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Purpose of the Report: This report has been developed by the writer in order to facilitate a better organization and to present this as a guide for others to follow in organizing the personnel in a woodworking shop so as to reduce the many administrative duties and reports that does not allow the instructor sufficient time to teach successfully.

Conclusions: This organizational plan contributes directly to increased educational values in Industrial Arts subjects. This type of plan develops cooperation in working together for the common good of all and it familiarizes the student with the type of organization that is commonly used in industrial plant management. The student learns to respect authority and to understand the problems that the employer and employee face in real life situations. It should eliminate most disciplinary problems, waste of time, waste of materials, loss of tools, and help to develop in the student, a habit of order, system, neatness, and responsibility. This report contains a list of detailed duties of each officer, Superintendent, Assistant Superintendent, Tool Cabinet Foreman, Safety Engineer, Material Foreman, Finishing Room Foreman, in the organization with an explanation as to how each fits into the plan. It tends to be democratic in function and principle as well as developing leadership and furnishing good character training. Furthermore, it provides opportunities for developing the meaning of individual and group effort; it provides opportunity for directing, supervision, and aiding in the activities of others, and tends to make the student ambitious, dependable, honest and obedient in the eyes of his fellow-associates.

ADVISER'S APPROVAL: K. Hill

A FORM OF PERSONNEL ORGANIZATION

IN A WOODWORKING SHOP

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By

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CHAPTER I

INTRODUCTION

Organization in the management of a school shop has long presented a problem to the industrial arts instructor. Here are several necessary and desirable attributes of a successful personnel organization in the high school woodworking shop:

1. It must be democratic in function and principle.
2. It must be of educational value to the student to justify its existence.
3. It must relieve the instructor of the many managerial duties which do not allow him to teach.
4. It must evolve out of and meet the needs of a specific situation.
5. It must be tried out and altered until it functions efficiently in the given situation.

It is the aim of the writer to present a form of personnel organization in a high school woodworking shop that will justify and fulfill the above mentioned requirements. The industrial arts teacher should have some knowledge of the history of his particular field of study, therefore the author intends to start this report with a history of industrial arts and then present a form of personnel organization.

Origin and Need for the Study. The purpose of this report was established after considering that an industrial arts instructor has so many administrative duties and reports to make out that he does not have suffcient time to teach successfully. This study has been developed by the

writer in order to facilitate better organization in a school shop and also to present this as a guide for others to follow.

Method of Research. Research was confined to the Oklahoma State University Library where an expanse of material for this report was available from books, magazines and periodicals.

Extent of the Study. It is the purpose of this report to follow the problem, about which it is concerned, throughout the historical beginning of industrial arts to a logical conclusion using those principles deemed best in the development of the personnel organization.

Selected Definitions. The following definitions should be studied to make the reading more meaningful to the reader.

> Industrial Arts. Industrial arts is one of the practical arts; it is a form of non-vocational education which has for its purpose the giving of information about, and experience in, the use of most tools, materials, and processes incident generally to the home and to the manufactoring industry. (9, page 7)

> Practical Arts. The term as used in education is the broad inclusive term that embraces as subject of instruction; manual training, industrial arts, mechanical arts, household arts, domestic science, general agriculture, and general commercial education. (16, page 36)

> Industrial Education. A generic term including all educational activities concerned with modern industry, its raw material, products, machines, personnel and problems. It therefore includes both industrial arts, the general education forerunner of or introduction to vocational industrial education and the latter also. (8, page 7)

> General Shop. Shops that are planned and equipped to teach two or more distinct types of shopwork at the same time under one teacher are General Shops. (12, page 15)

Results of this Study. It is hoped that the results of this study will eliminate most disciplinary problems, waste of time, waste of materials, loss of tools, and help to develop in the student, a habit of order, system, neatness, and responsibility.

A preliminary study of the history of industrial arts education and

its development in general education will be brought out in the next chapter. This will help the reader to better understand the complexness of organizing the personnel in a shop.

CHAPTER II

HISTORY OF INDUSTRIAL ARTS

The history of industrial arts began when human life first appeared on earth and has developed and advanced forward from that time till the present. This chapter is divided into periods of education that are directly related with industrial arts, the leaders, their views, results of experiments, and other events that influenced the program.

Part A

Early History of Education

The education of the primitive savage consisted of providing the necessities of life. He learned handwork as a means of providing clothing and shelter for protection from the cold and food to satisfy his hunger. The savage therefore learned to obtain the necessities of life by means of Unconscious Imitation.

Barbaric Life. The Barbaric type of life developed from savagery when the people began to learn how to control fire. With fire they could cook food for better flavors and digestion. Metals with low melting points could be moulded and cast into shapes for weapons and tools. Many crafts were developed and divisions in the tribes were brought about. Some became hunters, some were guards, then labor divisions came about. Here conscious imitation took place. Projects were copied over and over until improved. Pupils were organized into groups and hence, here is the beginning of the first type of personnel organization.

Ancient Jewish Education. Jewish education was a type of religion

and law. The student would go to school in the morning where he was taught by religious educators and then in the afternoon he was taught a craft by his father or a tradesman. This was considered a half time school. The belief was that if the son was not taught a trade he was prepared to be a robber.

Grecian Education. This type of education consisted of a practical training which prepared for immediate duties of life. The craftsmen occupied a place of respect during the Homeric age, but in later times only the slaves or hired labor were the craftsmen. This type of labor was considered degrading and contemptable.

About 300 B.C. drawing, which was composed of drawing outlines and diagrams, was added as a new subject of instruction for boys. In latter years training was received in council, wars and expeditions. Spartan education was obtained in a military camp and consisted wholly of training of warriors. In Athens, education was an imitation type but it prepared the boys for citizenship as well as military service. Athens is known as the first state in history to let all the human capacities develop freely.

Christian Monks. Labor was a requirement of everyone and the days were divided into two parts, a time for prayer and a time for work.

