SUGGESTED COURSES FOR HANDICRAFT, AN AREA OF INDUSTRIAL ARTS, FOR SCHOOLS IN THAILAND

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CHAPTER I

INTRODUCTION

Handicrafts have been essential to mankind since the ancient time to the present. The people of the ancient age who lived in small groups roaming from time to time, or those that settled in specific areas, had to make their own tools, make their own shelters or homes and seek their own food. The people who lived two or three hundred years ago had to work by hand to a great extent. Even at the present time in many parts of the world, the people who live in the country, on farms, in the villages or small towns, where all the facilities are not as good, have to do a lot of manual work. Undoubtedly handicrafts must be a part of living to these people mentioned in this paragraph.

Today machines are plentiful and familiar to everyone. With the help of the machines the people save both their time and energy and do not have to work as hard as they did in the old days. Many kinds of materials are now used to make various items for the facility of living. The situation is different. Industrial arts becomes an essential and important part of the public school program. Industrial arts provides means for the students to experiment with tools, materials, and equipment of various kinds. Still handicrafts or crafts

play an important role as a part of the industrial arts program.

Formerly, industrial arts was considered by many people to be too difficult for younger students, and it was offered only to boys in higher grades such as sixth or seventh grades in the United States. The favorite and familiar materials used by students and teachers in the school shop were wood. But now many kinds of materials besides wood such as clay, metal, and plastic are used, and industrial arts is also made available to girls. With handicrafts or craftswork as a part of industrial arts, the industrial arts program can be offered to children in the very low grades. The children have a chance to express themselves by working with wood, beads, metals, textiles, clay, leather, and other materials. Because the industrial arts courses also continue throughout the junior and senior high schools, it may be stated without exaggeration that industrial arts is useful for children from kindergarten to high school graduation. Of course, the grown-up people have a lot of benefits from industrial arts throughout their lives.

The craftsmanship of the Thai people is admired by many foreigners who visit Thailand. The Thai ancestors taught their craftswork to their descendants from generation to generation; it is proper to keep these arts and crafts and make them grow more beautifully so that this branch of the Thai culture will always be in existence. This can be done through crafts or handicrafts taught to children in school. Of course,

the purpose of teaching handicrafts to the students is not for skill or craftsmanship but for educational values on the exploratory basis and as a part of general education.

The following parts in this chapter will reveal the scope of the study -- the why and how of the study, and definitions of some significant terms.

Part A

The General Scope of the Study

This research will cover the history of handicrafts and industrial arts together for the purpose of knowing the background, how handicrafts were developed into industrial arts. It will also include the philosophies of some philosophers and educators toward industrial arts, the general principles of the teaching of handicrafts and industrial arts, and some suggested courses which, in the author's opinion, will be suitable for schools in Thailand.

The Origin of the Study. Indeed, the life today is in the machine age or in the beginning of the atomic age as one may like to say, but the author sincerely believes that handwork cannot be neglected and that handwork, or crafts or handicrafts still hold a significant place as a part of the industrial arts program. Even the people who like to work with machines sometimes like to work merely by hand in such as wood carving and leatherwork. As a matter of fact, industrial arts in many schools in the United States today may be classified as handwork, or handicrafts, which is an area of industrial arts.

Needs for the Study. As the title of this thesis indicates, the author, in studying this topic, means to compile or to construct the courses for handicrafts as a part of the industrial arts program for schools in Thailand. Having been related and connected with school life and teaching for many years, the author realizes that the improvement and a variety of courses for "manual education", as being called in the National Plan of Educational System of Thailand, are really needed in both elementary and secondary schools. It is tiresome for children to work over and over with clay, or a few other manual activities day after day and year after year. The teachers cannot be blamed because they had not had enough training to teach a variety of manual-arts activities to their pupils.

The author hopes that the results of this research may help the Thai teacher to know and understand the principles and philosophies of handicrafts and industrial arts and that it should be a guide for the teachers to use more arts and crafts activities as suggested in this research for their school work. The author's attempt in the writing of this thesis should arouse the attention of some other teachers to study more the handicrafts, or arts and crafts, so that the learning and teaching will be more lifeful, and the school curriculum will be more and more improved.

Methods of Research. This research was made almost entirely through the study of books, periodicals, and literatures available in the library of Oklahoma State University.

The other sources or materials were the bulletins and literatures kindly distributed by several state superintendents of public instruction and other individuals. Thai-language literatures were not available for this study.

Part B

Definitions of Some Significant Terms

Some words have similar meanings such as "crafts" and "handicrafts", and sometimes one has some difficulties to define such words. In order to clarify some significant terms used in this thesis so that the reader and the author may have the same understanding of the words; the following definitions should be noted:

Handicraft. Webster defined handicraft as "a trade requiring skill of hand, manual skill"

Eaton quoted:

> The word "handicraft,"--is a broad term including all those things which are shaped by hand either for the maker's own use or for others. The article may be fashioned entirely by hand, including the preparation of all the materials as in basketmaking; or it may be in part machine made, as in the preparation of woods for fine cabinetwork, and the machine spinning of thread and yarn to be woven on a hand loom. But if the final product, the character of the things itself, is shaped by hand, it is an object of handicraft--- (13, page XV)

According to Encyclopedia Britannica:

> Handicrafts, manual skill, or skilled work with hand, more generally designating those visual arts which are actually produced by hand and associated with wearing apparel or decoration in the home. In a sense handicrafts may be considered as symonymous with arts and crafts, only of a less broad meaning;

> arts and crafts including those arts which are practiced by hand and those which are practiced with the aid of a machine. (50, page 148)

Craft. To this term Webster quoted "Art or skill; hence, an occupation requiring this; a manual art; a trade, business or profession."

According to Encyclopedia of Modern Education:

> Crafts refers to creative and productive activities accomplished by hand sometimes with the aid of simple tools or machines. Handicraft is also used to refer to crafts and is generally preferred to handicraft which is now thought to convey an irrelevant implication. There is suggestion that craft should be understood to refer to a piece of workmanship that has some claim to beauty, and that it can be associated only with the craftsman's actual production--the work of his own hands. (49, page 199)

Bridenbaugh stated about craft:

> When they spoke of a craft, our forefather and their English and German ancestors thought of a skill, an art, an occupation. Or they meant a calling requiring special training and knowledge; or possibly, even, the members of a given trade or handicraft taken collectively. But the word craft always suggested a trade or occupation, the "Art and Mistery" of which was acquired only after a long period of tutelage by a master craftsman.
>
> In considering a craft, we must not fall into the common error of assuming that the term always implied handwork. It might, or it might not according to conditions in a given trade. (9, pages 1-2)

In short handicrafts stress hand processes; craft may be hand or machine-made. These two terms will be used synonymously in this thesis.

Manual Training. Silvius and Curry quoted about manual training from Western Arts Association Bulletin of March, 1933, as follows:

> Manual training is a historical term describing education of the mind through the hands based on hand work instruction in the elementary industrial processes and the theory of formal discipline. It was offered originally for general educational value without regard to vocation and usually applied to the training of boys. The work was usually offered during the 7th, 8th, 9th and 10th years of school for the purpose of forming habits of thought before action; will; patient, careful application; educating the mind through the hands; developing skill of hand and eye, appreciation of the dignity of labor; and developing the "powers" of observation through the senses. Manual training usually consisted of woodworking and mechanical drawing, but occasionally included printing, metal work, and other units. (41, page 6)

Manual Arts. Manual arts followed in the path of manual training and remained popular until the term industrial arts was advocated. It was defined thus:

> Manual arts is a term used to describe such subjects as woodworking, mechanical drawing, metalwork, printing, leather work, jewelry making, clay work, book-binding, etc., when taught as a form of general education having for its chief purpose that of developing within the pupil, through work in the school shops, manual skill and an appreciation of good design and construction by practice with a variety of exercises and practical projects of personal value. (41, page 7)

Industrial Arts. There are many different statements in the definition of this terms. Newkirk said:

> Industrial arts is a study of materials and of the desirable changes made by hand or by the several manufacturing processes from the raw state into products designed to meet the consumer's needs and comforts for daily living. (34, page 5)

According to the bulletin "Industrial Arts in Oklahoma":

> Industrial arts is a group of school subjects that contribute to the attainment of the goal of general education by furnishing guided experiences in the use of tools, materials and machines, and insights into those phases of industry that have

become an important part of our social culture. (53, page 1)

The description of industrial arts in the bulletin of the United States Department of the Interior, Office of Education is as follows:

> Industrial arts is a phase of general education that concerns itself with the materials, processes, and products of manufacture, and with the contribution of those engaged in industry. The learnings come through the pupil's experiences with tools and materials and through his study of resultant conditions of life. It is a curriculum area rather than a subject or course, being comparable in this respect to the language arts.
>
> Industrial arts, therefore, has general values that apply to all levels, and in a continuous program these values are progressively intensive and are cumulative in their effect as the pupil advances in maturity. (55, page 1)

In brief, industrial arts is (1) a part of general education and (2) pupils learn by experience using materials and tools or machines.

Mechanic Arts. Friese described Mechanical or Mechanic Arts as follows:

> This term is in some ways a desirable one because it is applicable to both industrial and assembling and building trades. It may also be interpreted as meaning something quite technical, or leaning toward engineering. However, it is narrow so far as school shop work is concerned in that it is only one of several types of manual arts. After a period of try-out it has failed to become very generally accepted. (16, page 56)

Practical Arts. Practical arts as used in the broad, inclusive term that embraces as subjects of instruction: manual training, industrial arts, mechanic arts, household arts, domestic science, domestic arts, general agriculture, and general commercial education. (42, page 36)

General Shop. According to Newkirk the general shop is the shop that is equipped to teach two or more types of industrial arts work. (34, page 14)

Vocational Education. Rivlin defined vocational education as follows:

> In its broader sense, vocational education refers to life experiences, education, and training, both direct and indirect, that fits one to carry on a socially useful vocation. In a more restricted sense, vocational education refers to specific, functional training for useful employment. (49, page 882)

According to the definition of the Committee on Research and Publications of the American Vocational Association in 1954:

> Vocational education is the education designed to develop skills, abilities, understandings, attitudes, work habits and appreciations encompassing knowledge and information needed by workers to enter and make progress in employment on a useful and productive basis. It is an integral part of the total educational program and contributes toward the development of good citizens by developing their physical, social, civic, cultural and economic competencies. (39, page 12)

Industrial Education. Industrial education refers to all forms of shop work and industrial drawing taught for any purpose whatsoever. In this sense it is the all-inclusive title that should be given to a department which includes both industrial arts and trade and industrial courses. (53, page 2)

Having presented the definitions of some significant terms, the author will, in the following chapter, discuss the history and philosophies of the industrial arts.

CHAPTER II

THE HISTORY AND PHILOSOPHIES OF INDUSTRIAL ARTS

A history helps one know and understand more the background of a subject. Sometimes the result can be more or less predicted by the study of the event in history. To this opinion the author does not want to argue whether the saying "History repeats itself" is always true, but the point the author is trying to make is that history is still essential to the social life. "Without a sense of history," according to Sir Winston Churchill, "no man can truly understand the problems of the present time." The study of the history of industrial arts will certainly be beneficial to one who likes to know and understand more about the industrial arts.

Education, to be worthwhile and servicable, must be based upon some sort of philosophy which has been developed through long-continued experience of mankind. This expression holds true for the industrial arts. The philosophy of industrial arts is the most important for both teachers and students in teaching and learning of the industrial arts because it goes to the roots of the industrial arts.

For simplicity, the philosophy may be defined as the belief about every important aspect of the thing, and this

very belief is the guide to deal with that thing. As a matter of fact, one cannot do anything without one's belief.

Through generations and ages of time, man attempts not only to profit by his own experience, but also to bequeath the benefit of such experience to his descendents or the younger generations. From the prehistoric time all the way down to the present, the store of knowledge and experience of industrial arts has been added little by little, and thus causes the continued and steady growth and improvement of the industrial arts.

The study of the history and philosophies of the industrial arts will lead to the better ideas and the improvement of the industrial arts. With this consideration, the history and the philosophies of the industrial arts of the past, the current beliefs, and the author's viewpoints are presented in this chapter to illustrate the development and the trends of industrial arts to the present day.

Part A

The History and Development of Industrial Arts

Industrial arts is not the subject of recent origin as some people may think. In unorganized form, the history of the industrial arts may be traced back to the beginning of the human race.

Ancient History. The earliest forms of industrial arts, no doubt, centered around such problems as those of securing food, or providing shelter and of making clothing. The father

or mother or the leader in the clan or tribe was the instructor; the method employed was usually that of demonstration and practice on the job, by trial and error and by imitation.

Man worked with stone implements more than 50,000 years ago. The characteristic handiwork of this period was the first hatchet with cutting edges sharp enough to shave wooden tools and weapons. During the succeeding 40,000 years he continued to work with stone and passed through what is known as the Early, Middle and Late Stone Ages. Man, during this period, learned to fabricate sharper implements from flint, construct wooden boats, domesticate animals, manufacture pottery, produce grain, and live in communities. Man continued to make progress through work, and about 6,000 years ago he developed civilizations based on scientific knowledge, government and religion in the valleys of the Nile, the Tigris, and the Euphrates rivers. (39, page 35)

Egyptian Civilization. About 4200 B.C. the Egyptians learned to reduce copper ore to copper metal. This discovery, the most important since the discovery of fire, ushered in the age of metal and enabled the people of Egypt to construct buildings and monuments of various kinds, many of which are present-day wonders. The many accomplishments in the arts and crafts lead some historians to believe that organized apprenticeship programs were in operation at that time.

