may be called. It is only by means of the harmonious development of every faculty of our nature, in one connected system, that we can hope to see complete men issue from our institutions—men who may become the savior of the country, and benefactors of mankind. His instruction and discipline should be directed, if he means to fill the exalted office of 'being a fellow-worker with God.'²

In comparing the schools of Pestalozzi and Fellenberg, it is found, in a letter to Lord Kenyon, that Pestalozzi is a man of genius, benevolence, and enthusiasm. Little acquainted, as he tells me, with philosophy, literature, and science, he depends much on his numerous masters for the execution of that plan of education of which he points out the outlines. Fellenberg is a man of much ingenuity; and may be called a disciple of Pestalozzi, having at one time, as he tells me, superintended his school. Pestalozzi has 15 or rather 20 masters, including five who were formerly his scholars, for 100 students; Fellenberg, 13 for 54

¹Samuel J. Vaughan, Content and Methods of the Industrial Arts, pp. 22-23.

²"Educational Establishment of Mr. De Fellenberg at Hofwyl," Barnard's Journal of Education, III (1858), 591.
pensioners. His school for the poor consists of 32 boys who work about ten hours a day, and study two. They are chiefly employed in agricultural labor, sometimes in mechanical work. They learn to read, write, cipher, draw, music, and the elements of geometry. Music and drawing (designing) are in great request in their school, and also geometry. The new school has but one master (Verhli) of distinguished merit. The excellency of both institutions, and their superiority, about which, Fellenberg's particularly, an immensity of pamphlets and philosophical disquisitions have been published, consists both in a single point which is not much noticed. Every class, and every scholar, has his master always at his side, whether at study, work or play.

Fellenberg's great educational establishment at Hofwyl, Switzerland, which originated in motives of patriotism and benevolence, has attracted more attention and exerted a wider influence than any one institution in Europe or America. It originated in the early years of the nineteenth century and was sustained for forty years by the personal efforts and sacrifices of its founder. Fellenberg began his works by absorbing into his family two or three boys to be taught with his own children. From time to time two or three more pupils were received so that "they might fall insensibly into the habits of the school, without producing any effect upon its general state." 4

The first building was erected for the "Literary Institution" in 1807. The number of children, mostly from


patrician families, increased to eighty. It was during this year that Fellenberg projected an institution for indigent children. The principles upon which this school was founded employed agriculture as the means of moral education for the poor and made their labors the means of defraying the expense of their education. This school grew rapidly and attracted the attention of educators and statesmen in Switzerland and all parts of Europe. It was during this period that Fellenberg began his school of "Theoretical and Practical Agriculture," for all classes of pupils, and his "Normal School," for teachers able to apply the methods used at Hofwyl.

Manual Labor Movement

Like most educational movements during the early part of the nineteenth century, the chief inspiration in establishing the manual labor movement originated with the Fellenberg schools at Hofwyl. The great interest in the idea of combining manual labor with studies in seminaries and colleges grew throughout most countries. Among those in America following this movement were the Gardiner Lyceum Manual Labor School of Maine, which was founded in 1823, the Fellenberg School, Windsor, Connecticut, and New Harmony, Indiana, in 1823; the Maine Wesleyan Seminary, in 1825; the

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5 Ibid., p. 592.
mechanical association at Andover Theological Seminary of Massachusetts, in 1826; and the Yates Polytechnic of New York before 1850.

Two of the most successful schools in the manual labor movement were the Maine Wesleyan Seminary and the Andover Theological Seminary. The Wesleyan Seminary was a preparatory school of the Fellenberg type. The plan to unite manual labor and studies so that indigent young men and others who felt the need might pay for their board and tuition with the labor of their hands was accomplished.\(^6\)

The success of the experiment at Andover is noted from the following excerpt from the Quarterly Register and Journal of the American Educational Society:

> The mode of exercise which they have adopted is exciting attention widely throughout this country. Their establishment has in fact, become a model for other similar institutions, and their example is cited in proof both of the practicability and utility of the system.\(^7\)

The movement, which suddenly assumed large proportions about 1830, just as suddenly ceased to exist ten or fifteen years later. Chief among its many causes of failure were the following: first, there was no insistent social demand for manual labor instruction; second, the notions of the

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\(^7\)Ibid., p. 64.
values of manual labor in relation to literary instruction were in error; and third, the labor performed by students could not be made a financial success.8