> ...With the teachings of the rabbis in the background and the example of Jesus, the carpenter of Nazareth, and his disciples in the foreground, it is not strange that the early Christian Monks, in their great enthusiasm, made a fetish of manual labor. (2, page 17)

Fasting could not interfer with their labor, they thought it better to eat like a workman of Christ. The monasteries were great schools of labor as well as great schools of charity.

Roman Education. Education of the Romans consisted mostly of the

teaching of laws and civil engineering. The courses contained physics and the use of leverages and pulleys. The physical labor was done by the non-citizens and slaves. The apprenticeship lasted from 3 to 7 years depending on the craft. Most of the simple machines were developed by the lazy apprentice as he devised means of making his work easier.

Part B

Apprenticeship

Apprenticeship was chiefly an educational institution for the middle-class youth of the Middle Ages. The youth, through apprenticeship received technical as well as non-technical training. He was being prepared for life while learning the scope of his craft. In some crafts, the apprenticeship was for a period of more than seven years. In some of the gilds, the craftsmen or masters were fined if they did not teach their students to read and write.

Statute of Artificers. In 1562 during the reign of Queen Elizabeth, a Statute of Artificers was established to codify the rules, regulations and conditions of servitude of the apprenticeship contract.

Poor Law of England. In 1601 the Poor Law was passed by the British Parliament to provide food, clothing and shelter for poor children under a responsible person or organization such as a church. They were given instruction in a trade but the law was mainly to provide the pauper children with the necessities of life.

Apprentices in Colonial America. In 1641 the General Court of the Colony of New Plymouth passed an act adapting the English Poor Law to the needs of the colony which would apprentice the children of the poor into families where they may be better brought up and provided for. In

1642 the Massachusetts Bay Colony passed a comprehensive apprenticeship law which was to train the children in labor and learning that would be profitable to the Commonwealth. They were to learn to read, understand the principles of religion and laws of the country.

In 1671 a New Plymouth Order required officials of every town to see that the children would learn as much as possible from their parents and craftsmen and further that the children would have a labor that was lawful and honest. This carried a fine of 10 shillings on negligent parents and craftsmen.

The General Court of Massachusetts in 1647 ordered that every town of fifty householders should appoint one within their number as a school teacher who should be paid by the parents and masters of all the inhabitants. Under this law many towns established free schools. (2, page 268-269)

Part C

Early Leaders of Trades and Industrial Arts

In Europe during the sixteenth century there were two types of thought upon which modern instruction in industrial arts has been built. The first, sense impressions are the bases of thought and consequently of knowledge, and the second is related to the idea of learning by doing. There are several men in this part of the report who led the way in these two thoughts.

Martin Luther (1483-1546). Martin Luther was a Protestant "reformationist" and in 1517 nailed his "95 Theses", in regard to the indulgencies of schools like prisons, to the church door. He contended that the church, state and home should work together for the students' education, also boys and girls should be educated in schools, possibly for

two hours then the rest of the day with their parents to learn a trade.

Rabelais (1483-1553). A French Monk who wrote two novels, Gargantua and Pantagruel which includes his ideas of reform. His idea of school subjects included sports, religion, music, geography and mathematics. He thought the student should be taught subjects which were pleasant and in an atmosphere of a kingdom, not a prison, where learning could be accomplished. Teaching should be approached through a medium of observation of objects and processes close at hand.

Richard Mulcaster (1531-1611). The beginning of a form of democratic education was thought of by Mulcaster. He introduced drawing into the curriculum with reading and writing first. He planned the 6 year elementary school in which rich and poor alike could learn; with sensory perception as the chief tool in learning.

John Comenius (1592-1670). Comenius was of Moravian origin, practiced in Germany, and was known as the "Father of Modern Pedagogy". He advocated an education for righteous living by teaching all truths about all things to all people. Comenius introduced four periods of education which were six years each. The first was known as the "Mother's Knee School" which was an early kindergarten then second came the more advanced or elementary school. Third was the "Latin School" which was for selected students who were to receive a liberal education. Fourth was his university type schooling. He was the author of Orbis Pictus, a Latin book using pictures and words in Latin as a method of teaching Latin.

Samuel Hartlib (1600-1670). Hartlib was born in Germany but practiced in England. He stressed a need for agriculture education and established an agriculture business college. He proposed an Office of

Address which now would be known as an Office of Education. He is known for starting progressive education in England.

Jean Jacques Rousseau (1712-1778). Rousseau wrote The Social Contact which was blamed for the French Revolution and Emile which caused an upheaval in education. He believed education should be both natural, to develop natural abilities, and spontaneous. He thought that experience was the best teacher. He advocated that a student should be placed in a workshop and be left alone to try and experiment on a project, and after failing, the instructor should take over and show the student what to do and how to make the project with less effort and time. He never got a chance to try his system but led and prepared the way for others who followed him. He advocated that manual arts was good for mental training.

Johann Heinrich Pestalozzi (1746-1827). Pestalozzi started his career as a clergyman but failed. He then took up law but quit for agriculture, but Pestalozzi did not prosper in his farming. He was determined that he would devote his life to try to lessen the misery and suffering and sin of the world through the education of the children of the poor. He took in twenty poor children and treated them as his own. They were always with him in the fields or in the house sharing the work. He did not spend much time on lessons of reading or writing but taught by constant conversation while working with their hands. After this form of schooling for five years, Pestalozzi was aware that economically he had failed but considered the principles on which he had based his undertaking a success. (2, page 112) He wrote two books, Evening Hour of a Hermit and Leonard and Gertrude which bore out his principles of human nature and education. From the early teachings and methods

of Pestalozzi he has become known as the "Father of Manual Training".

Friedrich Wilhelm Augustus Froebel (1783-1853). Froebel was a German educator, the son of a Lutheran minister and wrote the book, The Education of Man. He was the first person to open a kindergarten type of school. He took a stand and believed that handwork should be used as a subject of instruction. Pestalozzi introduced objective study in manual activities, but it was Froebel that gave them a creative purpose.

Part D

Practical Experimenters in Manual Instruction

Some practical experiments were carried on in manual instruction in the schools during the seventeenth and eighteenth century that are being used today. In this part, the leaders and their experiments are recognized as an important phase of the evergrowing field of industrial arts.