The Egyptian alphabet, the first alphabet known to man, was invented before 3000 B.C. The Egyptians devised a

pointed reed for a pen, compounded a writing fluid and learned to split papyrus into thin layers for use as writing paper. These inventions led to the establishment of the first organized schools, started in Egypt during the period between 2000 and 1200 B.C. Two stages of training were given in these schools. The first or primary stage consisted of learning to read and write ancient literature, and the second being an apprenticeship stage. (39, page 36)

Orient Civilization. The crescent shaped strip of land extending from the Persian Gulf along the northern border of Arabia to the Mediteranean Sea, occupied in turn by the Babylonians, Assyrians, Chaldeans, Medes, Persians, and Hebrews, was the first home of the people of Western Asia and the home of the Christian religion. The people of this region constructed houses of sun-baked brick and fashioned arts and crafts works from stone and metal. Vocations became specialized, and apprenticeship training programs were organized and legalized. The first historical reference to apprenticeship was in the Babylonian Code compiled about 2100 B.C. by King Hammurabi of Babylonia. The code suggested that:

> If an artisan takes a son for adoption and teach him his handicraft one may not bring claim against him. If he does not teach him his handicraft that son may return to his father's house. (39, page 37)

Hebrew Civilization. The Hebrews settled in Palestine about 1200 B.C. They were advanced in agriculture, arts and trade. They traded in jewelry, furniture and bronze from

the valley of the Nile; pottery from the islands of the Aegean Sea; and earthenware and woven cloth from Babylonia. The Hebrews unlike many of the early peoples, held manual labor in high regard.

Education of Hebrew children was assigned to the father of the household. The religious teaching was known as the Law. Schools for children were attached to the synagogues by 100 B.C., and compulsory education of children for the first time in history was ordered in A.D. 64. A youth as a rule attended the church school in the mornings and learned a trade from his father in the afternoon. (39, page 39)

Greek Education. Education in both Sparta and Athens was the training of strong and courageous soldiers and loyal citizens. The Spartan mother kept children from birth to age seven, then the boys were placed in public barracks until the age of eighteen. The boys and girls of Athens began education at age seven; the boys were sent to school, and the girls were educated at home. (39, page 41)

During the Homeric age in Greece, handicrafts occupied a place of respect, but in later times, while agriculture and cattle raising were regarded as an occupation fit for a free citizen, since the more menial part of work was performed by slaves or hired labor, the work of handicrafts was designated as "banausic" (merely mechanical, word of contempt). (4, page 15)

Roman Education. The Roman people were practical and conservative. They were noted for codes of law and plan for

public administration. Their engineering and architecture were on the practical side, and they excelled in the art of spreading a civilization over wide areas and among many peoples. This civilization, much of which was borrowed from the Greeks, has had a strong influence on present-day civilization. The child, at the age of seven years, began elementary education, and secondary or grammar school at the age of ten. The influence of Roman culture declined with the fall of Rome in A.D. 410, and teaching in the schools became formal and superficial. By the sixth century, most universities were closed. Western civilization entered the Dark Ages of the medieval period. Roman Catholic Churches became the centers of learning. (39, page 43)

Early Christian Labor. Early Christian monks, following the example of Jesus, the carpenter of Nazareth, made a fetish of manual labor. The Rule of St. Basil (329-379) insisted upon the perpetual duty of labor, and St. Benedict (480-543) made manual labor, seven hours a day, one of the cardinal principles of his Rule. The Rule of Benedict also required two hours of reading as daily occupation of monks. All the reading had to be done from manuscripts as the printing of books were not invented until about 1450. The increase in number of monks called for a multiplication of manuscripts, the copying of manuscripts then became a favored occupation of the monk. Thus grew up the art of book-making and penmanship. (4, pages 17-18)

The religious zeal and missionary enthusiasm of the Benedictines carried them north of the Alps, and the need of buildings for worship was necessary. While the early churches of Italy had been constructed by secular labor under the bishops' control, the building of churches of the North came more and more into the hands of the monks from the ninth to the twelfth centuries. (4, page 19)

As a necessary part of this religious movement in book making and building, the minor arts and crafts were developed, and scientific study and invention were stimulated. Through the promotion of agriculture the handicrafts, and art, along with religious instruction for all, and book learning for a selected few, the Benedictines became the civilizers of barbarians and examples of enterprise, thrift, and Christian culture. (4, page 20)

Apprenticeship in the Crafts. Outside the monasteries, to participate in skilled labor was the principal means of education. As the crafts developed, apprenticeship in these crafts consisted of a large body of "mysteries" to be learned and more manual skill to be gained. Since no schooling was offered to the great majority of the people up to the nineteenth century, the education they acquired came through their trade or occupation, and social contacts. Apprenticeship then became the chief educational institution for the middle-class youth. (4, page 21)

The Guilds of England. In the twelfth century the craftsmen of the town were associated in guilds for their

mutual protection, for the advance of their crafts, and later to hinder competition from those who were not free of the town. The guild consisted of the masters and apprentices, the masters being those who were skilled in an art, a science, or a craft, and the apprentices those who were learning its mysteries. The guilds concerned themselves closely with the enrollment and training of the apprentices. No master was allowed to take more apprentices than he could properly train. The period of apprenticeships was almost invariably seven years. When the full apprenticeship had been served, the apprentice became a journeyman working for wages or practiced his craft as a master with his own journeymen and apprentices. At the beginning of the sixteenth century the guild's monopoly declined because of: first, the journeymen setting up as masters outside the towns free of all guild and municipal restrictions; secondly, growth of new trades as hardware, cutlery and textile trades in Burmingham, Sheffield, and Manchester; thirdly, the rise of merchant companies, and later fourthly, by confiscation of the guilds' religious property in the time of Henry VIII and Edward VI.

The Act of 1814 marked the end of compulsory apprenticeship. The apprentice no longer lived without wages and under the personal control of his master, but served under a strict apprenticeship contract and lived with his parents and received wages. At the end of the nineteenth and the beginning of the twentieth centuries, employers became less willing to spend time and money on training of apprentices which the

specialization of processes and the speeding up of production had rendered more difficult and more expensive. The trade unions realizing that the employment of cheap juvenile labor needed protection, called in aid the time-honored methods of guilds and of the apprentice laws, and imposed restrictions on the number and proportion of apprentices and the conditions of their employment. (47, page 145)

Apprenticeship Laws in the Colonies. Apprenticeship came to the New World in the Early Colonial period. This type of training in the colonies resembled that of the mother countries, except that it developed directly under the laws of the towns and counties.

Two kinds of apprenticeships were established in the American Colonies: voluntary and compulsory. The voluntary apprentices, motivated by desire to learn a trade, entered into the agreement of apprenticeship of his own free will. The compulsory apprentices, who as a rule were children of the poor, were bound out as apprentices by the town authorities primarily for the purpose of providing maintenance for the children. This compulsion was enforced by a law passed by the General Court of the Colony of New Plymouth in 1641 adopting the English Poor Law of 1601 to the need of the Colony. The Massachusetts Bay Colony in 1642 enacted a comprehensive apprenticeship law requiring parents and masters of apprenctices to teach each child a trade or calling and to instruct him how to read and understand the principles of religion and the laws of the Colony. Labor was emphasized

because the puritans believed in the virtue of industry. Any parent or master who neglected to teach these abilities was subject to a fine. A similar law was enacted in 1650 in the Connecticut Colony. Girls as a rule were not taught a definite trade under these laws. They were, however, trained to do housework, including cooking, sewing, spinning and weaving, all of which was carried on in the home. New York also passed a similar law which was a compulsory education one. (39, page 50)

The Decline of Apprenticeship in America. The period of Industrial Revolution began in England about the year 1760 with the use of machine methods in the textile industry. Restrictive legislation in England was responsible for a delay in the time the industrial revolution reached the United States. However, by 1803, there were four cotton mills in operation, and by 1812 manufacturing was well started in the United States. The expansion of trade brought about the invention of new machines and the improvement of others in the agricultural and manufacturing industries. The power loom in 1814, the locomotive in 1829, the mechanical reaper and the telegraph in 1835, the sewing machine in 1846, together with the development of the coal and iron mines and the growth of the railroads, brought about rapid changes in the nations economy. At the close of the War Between the States, the nation was well into the Industrial Revolution with its increasing demands for and readjustments of labor.

The rapid development of power machinery and the increased demands for goods led to a greater demand for labor than could be met by apprenticeship. This demand was met in part by the employement for wages of young children and in part by the compulsory apprenticeship of the children of the poor. The children who in previous years were placed under the master craftsman and taught a trade were placed in a factory under a foreman interested primarily in production. The cruelty and wastefulness of child labor gradually began to be recognized, and the states began to enact more and more legislation designed to correct the evils of child labor. (39, page 59)

The decline of the apprenticeship program and the increasing interest in the educational welfare of children made necessary the organization of new types of schools both vocation and general.

The Beginnings of Manual Training. The practical arts or manual training movement came into being because of the insistence on the part of some educators that hand work and artistic modeling were as much a part of general culture as mathematics and foreign languages. The practical arts educators stated that education in the practical arts had both a broadening and a humanizing effect and contributed to the development of the individual as a whole.

The teaching of drawing courses, first in the fine arts institutions, and later in the elementary and secondary schools, was responsible for the development of public

sentiment for other types of manual or industrial education in public schools. As a result of this sentiment and other forces, manual training was added to the high school and elementary school curricula. Various types of schools in prior years had had some of the elements of manual training or industrial education. The schools of Pestalozzi and Fallenberg provided industrial education as a school discipline as well as a means of vocational training. The manual labor schools of the first half of the nineteenth century had some of the elements of industrial education. However, it was not until the last quarter of the nineteenth century that an effort was made to include an organized course of manual training in a secondary school curriculum. (39, page 71)

It was in 1820 that Joseph Neef and William Maclure organized what is known as the manual labor movement in the United States. It was a plan of introducing manual instruction into the schools on the basis that pupils would work, under school auspices, for about half of the day, and would receive academic instruction during a part of the remaining time. The plan was a by-product of the Fallenberg movement in Switzerland. The general ideas back of the movement were quire right, but it did not get very far because public sentiment was not ready for what appeared to be a radical innovation. (42, page 16)

The Manual Training School of Washington University. The first manual training high school in the United

States was established in St. Louis, Missouri. The school, being a part of Washington University was founded in 1880 by Professor Calvin M. Woodward, Dean of the Washington University Polytechnic faculty. Professor Woodward had operated courses in shopwork at Washington University for two years prior to the founding of the manual training school. These shop courses were organized for college students. Professor Woodward saw the need for a combination of shopwork and academic courses for secondary school students as a means of supplementing liberal education with manual activity. It was suggested that this combination of manual and general education would improve the training programs for all prospective workers.

The manual training school was a four-year institution which had for its purpose instruction in mathematics, science, drawing, and language and literature, as well as practice in the use of tools. Tool instruction included carpentry, wood turning, modeling, brazing, soldering, forging, and bench and machine work in metals. The manual training facilities in the school included a blacksmith shop, a machine shop, a turning shop, a carpentry shop, a drawing room, a physical science laboratory and rooms for academic subjects. Each shop was equipped for twenty students to do the same kind of work at one time. (39, page 72)

Conflicting Theories of Education. The manual training school met the need of a large group of secondary school students and proved popular among the lay citizens from its

beginning. However, it aroused the opposition of many educators who did not recognize the educational value of any type of manual activity. These educators feared that the manual training idea would break down the standards of the college preparatory type of secondary school which was becoming established at the close of the nineteenth century.

The proponents of manual training contended that instruction in the use of tools was not for its application to any particular trade or trades but for the development of the skill of hand as a means of both manual and mental development. The school shop stimulated and increased interest in books, provided direct and positive help in the study of basic sciences, and assisted the student to make a more intelligent choice of a vocation and to arrive at a better understanding of industrial processes and materials. Professor Woodward suggested that the teaching of manual training would enable the school to provide for a more symmetrical development of mind and body than was possible under old systems of general education. (39, page 74)

The success of the Washington University Manual Training School led to the establishment of manual training high schools in other cities and towns of the United States. The other types of manual training high schools were also established. The Technical high school was used to designate a more specialized school of the manual training high school types. The cosmopolitan or comprehensive high school brought the courses and equipment for general, commercial and manual

training education into one school.

Manual Training in the Elementary Schools. An experiment was conducted in Boston in 1882 to determine the feasibility of teaching manual training in the elementary school. The manual training, largely woodwork, was given in addition to the regular school work. The students were graded, and records of progress were kept in much the same manner as records in academic subjects. It was found that students were stimulated to do better work in academic classes in order to remain in the shop classes, and shopwork was judged to be a benefit rather than a detriment to work in other classes.

Manual training was introduced into New York City elementary schools largely through the efforts of the Kitchen Garden Association which later became the Industrial Education Association. The Association sponsored exhibitions of industrial work constructed by children, and this led to a demand for more of this type of work in the elementary schools. The course of study in manual training for the first five grades included knife work, drawing, gluing, making of joints, planing, sawing, chiseling, and project construction. This course was the effort to introduce manual methods in teaching the regular school subjects in the elementary school with special emphasis on form study, drawing, and modeling.

In 1882 the citizens of Montclair, New Jersey, agreed to provide manual training in the grammar grades provided that such instruction did not interfere with the regular

studies. The course consisted of shopwork for the boys and needlework for the girls with two hours for work devoted to these subjects. Manual training activities were provided from grades one through nine. Among the cities that provided manual training in elementary schools during this time were: New Haven, Connecticut (1883); Peru, Illinois (1884); Omaha, Nebraska (1885); Springfield, Massachusetts (1886); Beardstown, Illinois (1887). The first manual training high school supported by public expense began in Baltimore in 1884. After 1887, manual training developed rapidly in the grammar schools throughout the United States. (39, page 78)

From Manual Training to Industrial Arts. The manual training programs of the nineteenth century have developed into present-day industrial arts programs. During this period of development, the nature of manual training programs was influenced by a series of movements including the Russian system, the Sloyd movement, the arts and crafts movements, and the industrial or vocational movement. Each of these movements, some of which occured simultaneously and all of which have overlapped to some extent, was especially prominent from 1880 to 1920. Some characteristics of each movement are found in present-day programs of industrial arts.

The Russian Manual Training System. The organized manual training programs in the United States were first influenced by the Russian system of manual training. This system had its origin about 1868 in the work of Victor Della

Vos, director of the Moscow Imperial Technical School. The Russian system was designed to teach the fundamentals of the mechanical arts to large groups of students in the least possible time. The idea came to the United States through an exhibit of tool instruction shown at the Centennial Exposition at Philadelphia in 1876. The exhibit attracted the attention of John D. Runkle, president of Massachusetts Institute of Technology, and as a result a somewhat similar system of shopwork was organized at the Massachusetts Institute to provide practical training for engineering students. Professor Woodward also formulated a shop course for engineering students at Washington University with the impression of the Russian exhibit.