Mechanics' Institute Movement

Another movement begun about this time was the Mechanics' Institute movement which began in England in the early part of the nineteenth century as a result of lectures given by George Birkbeck.9 It was a definite movement among the common people to obtain more knowledge. It manifested itself especially among the group of intelligent workers whom the industrial revolution had trained.10

There had been efforts to promote adult education previous to this time. The Sunday Schools were the first to offer adult education. In 1798 the first of these on an undenominational basis was opened in Nottingham. It was during this time that there developed in England a marked interest in physical science due to new discoveries, inventions, and their applications in agriculture and industry. Local literary and philosophical societies were formed for mutual education. The professional and commercial classes

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9Fabial Ware, Educational Foundations of Trade and Industry, p. 16.

were usually attracted to their societies, but following closely behind these were classes especially for mechanics.\textsuperscript{11}

In 1823, as a direct result of the classes established by Birkbeck at the Andersonian Institute, there was established an independent institution, the Glasgow Mechanics' Institution, directly under the management of the mechanics themselves.

The instruction the first year consisted of 'two complete courses of lectures on chemistry and on mechanical philosophy.' The courses of the second year included chemistry, mechanics, geometry, arithmetic, farriery, and architecture. A class in mechanical and architectural drawing proved to be 'highly successful.'\textsuperscript{12}

The mechanics' institutes continued to spread during the next twenty years until, in 1841, there were 216 in Great Britain. Grave difficulties began then to appear. The first of these was in finding competent lecturers. The second difficulty, and far more important, was that the members of the institutions lacked the essential elementary education necessary to understand the lectures. A third difficulty was that in most cases the membership was chiefly from the commercial workers instead of the mechanics. The fourth difficulty was of a financial nature. Manufacturers supporting the institutions often insisted that the curriculum of

\textsuperscript{11}Charles A. Bennett, \textit{History of Manual and Industrial Education Up to 1870}, p. 301.

\textsuperscript{12}\textit{Ibid.}, pp. 303-304.
these institutions be kept wholly utilitarian or technical in character. Obligations to pay large sums for interest on mortgages as a result of unwise financing of too fine buildings were all too common.\textsuperscript{13}

Although, as a result of these difficulties, many of these institutions died out, they must not be considered failures, for they showed the positive need of a nation for a comprehensive scheme of elementary education that would be available to every child. Moreover, colleges and schools of technical instruction developed from these institutions. As an example, the Manchester Mechanics' Institute developed into the great Manchester Technical College, and the London Mechanic's Institute became Birkbeck College of London University.\textsuperscript{14}

Mechanic's Institute Movement in America

While this was taking place in England, a corresponding movement was developing in the United States. Fundamentally, the movements were the same, but the conditions in America were more fluid because the country was new and the people were scattered over a larger territory. Consequently, the movement here was less fixed and the institutions were more varied in character.\textsuperscript{15}

\textsuperscript{13}Ibid., pp. 306-308.  \textsuperscript{14}Ibid., p. 308.  \textsuperscript{15}Ibid., p. 316.
The first important institution in America was founded by the General Society of Mechanics and Tradesmen of the City of New York. In 1820 this society opened a library for apprentices and later established a mechanics' school. This school for the children of mechanics was established because the Public School Society could not meet all the needs. This school existed until 1858, when the city adopted the public school system. The night school, which proved even more successful, was established when the day school was discontinued.16

The Franklin Institute of Philadelphia, the second and most famous institute in America, was incorporated in 1824. The original intent of its founders is indicated in the following resolutions passed at its first meeting:

Resolved, That it is expedient to form a Society for the promotion of the useful arts in Philadelphia, by extending a knowledge of Mechanical Science to its members and others at a cheap rate.

Resolved, That the best mode of attaining this object will be by the establishment of Popular Lectures, by the formation of a cabinet of Models and Minerals, and of a Library, and by offering premiums on all useful improvements in the Mechanic Arts.