August Hermann Francke (1663-1727). Francke was educated at the Gotha Gymnasium and later was pastor of a church in Halle, Germany. He was in the habit of giving out weekly allowances of bread to the poor people in front of his home. One day he invited some of them into the house and asked them questions out of Luther's Catechism to find out what they knew about religion. Then he offered prayer and gave them their usual allowances. He was surprised to find out how little they knew about Christianity. He therefore formed the children of these poor people into classes to give them religious instruction. In order to help pay the expenses of instruction he hung out a poor-box, for contributions. One morning, on finding seven florins in the box, he decided to found a permanent school. Out of this school there developed a

great institution, including not only a school for poor children, but also a Latin school for the well-to-do, a seminary for training teachers, a publishing house especially to print inexpensive copies of the Bible, and several other departments. This institution became the educational center of the Pietist Movement in the Lutheran Church that spread all over Germany.

Francke's pioneer work in giving the industrial occupation a place among the activities of the classical secondary school was carried out in the Pedagogium Regium, a school established by him for the youth of the aristocratic class. Tool and shop work were prescribed not as part of the regular and required work of the school, but as an optional employment for hours of leisure. Its introduction, therefore, simply afforded the boys of this aristocratic school an opportunity to engage in a form of recreation and physical exercise which had already become quite popular among their elders. Students were permitted, outside of their regular study hours, to visit workshops and factories and to practice one or more of the handicrafts. A number of lathes were installed for the use of the students and a master workman was employed to give instruction and training in wood turning. Training was afforded also in the grinding and polishing of glasses, in engraving on copper, and in other handicrafts.

Francke's views as the aims of these industrial studies and occupations to serve not merely as a means of recreation and for purposes of bodily exercise but also "to lead the pupil to form correct ideas of all things pertaining to the common-wealth and to learn their names in German and in Latin". (1, page 35) Other ends proposed were those of habituating the pupil to employ his time in useful ways, of fitting him to make useful

discoveries and inventions, and of rendering him generally efficient.

Francke introduced industrial occupations into the general school curriculum. As early as the beginning of the eighteenth century some of the men who were working under Francke recognized the need for a new type of secondary school. They therefore organized a curriculum which included mathematics, mechanics, natural science and handicrafts.

Johann Julius Hecker (1707-1768). Hecker became a teacher in the Pedagogium, where his influence was felt in the development of the courses of study in the sciences. He was called in 1736 to the directorship of the Potsdam Orphanage, where his work attracted the attention of the King who appointed him pastor of the Church of the Trinity in Berlin. Here he became more and more interested in projects for the better adaption of school work to the needs of the people, especially those of the burgher class. He was convinced of the necessity of special schools for those who were to take up industrial occupations. He founded in 1747 the Economical Mathematical Realschule.

The aim of the school was to develop the tendencies of such young people as were not destined for studious pursuits but whose talents would fit them for business, for agriculture, for the industry and fine arts, etc., and to afford them an introductory training for these pursuits. Pupils were led with the approval of the parents to select what would be necessary for them in their future station in life.

Pupils were to be directed earnestly to "subjects useful and helpful to them in their future occupations". (1, page 37) Instruction was to be given in the principles of the manufactures and the handicrafts. Special attention was paid to directing pupils to the study of things, of realities, especially to the study of such things as would be indis-

pensable to them in their future manner of life. For instance, those who were to become goldsmiths, sculptors, or cabinetmakers gave more attention to drawing than to Greek. Those who were to enter the leather business received instruction not only in the different kinds of leather, in their value and use, in the processes involved in their manufacture, but were allowed to examine some eighty or ninety different kinds.

Hecker's Realschule, though it did not aim to make craftsmen of its pupils, did aim through preparatory instruction to make them more efficient in grasping, readily and thoroughly, the essentials of their future trade, in devising improvements and in applying under varing circumstances what they had learned of science and mathematics in the school. As a result of attempts to meet the needs of various classes, the organization as well as the curriculum became extremely complex.

The Agenda Scholastica, a periodical published by Hecker and Johann Hann, principal of Hecker's Realschule, in the interest of the Realschule, reveals the connection between this and earlier movements for realistic and industrial education. (1, page 38)

Johann Bernhard Basedow (1723-1790). Basedow was son of a wig maker who wanted to make a wig maker out of him but Johann protested by running away from home and entered the service of a country physician. The physician discovered he had unusual abilities and sent him with a letter to the Hamburg grammer school. Later he went to the University of Leipzig to take a Theological course.

> In the atmosphere of the University, with his natural independence, he became so unorthodox that he was not ordained, and in 1749 he began work as a private tutor... Later he began to write on education, and in this field his writings became popular. (2, page 82)

The most important of his books were his Methodenbuch published in

1770 and his Elementarwerk, complete in four volumes, in 1774. The Elementarwerk contained one hundred plates of illustrations which were intended to help in giving the students a knowledge of the world and things. He believed that the best way to get knowledge was through the senses and experience. But when the thing needed in such instructions was not available, he would resort to models and drawings. Basedow's plan involved the vivid presentation to students either by objects or pictures. (2, page 82)

Basedow recommends:

> ...that the four vacant hours unprovided for should be devoted by the pupil to the acqusition of experiences that will broaden and intensify his knowledge of human life in civilized society. He is to acquire some skill in the use of the tools of carpenters, smiths, and others which are most frequently needed in making repairs about the house. To extend his knowledge of the various important fields of human activity he is, after some preparatory instruction, to visit the shops of craftsmen. In addition to this, he is, during his sixteenth year, to spend two weeks of each of the four seasons with a peasant, in order to acquire a knowledge of agriculture. At about the same age, he is to spend a fortnight in camp, another at a mine, one at a seaport where there are ships of war, one in the office of a large commercial house, one as a listener in a large city school, one with the chaplain of a large orphan asylum. Finally a month is to be spent at court. (1, page 53)

Basedow suggested that children be taught to make their own toys, and in his further suggestion that through sharing these with each other they be given their first lessons in the study of social relationships.