The Russian system of manual training was a formalized system based on the principle of a logical method or procedure in which exercises were assigned in order of increasing difficulty and were undertaken by students in this order. The Russian system consisted of a series of graded exercises without special reference to their application in the construction of useful articles. The teaching of the course involved three stages. The first consisted of a study of tools and materials, the second involved the acquisition of skill in joining together the materials under study, and the third stage was the construction stage in which whole or parts of projects were made. Students learned to sharpen, care for and adjust tools and to know the nature of materials. Freehand and mechanical drawing were emphasized throughout the course.

The Russian system, the formal class method of instruction, provided little opportunity for self-expression and for the recognition of individual differences. Students were told how to proceed in each step of the teacher-selected exercises. The exercise and the demonstration were used almost exclusively. A system of teacher's marks and grades added to the formalism of the course. (34, page 81)

The Sloyd Movement. Sloyd stands for the manual labor proper to schools and domestic work. Otto Salomon did most to develop Swedish Sloyd. In 1872 a free privately endowed school was opened at Naas about fifty miles from Stockholm, for children ten to fourteen years of age. A normal school was established in 1875 in order to train teachers of sloyd. This program was under the charge of Otto Salomon and an assistant, Mr. Johanson. (42, page 23)

The sloyd method, originated in the Scandinavian countries, was brought to the United States by Lars Erickson and Gustaf Larsson, both of Sweden. Erickson started a class in Anoka, Minnesota in 1884, and Larsson organized a class and a training program for teachers in Boston in 1888. An experiment was conducted in Boston in the 1890's to determine whether the sloyd or Russian systems could better meet the needs of the grammar grades. This experiment resulted in the almost exclusive use of sloyd in the Boston schools. Albany schools and Chicago tried out this system in 1889 and 1892 respectively. About 25 per cent of all schools offering manual

training taught sloyd according to the Report of the U. S. Commissioner of Education for 1893-1894.

The outstanding characteristics of the sloyd system were the individual method of instruction, the useful model and the encouragement of the student's initiative and self-direction. This course included the use of measuring tape and also free-hand work which required a sense of form through sight and touch. Special importance was attached to neatness, accuracy, finish and the desire to do good work. Well-trained teachers rather than artisans were preferred as sloyd teachers. American educators made some changes in the Swedish sloyd namely the development of a course of drawing and the improvement in the design of the models. (39, page 81)

In the primary schools of Sweden manual training was limited to work in the following materials:

1. Iron-working: forging, lockmaking
2. Working in straw and willow: basketmaking
3. Working in paper and cardboard
4. Woodworking including turning, sculpture, carpentry, woodenware.

The chief objectives of sloyd as seen by Otto Salomon:

1. To cause the child to acquire a general skill of hand.
2. To awaken in him the taste and love of labor.
3. To call forth spontaneity -- the initiative.
4. To give him experience of the fact that order and correctness in labor are necessary elements of progress.

5. To develop the faculties of attention and perception.
6. To render the child earnest and persevering.
7. To inspire the aesthetic sentiment without allowing it to become vague or exaggerated.
8. To neutralize the injurious effects produced upon the system by intellectual studies, and by the sitting position which the child must maintain during the ordinary lessons. (42, page 24)

The Arts and Crafts Movement. The arts and crafts movement, originated in England during the latter part of the nineteenth century to protest against poor craftsmanship, exerted an influence over manual training programs of the United States. This movement placed emphasis on the aesthetic and creative side of the work instead of the skilled side as stressed in the Russian and sloyd movements. The arts and crafts emphasis was introduced into the Philadelphia schools about the same time the Russian system was getting started. James P. Haney, in an address at the 1903 meeting of the National Education Association, suggested that the term "manual arts" be used instead of "manual training" as a means of placing more emphasis on artistic elements of manual activity.

This movement stressed the importance of industrial drawing and various types of decorative work. Activities such as drawing, modeling, carving, leather work, and metal tooling, made up the major part of the course of study for elementary school students.

The principle of rotation of work was one of the features of the arts and crafts movement. Students were rotated

among the four departments of drawing, designing, clay modeling, and wood carving. A great attempt was made to correlate drawing with other school work. Students were expected to select and design some article of personal interest and were encouraged to use various types of materials other than wood, iron and steel for planning and design work. (39, page 80)

The Industrial or Vocational Movement. At the first decade of the twentieth century, the advocates of vocational education emphasized manual arts. These educators suggested that the manual arts program should contribute more directly to the vocational preparation of secondary school students. This point of view was popularized as a result of the report of the Douglas Commission appointed by the governor of Massachusetts to investigate the need for vocational education. This report deplored the cultural emphasis in manual training and suggested that more practical courses in vocational education were needed.

John D. Runkle of Massachusetts Institute of Technology and Calvin Woodward of Washington University had previously suggested that while manual training had some value in training for the mechanical occupation it was primarily general education. The report of the Douglas Commission caused some educators to suggest that the emphasis be shifted more to the vocational and less to the cultural. Robert W. Selvidge, who later became professor of industrial education at the University of Missouri, suggested in 1913 that the vocational side

of manual arts had not been stressed as much as it should have been and that students needed instruction in industrial methods and practices to give them a greater understanding of how consumer goods are produced. Advocates of the vocation emphasis suggested that the school shop be organized on a factory basis and engage in production work for the school system. This involved the use of groups rather than individual projects.

The passage of the Smith-Hughes law in 1917, providing Federal aid for vocational education, resulted in the organization of special schools and classes designed to carry out many of the principles and practices previously suggested as desirable in manual training programs. As a result, many manual training educators suggested a return to the general education emphasis. But some educators still continued to insist that manual training with a vocational emphasis met the requirements of the Federal vocational education act despite the fact that the manual training program was designed for general rather than specific education. The vocational emphasis on manual training proved beneficial because it brought about a reexamination of the purposes of manual training which resulted in a restatement of its values and aims in terms that were more attainable. (39, page 83)

The Development of Industrial Arts. Charles R. Richards of Teachers College, Columbia University, suggested in an editorial in the October, 1904 issue of Manual Training Magazine that the term "industrial arts" be used instead of

"manual training" or "manual arts" because the course should center more attention on a study of the industrial processes that operate in transforming raw materials into usable products. (39, page 84)

Since the passage of the Smith-Hughes law, the industrial arts movement has increased in popularity. This law shifted responsibility for vocational education to separate schools and classes, thereby freeing industrial arts from this responsibility and enabling industrial arts educators to devote their efforts to the aims of general education.

Summary of Industrial Arts Curriculum Development. At the end of the nineteenth century, subject matter areas in manual training consisted of woodworking and mechanical drawing. As the industrial arts replaced the manual training, the work done with machines increased. Through the period of 1900 to 1928 industrial arts materials and activities were expanded greatly. Some of the leading areas around 1924 were wood, drawing, leather, general metal, art metal, craft work, and electricity. By 1925 the general shop idea was being accepted generally, and around 1930 many programs included woodwork, drafting, metalwork, electricity, auto mechanics, graphic arts, and blue-print reading. By 1947 the trend was toward generalized program with much more emphasis on planning to include work in many materials. In 1953 the American Vocational Association recommended the general instructional areas for a comprehensive general shop: (1) drawing and planning, (2) woodworking, (3) metalworking,

(4) electricity and radio, (5) graphic arts, (6) transportation and power, (7) plastic, (8) leather work, (9) ceramics, (10) textiles, and (11) home mechanics. (59, page 142)

The short history of industrial arts from the early age to the present described in here revealed how industrial arts has been changed and developed through various phases. Yet the story is not finished; there will be more changes in the future according to the new concept and philosophy. The philosophies of industrial arts of the past are interesting and worthwhile for further study.

Part B

Philosophies of Some Philosophers and Educators of the Past

As mentioned in Part A about the history of handicraft, manual training, or industrial arts in the present concept, the education of this area was neglected at one time and promoted at the other. The philosophies of some educators toward these aspects should be worth-while for study.

Socrates (470-399 B.C.). Socrates was the first great teacher to be adequately recorded in history. He is important not only because he was the first, but also because he developed a method of teaching that has survived for more than two thousand years and is still in use. "The Socratic method" --the method of analysis and questioning is still well-known today. (10, page 8)

Socrates had the attitude of contempt toward the mechanical arts by giving his reasons as follow:

> The so-called banausic arts have a bad name, and quite reasonably they are in ill repute in the city-states. For they ruin the bodies of those who work at them and those who oversee them. They compel these men to remain seated and to work in gloomy places, and even to spend entire days before a fire. While their bodies are being enervated, their souls, too, are becoming much enfeebled. More especially, also, the banausic arts offer men no leisure to devote to their friends or to the state, so that such men become base in relation to their friends and poor defenders of their fatherland. And so in some of the cities, no citizen is permitted to work at any banausic craft. (4, page 15)

Plato (427 or 429-347 B.C.). Plato's chief interest was education for character, citizenship, and leadership. Being the disciple of Socrates, Plato shared the prejudice against the practical arts. To him the practical arts were evil and unfit for gentlemen because they distorted the body, kept the individual from enjoying the leisure necessary for the higher things of the soul, and prevented the man to attend the duties of the state. The practical arts were excluded from Plato's system of education. The artisans, the laborers, and the slaves were not thought of as citizens. Plato contemptiously declined to prescribe a system of training for the people. He suggested that workers should be assigned to the occupations for which they were naturally fitted. They were to follow the traditional family life. The boy was brought up to follow the father's occupation; the girl to engage in the household activities of the women. The children had to learn the skill of crafts or work by imitation or copying and continued practice until the manipulative

dexterity had been acquired. Such training was informal and took place in the family. (14, page 90) (29, page 251)

Xenophon (430-355 B.C.). Concerning apprenticeship, Xenophon suggested that a contract concerning what the boy should know must be made when a man put his son out to apprenticeship to be trained. In referring to the manufacture of shoes, Xenophon stated:

> In great cities, because there are numbers that want each particular thing, one art alone suffices for the maintenance of each individual; and frequently, indeed, not an entire art, but one man makes shoes for men, and another for women; sometimes it happens that one gets a maintenance merely by stitching shoes, another by cutting them out, another by cutting out upper leathers only, and another...by simply putting together the pieces. (4, page 16)

This system of production is said to have resulted in a large increase in the number of slaves.

Both Plato and Xenophon did not say much about handwork. The attitude of the upper classes did not prevent the continuance among the lower classes of the apprenticeship in Greece. Even Quintilian (A.D. 35-95), the most outstanding teacher of Rome, who gave a good statement of the supposedly modern doctrines of individual differences and wanted schoolwork to reflect as closely as possible the realities of life outside school, did not seem to pay much attention to handwork. Beside the early Christian monks - St. Basil (329-379) and St. Benedict (480-543) no outstanding educators were concerned much in handwork until the Protestant Reformation period.

Martin Luther (1483-1546). Luther must be recognized as

the first modern reformer to advocate compulsory education and to lay the foundation of national control of education and religion throughout Germany. In 1520, he published in rapid succession three of his most powerful and epochal work: the first, "The Address to the Christian Nobility", the second, "The Freedom of a Christian Man", and the third which was issued red-hot from Luther's soul, "On the Babylonish Captivity of the Church". These three publications threw the German world into a state of religious bewilderment and educational chaos. Luther violently assailed the schools, the subjects taught, and the texts used. He termed the schools, "hells, purgatories where a boy was forever tormented with cases and tenses, and where he learned nothing by reason of ceaseless flogging, trembling, woe and anguish." (15, page 63)

He wrote of trade and manual work,

> My opinion is that we must send the boys to school one or two hours a day, and have them learn a trade at home for the rest of the time. It is desirable that these two occupations march side by side. (4, page 61)

Rabelais (1483-1553). While Luther in Germany was still protesting against indulgences in the Church and "monkish tyranny" in the schools, Rabelais in France began to hurl his shafts of satire against the formalism, insincerity, and shallowness of the Church, the school, and the State. He saw advantage of manual labor as a means of recreation and placed the arts of painting and carving on the same level with playing games as a rainy-weather occupation. (4, page 33)

Richard Mulcaster (1530-1611). Mulcaster, the famous English schoolmaster laid the foundation for the modern science of education in England. No one until Pestalozzi placed so much emphasis upon elementary training as did Mulcaster. He suggested that the elementary education should consist of reading, writing, drawing, painting, music (singing and instrumental), dancing and playing. He has been given the credit for being the first to make drawing one of the fundamental studies of the school. (15, page 132)

Francis Bacon (1561-1626). Bacon advocated the inductive method, scientific method, and the direct study of nature. He pointed out that the way to study nature was not merely to learn what others had written but to go straight to nature and learn through senses. His philosophy of realism provided the motive force in education that later developed the modern schools of applied science. In his "Advancement of Learning" he described mechanical arts as follows:

> We add, that the body of this experimental history should not only be formed from the mechanical arts, but also from the operative and effective part of the liberal sciences, together with numerous practices, not hitherto brought into arts; so that nothing may be omitted which has a tendency to inform the understanding. (2, page 49)

Concerning industrial arts Bacon's suggestion as stated by Anderson:

> Of the several arts, preference is to be given in the first instance to those which "exhibit, alter, and prepare" natural bodies and materials, such as cookery, dyeing, agriculture, chemistry, the manufacture of glass, of sugar, enamel, artifical fires, gunpowder, paper and the like. Of less general use

> are the arts which manifest the delicate motion of the hands and the making of instruments, for example, weaving, carpentry, architecture, the manufacture of clocks. (1, page 263)

Johann Amos Comenius (1592-1670). His name was originally spelled "Komensky". His people were Slavs. Comenius, having the ministry in view, went to the College of Hirborn, in Nassau, and spent some time studying in Amsterdam, the most enlightened and progressive center of culture in Europe at that time. After training, he went back to Maravia, his birthplace, but later was driven from there by fiendish persecution after having lost all his property. He settled in Lisse, Poland, and became rector of the gymnasium. Here he wrote his "Great Didactic", his "Gate of Tongues Unlocked", and "Vestibulum". He was invited to Sweden and Hungary and worked in both countries. (15, page 179)