Resolved, That the Society shall consist of Mechanics, Manufacturers and others friendly to the useful arts.17

The greatest difficulty encountered in developing a mechanics' institution in Philadelphia, as in London, was the

16 Ibid., p. 318.

17 Centenary of the Franklin Institute. A pamphlet published by the Institute in 1924, p. 8. (As cited by Bennett, History of Manual and Industrial Education up to 1870, p. 319)
lack of fundamental education of the students. To overcome this, a high school was established, the course of study consisting of four important classes of study; English branches, classical studies, modern languages and mathematics and practical sciences.\textsuperscript{18} From this it is seen that the Institute sought to broaden secondary education. The school, which continued until 1832, prepared the way for the Central High School which was established in 1838 by demonstrating the need for such a school.\textsuperscript{19}

\textbf{Manual Training}

The Mechanics' Institute Movement in America, by 1870, had done an important work in providing considerable instruction in secondary and technical education subjects.\textsuperscript{20} However, it was in Russia that the first use was made of scientific principles in analyzing the mechanics arts and courses of instruction were made based on these analyses.\textsuperscript{21}

Russia had copied and amended the system of handwork in the schools of Finland, which was an extension of the educational theories of Pestalozzi and Froebel. However, she did not put it into effect in the primary schools but in

\begin{itemize}
\item[\textsuperscript{18}] Journal of the Franklin Institute, Philadelphia, VI, (1828), pp. 111-113. (As cited by Bennett, History of Manual and Industrial Education up to 1870, p. 319.)
\item[\textsuperscript{19}] The Franklin Institute, Yearbook, (1923), p. 27. (As cited by Bennett, History of Manual and Industrial Education up to 1870, p. 322.)
\item[\textsuperscript{20}] Charles A. Bennett, History of Manual and Industrial Education 1870-1917, p. 310.
\item[\textsuperscript{21}] Ibid., p. 45.
\end{itemize}
the Technical Institutes which admitted only boys of
eighteen years and over. 22

The plan in brief was that of analyzing work-
shop operations into their elementary processes,
of arranging these in a graduated series, and making
them the object of systematic drill by the student.
The product of the student's work had no utilitarian
value. These manipulative exercises were to serve
the same purpose to the manual arts student that
finger exercises did to the pianist. 23

It was at the Centennial Exposition at Philadelphia, in
1876, that John D. Runkel, president of the Massachusetts
Institute of Technology, saw the exhibit sponsored by the
Imperial Technical School of Moscow. He became an enthusiastic
propagandist of this new movement and it was through his
efforts that tool instruction was established in his institute. 24

In 1877, Calvin M. Woodward, dean of the Polytechnic
School, Washington University, as a result of his study of the
Russian system of tool instruction, issued an official state-
ment to the University officials. In this statement he said:

The process of instruction must precede that of
construction; that is, the student must learn the use
of tools before he is required to construct anything.
Here is the point where the best manual training
schools differ radically from the ordinary system of
apprenticeship. In the latter, the learner acquires
the 'arts' involved in a piece of work incidentally,
and generally without a conscious analysis; in the

22 Paul Douglas, American Apprenticeship and Industrial
Education, p. 176.

23 W. T. Bawden, Industrial Arts in Modern Education,
pp. 84-85.

former, the 'arts' are made the direct object of
his study and attention; their subsequent combination
(which may or may not follow in his school experience)
is a very simple matter.25

Calvin Woodward defined manual training as;

neither a technical school nor an industrial school.
It is far too elementary to deserve the name technical
or polytechnic. It forms a fine foundation on
which to build up a technical training, if the pupil
possesses the requisite natural abilities and apti-
tudes. On the other hand it is too wide and too
free for the term industrial. In a manual training
school the aim is not the narrow one of 'learning a
trade.' Neither is dexterity sought in special
operations which may be only a small part of even
a trade.26

It was through the influence of Calvin Woodward, in
1879, that money was raised for ground, buildings and
equipment for the St. Louis Manual Training School. It
was opened in the fall of 1880 as a preparatory school
for Washington University. Courses of exercises were
worked out in joinery, forging, pattern-making, and draft-
ing. Special shops were provided for the different lines
of work.27 These courses consisted of a carefully graded
series of exercises, or models based upon detailed analyses
of tool processes. Emphasis was placed upon accuracy and

25Manual Education of the Polytechnic School of Washington
University. (As cited by Bennett, Manual and Industrial
Education 1870-1917, p. 337 from a pamphlet loaned by Dr.
Woodward, 1877.)


27Samuel J. Vaughn, Content and Methods of the Industrial
Arts, p. 28.
correctness of procedure. Woodward stressed the general education of values as contrasted with the specific work of occupational training.28

The first manual training high school to be supported as part of a public school system was opened in 1884 in Baltimore, Maryland. Within ten years of the first appearance of manual training in the public schools, it was introduced into more than fifty cities in the United States. By 1900 this number had more than doubled.29

Educational Sloyd

Following closely upon the introduction of the Russian system into American schools, came the influence of Swedish Sloyd. Little attention had been given this movement until Otto Salomon made a study of the system and developed what he called educational sloyd.