In the same year that Basedow published his Elementarwerk, Prince Leopold of Dessau helped him found an educational institution at Dessau in which the principles of the book were to be put into practice. The Prince gave a building, a garden, and $12,000.00. The institution was called the Philanthropinum. According to the program for 1778, the two upper classes of "famulants" were to receive daily instruction in handwork,

the former from one to two each afternoon, the latter from two to three. (1, page 53) The work was carried on in a room especially fitted for the purpose with four turning lathes and three workbenches supplied with all necessary tools for turning and cabinetmaking. Instruction was given by various master craftsmen of Dessau. A report on the work of the students for the above mentioned year states that:

> ...some of these apprentices can use the chisel, the tongs, the hammer, and saw to good purposes; and a pyramid for decorating a bookcase, a ninepin, a rule, a letter cabinet, or a small writing table which they succeed in making gives them more pleasure than the best they can buy. (1, page 53)

Many men of prominence were interested in the Philanthropinum. But Basedow proved to be totally unfitted to direct such an institution and the management was turned over to one of his assistants. After four years, he left the school and it was soon abandoned.

Although the Philanthropinum experiment was a failure as a school, it had a very stimulating effect on educational discussion, and through the assistants of Basedow, it was the center of several reforms.

Joachim Heinrich Campe (1748-1818). Campe, who was in charge of the Philantropinum for a short time beginning in 1776, remained only a few months on account of unpleasant relations with Basedow. He then went to Trittow, near Hamburg, where he founded a similar institution, which he conducted with marked success. Raised to the rank of School Councilor by his friend and patron, the Duke of Brunswick, he devoted his time as a writer and publisher to the promotion of educational and other reforms. In two pamphlets addressed to Fredrick William II of Prussia upon his accession, he urged introduction of trade instruction and training into the folk schools. (1, page 58)

Ungraded and with only one teacher, these schools he contended, by

leaving the pupils so largely to their own resources, were actually instilling into them habits of idleness and of corrupt conduct. To counteract this, he proposed the addition to each school, a teacher of the handicrafts, who should provide industrial training for successive groups of pupils during the periods when they were not kept employed by the regular teacher. In this way, he contended, wholesome and gratifying exercises would be afforded the pupils impulse, and instead of evil habits, habits of industry and of efficient workmanship would be cultivated. (1, page 58)

Concerning manual work Campe said:

> I for my part, cannot deny that every child, be the standing or sex what it may, ought to be kept regularly, and from an early age, at some mechanical and corporeal work; provided only that in the choice of it regard be paid on the one hand to the future lot, and on the other to sex, and that one child must be more and another less occupied in this manner. The usefullness of this is indeed too great and manifold for me to wish any child to be deprived of it. (2, page 85)

Campe has been spoken of as the best representative of the principles of the Philanthropinum. He avoided the eccentricities of Basedow and thus gained for the principles which they both represented, a much larger number of friends.

Christian Gotthilf Salszmann (1744-1811). Salzmann was the preacher at the Philanthropinum and conducted the devotional exercises and gave religious instruction there for three years. In 1784 he purchased a villa at Schnepfenthal, near Gotha, and founded a new school for the sons of people belonging to the higher class of society. His school was very highly regarded, and he placed emphasis on physical training and on manual work. He employed the handicrafts as a means of cultivating manual skill. He wrote:

> I believe that it is essential to good education that children should engage in serious manual labor....For we all have bodily powers; why then should we allow them to deteriorate through lack of exercise? Is not the human hand the most wonderful of tools? (1, page 55)

Pupils were given instructions in paper work, carpentry, basket-making and turning by specially trained teachers in each subject, not by mere artisans. Salzmann believed industrial training should be given, not by a workingman but by a professional teacher. Hence, he urged the incorporation of industrial training into the professional preparation of teachers. He would have the prospective teacher acquire skill not only in paper-folding, knitting and gardening, but also in the use of the commoner tools-the plane, chisel, brace and bit, saw and hammer. He says, "when thou knowest how to handle such tools, then thy strength and efficiency are greatly increased". (2, page 85)

Salzmann placed carpentry benches and tools in the rooms where pupils came together in their free hours so as to tempt them to work. It is found that the boys often preferred work at the bench to any other way of spending their time. But such work was merely incidental. He said, "I am of the opinion however that it is requisite to a good education that the child should perform some manual task in real earnest. (2, page 85) Salzmann believed that all institutions claiming to give children an adequate education should make it an indispensable condition that pupils be trained to readiness in play of various kinds and later in the use of tools.

Handwork was carried on outside of school hours since it was not considered important as a school activity. As the organization of the work would seem to suggest, more attention was paid to handwork in Salzmann's school than in older institutions of the kind.

Ferdinand Kindermann (1740-1801). Kindermann, a Catholic clergyman, introduced certain industries into his parish school at Kaplitz, as a means of improving the moral character, the industrial efficiency and through these, the economic condition of the people. The schools under his charge soon became famous and in 1775 he was appointed superintendent of schools for Bohemia, and made professor of pedagogy in a Gymnasium in Prague. Later he was knighted and also made a bishop of the church for the great service he had rendered to the Bohemian schools.

The special service rendered by Kindermann was in his introduction of remunerative industrial work into the Volkschule. It is said that he had noticed that when peasants were trained in the normal school they did not want to cultivate the ground anymore or do any hard work. This suggested to him the idea of putting industrial work into the Volkschule. He knew the poverty of the teachers and he knew, also, the poverty of the parents who were obliged to pay tuition for their children. He thought, therefore, that by bringing into the schools industrial work for which pupils would receive pay, he could help both parents and teachers. The motive of Kindermann was, therefore, economic rather than pedagogic. As to the considerations which led him to make this innovation Kindermann writes:

> Upon closer observation of the volk schools I perceived that in them the young were trained least in what they most needed; that they learned much that was useless and almost everything in the wrong way. Here I saw the sources of idleness, of the poverty and of not a few of the vices of the people....I was convinced that our volk schools in addition to teaching the regular subjects must develop in our youths habits of industry; that classes in handwork should be organized and related to the literary subjects and that in these pupils should be trained and accustomed to work from early childhood. (1, page 80)

Under Kindermann's plan, the pupils were enabled to earn enough

to pay, at least, a part of their school expenses. At the same time, they cultivated a spirit of industry and prepared themselves for a vocation.