Comenius was called "the father of modern pedagogy". He was the most famous educational writer of the seventeenth century. His philosophy was that the instruction in words and things should go together. The subject taught must not be too difficult for children to comprehend and the method must be according to the order of nature. He proposed a system of education that included an infant school for children up to six years of age, public elementary school for children from six to twelve years of age, a secondary school for children from twelve to eighteen years of age, and a university for young men beyond the age of eighteen. He referred to handicraft, but his "method of arts" was not to

show how handicraft should be taught. He did not include in his school curriculum the handicrafts to which he referred but they were to illustrate a rational method of teaching the school subjects of his time. (4, page 39)

John Locke (1632-1704). Locke was renowned as the deepest thinker England had produced. His writing covered philosophy, government, education, economics, and religion. He included the manual arts in his scheme of education. In 1697, as a commissioner of trade and plantations, he advocated a system of "working schools" for all pauper children between three and fourteen years of age. The children were taught spinning or knitting or some other part of woolen manufacture. He suggested that children should be directed to "something that may be useful to them". Ulich stated as follows:

> (1) Where the skill itself, that is got by exercise, is worth the having. Thus skill not only in languages, and learned sciences, but in painting, turning, gardening, tempering, and working in iron, and all other useful arts, is worth the having. (2) Where the exercise itself, without any considerations, is necessary or useful for health. Knowledge in some things is so necessary to be got by children, whilst they are young, that some part of their time is to be allotted to their improvement in them, though those employments contribute nothing at all to their health: such as reading, and writing, and all other sedentary studies, for the cultivating of the mind... Other manual arts which are both got and exercise by labour, do many of them by that exercise, not only increase our dexterity and skill, but contribute to our health too; especially such as employ us in the open air. (45, page 380; 4 page 61)

Jean Jacques Rousseau (1712-1778). Rousseau, born in Geneva, originated the doctrines that revolutionized views

of government, religion and social life; that radically changed the prevailing ideas of marriage; that necessitated the reconstruction of philosophy; that inspired a new literary movement; and that place education on a new track.

His philosophy was the education from circumstances through nature study and the manual arts. He believed profoundly that experience is the best teacher, and he would therefore have everything possible taught by actions; he would say only what he could not do. Concerning the handiwork, he wrote in his Emile, "Emile will learn more by one hour of manual labor than he will retain from a whole day's verbal instruction". He considered agriculture as being the most respectable of all arts and professions. Next to this came smithing and carpentry. Rousseau's purpose of having Emile learn a trade was not that Emile would be likely to earn his living by it, but because it would be a vital part of the process of his education. He advocated that manual arts be taught as a basis for intellectual improvement. (4, page 80)

Johann Heinrich Pestalozzi (1746-1827). Pestalozzi was born in Zurich, Switzerland. His school was "the cradle of the modern elementary school". He opposed coercion. In general there were neither punishments nor rewards. Rivalry and fear were not used as incentives. He never wavered in the conviction that the home is the ideal educational institution, the most effective medium for social experience; the foundation of all moral, political, and

religious life. In his experience in the orphanage at Stanz, he had tried to unite training in gardening, farming, cotton spinning, and housework, with instruction in reading and writing. Pestalozzi's interest in drawing grew out of his doctrine of sense impression as the foundation of all instruction. (15, pages 436 and 455)

Philip Emanuel von Fellenberg (1771-1884). Fellenberg, born in Berne, Switzerland, believed that the only means of permanence in the social conditions of the country is through the education of all people. Manual labor was the chief distinguishing characteristic of Fellenberg's scheme and it gave a great impulse to three types of institutions that followed it: the agricultural school, the industrial reform school, and the manual labor school. (4, page 128)

In his school a student might choose his voluntary exercise in several branches of mechanic arts in the workshops. Fellenberg kept students busy to avoid vicious habits. To bind the upper class to the lower one to exalt the condition of humanity, Fellenberg suggested to turn student's attention to agriculture and mechanical arts, to inspire them with a love of labor, to exercise in use of tools and instruments, and to observe nature. He believed in the closest possible connection between theory and practice. He said, "Instruction should be followed by action as closely as the lightning by the thunder, and the life should be in complete harmony with the study". (4, page 134)

Of all three types of schools, the academy for boys of higher social class, the school of applied science for young men from the middle class, and the farm and trade school for infants and boys from poor family. The last one was the most important and should be considered more.

The daily program of the farm and trade school consisted of lessons and farm work with about three to five hours of instruction and seven hours to twelve hours of labor per day, depending on the season. The instruction was omitted during the harvest season. Students were taught to sew, and they had responsibility for all house work. The manual labor provided a natural environment for growth.

Fellenberg employed mechanics representing several trades to supply the needs of his institution. Among the skilled trades represented were those of blacksmith, wheelwright, cabinet maker, carpenter, shoemaker, harness maker, tailor, turner, brassworker and book-binder. (39, page 97)

Heirich Gottlieb Heusinger (1766-1837). Heusinger, professor of philosophy and pedagogy at the University of Jina, Germany, made manual work the central point of his system. His seven rules concerning instruction in manual work: (1) The work should correspond with the powers of the child, (2) The work should not be unhealthy, (3) The work should not be executed in a sitting posture, but by movements when standing, (4) The work should be not merely a foundation for artisan's work, but for general education, (5) The materials

should be as various in character, and furnish as great variety in the forms of objects as possible, (6) Great stress should be laid on the relations between work and the implanting of knowledge, (7) The sense of form and beauty should be developed. (He recommended the use of card board, wood, metal, clay, bone or horn, and wax.) (4, page 158)

Johann Friedrich Herbart (1776-1841). Concerning the manual arts he said:

> Children in any case must be occupied, as idleness leads to mischief and unruliness. If the occupation is some useful work (such as manual or field labor) so much the better. An better still, if, by means of occupation, something is taught and learned which contributes to future culture. But not all occupation is instructive, and where the government of children is always difficult, then learning is not the most suitable occupation. Most grown-up boys are better brought under control with an artisan, a merchant, or a farmer, than in the schools.

Herbart suggested that the growing children should learn to handle the carpenter's tools as well as the ruler and the compass. Mechanical dexterity would often be more useful than the ability in gymnastics. The one helped the spirit, the other the body. To Herbart's opinion, elementary schools should have workshops, though they should not actually be technical schools. Every man should learn to use his hands. The hand holds the place of honor at the side of the power of speech in raising man above the beasts. (4, page 161)

Friedrich Wilhelm Augustus Froebel (1782-1852). Froebel took Pestalozzi's idea of organic growth and developed it into the doctrine of self-activity which he made the very

center of his educational theory. He took Pestalozzi's practice of training in observation and sense perception and expanded and systematized it until he produced the kindergarten gifts and occupations. He described handwork in The Education of Man:

> Primarily and in truth man works only that his spiritual, divine essence may assume outward form, and that there he may be enabled to recognize his own spiritual, divine nature and the innermost being of God ... The young, growing human being should, therefore be trained early for outer work, for creative and productive activity. Every child, boy, and youth, whatever his condition or position in life should devote daily at least one or two hours to some serious activity in the production of some definite external piece of work. Lesson through and by work, through and from life, are by far the most impressive and intelligible and most continuously and intensely progressive both in themselves and in their effect on the learner... (4, page 164)

Froebel proposed to devote the forenoon to instruction in the current subjects of school study, and the afternoon to work in the field, the garden, the forest, in and around the house. His list of occupations comprised the preparation of wood for the kitchen and the furnace; the making of simple wooden kitchen utensils; the weaving and binding of mats for the table and for the floor; the binding of books and ruling of slates and practice-paper; the making of a variety of collections of objects of nature and art, and of suitable boxes for these objects; the care of the garden and orchard, the field; the plating of straw mats for the hot-beds, and basket making; the care of pigeons, chickens, ducks, etc.; the preparation of artistic and geometrical forms with paper in folding, cutting, mounting, pricking, weaving,

interlacing, etc.; the use of pasteboard in the making of stars, wheels, boxes, napkin-rings, card baskets, lamp-shades, etc.; play with splints, tablets, sticks and pens; the whittling of boats, windmills, water-wheels, etc.; the making of chains and baskets from flexible wire; modeling with clay; drawing and painting; and many other things.

Benjamin Franklin (1706-1790). Franklin was the living embodiment of the idea of democratic progress, the man who through self-education had become one of the leading citizens of his country. Franklin proposed the school system for education of youth in Pennsylvania, Philadelphia:

> That the House (for the Academy) be furnished with a library with maps of all countries, globes, some mathematical instruments, and apparatus for experiments in natural philosophy, and for mechanics; prints of all kinds, prospects, buildings, machines,... (45, page 444)

Robert Owen (1771-1858). A successful factory manager and later the founder of English socialism. In 1816, he established, in the spirit of Pestalozzi, at New Lanark, Scotland, his famous infant school which was the first in England. The first master for his school was a weaver, James Buchanan, illiterate and without professional training, but he was selected because "he does not know how to teach what is found in books, but he does know the nature and love children, and by that love will bring nature and the children together". Buchanan was assisted by a girl of seventeen years old. The children from the ages of two to five years were in the infant school, and five to ten

years were in the higher school.

Robert Owen came to America in 1825 to start a "new moral world" and settled in New Harmony, Indiana. The same system of school as in New Lanark was established with William Maclure (1763-1840) as education director.

In Maclure's scheme "the child was permitted to choose the branch of subjects in which he wished to be trained. If he made no choice, he was assigned one for which he had special attitude". Every child was expected to learn at least one occupation or trade well. When this had been done he might receive permission to enter another workshop and learn a second industry. Occupations taught were: taxidermy, printing and engraving, drawing, carpentry, wheel wrighting, wood turning, blacksmithing, cabinet making, hat making, shoemaking, agriculture, washing, cooking, sewing, housekeeping, dressmaking and millinery.

Strong differences of opinion developed between Owen and Maclure, the system collapsed after two years and Robert Owen returned to Scotland. (4, page 178)

Amos Bronson Alcott (1799-1888). Alcott, knowing nothing or very little about the work of Pestalozzi, applied Pestalozzian principles in a school at Cheshire, Connecticut. Alcott's educational thought and practice was a generation ahead of the time in which he lived. His ideas were not popular, except with the progressive teachers; he was too radical, yet many of the reforms he advocated and put into

operation in the schools he taught have become the standard practice of today.

He opened his unique school in the Masonic Temple, Boston, where his educational theories were put into practice. His religious views, when made public, reduced the number of his pupils from thirty to ten. When he admitted a colored boy, the number was reduced to five--his own three daughters, a staunch friend's child, and the colored boy. The school closed in 1839. Alcott then became the dean of the Concord School of Philosophy.

Alcott considered the early education of achild as a leading of the mind to self-education, and his chief concern was always for moral and spiritual culture. His three-fold nature of childhood theories were (a) the spiritual faculty, (b) the imaginative faculty, (c) the rational faculty. He did not seem to use the manual arts, but he made the effective use of professional methods of drawing. He was also a pioneer in schoolroom decoration. (4, page 179)

Most of the philosophers and educators mentioned in this part thought that handwork was important and necessary for education. Only a few put little value on handwork. From this period on, all educators seem to agree on the value of craftswork, but they stated their opinions differently. The current beliefs of some philosophers and educators will be discussed in the next part.

Part C

The Current Beliefs of Industrial Arts

The philosophy of industrial arts at present has been developed through the current beliefs of the outstanding educators since the last part of the nineteenth century. The most outstanding was John Dewey's philosophy which caused significant changes of the school curriculum not only in the United States, but also in many other countries all over the world. The current philosophies to be described in this part will be concerned with those that were developed in the United States.

John Dewey (1859-1952). Dewey's philosophy dominated the last decades of the nineteenth century and the first decades of the twentieth. While Spencer with his insistence on pure science and individualism was typical of the nineteenth century, Dewey with his insistence on applied science and industrial arts and on the social factor was representative of the twentieth century. He wrecked the traditional philosophy, that the education was the preparation for life and supplanted it with the new philosophy that education is life. His definition of education was, rather abstract, that education was the process of the reconstruction or reconstitution of experience, giving it a more socialized value through the medium of increased individual efficiency. (40, page 299)

Dewey stated his comment about the manual training:

> No one any longer doubts the thorough training of hand and eye, and (what is of greater importance) of the hand and eye co-ordination, which is gained through these agencies. Recent psychology has made it unnecessary any longer to argue the fact that this training of hand and eye is also directly and indirectly a training of attention, constructive and reproductive imagination, and power of judgment. The manual-training movement has been greatly facilitated by its happy coincidence with the growing importance attached in psychological theory to the motor element. The old emphasis upon the strictly intellectual elements, sensations and ideas, has given way to the recognition that a motor factor is so closely bound up with the entire mental development that the latter cannot be intelligently discussed apart from the former. (11, page 55)

Dewey placed industrial arts in the center of school curriculum as he described further in the article mentioned above:

> If there be any measure of truth in these conceptions, then the forms of occupation, construction work, manual training (whatever name be given them), which are employed in the school must be assigned a central position. They, more than any other one study, more than reading or geography, story telling or myth, evoke and direct what is most fundamental and vital in the child; that in which he is the heir of all the ages, and through which he recapitulates the progress of the race. (11, page 58)

With this new philosophy put into practice, the teacher needs to teach arts and crafts, industries and occupations that are servicable in the home, in the school, and in the play environments of children. The purpose of the teaching of these subjects is not for the skills or products gained by students, but for giving play to the deep-lying motor instincts and demands of the child. The motor instincts would enable the child to become conscious of his powers through the variety of uses, and thus to become aware of their social values. The saw, the hammer, and the plane, wood and clay, the needle and cloth, and the processes by

which these things being manipulated are not the ends in themselves; they are rather agencies through which the child may be initiated into the typical problems requiring human effort, into the laws of human production and achievement and into the methods by which man gains control of nature. The interest in the technical problems and processes of manual training should be let grow gradually. (11, page 59)

Calvin A. Woodward. As the advocate of manual training, Woodward emphasized the importance of "making good workmen" as well as "educated intellects". He claimed that workshop or manual education did not detract the interest of boys in books or other subjects, but it stimulated their interest either directly or indirectly. In 1883, he stated the result of manual training programs in his speech on "The Fruits of Manual Training" as follows: (1) larger classes of boys in the grammar and high schools; (2) better intellectual development; (3) a more wholesome moral education; (4) sounder judgments of men and things, and of living issues; (5) better choice of occupations; (6) a high degree of material success, individual and social; (7) the elevation of many of the occupations from the realm of brute, unintelligent labor, to positions requiring and rewarding cultivation and skill; and (8) the solution of labor problems. (5, page 362)

The above mentioned list was understood as his objectives in manual training.