By educational sloyd is meant the application of sloyd to educational purposes. Sloyd is not to be confused with the work of the artisan—a mistake which may easily happen if the distinction is not sufficiently strongly emphasized. Speaking generally, the sloydor does not practice his art as a trade, but merely as a change from some other employment; and in the nature of the articles produced, in the tools used in their production, in the manner of executing the work, etc., sloyd and the work of the artisan differ very decidedly the one from the other. Sloyd is much better adapted to be a means of education, because purely economical

29Ibid.
considerations do not come forward so prominently as must be the case with work undertaken as a means of livelihood. 30

The method of sloyd teaching is based upon the arrangement of exercises. "Method in sloyd only becomes educationally sound when the pupil, by constructing objects which can be used in everyday life, acquires dexterity in performing the exercises as they occur." 31 This system was supposed to teach self-reliance and initiative. There was a definite sequence of projects which the students were to make. The mind of the child was somewhat restricted to the sole thought of being able to copy something to exacting tolerances. 32

This movement, through the influence of Gustaf Larsson, who came from Sweden in 1886 to introduce sloyd into Boston schools, became the second stage of manual training. This movement gained recognition and grew along with the Russian system. The products of manual training work were of no practical use, while the sloyd system produced practical projects, and when the two systems were brought together manual training was made much stronger and provided more interest to both the pupil and the public. It was not until the closing of the nineteenth century that emphasis in manual


31 Ibid., p. 11.

32 Bernard T. Rappart, Swedish Sloyd, p. 357.
training shifted from the purely mechanical aspects to considerations of beauty and artistic expression in the objects made. 33

This shifting was due to the influence of Ruskin and Morris, who were impressed with the ugliness and unhappiness if the industrial situation of the time when the introduction of modern machinery and methods of production had driven the craftsman and his wares from the markets; and when the machines not only gained control of industry but also became the masters of the operatives themselves. 34

These two men advocated that beauty should be brought back to the common things of life, that manufacture should be so reorganized as to encourage artists and artisans to achieve service, joy, and beauty in a common product. Unfortunately, their ideals were misinterpreted and there was a veritable riot of amateurish efforts in the various handicrafts. The machine was proclaimed the basest of all devilish inventions, and anything 'handmade' was looked upon as the acme of correctness and refinement, while tool marks, inaccuracy, and general crudeness were evidence of genuineness and superiority. 35

In spite of this, a few wholesome effects were produced. It made the manual training teachers conscious of the fact "that there are such things as good taste, artistic ideals, beauty in simplicity, originality in design, and honest construction." 36

Attempts to industrialize and vocationalize shop work had begun somewhat earlier than 1900. There was a new conviction

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33 Vaughn, op. cit., pp. 31-35. 34 Ibid., p. 35.
that shop work should bear a more intimate and definite relation to the industrial world, that it should provide a fund of information and experience relating to materials, processes, methods of manufacture, opportunities for employment and success in certain fundamental industries. It was thus that the term Industrial Arts supplanted Manual Training.37

37 Ibid., p. 37.
CHAPTER V

INDUSTRIAL EDUCATION SINCE 1900

The industrial education is comprised of two major parts—industrial arts and vocational-industrial education. Since both areas deal with the materials and processes of industry, they together bear the name industrial education. However, they do differ in the purpose, and to some degree, in method. Industrial arts is intended to contribute to the general, all-round development of individuals, whereas the vocational-industrial education is a phase of specific vocational education designed to train prospective and employed workers for proficiency in industrial vocations. They deal with distinctly different groups of pupils or with the same pupils at different stages of learning.¹

The philosophy of industrial arts has always been the welfare of the common man; ... and has been included in writing from the beginning of written history, and even has existed from the time when prehistoric man left the forest to make his first timid foray through the grasses of the plains. From that time on, one of the most important purposes in the educational life of man has been 'how to earn a living.'²

¹F. Theodore Struck, Foundations of Industrial Education, pp. 36-38.
²R. A. Hardin, Our Evolving Philosophy of Industrial Arts, p. 179.

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Industrial arts education is a phase of general education, designed to develop certain habits, attitudes, and abilities desirable for all citizens of an industrial civilization regardless of their vocations. It helps to make persons intelligent consumers by giving them a limited contact with, and some information about, tools, processes, materials, design and life problems, but it does not aim directly to impart vocational proficiency.\(^3\)

A school shop must have three essentials—skill, knowledge, and attitude if it is to function properly. From reverence for skill grows the desire to be skillful. As a skill develops, knowledge also develops, "for skill—after all—is wisdom in action."\(^4\)

Skill is a relative term and one does not expect to develop it to a high degree in industrial arts work; however, skill should be developed enough to give some confidence in the use of tools.