Among the industries taught to both boys and girls were the spinning of cotton and flax, the carding of wool, knitting, sewing, lace making, silk culture and gardening.

Kindermann was acquainted with Francke's institution at Halle, but he considered it too expensive, and that it reached too few people. "If one wishes to put industry and love of work in place of the begging and laziness of a whole people, the means he employs must be as general as the evil." (2, page 8) Therefore, instead of following Francke's model of an industrial school for rich children, he put industry into the schools of the poor. He began to organize such work in the schools as early as 1774 and in 1787 there were more than one hundred schools of this new type in Bohemia, including nineteen in the city of Prague.

The hours for industrial work were separate from the hours for the school studies. There was little or no vital connection between the industrial work and the other school work. The purpose of this industrial work was primarily to give the children an opportunity to earn money while attending school. Pupils sometimes made enough through the industrial work to pay for their education.

While Kindermann's scheme did not get very much public support, his wisdom, energy, and ability to work with all classes of people won for him high honors. The industrial work he introduced disappeared from the schools after a few years but the statement has been made that if one had asked the successful Bohemian farmers, or the thriving merchants, or the wealthy manufactures of the early part of the nineteenth century

the cause of their material prosperity, they would have answered, "It was the school which gave us the love and desire for work and showed us the blessing of industry, order and economy". (2, page 87)

Part E

Later Developments in Industrial Arts

The progress of industrial arts education as a part of public education was slow at first but as new and better machinery came into being, there occurred an industrial revolution that was started in Europe and later moved to America. The use of hand tools was started as a solution to the need of our future engineers for training in the use of hand tools and machinery. Practically all the movements for the introduction of hand training into school education have found support in the belief that such training contributes to the vocational pursuits of those who are to enter industrial fields.

Industrial Revolution and Rising Factory System. This started around 1800 with the invention of machines that would manufacture items on a vast scale. This caused an increase of wage earners because of its attractiveness. Automatic machines, patent laws, steam engines, and development of transportation are among the chief causes of changes during this time. Following is a list of events, dates of inventions and inventors:

1764 Cotton Spinning Jinny

1769 Spinning frame in England

1769 James Watt invented the Steam Engine

1776 The steam engine placed on the market

1777 The steam engine placed in factories

1778 Spinning Mule

1790 Development of Trade Unions

1791 Slaughter's Mill brought to America

1793 Eli Whitney invented the Cotton Gin that replaced 50 slaves

1798 Fire arms were made for the U. S. Government using interchangable parts

1830 Objections were started about labor conditions since nine-tenths were women and children in factories with hours from 5 am to 7 pm. This was called the sweat system or sweat shops. Later, from these objections came the child labor laws and immigration laws

1846 Elias Howell invented the sewing machine

1851 Mixing of air, coal and iron for better steel, known as the Bessemer Method

Mechanics Institute Movement in America. Started in 1820 by Wood when he opened an apprentice library in Boston. In 1824 the Franklin Institute in Philadelphia, second to Massachusetts Institute of Technology was opened, followed by Merick and Keaton Institutes in Philadelphia. In 1824 the Lyceum Movement was started in Gardiner, Maine. It was a manual labor school that paid for itself through its own production shop. It was considered a technical school of college level. Another important school that gave instruction in applying science to the common purpose of life started in Troy, New York, under the leadership of Van Rensselaer. Today it is known as the Rensselaer Polytechnic Institute which grew out of the need of new developments in the country.

The Land-Grant Act (1862). Improved agriculture was being experienced by educated men while working on the farm. From this a need was felt for federal aid in the establishing of schools that would teach agriculture and mechanical arts. The Morrill Act or Land-Grant Act was passed by both houses and signed by President Lincoln on July 2, 1862.

> By terms of the Land-Grant Act, 30,000 acres of public land per senator and representative in Congress were granted to provide colleges of agriculture and the mechanic arts in the several states. (2, page 358)

Out of later ammendments and additions have grown the agricultural colleges of today.

After the War of 1812 there was a need for engineers to build great structures and other improvements. A combination of scientific reasoning and shop experience was needed. Industrial arts today has come about as the result of its historical founders who realized the value of skills and developed courses that correlated with the general education. An attempt has been made in this chapter to relate the history and development of industrial arts to the present day achievements. In the next chapter a form of organization in a shop will be explained in detail.

CHAPTER III

INTRODUCTION TO THE ORGANIZATION

The plan of operation for the industrial arts program in the school should be organized to conform with the practices observed in industry. A student who has worked as a member in such an industrial organizational program will find his training in the school shop of definite benefit for life, citizenship, and employment.

Industrial arts instructors who teach several activities simultaneously should employ some type of organization plan. This not only assists in handling multiple activity classes, but is an efficient aid for better teaching of larger unit type classes, and last but not least, it gives the student an opportunity to assume responsibility where it is needed and by which he can wholesomely profit.

Part A

Developing a Plan of Organization

It has been necessary for the instructor to assign many of the maintenance, clerical, preparatory, and general routine duties to the students since many areas of activities in the woodworking shop have increased in multitude and size as well as increased number of students.

Students can receive valuable experience and at the same time share in the responsibilities of keeping the shop running efficiently in such a plan. Some of the basic values obtained through being part of a well planned organization are as follows: (1) allows more time for instruction; (2) eliminates most disciplinary problems; (3) develops habits of order, neatness, and system; and (4) creates more interest in their work.

The industrial arts instructor should devise a plan with positions of leadership which could be filled by leaders which were appointed or elected by the students.