Frederick G. Bonser. To his definition, industrial

arts is a study of the changes made by man in the forms of materials to increase their values and of the problems of life related to those changes. (6, page 5)

Bonser helped expand the conception of industrial arts in the elementary school and sought to help in reforming elementary education as he accepted the social philosophy of Dewey. In doing so, he made full use of industrial arts. He asserted that industrial arts is an appropriate subject for elementary school because all children need intelligence, insight and appreciation of its subject matter and the activities involved in appropriate impression through its materials. On the emphasis of industrial arts, he said:

> From this standpoint, it will at once appear that primary emphasis will not be placed upon the production of industrial commodities, but rather upon intelligence and cultivated taste in their choice and use. In not a single field will all of the children function as producers, but from every field worthy of study they will all function as consumers. The largest problems are those of developing an appreciative understanding of industry as it is at the present time, realizing its social problems and cultivating intelligent judgment and appreciation in selection and use of industrial products.
>
> To secure these pragmatic values means far more than mere manual training -- training of the hand or of the hand in coordination with the eye. It means a well-organized body of thought, giving insight into industrial materials, industrial methods, and the social aspects of industry; it means a study of the evolution of industry, showing how the complex factory system with organized capital, organized labor, and highly specialized machine production has grown from the simplest beginnings; it means a more practical study of design--of the principles of design in relationship to their appropriate usage in specific product--as design is used today and as it has developed among different peoples in different times, and it means participating through

> the making of many projects--more design and handwork than we have had in the past, not less--all chosen with reference to their appropriateness to illustrate the major principles of design and construction, and the fuller appreciation of industry which they represent. (7, page 108)

William A. Warner. Professor of Industrial Arts Education, Ohio State University, described the objectives of industrial arts for junior and senior high schools: (1) Exploratory or findings values which relate to the detection, discovery, or tryout of interests and aptitudes. (2) General guidance, both educational and vocational. (3) Household mechanics or the development of handyman abilities about the home. (4) Avocational opportunities for the development of hobbies, or a side-line interest. (5) Formation of desirable personal and social habits and insights which will influence conduct. (6) Consumers' or utilizers' knowledges and appreciations of the products of industry. (7) Development of a degree of skill with tools and in tool or machine processes commensurate with the ability of the pupil and incidental to the completion of a project or activity which sums to have "educational" value. (8) Correlation or integration with other studies and interests both in and out of school. (9) Vocational purposes in the definite preparation for a future industrial vocation. Applicable to from 0 to 16 percent of the average junior high school groups where the occasional boy has to drop out of school. (46, page 44)

General Objectives of the Industrial Arts. Dr. Louis V. Newkirk, Director, Division of Industrial Arts, Chicago Public Schools and Dr. William H. Johnson, Principal, McPherson School, Chicago, Illinois, stated the general objectives of the industrial arts as follows:

(1) Develop the ability to plan and complete projects, using a variety of tools and construction materials in a workmanlike manner. (2) Give experiences that will increase understanding of modern industry and that will lay the foundation for and help determine vocational interests. (3) Develop the ability to read and make working drawings, charts, and graphs. (4) Develop the ability to recognize quality and design in the products of industry. (5) Develop the ability to maintain and service in a safe and efficient manner the common products of industry. (6) Provide an objective medium for expression in mathematics, science, language, arts, and social science. (7) Develop an interest in crafts as a valuable medium for creative expression in leisure time. (8) Give experiences that will develop social understanding and the ability to work effectively with others either as a leader or as a member of the group. (34, page 7)

Standards of Attainment Objectives. The American Vocational Association Committee on Standards of Attainment in Industrial Arts worked from 1930 to 1937 in producing a bulletin of the same name. This bulletin was revised in

1946 and again in 1953 and published under the title "A Guide to Improving Instruction in Industrial Arts". The nine objectives were listed:

(1) Interest in Industry. To develop in each pupil an active interest in industrial life and in the methods and problems of production and exchange. (2) Appreciation and Use. To develop in each student the appreciation of good design and workmanship and the ability to select, care for, and use industrial products wisely. (3) Self-Realization and Initiative. To develop in each pupil the habits of self reliance and resourcefulness in meeting practical situations. (4) Cooperative Attitudes. To develop in each pupil a readiness to assist others and to join happily in group undertakings. (5) Health and Safety. To develop in each pupil desirable attitudes and practices with respect to health and safety. (6) Interest in Achievement. To develop in each pupil a feeling of pride in his ability to do useful things and to develop worthy leisure-time interests. (7) Orderly Performance. To develop in each pupil the habit of an orderly, complete, and efficient performance of any task. (8) Drawing and Design. To develop in each pupil an understanding of drawings and the ability to express ideas by means of drawings. (9) Shop Skills and Knowledge. To develop in each pupil a measure of skill in the use of common tools and machines and an understanding of the problems involved in common types of construction and repair. (59, page 142)

Philosophy of Industrial Arts by Giachino and Gallington.

Dr. Giachino is the Professor of Industrial Education and Head of Vocational-Industrial Education Department, Western Michigan College of Education, and Dr. Gallington is the Professor of Industrial Arts Education, Southern Illinois University. Both professors stated:

> Industrial arts is a part of general education which should be afforded by our public schools to all youth. It is not designed for specific occupational preparation, but for the exploration of industrial knowledge, industrial methods, hobby interests, and the development of such attitudes as will enable youth of all ages, and adult as well, to adjust more adequately to the duties and responsibilities of a democratic society dominated by the works and products of industry. More specifically, industrial arts in education is a body of selected basic learning experiences involving significant industrial activities and understandings inherent in industrial occupations, arts, and crafts of past and present civilizations, giving interpretations to: (1) the sources, refining, and distribution of raw materials used in industry, (2) the processes involved in the manufacture of industrial products, and (3) the pertinent related technical and occupational information, including group and individual safety. (19, page 51)

The two professors stated that in industrial arts, the student is given experiences in the home, mechanics, home maintenance, creative design, and handicrafts, all of which contribute greatly toward "successful family life". Consumer education is given great emphasis in industrial arts.

Friese's Viewpoint. John F. Friese, former Professor of Industrial Arts Education, Pennsylvania State University stated in his book, "Course Making in Industrial Education", the most recent publication in this field, that philosophy

of industrial education to be sound must be arrived at through the techniques of the scientific method of research, particularly as applied to reasoning; must recognize individual right to creative, artistic, economic and occupation development; there is to be rather continuing change; must accept and cooperate and coordinate its educational activities with general cultural education and other special-interest areas; and must provide for present intelligent social living as well as (for some) preparation for adult economic living. He agrees that industrial arts objectives go along with the Cardinal Principles of Secondary Education of 1918 (1. Health 2. Command of the fundamental process 3. Worth home membership 4. Vocation 5. Civic intelligence 6. Worthy use of leisure 7. Ethical appreciation and development) and that the only new concept to be added is that of providing youth with opportunities to develop patterns for attempted solutions of all kinds of problems, and to give them opportunities to carry out the solutions and learn from these experiences. In Friese's opinion, industrial arts is one of the few remaining areas of general education where a student may carry out approaches to real-life learning experiences in the most dominating area of modern life, industry based in large part on physical science. The current industrial arts concept is concerned with developing sound work habits and some manual skill development. It is concerned with understanding and practice of certain attitudes such as attitudes toward public property, economical use of materials, attitudes toward leadership and followship

responsibilities in the personnel organization plus such obvious factors as attitudes toward cooperative effort at times and toward the best possible achievement in personal accomplishment.

Industrial arts is concerned with and makes significant educational contributions at all age levels. Industrial arts could be made to contribute "something" to youth in the Sixty Percent Group who are headed for post-high school education or who are not in vocational classes of some kind to reduce some of the problems of early delinquency. Out-of-school hours at which school shops are open should be considered. Industrial arts must be helpful to youth either in personal interests of occupations or local trade groups, and its learning units must represent the chief common areas of industrial, trade, and handicraft activities. Industrial arts should help students to do better things and develop sound understandings of the impact of technology on modes of intelligent living. For adults, industrial arts is chiefly planned on the avocational, hobby-craft aim for the value of recreation plus positive emotionally therapeutic values for some persons. (17, page 57)

William A. Bakamis. Dr. Bakamis is Professor of Industrial Arts Education Department, Washington State College. He quoted in his book about the definition of industrial arts.

> There is no single acceptable definition for industrial arts. Practically all the leaders in the field have expressed their definition of

> industrial arts in terms of "industry". The author is not in agreement with this definition, for the work being done in the shops of the many school systems is a far cry from "industry". (3, page 33)

According to his article, "A New Look at Industrial Arts" in the School Arts magazine of January 1959, the chief significance of the words "industrial arts" is in the second word "arts". The word "industrial" is a minor adjective indicating the area of application. True art requires imaginative application of intellect to conceive pleasing and functional forms for which the designer has the interest and ability to create. Industrial arts is concerned with the "process of creating" rather than the study about industry, its products and processes. The method in industrial arts is far more important than the content. The method of finding problems and solving them is the "new" concept in industrial arts education.

Students in industrial arts must not be relieved of the tasks of thinking for themselves. The student must not be told what to do, how to do, and when to do without consultation with him. He is not supposed to follow mechanically through the steps which are plotted for him, in ways plotted for him as a result which is plotted for him. He should be taught to develop the traits of interest, initiative, free thought, self-reliance, perserverance, patience, and others which define individuality. The industrial arts taught as arts would begin and end with the student. The student would be given personal responsibility for the thought, conclusion,

and subsequent action from beginning to the end of any significant task. This would lead to future adjustment through a series of ongoing present adjustments. (57, page 15)

The current philosophies in this part may be summarized that attempts have been made to develop the industrial arts to meet the needs of child and adolescent, to make home life more meaningful, to offer a variety of industrial understanding, and to give consumer education to students. The industrial arts has been put in the significant place of general education and taught in the broad areas of industrial activities where the problems being related to daily living are beneficial to all age levels.

Part D

The Author's Viewpoints

The following descriptions are the author's personal viewpoints of the industrial arts and how it should be applied for schools in Thailand. The improvement of the children's education is the prime purpose. The author does not mean to depreciate anybody or the school system of Thailand.

There is no doubt about the value of industrial arts. The author can find no expression about the value of the industrial arts better than what Bonser said, "The place of the industrial arts in an efficient education can be estimated as nothing less than of the highest importance." (7, page 106)

As mentioned in Part C., many advocates of the industrial arts stress the importance of the industry; some others find it far from and uncomparable to the sense of the present industry. To the author, the meaning and the scope of the industrial arts are expressed in the words "industrial arts" themselves. The two words, "industrial" and "arts" are equally important, though the physical appearance seems to be at the word "arts". In short, "industry" and "arts" must stay together in teaching and learning of the industrial arts.

To set up a program of handicraft as an area of the industrial arts is probably very appropriate for the industrial arts program in any school. The handicraft should not be neglected because of the growth of the industry or because production of the industry cannot permit the handicraft to take part. If the industrial arts is the study of the industry alone, to pay no attention to the handicraft would be justified. Furthermore, the skill of the craftsman who engages in the handicraft is still needed in making of a mold or a preliminary design to be used before a machine can produce anything in the industry. The industry cannot disregard this role of the handicraft.

The industrial arts program for schools in Thailand will have to be developed with the handicraft as an important part of it. The most important reason is that the funds to be used are insufficient. Although the Thai Government increases the budget for education every year, the need

of funds for establishing school buildings, for materials and equipment to be used in schools, and other expenses for education is far from enough. So to spend the budget for building of school shops and for buying of machines, tools, and equipment of the industrial arts is hardly permissible. The industrial arts program must gradually grow from the budget available. The handicraft, therefore, seems appropriate for starting the industrial arts program. Another reason is that if the handicrafts are neglected the high culture of the Thai people in this area will gradually disappear. Weaving which was once an important domestic handicraft is on the decline; the hand looms once seen in the households all over the country are now decreasing in numbers. To let this happen is deplorable. (28, page 115)

The industrial arts should be added to the general education program of Thailand to improve the school curriculum which is highly academic and traditional. This has been done by the improvement of the National Plan of Education System in 1951 in which the Manual Education has been added and emphasized. The former system described only three types of education namely Intellectual Education, Moral Education and Physical Education. According to the present plan, the children should acquire all these four types of education. Without industrial arts added to the school curriculum, these goals will never be accomplished.