The student should realize that the unaided hand is wholly incapable of doing the work of the world, and that he increases his power with the increase in his ability to use tools and machines. To know how to do a thing is the first step in the development of skill; to be able to do it efficiently is skill.\(^5\)

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\(^3\) Stuck, op. cit., pp. 36-38.

\(^4\) James McKenny, "Outsider Looks In," Industrial Arts and Vocational Education, XL (February, 1952), 38.

\(^5\) R. W. Selvidge and Verne C. Fryklund, Principles of Trade and Industrial Teaching, p. 47.
In helping to develop these skills, the teacher should realize that his major purpose should be to teach so that his pupils will form the habit of achieving whatever they set out to accomplish. In doing this, they will come increasingly to maintain high standards of achievement.6

The very heart of Industrial Arts lies in the opportunity for the boy himself to participate in the activities of doing, making, and manipulating tools and materials. The importance of maintaining a certain necessary relationship with the world of things as they are outside the school must be stressed.7

Development of Industrial Arts in Texas

Texas, after giving it much study, decided to introduce manual training, or industrial arts, as it was soon called, as a part of the high school course of study. N. S. Hunsden, who had received his early training at New Harmony, was brought from Woodward's manual training school in St. Louis to Austin as the first manual training teacher in Texas. His course of study was in line with that prescribed for the St. Louis school. Work began in September, 1896 with eighteen pupils.

During the first six years manual training was taught in Austin, the work continued steadily to win public approval.


The enrollment increased from eighteen to eighty students. It was soon realized that this helped to keep many boys in school who would otherwise have dropped out. Having made such a favorable impression on the public, industrial arts were promoted by means of addresses, committees, resolutions, and legislative appropriations. At the suggestion of Judge V. V. Grubbs, editor of the Greenville Headlight, C. M. Woodward came from Washington University to address the Texas legislature in favor of manual training. A committee of senators was appointed in 1899, which formulated plans for the promotion of industrial education. Thus the foundation for industrial arts was laid in Texas.

By the year of 1904 there were ten public schools offering manual training. In 1909, when the state legislature passed a bill authorizing the state board of education to allow the teaching of manual training in state normal schools, the number of schools offering manual training was twenty-three. The passage of this bill brought about a general broadening in the field of manual arts and by 1915, there were ninety-five schools throughout the state of Texas offering this subject. This figure dropped to sixty-seven in 1921, the Smith-Hughes Act having been passed by Congress in 1917; however, it gradually rose

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to ninety-eight schools in 1927. The Rural Aid Bill, 1925, helped to carry industrial arts into the rural schools of Texas.

The number of students enrolled in manual training classes increased from 3560 in 1915 to 4437 in 1917. In 1921 there was a drop to 3819, but by 1923, the figure was 5092, and in 1927, the figure had increased to 7257 students.9 The number of students enrolled in all industrial arts classes fluctuated somewhat until the 1939-1940 period, when the enrollment jumped to 12,726. This figure steadily increased until, in 1949, there were 23,741 students enrolled in industrial arts classes throughout Texas.10

No attempt has been made to use statistics to give absolute proof, but to show development in a general way. One would likely find the same results in any other state of the union.

Vocational-Industrial Education

Vocational industrial education is concerned with the training of youths and adults who have definitely chosen an industrial occupation as their means of making a livelihood in some specialized field of industry. Its aim is strictly that of vocational training.

9Ibid., pp. 133-144.

After centuries of apprenticeships and the rise of
the factory system, there was a great need for some type
of training for the trades and industrial worker. Through
all the ages, however, there has been but one way for the
unskilled worker to learn to do his tasks, namely, the
"pick-up" method. It is only in recent years that any
serious attention has been given to the matter of training
the common or unskilled laborer for his work.11

There was very little difference in vocational educa-
tion in the United States from that of Europe between the
middle ages and the early period of American history.