> The organization should be set up at the beginning of the school year. Careful orientation is necessary to build up the right attitude toward it. Otherwise some students may think it humorous to vote a boy into a foremanship without consideration of his qualifications. Students should be shown how the organization will function in promoting safety, making for a more efficient shop, giving them a greater opportunity: and they should be impressed with the need for individual responsibility and for each individual to clean up after himself in order that a shop of this type may function with greatest opportunity for all. (17, page 98)

At the end of the first quarter of the term or a certain designated time, the personnel could be selected on a basis of scholarship, leadership, and interest, or rotate the assignments to give each student an opportunity to occupy the positions.

There are many organization plans in effect and each will be somewhat different, depending on the instructors who use such plans, but they will be basically the same.

> Student personnel organizations may vary according to many conditions that prevail in the laboratory, such as the number in class, kind of equipment, areas of work, and age of students, an effective and worthwhile organization calls for careful planning on the part of the instructor. Because of the many variables that exist, no one plan could possibly fill all situations. (17, page 98)

As the instructor continues to use an organizational plan in his teachings, he will use the most successful type that benefits his program. His method of appointing or electing officers to their positions will probably change from time to time depending on the background and type of students he instructs. The plan proposed in this research report is based upon the general procedure practiced by most instructors but adaptable to the writer's particular problem.

Part B

The Plan of Organization

The plan submitted in this part is based upon the general procedure followed by most instructors.

Class Officers:

1. Superintendent
2. Assistant Superintendent
3. Tool Cabinet Foreman
4. Safety Engineer
5. Material Foreman
6. Finishing Room Foreman

The instructor should use some type of assignment plan which can be changed weekly. An organizational board could be used effectively in the rotation of assignments. List each student's name vertically for each period taught using this board. At the left side of the board, list the class officer assignments. At the beginning of each week, move the assignments down one or more names.

The advantage of this type of plan is that it can be controlled by the teacher and does away with favoritism.

The disadvantage is that it gives some students an assignment that they cannot fulfill, and also it is not as democratic as it could be.

Designation of Officer Responsibilities. Briefly, the duties of the shop personnel organization are as follows:

1. Superintendent: Assume charge of the room when the instructor is called out of the room. See that everyone is busy when visitors enter the room. See that everyone knows his duty or assignment. Assist the instructor when called upon.

2. Assistant Superintendent: Assist superintendent and take over any foreman's duty who may be absent. Help boys who are behind in their work. See that all items are put away and ring the clean-up bell.

3. Tool Cabinet Foreman: See that tool cabinets and panels are kept neat and clean at all times. At the end of the period see that all tools are in their proper places. Report all tools missing and in poor condition.

4. Safety Engineer: See that all safety devices and guards are used and in working order. Report all unsafe conditions in the shop. Report any violation of the shop safety rules. See that all injuries are given prompt first aid and inform instructor of such injury.

5. Material Foreman: Sees that records for materials and supplies are kept very carefully. Issues correct amount of materials and checks on wastage.

6. Finishing Room Foreman: See that paint cabinets are clean and tidy at all times. Keep all finishing brushes clean, and all rags placed in appropriate containers.

Detailed Duties of Officers. List the duties of each officer in detail to save the instructor time and to let the students know what is required of each officer.

> The instructor should use care that he does not list duties and assignments that are impractical or unnecessary. The entire plan should be kept as simple and free of complications as possible...It should be remembered that the effectiveness of the duties performed will be directly proportionate to the training which has been given these students on the method of accomplishing their respective responsibilities. (17, page 99)

These duties should be followed very closely by the officers so as to give the instructor more time for definite instruction and better demonstrations. This is also beneficial for individual instruction.

The Tool Cabinet Foreman will probably be the only officer whose duties will keep him busy most of the hour. The instructor should provide guide and instruction sheets that are related to tool care, maintenance, and sharpening.

> The General Superintendent has the most responsible assignment of all the officers. He will undoubtedly be the last officer to start to work on his own project, and should be the first to clean up at the close of the period, in order that he can check on the various duties to be performed by the other officers. (9, page 12)

This plan is designed to be beneficial for all students and the instructor with no waste of time and effort.

Superintendent's Duties:

1. Come to the shop as soon as possible.
2. Unlock all cabinets and panels pertaining to his particular period.
3. Unlock the tool cabinet after the tool foreman has arrived.
4. Turn on power switches.
5. Assume charge of the shop.
6. Assist and help other students when needed.
7. Oversee other officers and members of the class.
8. Check with the instructor for anything that might need to be done during the hour.
9. At clean-up time see that all students have quit working on their projects and have started cleaning up.
10. See that the other officers are performing their duties.
11. Lock up all the cabinets and panels.
12. Turn off all power switches.
13. If the superintendent has charge of the keys during the class period be sure to give them to the instructor at end of the period.

Assistant Superintendent's Duties:

1. Take over Superintendent's duties until he arrives.
2. Keep required class attendance.
3. Assist the Superintendent throughout the period, or assume duties of any forman who is absent.
4. Take care of material bills and any forms that may be used in class.
5. If a progress chart is used, keep it up to date.
6. Ring clean-up bell five minutes before dismissal bell. Clean up own work station and be prepared to leave before ringing clean-up bell.
7. Assist Superintendent in seeing that all tools, materials, and projects are in their proper places.

Tool Cabinet Foreman's Duties:

1. After Superintendent has unlocked cabinet, check it carefully to see that all tools are present and in working condition.
2. Report any tools that are missing.
3. If a tool room is used, see that a slip is filled out completely for each tool. Leave this slip in place of the tool when checked out.
4. Will be held responsible for all hand tools assigned him.
5. See that all tools are in their proper places at the end of the period.
6. Report any tools that are broken.
7. Sharpens and keeps all the tools in proper working condition.
8. Be on the alert to see that all tools are used properly.
9. At the end of the period report to the Superintendent.