There was little movement in the field of Manual Education in school before 1955. The significant change is the

establishment of a new type of school called Sarman Matayom (Sarman: general; Matayom: secondary), which is the secondary school combined academic and vocational characteristics together. The need for this type of schools is the fact that a student, having finished the compulsory elementary education, is still very young. The student does not have any experience of work or vocation at all. If he does not further his secondary education either Visarman (academic), or Archiva (vocational), he cannot do much for his living. The Department of Elementary and Adult Education names this type of school (Sarman Matayom) in English as "Primary Extension School". The name in English really reveals the purpose of extending the school years of a child from four years primary classes to seven years. The Ministry of Education recently announced that the extension of compulsory classes to Matayom III would be enforced in the future. This means that after four years of the elementary school, a student must continue his education for another three years in a secondary school. According to the National Education System of Thailand (Figure 1), the secondary education consists of three types: Visarman Matayom (academic secondary) of six classes, Archiva Matayom (vocational secondary) of six classes, and Sarman Matayom (academic and vocational secondary) of three classes. The student may choose any type of secondary schools. But recommendation is made that if the student does not intend to finish all six years of secondary education, he ought to choose Sarman

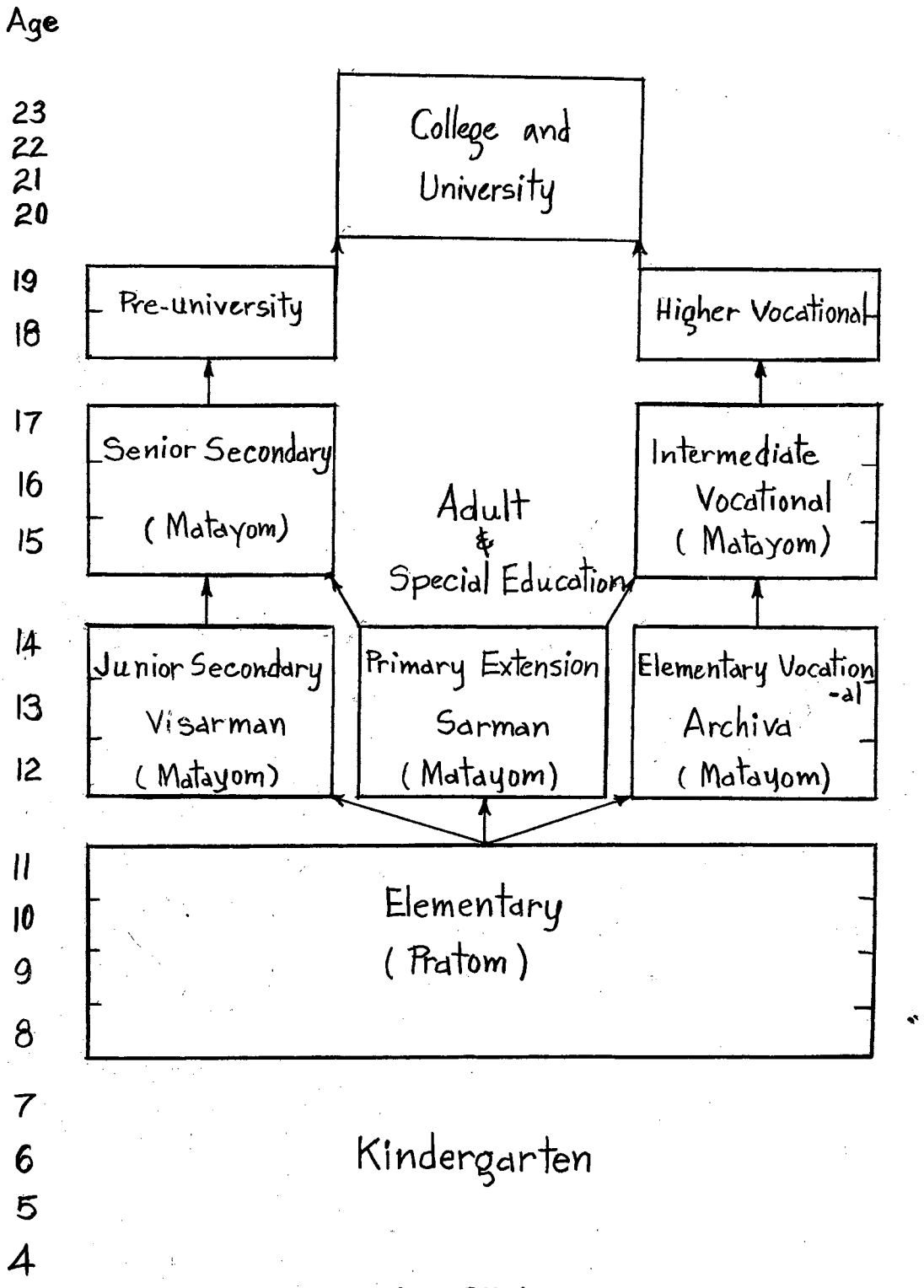


FIGURE I

NATIONAL EDUCATION SYSTEM

OF THAILAND

Matayom. After finishing Sarman Matayom III, and if he wants to go on with his education, he may enroll in Matayom IV, either of academic type or of vocational type.

The industrial arts program is very appropriate to be introduced in these mentioned primary extension of Sarman Matayom classes because it will serve the purpose well.

Probably the first three years of the secondary school should be established like Sarman Matayom or Primary Extension classes all over the country instead of dividing into three types. At this age level, the child is still too young to emphasize the vocational education. Also to stress too much on the academic work is unnecessary. The basic knowledge the children received from Sarman Matayom classes is almost the same as what they expect from Visarman Matayom or academic secondary classes. In addition, the children acquire the knowledge of the industrial arts, which is vitally important and should be offered to children, from Sarman Matayom classes.

The study of the history and philosophies, old and new, of the industrial arts, will be useful for teaching of handicraft activities as an area of the industrial arts, to be described in Chapter III.

CHAPTER III

SUGGESTED ACTIVITIES OF HANDICRAFT FOR SCHOOLS IN THAILAND

All activities of handicraft suggested here in this chapter are for the purpose of guidance to the teachers of elementary and secondary schools in Thailand. The teachers should use, adapt, or change them to suit their purposes of teaching.

For the elementary school, the handicraft activities presented in Part B should be helpful for teaching more effectively the regular school subjects. The elementary school teacher should offer the handicraft not as a separate subject but as an aid integrated in teaching units. Some material objects may be constructed in miniatures to go along with the unit work. These projects made or constructed by students either in miniatures or in real forms are not necessary to be similar or identical. The ideas of the projects should be originated by children from their reading and work concerning the teaching units.

For the secondary school, the author has a specific aim at the first three classes: Matayoms one, two and three whose courses of study and curricula being enriched and developed by the authorities of the Elementary and Adult Education Department of Ministry of Education. These basic kinds of handicraft activities in Part C may be applied to all classes

of the secondary school level including Matayoms four, five, and six, in case that the handicraft or industrial arts teachers of the last three classes stress individual development within specialized areas and encourage creative thinking and planning in design. The student should be permitted to work according to his particular interest.

Part A

General Suggestions

The general suggestions are introduced here in this part for the betterment of the learning and teaching of handicraft in the school program. They are concerned with some methods and techniques of teaching, safety matters, the design in handicraft, evaluation, and lists of tools and equipment.

Before mentioning these matters, the emphasis should be stressed again that the handicraft program in schools is a part of general education. The work provided in handicraft is not merely for developing of technical skills, but for exploring the crafts, for expressing children's creativities, for increasing the pupils' growth (socially, physically, emotionally, aesthetically, creatively, perceptually, and intellectually).

The handicraft should be integrated in a unified program of one's experience of social life and other subjects in school. It should begin in the early schooling of children and continue on a pre-vocational level throughout compulsory school-ages of children. No attempts should be made to

establish adult standards of work for pupils.

The Provision for Creativeness. The creative ability of children is one of the most important qualities that the teacher should develop in the students in teaching of handicraft. Teaching techniques must let the student be the controling participant and often the initiator of the activities going on in the class. Considerable attention is being given to motivation because no significant expression can be forthcoming unless interest in a topic is aroused. Various materials available, a setting of situation in which children have to solve the problem through their own effort, and proper guidance of the teacher, will help develop creativity in children. A trip to the museum to observe the arts and crafts objects may inspire a child in designs and creative works if copying idea is discouraged.

Variety of Materials. To ensure the creative character of the program, the teacher should have available a supply of various materials such as cardboard, boxes, strings, wood, and those that children may select and use to enable them to discover the possibilities of unfamiliar materials. The emphasis should be placed on a continued good experience with materials and a continued involvement in the processes rather than upon the products.

Need of Problems and Solutions. Craft teaching is not only to teach the procedures but also to create problems which call for personal solutions. The teacher who has the ready-

made solution for arts and crafts, and directs the group of children through every step, selecting and deciding for them not only destroys the opportunity for the children's growth through art experiences, but also ruins their confidences in their own abilities to create. Occasionally the information regarding the uses of tools or peculiar materials may be given by the teacher in a demonstration, but the information given must assist rather than interfere with the pupil's intelligent planning of an article to be made.

Children Require Guidance. Guidance should be given to children in their works. The teacher should see that the problems selected by each child are not beyond his ability to solve. The teacher should let the child work independently until he reaches his own stopping point where he needs help. The teacher should not provide any more help than is required, so that the child may develop his own initiative in the completion of the work. Conversation is a good method for the teacher to use to stimulate the child's thinking and to activate his passive knowledge. But this does not mean that the teacher will be satisfied with everything the child produces, rather the teacher strives to see that the child continually raises his level of achievement.

The students may be arranged in groups according to their interests and do group work sometimes such as wall decoration or dioramas. In this way, the children will learn to work together, and the teacher will be able to supervise the class more efficiently.

A Handicraft Area. For the secondary school level, a handicraft area should be set aside in the industrial arts shop or a room is provided for handicraft. For the elementary school level, the handicraft activities may be well carried on in the ordinary classroom.

Safety. The teacher should take preventive measures for safety in carrying out the handicraft program. The scrap materials, tools, objects, or handicraft projects lying about on the floor may be dangerous to students, or may cause fire hazards. The teacher should see that things in the handicraft room or area are in order. Correct use and care of tools and equipment not only lengthen the life of tools, but also provide safety to children.

An Exhibition Day. The teacher should plan an exhibition day when specimens of every child's projects will be displayed. Invitations should be sent to the children's parents or guardians to visit the school especially on the exhibition day to stimulate the community's participation and relation.

The Design in Handicraft. The design in handicraft as well as arts may be representational (realistic), geometric or abstract. The object designed must fulfill its purpose efficiently as Louis Sullivan stated, "Form follows function". The qualities of each material should be exploited to the utmost. Meantime, no medium should be forced beyond its inherent possibilities. Clay, the material which lacks tensile

strength, should not be made to look like or function like metal. It is dishonest and of bad taste to use metallic paint to make wooden objects appear like metal casting.

Every good design should have one dominant element; the other elements should be of varying degrees of subordination to this one. There must be simplicity, balance, and a harmony of form, texture and color. An equal division of space is not likely to be as actractive as an unequal one; one space should be greater in height, width, or bulk.

Designs in pattern-making should be based on life experiences of children--life at home, at school, at play. Non-objective forms of design will permit children who are not good draftsmen to work without feeling handicapped in comparison with those who are able to draw well.

Evaluation in Handicraft. Evaluation is the process by which one chooses among values or places a value upon something. Evaluation requires more than measurement. Generally evaluation is determined by skills indicated by a finished project and by acquisition of information indicated by tests. Educational tests may be classified into two general types; objective and essay-type tests. The objective test is suitable for use in teacher-made informal examination and in more carefully constructed standardized tests.

In reporting of progress in art and crafts, the word "satisfactory" may be given to the student who does his best, and the word "unsatisfactory" to the opposite. Also letters "A" may be designated to the outstanding ability of work and

marked improvement over previous performances, "B" to the satisfactory work according to the student's level of ability, and "C" to the work below the level of the student's ability.

Probably the most effective means for evaluation is a written statement. Such a short statement with a resonably accurate picture of the student's progress should be sent to the parents. The written statement has the great advantage of flexibility in the sense that no pupil needs be placed in a numerical category. Because accurate measurement cannot be done, and because the student's personal development is very important, the written statement in reporting progress seems to have many practical advantages over other methods.

A List of Tools and Equipment. Tools and equipment, listed in Table I are the ones generally used for the handicraft. The specific purposed tools used in a particular craft such as in rope making and weaving, are listed with the suggested activities in Part B and C wherever the activities are presented. To purchase all of these tools and equipment will cost a big amount of budget. Some tools may be made in the industrial arts shop. The students will learn more in making their own tools. If the handicraft area is in the industrial arts shop, the tools and equipment used in other areas may be used in handicraft.

TABLE I

EQUIPMENT LISTS

Item	Quantity
A. Bench, Table and Cabinet Equipment	
Bench, finishing, 30 x 72 inches, height 33 inches	1
Tool panels	2
Vises, 3 inches	4
B. General Purpose Tools	
Anvil, 100 lb., steel face and horn	1
Awls, scratch	2
Chisels, cold, set sizes 1/4 in., 3/8 in., 1/2 in., 5/8 in., 3/4 in.	1
Clamps, "C" 4 in.	2
Clamps, "C" 6 in.	2
Dividers, 8 in.	1
Drill, hand, 0 to 3/8 in. capacity	3
Files, single cut mill, 8 in.	2
Files, round second cut, 6 in.	1
Files, flat mill, smooth cut, 6 in.	1
Hacksaw, 10 in.	1
Hammer, ball peen, 12 and 16 oz.	2
Hammer, riveting, 12 oz.	1
Mallet, hardwood (hickory)	2
Pliers, combination, 8 in., with slip joint	1
Punches, 4 x 5/16 in., center	2
Rules, 12 in., steel	2
Screwdrivers, regular pattern set	1
Screwdrivers, Phillips set	1
Snips, curved, 2 1/4 in. jaw, 12 1/2 in. long	1
Square, try steel, 6 in.	2
Square, framing, 16 x 24 in.	1
C. Metal Craft Tools	
Brushes, lacquer and varnish, 1 in.	2
Bunsen burner	1
Chasing tools, set	1
Hammer, art metal forming, 6 in. head	2
Hammer, art pein, 4 5/8 in. head	2
Jeweler's saw	1
Jeweler's files, set (hald round, round, flat and triangular)	1
Molds, hardwood	3
Soldering equipment, set	1
Tongs	1
Tweezers	1

TABLE I (Continued)

Item	Quantity
D. Ceramics Tools and Equipment	
Dampbox	1
Kiln, electric	1
Potter's wheel	1
Spray gun	1
Wedging table and wire	1
Sieves	3
Rolling pin	1
Tools, wire, hardwood, sgraffito, scrapers, set	3
E. Leather Craft Tools	
Tooling and carving sets	2
Modelers	4
Ball tools	2
Eyelet setter	1
Snap attaching set	1
Revolving punch, 6 tube type	1
Thonging chisels, 1 prong and 4 prong	2
Mallets, rawhide	4
F. Wood Craft Tools	
Jack planes, 11 and 14 in.	4
Back saws, 12 in.	4
Handsaw, crosscut, 22 in. 8 points	1
Handsaw, rip, 26 in. 5 1/2 points	1
Coping saw	1
Carborundum or grit stone, coarse and fine surfaces	1
Wood carving tools -- skew chisels, 3/8 in.	2
straight chisels, 1/2 in.	2
long radius gouges, 3/8 in.	2
short radius gouges, 3/8, 5/16 in.	2
veiners, 5/16 in.	2
parting tools, 1/4 in.	2

Before this part closes, the school teachers should keep in mind that creative thinking is important not only for the students, but also for the teachers themselves. The handicraft program will be more and more interesting if

the teachers are creative and always in search for new activities of handicraft. Scrap materials should not be overlooked. They cost nothing or much less than first grade materials. The teachers, especially in the elementary school, should use them in teaching. Many beautiful things may be made out of the scrap materials. At least to use them is better than to let them be destroyed without use. When there is a shortage of first grade materials, the scrap pieces will suffice very efficiently.