The aims of the early vocational school had
been to eliminate the necessity of apprenticeship.
The founders of these vocational schools found them-
theselves confronted with several problems. Chief of
these was the fact that attempts to duplicate factory
conditions and equipment were expensive.12

The greatest need for vocational industrial training
was felt following the Civil War, which was during the
remarkable industrial expansion. The war caused concern
over the shortage of skilled mechanics and the lack of
adequate means for training industrial workers. The con-
troversies between organized labor and employers over
apprentice training previous to the war had almost destroyed


12 Erhard Wendt, "Brief History of Industrial Arts and Vocational Education," Industrial Arts and Vocational Educa-
tion, XXXV (April-June, 1948), 205.
organized apprenticeship. One means of solving the problem was trade education which gave a continual growth to industry. Trade departments were established among the more significant types of schools. These schools differed greatly in character; some merely supplemented the daily occupational work of apprentices, others attempted to train completely for journeymanship. Classes were both for full-time day pupils and for evening students who were engaged in trade work during the day.

During the time of the manual training movement, efforts were continued to increase the opportunities of specific trade training and in 1917 efforts finally culminated in the passing by Congress of the Smith-Hughes Act, which provided for federal aid for vocational education of less than college grade, and which almost caused the death of industrial arts. Gradually the fact was realized that the training of skilled mechanics was not the only, nor, even the largest problem of industrial education. The rapid development of machinery and the continuous advancement in specialization of processes made the training of semi-skilled workers increasingly important. As a result of this condition, there arose a demand for public part-time schools and for

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13 Mays, op. cit., pp. 4-48.
vestibule schools in the industrial plants. A more general training—foreman training—also became important as a means of insuring training "on the job" for machine operators and other semi-skilled workers.14

Other types of laws have been passed since that time, but all have the same general purpose.15

The Smith-Hughes Act was

to provide for the promotion of vocational education, to provide for cooperation with the States in the promotion of such education as agriculture and the trades and industries, to provide for cooperation with the States in the preparation of teachers of vocational subjects; and to appropriate money and regulate its expenditure.16

Every nation which moves toward an economy of abundance finds it necessary to step up provisions for education of all types. No nation has made much progress without doing so. Education—occupational, economic, and general—is a major factor in mankind's fight to triumph over his wants.17

Aims of Industrial Arts

It is only in recent years that educational leaders have insisted on a definite statement of aims or purposes.

14Mays, op. cit., pp. 151-158.


17John K. Norton, Two Routes to Freedom from Want, p. 30.
Industrial arts, along with the other subjects, is experiencing considerable difficulty in abandoning the customary, attractively worded claims for definite, specific aims which fall clearly within the bounds of a reasonable expectation of realization. Whatever the character of the lists of objectives, it is clear that the aims, while having to do with industrial facts, materials, processes and problems, are still not specifically vocational but are of the nature of those of general education. Industrial arts is not designed definitely to train mechanics for the trades but, in so far as it is possible to do so through industrial courses, to produce the insights, skills, habits, and attitudes which should characterize all men living and working in a modern industrial environment.\(^\text{18}\)

The war has modified our society with increasing and heightened results. The full effects have not yet been reached. Important changes are still to come.

Our new outlook will cause fundamental and far-reaching changes in every aspect of education. We must not ride in an automobile and think in a horse and buggy; we must not live in the past and prepare our pupils for times of Silas Marner. Unless educators see the implication of modern times and adjust education to them, future generations will deem us stupid and inept as we ourselves now properly judge many of our predecessors to have been. There is certain to be an educational lag, but we must reduce it as much as possible. It is our duty to study the social changes round about us, carefully to estimate trends, and then to derive educational implications.\(^\text{19}\)

The features which we must include in our educational program are:

\(^{18}\) Mays, \textit{op. cit.}, p. 201.

\(^{19}\) William F. Russell, "Frontier Within," \textit{Journal Adult Education}, III (June, 1931), 284.
intelligent guidance based on factual information and broad understanding, effective occupational and professional education, including adequate provision for work experience, adequate placement facilities, provision for follow-up, additional training and retraining for more effective economic education, and general citizenship education appropriate to a culture such as we have and hope to develop.20

Industrial education must keep up with our modern industry, which is constantly changing. Even when we keep constantly alert, we will most likely find ourselves lagging behind. If those in industrial education, and especially those in vocational education, think only in terms of present conditions, students learning at the industrial schools and classes will, at best, find themselves prepared for occupations that have already changed. Changes are so swift and so frequent that in trying to keep up with them it leaves us constantly changing. The trends toward breaking up the highly skilled occupation into a group of specialized occupations began growing rapidly since the beginning of World War II, and it is still growing. These changes are of extreme importance because of their implications for content and methods of preparation of instruction.