Safety Engineer's Duties:

1. See that the shop is well lighted.
2. Regulate ventilation.

3. Know fire and security drill regulations, routes to follow, and position for his class.

4. Take care of minor First Aid patients and report same to instructor.

5. Place and change safety posters about the room.

6. Be on the alert for carelessness.

7. Enforce general safety rules.

8. Notify the instructor of any accident.

9. See that all guards on the machines are used and in proper working condition.

10. See that no defective tools are used.

11. Check finish room for oily or stain rags.

12. See that finish room exhaust fan is used.

13. At the end of period see that floor is clean and no tools or other articles are lying around.

Material Foreman's Duties:

1. Issue materials and supplies to the students.

2. Keep the material room clean and tidy at all times.

3. If any material or supplies are running low, report what and how much to the instructor.

4. Keep any stock record cards up to date.

Finish Room Foreman's Duties:

1. Is responsible for the finishing room, gluing, and assembly areas.

2. See that the standard stock of finishes, shellac, stain, turpentine, lacquer, lacquer thinner and varnish is available to the students at all times.

3. Replace the finish stock as it is used, seeing that the oldest is used up first.

4. See that the exhaust fan is turned on at start of the period and off when not in use.

5. Assist students who require special finishes or equipment.

6. See that there is no waste of finish.

7. See that each student cleans up the material he has used.

8. See that all finish equipment is in usable condition.

9. See that the gluing and assembly area is neat, tidy and clean.

10. See that all glue, dried or wet, is cleaned up after using the clamp table.

11. Check the bar clamps and hand screws once a week for operating condition.

12. See that all oily or stain rags are placed in a container provided for them and not left lying around the room.

These assigned duties of each officer should be followed closely but could be changed by omitting or rearranging some of the duties in order to fulfill a particular type of shop or arrangement that will best suit the instructor. There are other conditions that should be taken into consideration in using this type of organization which will be brought out in the next part.

Part C

Shop Conditions Affecting Class Organization

Important, equally, to the pupil and the teacher pertaining to the matter of student reaction and conduct stands the question of the physical conditions under which students work. It has been proven that interest in the work is closely correlated with conditions under which the student works. This is true in schools and industry as well; perhaps even more so in schools, because of the lack of other factors possessed by industry. Consider the following main topics of this part in this connection.

Assign a Working Place for Each Student. Students not knowing where they belong, should not be expected to go to work in a regular manner and

attend to only their work. Continued interest cannot thus be maintained, and the play spirit will at once begin to show itself. This does not mean that under some shop conditions such working places may not be reassigned often, but today the student must know exactly where he is expected to be, and that he will not be interferred with while doing his work.

Numbers in the shop to assign lockers, work benches, and seats in instructional areas will prove to be an effective means of directing the different activities of the students. These numbers can also be used to identify the students on progress charts, in class record books and during the roll call. One of the leading authorities on the woodworking shop has said, "There are so many personal contacts between instructor and pupils, as well as among pupils...,that there can be nothing objectionable in this minor use of numbers". (12, page 109)

Sufficient Working Space. Do not try to crowd the students into a small space. Lack of working space and too close contact with other students will cause distractions and disturbances that lead to broken morale and poor class organization. No matter how strict the rules may be against horseplay and running in the shop, it is likely to exhibit itself when the students are placed too close to each other during the working period.

A limited study made by Emanuel E. Ericson covering shops and shop buildings featured in various periodicals furnishes some suggestions:

> The average of ten home-mechanics shops in junior and senior high schools shows 44½ square feet per student... Fourteen junior high school woodworking shops averaged 56¼ square feet per pupil...More recent planning would indicate a tendency to increase shop sizes. (5, page 308)

The absolute minimum per pupil floor space for all shop activities

should not be less than 50 square feet, except with the possible exception of drafting in the junior high schools.

Adequate and Proper Light. A discipline case could probably be made out of the finest type of student that is working in poor light. The spirit of rebellion, unconsciously, may show itself in any number of ways.

> The light in every shop and drafting room should be checked with a light meter. Often minor changes will give a much improved condition. Too much light causes glare, while not enough causes shadows which make it very difficult, if not impossible, for certain students to see. (15, page 22)

Improving light conditions for students may be accomplished in many ways, such as, adding skylights, by putting in prism glass for diverting light, by installing artifical light, by interior painting, and last but not least by moving and changing work-benches so that the light falls in the proper way and from the proper angle.

Location of Machines and Common Equipment. An important bearing on the problem is the location of machinery for routing of work and supervising instructional units. Gordon O. Wilber lists the following statements as to the arranging of equipment in an orderly and efficient manner:

1. Determine areas to be represented on the basis of the objectives of the course to be taught.
2. List the major items of equipment for each area on the basis of the activities to be carried on.
3. Prepare a scale drawing of the room to be used, showing all windows, doors, and other structural details which will affect the placement of equipment.
4. Prepare scale cut-outs for all major pieces of equipment, benches, cabinets, etc. These cut-outs are later used to determine the most effective placement of equipment. They may be set on the scale drawing and moved readily from place to place until the most efficient use of all space is attained. (18, page 277)

Lack of interest in the shop leads to a substitution of something else for purposeful work. Accessibility of equipment is important in keeping interest in the shop and for final success.

A Special Room for Class Teaching. An assembly-room where the class may be called together and permitted to sit in chairs is very desirable in connection with all shops; but an absolute necessity where more than one class is at work in one room. An orderly demonstration with proper attention cannot be given in a shop where a large number of other students are at work.

> Within the instructional area the teacher needs to locate benches, machines, chalk board, space for hanging teaching aids, and visual equipment so that the group instruction can be carried on without moving students to other parts of the laboratory. (15, page 101-102)

One plan is to arrange the benches in such a manner that some of the students can sit on them while others sit on stools that are placed between benches. Neither of these methods provide a suitable writing surface for the students so that they can take notes during the demonstration. After the demonstration and discussion is over, the students can copy in their notebooks the material the instructor has written on the blackboard. A combination planning and work station has been developed that has proven very popular. This bench has a seat attached to it. When arranged properly, students sit at their assigned work stations during the demonstration. (14, page 101-102)

Instructional facilities should be available if the students are expected to profit by the work and pay attention to it.

Adequate Locker Facilities. Students need an adequate place to store their supplies in industrial arts classes. Many schools have not made satisfactory provision for storing materials.