Part B

Suggested Handicrafts for Elementary Schools

A teacher who teaches the elementary school handicraft plays a very important role in a child's learning of this subject. The teacher's dictatorial attitude and inappropriate teaching method will result in the child's bad feeling toward the handicraft. Criticism of the student's work and competitive and vigorously neatness encouragements may cause the student to be afraid to experiment with crafts. A variety of handicraft activities suggested in this part will be helpful for elementary school children to experiement with various crafts. Most activities will be good for play and learning purpose; some will be useful for making things to be used at home. When the handicraft projects such as puppets or marionettes are finished, the teacher should encourage the children to play with them or to present a show in the class.

Doll Making. Any youngster is always interested in dolls. Dolls can be made by children from many kinds of materials. The following projects are only suggested to inspire the teacher and students for more creative works.

A. Cork Dolls. These dolls may be made from any shape of cork. The short, thick corks are preferably used for heads, long, thin ones for arms and legs, and larger cork for bodies. Glue these parts together. Children will have great fun dressing the dolls with crepe paper or scraps of fabric. The face may be painted or penciled on white cloth.

A "Lampoo" tree's knee as known by the Thai people is a good substitute for cork.

B. Stocking Doll. The extended part of the foot of the stocking is cut off, and it is cut again into two pieces which may be sewed and stuffed with cotton to make two arms. The open end or upper part of the stocking is then cut and sewed to make two legs. Stuff with cotton and sew up the top. Draw a string around the stocking to form a neck and at the same time the head. Attach the two stuffed arms by sewing. (37, pages 238-242)

C. Rag Dolls or Padded Dolls. The dolls may be made human or animal figures, from oilcloth, unbleached muslin, etc. The patterns are drawn for the doll, two pieces for each figure. Cut the pattern with 3/8 inch seam allowance. Sew the two patterns together leaving two or three inch opening for turning the doll right side out and for stuffing.

Stuff it with cotton waste rags, kapok, saw dust, dried coffee grounds, etc. The stuffed doll should not be hard, but firm and well-rounded. The delineation of the figure and features may be made with wax crayon, India ink, and yarn; buttons make good eyes. (33, page 309)

D. Corncob Dolls. Corncobs may be painted with poster paint to make eyes and the mouth of the doll. Sew some cornsilk on top for hair. Tiny pieces of cob may be tied at the bottom of sleeves for hands. (26, page 196)

Puppetry. The making of puppets is a craft that adds a new dimension to dramatics. Types of puppets are from the simple hand puppet to marionettes that dance from strings. Children will have a lot of fun playing with puppets. The following are suggestions for making of puppets:

A. A Shadow Puppet. This puppet is flat silhouettes cut from a thin cardboard and is attached to a stick for the handle. The puppet is used against a sheet screen with light shining from the back, so that the puppet casts a shadow on the screen. If the colored shadows are required, insert colored cellophane paper in the figures.

Shadow puppets may be made with or without movable joints. Small wires are used to hold arms or legs for movement. (21, page 303)

B. A Paper Bag Puppet. A small paper bag is needed to make a puppet by stuffing crushed paper, grass, rag, etc. and

tie string around under the chin. Cut slits in the bag at shoulders for arms. The operator's thumb and middle finger make the arm action. (21, page 299)

C. A Hand Puppet. The hand puppet or glove puppet is the type that fits on the hand. The major part of this puppet is the head. Two small arms and a small cloth sacklike garment, suspended on its shoulder, will complete the figure for operation.

The Head may be made from unbleached muslin, papier-mache, white pine wood, or a hollow doll's head. The hand may be made out of wood or papier-mache. A cloak is sewed and fastened to the neck with hands fastened into the sleeves. The bottom of the cloak is open, sack-like, to permit the hand placed through the cloak and fingers into the sleeves. (37, page 23)

D. Marionettes. The marionettes offer the greatest challenge and demand greater resourcefulness and imagination than other types of puppets. The head may be made of papier-mache, plastic wood or cloth. In case of similar features, time may be saved by making a mold out of plaster of Paris. The lower legs may be carved out of wood; the arms, made from broadcloth or any white material. Stuff the upper arm with cotton and the lower arm with weight. The hand is made from a light-weight copper wire joined to the wrist which is made of wood. Fill the wire framework with plasteline, with which the fingers and palms will be shaped. Wrap

all the fingers by starting with the thumb and terminating with the wrapping of the palm. Sew the hand to the lower arm. Attach the head in the neck socket. Use gray string to attach the arms, the back, the hands, and legs. Tie the strings to the controller shafts as illustrated in Figure 2.

Attractive marionettes may be made from any white cloth of soft texture. The head and the body are not separate in this type. To permit forward and backward movements, two rows of stitches 5/8" apart from each other are made at the bottom of the neck, the upper and lower leg and the foot may be made in one piece, with two rows of stitches at the knee to permit joint movements.

Common dolls purchased in a store may be converted into marionetts by disconnecting all the arm and leg joints and then assembling them together with binding tape to permit joint movements. (37 page 9)

E. Buffoons. Buffoon shows are simple. A stage made by a standing frame covered with black cloth is needed to present a show. Usually there are two persons who act the characters, so the frame must be large enough to cover the upper parts of their bodies. Their feet and legs are exposed below the frame. Holes are cut at natural height for the persons' heads and hands to protrude through the cloth. Small headless-rag figures are attached below the holes cut for the heads. The figures must be flexible at the joints to permit manipulation by strings held in the hands of the

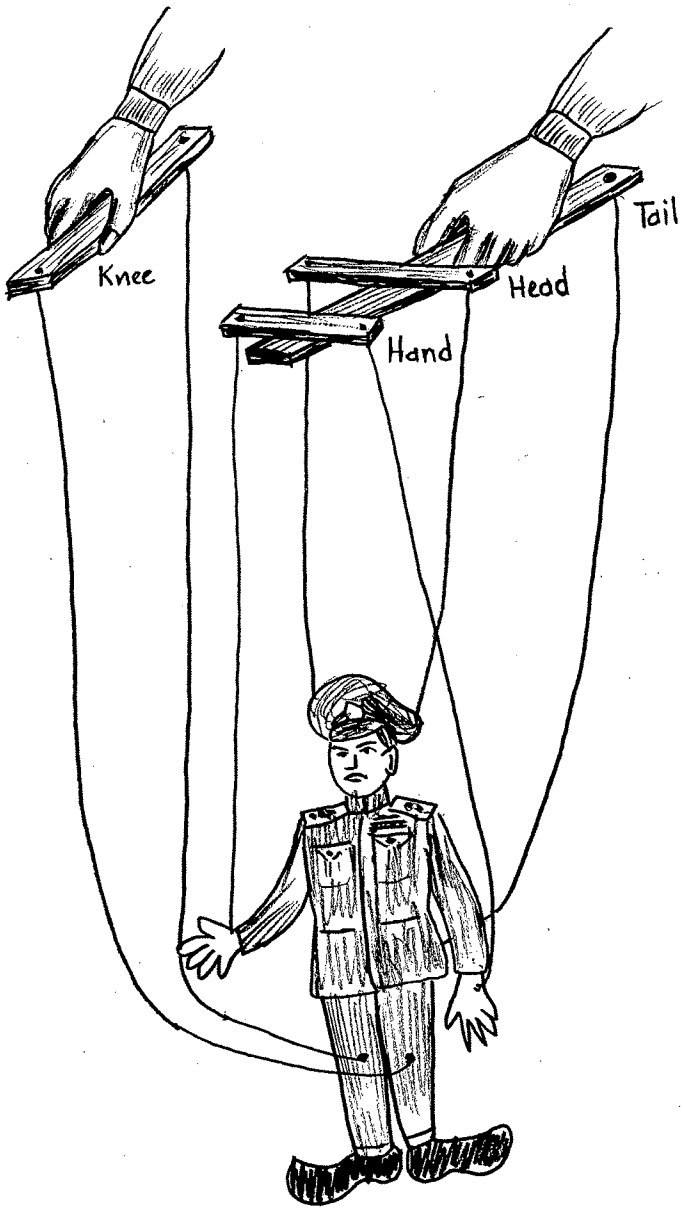


FIGURE 2

MARIONETTES

performers. The persons' heads form the heads of the figures. The rag figures are dressed to suit the characters represented. Buffoons are most spectacular when made to dance to musical rhythm. (26, page 139)

Paper Craft. Paper crafts need few tools but they offer a great fun. Children can work with simple cut-outs to modeling or sculpture. The following cut-out projects will be interesting to children.

A. Chain Baskets. Take a square piece of lightweight paper. Fold it on the bias three times. Cut the unfolded end in an arc, then cut with a pair of scissors alternately from side to side.

B. Paper Animals. The children draw their own paper animals and cut them out with scissors. Several pictures may be made at one time if the piece of paper is folded into several layers.

C. Paper Windmill. A square piece of paper is cut from each corner so that all the cuts almost meet at the center of the paper. The alternate ends of the cut are then glued together and fastened to a stick with a straight pin.

D. Jointed Paper Toys. A picture of an animal is drawn with all movable parts separated. Allow rounded joints for fastening the various parts together. (37, page 99)

E. Paper Modeling. Paper modeling is done by covering a foundation into several layers of paper, torn into pieces

two or three inches in diameter, dipped in starch. Any kind of paper which is flexible as newsprint may be used.

F. Papier-Mache Animals. Animals are made by first shaping a wire armature to form and dimensions of the body. Begin building up the body by crushing pieces of newspaper and tying in place around the armature. When the body has taken shape, apply small pieces of paper dipped in starch until the entire animal is covered. (26, page 209)

G. Papier-Mache Masks. Make a mold, the features of a face. When the mold is dry, coat with a heavy oil or petroleum jelly. Tear up newspapers or lightweight wrapping paper to make strips about 3/4" x 3 1/2". Immerse the pieces of paper in paste, then lay them on the face model starting at the forehead and laying the strips diagonally. The entire face must be covered. After the second layer is dry, paint with a thin coat of glue or paste. Four to six such layers should be made, allowing each layer to dry, and placing the strips of each layer at cross directions with the previous one. Paint the mask with oil color. After drying, the mask should be covered with a coat of shellac or varnish. (37, page 1)

H. Relief Maps. Tear paper into small bits, pour on hot water to cover and let soak about twenty-four hours. Squeeze out the pulp. Use three parts pulp, one part flour and one-third part salt. Mix flour and salt with a little

water then add the pulp and more water if needed. (middle and upper grade)

I. Bowls and Plates. A plate or bowl with a flare at the top is used as a mold. Strips of newspaper about one inch wide are cut and wet in water, then put a layer all over outside of the bowl, strips should overlap each other slightly. The ends of the strips project over the edge of the bowl by one inch. The second layer of strips are wet with paste and run in the opposite direction from the first layer. About ten layers of strips are enough.

Other things may be made with the same method but only four layers of paper are enough. When the paper shell is dry it is cut open, stuffed with newspaper wads and fastened together with more strips. The project is finished with fine sandpaper and paint. (36, page 26)

Other simple paper crafts are waxed paper floats (boats, canoes, floating houses, etc.), paper stencil, paper mosaic, etc.

Toy Making.

A. Broomstick Hobby Horse. Small children enjoy playing with horse riding games. A broomstick hobby horse may easily be made by children. An old stocking, or two paper bags, and a broomstick are needed to make a hobby horse.

Stuff the foot of the stocking with rags or paper for the head, and the leg of the stocking for the neck of the hobby horse. The horse's mane may be sewed on with a strip

of fringed black oil cloth. Other features may be painted on bits of oil cloth and glued to the horse's head. Slip the open end of the stocking over one end of the broomstick and tie it in place. A strip of colored cloth or cord may be attached for reins.

B. Wheeled-base Toy. A simple method of activating a toy is to mount it on a wheeled base which has one pair of wheels fastened off center. A good project is Hopping Kangaroo (Figure 3) mounted on the wheeled base with the rear wheels about 1/4 inch from their true centers. When the toy is pulled, the amusingly realistic hopping motions results. To insure a hopping movement, both rear wheels can be fastened firmly to a revolving axle.

The kangaroo should be jigsawed from plywood scraps. The base size is 1/2 x 2 1/4 x 5 1/2 inch, and the wheels are 2 inch diameter and mounted about 1/4 inch off the true center.

C. Merry Jacks. Merry jacks are animals that move mechanically up and down the stick. Looking at the illustration of Figure 4, one will understand how they work. The following projects are meant to be examples of this toy.