Much care should be taken in aiding the youth to choose his occupation before beginning preparation for it and checking

20 Norton, op. cit., p. 31.
from time to time in order to make certain the choice is best suited for him.21

Much attention has been given in the past few years to the training of all-round skilled workers as it is usually done in peacetime.

The problem of training people for the simplest occupation is a definite part of their general educational program, since it must be recognized that the employment and economic needs of many people will be adequately met in that way. Single elements of operation and occupations will in all probability lead us to recognize that training is a factor in every type of occupational activity, no matter how simple or how unskilled it may appear to be at the moment.22

It is found that schools can knock off the rough edges of workers and orient them through general shop work experience. For example, it is not economical for a company to pay wages for one to assimilate the large number of new terms, names of tools and how to use tools, when schools can accomplish the same results. Regardless of school training, the employer with whom he finds himself, will of necessity have to train him in his own particular method of production, no matter how good the school has trained the youth in the school training program.23


23 M. J. Ruley, Shortage of Skilled Workers Demands Thousands of Youths to Be Trained, p. 193.
Today apprentices, instead of food, some clothing and a few uncertain shillings, receive wages, increasing every six months, ranging from nearly $40 a week to nearly $60 a week. Instead of working 60 hours or more a week, only 40. Instead of slaving for a master in a menial capacity, he was employed by a large company as a member of a production force, and trained step-by-step on a job, as well as in the classroom. Instead of 'eight years' to learn a craft, only four. Instead of living in the house of a master, he lived in a home of his own as an independent, self-respecting citizen. Instead of a master as sole boss, workers themselves have a voice in training procedure through a joint management-labor apprenticeship committee.24

One of the more modern apprenticeship laws was passed in Wisconsin in 1911. The law required that all apprentices were to attend school five hours per week. There was an amendment in 1915, which placed apprentices under the jurisdiction of the State Industrial Commission. The states were given the responsibility of keeping up the requirement and the adjustment of the differences between employer and apprentice. The Federal Commission for Apprenticeship Training was established in 1934. This commission was to function under the Secretary of Labor. In 1937, the Fitzgerald Act authorized the Secretary of Labor to formulate and promote the furtherance of labor standards necessary to safeguard the welfare of apprentices. A second provision of the act requested that the Secretary of Labor take necessary steps to bring together employers and labor to formulate an apprenticeship training program.25


25 Wandt, op. cit., p. 246.
Industrial education in its ultimate consummation is concerned as necessarily based upon and growing out of a well organized varied program of industrial arts, functioning as an integral part of the great whole of general education.26

Whether the experiences in the general education industrial arts shop have vocational value or not depends as much upon the subsequent career of the boy as upon the nature of the instruction; and for other reasons, we may as well abandon the search for a sharp dividing line between general education and vocational education and endeavor to adjust our thinking and our practice to a philosophy which conceives education as an integrated whole.27

While no one believes that the answer to the whole system of our education has been found, it would seem that the industrial arts may be an answer to the question, or at least some of the questions. Only time and experiments will prove or disprove the philosophy of some of our greatest educators.

Charles Bennett reminds us that we should remember our inheritance. We should consider where we are going and what kinds of segregations we can afford to be a party to,

remembering that the opposition to Bacon's theory is still alive and sometimes too active even though we do dream of an educational millennium when the perfect balance of forces will give us the true democracy in education.28

27 Ibid., p. 49-50.
28 Charles A. Bennett, "Remember Our Inheritance," Industrial Education Magazine, p. 87.
Teachers of industrial arts must do more than dream. The future of our whole industrial society may depend upon their efforts to further the aims of industrial education.
CHAPTER VI

SUMMARY

It is a matter of history that the old apprenticeship system under the control of the gilds collapsed as the result of new inventions and the beginning of the factory system. This system developed as improvements were made in transportation, navigation, ease of getting raw materials from both beyond the seas and inland distribution, the invention of machinery utilizing fuel rather than water power.

As the number of factories increased, home manufacturing dwindled until many people were forced into poverty. In an effort to provide sustenance for these individuals, the Poor Law was utilized. This congestion of unemployed and their children constituted the ranks of poor law apprentices.

As steam power became more generally used, the factories which had been located back in the wilderness where water power was to be found, began moving into coalfield areas and large areas of population where child labor could be had without an apprenticeship agreement. It was then that the deplorable condition of these children became apparent to the eyes of the public.
Robert Owen, who later organized the school in New Harmony, began an agitation which resulted in the passage of an act limiting the number of hours children could work in cotton factories and raising the age limit to nine years. However, no provision was made until the Factory Act of 1833 established the principle that labor and education should be combined.