> A place where the student can keep his unfinished work is a valuable factor in student morale. To lose work upon which hours of patient effort have been expended leades to discouragement and dissatisfaction. (6, page 103)

Space normally used for storing of materials is frequently provided by steel lockers, bench drawers and compartments. Bench drawers have proven to be not as satisfactory as steel lockers.

Many shop classes are made up of students from more than one homeroom. When assigning compartments it would be best to assign the students from the same homeroom to the same section of lockers. This procedure will help control vandalism, since these students are well acquainted, and they will get their supplies at the same time.

Condition of the Equipment. A tool which does not serve its purpose or a machine that does not run, will cause more break-down of discipline than can be built up again by several days of effort.

Dull and partially damaged tools cause more accidents than tools which are kept sharp and in good condition. An organized plan is necessary for maintaining and keeping tools sharp. Sharp tools enables the students to do better work at all times with less probability of accidents. A student who has an opportunity to work with sharp tools while attending school will more than likely discipline himself to work under the same conditions at home or in industry.

> Respect for equipment is a factor in securing proper behavior in the shop, and ranks in importance, second only to the respect for the teacher. Probably one should go one step further, and list it as a prerequisite for the proper respect for the instructor, for unless the instructor is able to maintain the equipment in good shape he will very likely not hold the students respect. (5, page 102)

Toolroom. The condition that exists in the toolroom or tool cabinet is the key to the condition of the entire shop.

> The important consideration is that the toolroom should be carefully planned in relation to all the factors involved in a given shop setup and not left as an afterthought; nor should it be considered as a matter of minor importance. The location of the toolroom involves both the matter of convenience and of discipline. Good discipline is promoted by locating the toolroom where the students can reach it and return to their work stations by having to pass as few other students as possible, and by being where the instructor can have an unobstructed view of the room from any position in the shop. (10, page 15)

The way in which tools are handled here and the system of checking tools, along with the language and manners allowed and practiced, can easily be taken as a sample of the discipline of the entire shop. A disorderly tool room will not be found in an orderly shop. An important bearing upon this topic is the location of the tool room, for an out-of-the-way tool room will cause the student to waste time and have a tendency to loaf.

Proper Ventilation. Every experienced teacher knows that the problem of attention and concentration upon the student's work can be correlated with proper ventilation in the shop. The working temperature in a shop should be lower than in a regular classroom. When attention is poor, open some windows, for there is no reason for omitting proper ventilation except when the outside temperature is warm.

> With reference to the ventilation of the school shop, it is very difficult to give specific formulas which should be generally applied...The major problem involved in ventilation is to prevent "stuffiness" or "closeness" which is caused by body odors and not by poisons from the lungs as is commonly believed. Very careful study of the effects of body odors had been made and reliable data are available for preventing uncomfortable and undesirable conditions... The simplest and most practical test of ventilation conditions in a shop is to go into the outside fresh air for from five to ten minutes then return to the shop and note whether the room seems "stuffy". The nose is the "instrument" used in research in this field. The two major factors involved in proper ventilation are the air space per person in the room and the frequency with which the occupants of the room bathe and change their clothing...An interesting

> corollary of this general rule is that in those classrooms where the children are from very poor families, where bathing and change of clothing are infrequent, more than twice as much fresh air has to be provided to keep the room in proper condition than in the case where the children are from homes where frequent baths are the rule. (10, page 26-27)

Cleanliness. In the shop, cleanliness is a necessity for proper atmosphere. Special attention should be paid to the washrooms, toilets, tools, machines and the clothing of the instructor. Proper clothing in the shop goes a long way to establish the spirit of labor and "busy-ness".

> Excessive dust, dirt and an accumulation of junk in shops are contributing factors which result in careless attitudes, which in turn cause accidents. Dust has been known to cause explosions; oily floors are slippery and may result in falls. Materials piled on the floor block passageways and often contribute to serious accidents. The "Fibber McGee Closet" has no place in the home or school. Even a damaged instruction seat has been known to cause an accident. The teacher must begin his safety program by maintaining an attractive and orderly shop. (15, page 161)

Shop Atmosphere. The atmosphere of a real workshop will not have to contend with a spirit of mischief, play or loafing. The problem of discipline will diminish or disappear once a good shop atmosphere has been created. There need be little time devoted to catching up with offenders in an organization in which everyone has a job to do and is doing that job, also, where no one has time to think of breaking rules and where there are few to break, or where industry and effort are apparent on every hand.

CHAPTER IV

SUMMARY AND RECOMMENDATIONS

This report started with an introduction to the problem of organizing personnel in the school shop. Then came the history which brought the reader through the beginning of industrial arts, its leaders, movements and events, to The Plan of Organization.

Summary. This plan of pupil-personnel shop organization helps in solving the problem of instructing large classes. It reduces the amount of personal attention which the instructor has to give to routine shop details and thus allowing him to devote more time and energy to the teaching part of his job.

This organizational plan contributes directly to increased educational values in industrial arts subjects, in that it provides opportunities for developing, in a practical manner, the meaning of individual and group effort. It also provides an opportunity for directing, supervising, and aiding in the activities of others. This type of plan develops cooperation in working together for the common good of all; and it familiarizes the student with the type of organization that is commonly used in industrial plant management.

The student learns to respect authority and to understand the problems that the employer and employee face in real life situations. This tends to be democratic in function and principle as well as developing leadership and furnishing good character training. It tends to make the student ambitious, dependable, honest and obedient in the eyes of his fellow-associates. Furthermore, it trains him in cooperation, tolerance, perseverance, purposefulness, self-direction, and self control.

The experiences which the students gain under this type organizational plan are probably as educative as anything provided for in the strictly constructive activities of shop work.

Recommendations. Changing methods and systems of teaching will cause this form of organization to become outmoded, therefore, the writer recommends that a continuing study be made. The writer also recommends that this form of organization be revised and adapted for other types of school shops and grades.

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Report: A FORM OF PERSONNEL ORGANIZATION IN A WOODWORKING SHOP

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REPORT TITLE: A FORM OF PERSONNEL ORGANIZATION IN A WOODWORKING SHOP

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