Under the leadership of such educators as Pestalozzi and Fellenberg, institutions were established in which the student did "part-time" work to aid in his support and the maintenance of that institution. Fellenberg, using the principles of Pestalozzi, established his schools at Hofwyl, which became the chief inspiration of the manual labor movement. This means of education failed to supply the needs of students as too much of the student's time was required in trying to support himself and too little time remained for learning. As the financial support of these institutions depended almost entirely upon earnings of and tuition fees paid by students, this movement was doomed to failure.

Mechanics' Institutes were established to try to satisfy the craving for knowledge of workers who had been trained under the former gild system. The lecturers in these schools tended to import knowledge beyond the comprehension of students. As before, these institutions lacking provisions for elementary education, were gradually replaced.
These institutes, however, developed into such schools and colleges of technical instruction as Manchester Technical College and Birkbeck College of London University and prepared the way for the Central High School, established in 1838, by demonstrating the need for such a school.

While some educators were trying to place the Mechanics' Institute movement into the schools, others were looking for ways of improving or replacing it. John D. Runkel, president of the Massachusetts Institute of Technology, saw an exhibit from Russia on tool instruction at the centennial exposition at Philadelphia. Believing it to be a solution, he became an enthusiastic supporter of the new movement. Calvin Woodward became interested in this movement, and organized a school in St. Louis which he called the Manual Training School. This school like that of the Russian system consisted of a carefully graded series of exercises or models based upon detailed analyses of tool processes. This movement was accepted in some private schools and was placed in the public school system in 1884. Within ten years it was introduced into more than fifty cities.

The Swedish Sloyd system was another movement which followed closely after the introduction of the Russian system. This movement grew along with the manual training
movement. The Sloyd movement was an improvement over manual training in that the constructing of objects were of some practical use, while the graded series of exercises in manual training heretofore used were of no practical use. When these two systems were brought together, the training was made much stronger and provided more interest to the pupil as well as the public. After the emphasis in manual training shifted from purely mechanical aspects to considerations of beauty and artistic expression in the objects made, the system was much better.

As the philosophy of education broadened, these fixed exercises became more the means to an end, rather than the ends in themselves. The purpose of using handicrafts in schools has evolved from the original one of immediate financial support, to the phase of using them as a means of training for a vocational skill. Now handicrafts are used in making the child a more useful member of our democratic society.

The industrial revolution, by causing the breakdown of domestic apprenticeship, in itself, started the development of what is known today as industrial arts. Through scientific development and the creation of a whole new era of social and economic standards, a new phase of education developed—that of industrial arts.
BIBLIOGRAPHY

Books


Eby, Frederick and Arrowood, Charles Flinn, The History and Philosophy of Education, Ancient and Medieval, New York, Prentice-Hall, 1940.


Ham, Charles, Mind and Hand, New York, American Book Company, 1900.

Henderson, Ernest T., Historical Documents of Middle Ages, London, G. Bell and Sons Ltd, 1916.
Holy Bible, Authorized King James Version, New York, Thomas Nelson and Sons.


Knight, Edgar Wallace, Twenty Centuries of Education, Boston, Ginn and Company, 1940.


Montalembert, The Count De, Monks of the West, New York, P. J. Kenedy and Son, 1880.


Periodicals


Codman, H. W., "Future of Industrialism," Overland, XV, (June, 1890), 577-591.


Cribbs, R. B., "Fundamental Objectives of Industrial Training," Industrial Arts and Vocational Education, XXXV, (June, 1946), 251-252.


"In Defense of Revolution," Nation, CXV, (1922), 290.


Leatherland, C. E., "Could Revolutions Win?" Nineteenth Century, XC, (1921), 902-907.


O'Neal, J., "Footnote to History," Freeman, VIII, (1923), 58-60.


Ruley, M. J., "Shortage of Skilled Worker Demands Thousand of Youths to Be Trained," Industrial Arts and Vocational Education, XXXIII, (May, 1944), 190.


Scott, J. T., "The Decline of the English Apprenticeship System," The Elementary School Teacher, XLII, (December, 1912), 446.


Public Documents


Unpublished Materials

Blackburn, Samuel A., "The Development of Vocational Education in Texas" (Unpublished Ph. D. dissertation, Department of Industrial Arts, University of Texas, 1930), p. 15.