1. Climbing Stick Monkey: Jigsaw plywood scraps with the monkey's arms, legs, and body in separate pieces. Fasten the arms and legs to the body of the monkey. Make two strips of wood, one twice as long as the other. Take two strips of tin about 1/2 inch wide and fasten the two sticks together

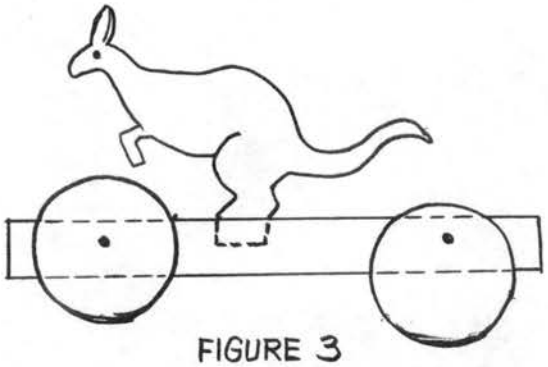


FIGURE 3

WHEELED-BASE TOY

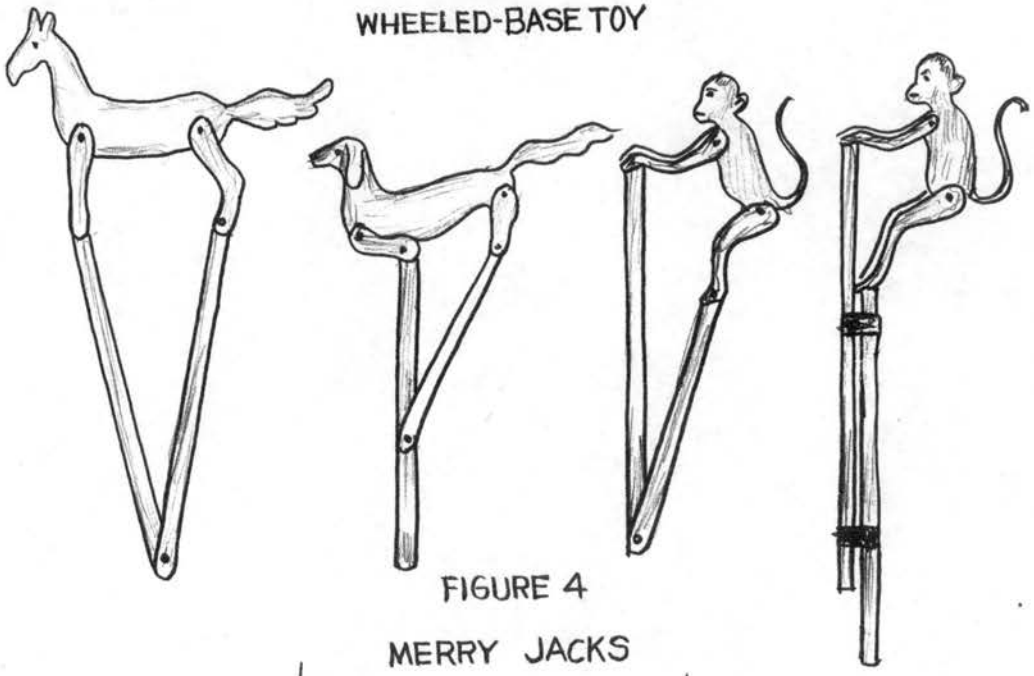


FIGURE 4

MERRY JACKS

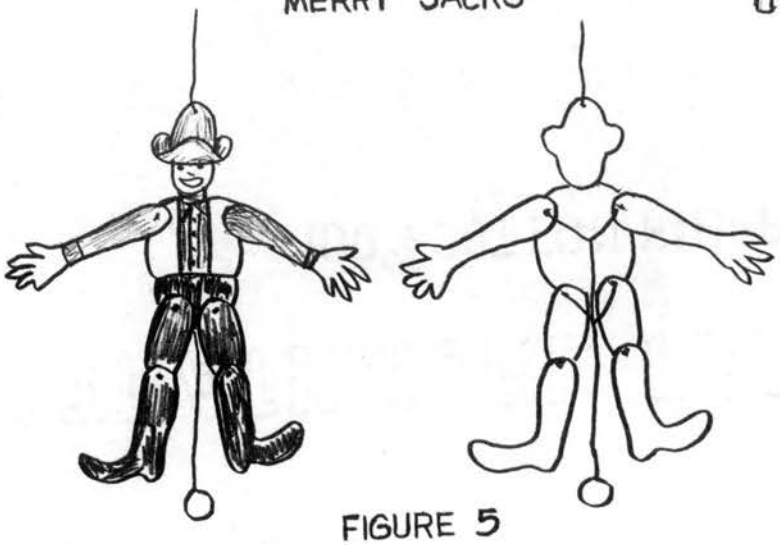


FIGURE 5

JUMPING JACKS

by winding the tin strips around them. Bolt the tin to the longer stick, thereby leaving the shorter one to slide up and down. Fasten the monkey's fore paws to the end of the longer stick and his feet to the shorter stick. The monkey's climbing results from the sliding of the shorter stick.

2. The Rooster and the Duck: This is also of similar principles to the above-mentioned projects. The rooster and the duck are cut by a coping saw or jigsaw. Lay the two birds facing each other. Then lay two laths on them so that the laths are parallel to each other and about 1/4" apart. Fasten the laths to both birds with small bolts or nails. The two slats being moved back and forth cause the duck to peck at the rooster and the rooster to charge back with a retaliating peck. (27, page 190 and 38, page 188)

D. Jumping Jacks. This toy is associated more often with England, although it is also made in Germany and other European countries. Jumping jacks are made from cardboard or thin wood. The arms, legs and the head are cut separately and fastened to the body by means of a clip or short strings. To each appendage a string is fastened and led to the center back of the figure and which, in turn, is fastened to a longer string with a ring at the bottom end. If this string is pulled down by the ring, the arms and legs of the jumping jacks will move. (27, page 190)

Miscellaneous Crafts.

A. Balloon and String. A balloon is inflated and wrapped

with string and yarns which have been saturated with starch when the string and yarns are dry, rigid, and strong, the balloon can be punctured, deflated, and pulled out from the webbing of string, leaving a light, interesting form. This form may be made into three of four layers of papier-mache with similar procedure. A piggy-bank may be made from this papier-mache form. (58, page 192)

B. Sand Painting. Sand, liquid glue, a set of water colors, a brush, a spoon, etc., are used. The design is sketched with a soft pencil and painted with water color. The student then applies glue and sprays colored sand. More glue may be added as needed and a successive layer then builds up. The details may be touched with water color. Shells, tooth picks, pebbles, and so on, may be used to build up the design. (58, page 216)

C. Peep Shows. A good type for a peep show is a show box. To develop the peep shows, scrap materials such as twigs, saw dust, pebbles, leaves, vines, cotton, etc. are gathered. A hole about the size of a quarter or fifty-cent piece is cut with a pair of scissors at one end of the box and the top of it is opened at the opposite end of the hole to permit the light to enter. The required scene is built on the inside bottom of the box. (27, page 171)

D. Dioramas. The diorama is a picture in three dimensions, with emphasis on a center of interest. As the picture needs to be framed in some way, it is usually built into some

sort of box or case. In the diorama, since a specific center of interest is treated, everything else is subordinated and put into perspective. The details of the scene must be carefully selected, and should not be overcrowded.

There are two chief types of dioramas: that having a curved background with a two-point perspective, and that having a straight sided background with a one point perspective. In the making of classroom dioramas, the perspective should not be overstressed. The base which supports the foreground scene must be firm and should be made of thin wood, heavy cardboard, and plaster, and it should be built one-half to two inches higher in the back than in the front to give an illusion of distance. In case of extensive use, a permanent display case of 22" x 12" x 15" should be built.

Figures of people and animals may be carved from wood, clay, or soap for higher grades, or may be sawed from board or plywood or paper cutout for lower grades. Huts, igloos, etc. may be built with paper, cardboard, match sticks, broom straws, etc. Artificial or natural light added to diorama will make the appearance more attractive. (33, page 221)

E. Panoramas. The panorama as used in school is not a picture but is in the nature of a model. It is laid out on a flat surface without perspective for the purpose of showing an area--farms, hills, forests, rivers, and animal or human figures--all in approximately proportionate sizes.

The three forms of bases are the floor, the sand table or worktable, and the portable base. A sandtable or worktable

needs a lining of oilcloth in order that water or moisture cannot leak through. Satisfactory bases may be made from plywood, wall board, or celotex cut 2' x 2' or 3' x 4', reinforced on the back and sides with strips of wood.

Occassionally the panorama is put against a wall with a painted scene hung behind. Ordinarily there is no background at all. (33, page 248)

Vegetable Craft. By vegetable craft the author means the craft produced by materials of plant or tree, nuts, twigs, gourds, corn, coconuts, etc.--more or less in natural forms. The vegetable craft includes what the other books called gourdcraft, nutcraft, and so forth.

A. Nut Craft. Citrus seeds, orange, lemon, grapefruit, etc.--yield the wherewithal for seed necklaces and bracelets with which children like to play and decorate the dolls or puppets. An awl is used to make holes through the seeds which must be dried, and given pastel shades with water colors, or painted with enamel paints. The necklace or the bracelet may be of one color or varying colors. String with beading wire or heavy wax thread. Two strings may be used simultaneously if two holes are pierced in each seed. A twist strand may be made by wrapping three or more strands around each other. To hold them in twisted position, draw all three ends of the left side through several seeds; repeat with the right side and then attach the fastener. Necklaces or bracelets may be made with cherry pits, pumpkin and

melon seeds, sunflower seeds, corn kernels or combination of any two or all. (38, page 11)

B. Gourd Craft. When the hardshell gourd and its stem have a light-brown color, it is ready to be picked. Hang the gourd to dry. Natural wax of gourd can be removed with alcohol. If this method fails, soak the gourd overnight, then scrape off the outer skin and hang it to dry. Before designing, all cutting and sawing must be done. Bore holes into the gourd with a small hand drill, and saw as even as possible with a key-hole saw. Smooth all the cuts with sandpaper.

The designs on the gourd may be carved, burned or painted, or given a combination of any two or all. Carving may be done in incise or relief patterns. In the former the design is cut out causing it to be depressed in the gourd. In the latter, the designs stand out in relief or uncarved, but the background has been carved away.

The burning is commonly done in incise procedure with a burning tool, or pyrograph, or a non-electric burning tool.

Painting may be done in solid colors or in design. Small gourd articles lend themselves readily to solid color. Paints may be oil, showcard (poster), or enamel. For oil or showcard colors, two coats of shellac should be applied after the paint has dried. Gourds may be made into a bank, a brush holder, an ash tray, a hanging bird house, a cookie dish, etc. (38, page 60)

C. Branch Craft. The branches can be made into many useful things, candle holders, table center pieces, napkin rings, buttons, window flower boxes, soap dishes, coat hangers. The size of the branch depends upon the things to be made. The table center piece or the window flower box requires a big branch five to seven inches in diameter whereas the button or the soap dish requires half inch in diameter. The following projects--the window flower box and the soap dish--will exemplify the utilities of big and small sizes of branches.

The window flower box requires somewhat decayed branches five to seven inches in diameter, and anywhere from eight to twenty-four inches long. Any fungus, lichen or moss growth on the limb need not be removed, for it will give rustic charm to the window box. Use a sharp knife, a chisel, a gouge, and a hammer to cut and hollow out the limb. At the ends, leave substantial sections that will not be hollowed; and avoid marring the exterior surface of the limb. Fern, seed and bulb flowers may be planted. Start growing by keeping them in the cool shade out-of-doors, later transfer the box to a window ledge of the school room. If the plants are kept in cool shaded windows, with just a little sunshine each day, the box will last for a long time.

Small branches one half inch in diameter and six inches long are needed to make the branch soap dish. Place five sticks about one half of an inch apart, lay one stick at each end. Then place one stick on each side to form the side walls

of the dish. At the corner of the dish, where the sticks cross, tie with heavy cords. (38, page 42)

Marine Crafts. These crafts are the same as what Eaton named "nautical handicrafts" or handicrafts of the sea, or the seacoast, including ship models, nautical instruments, net-weaving, scrimshaw, knots and braiding, rope work and shell work. (13, page 248)

A. Shell Craft. Shells may be made for decorative purposes. Students in the schools located along the east coast, the west coast of the Gulf of Thailand, and those who live in the southern part may work with shellcraft almost without any cost at all. With proper teaching the students may create a lot of things outs of seashells. A long and small type of shell may be made into legs of animals or birds; a big one, the body. With glue or cement and paint, beautiful things such as birds, frogs, necklaces, bracelets, ashtrays, ladles, spoons, etc. may be created from seashells.

B. Ship Models. The purpose for the elementary grades is not to make the complicated ship model, but for the easy type of whittling jobs that children do to make their sailing ships. Boat racing of this type is very popular, and the children really like it. The teacher can help improve the shape of the ship by guiding them to understand the importance of the fashioning concave areas. Typical of these are the forms plotted by the bow lines and buttock lines of a ship's hull. Incorrect rendering of these curves affects

the performance of the ship--particularly its speed and its behavior in the water. Templates for cross sections to give a complete contour picture of the bowline curve will be necessary for a more-neatly built ship. (25, page 34)

C. Net Weaving. Net weaving or netting is a simple handicraft but valuable for making of equipment for fishing, active sports, gifts, and household uses. The country people are accustomed to fish nets which may be found in every house in the rural areas all over Thailand. The children will be proud if they can make things in school and such things like nets may be used at home. If the student can do netting, he can help mend fish nets at home or make a new one when it is needed.

Many other handicrafts may be taught to elementary school children besides these suggested activities. Clay modeling, a popular craft of the elementary and secondary schools in Thailand, is still valuable. The students, even in elementary school level, should be taught how to make simple tools and how to use them in clay modeling such as in simple sculpture. This technique of clay modeling will make this craft more interesting than just the "hands as tools" process. Other handicrafts, for example, embroidery, simple weaving (card loom, raffia), potato or block printing, kite making, etc. are interesting activities for elementary school students.

The teacher should consider the individual difference among the students in teaching of handicraft. Attention

ought to be paid to the slow learners who should work into simple crafts. The gifted students who are more skillful in craftswork should be encouraged to do more difficult crafts requiring more skill. If such students want more handwork, the teacher may introduce to them the suggested activities of handicraft for secondary schools to be mentioned in Part C.

Part C

Suggested Handicrafts for Secondary Schools

A secondary school student's handicraft as well as industrial arts should be introduced so that the student may have a wide range of experiences based upon his interest and future choice. The needs of the individual at this grade level necessitate exploratory and guidance experience and knowledges; this implies breadth rather than intensity of experiences. The teacher of handicraft should emphasize creative work and the skill acquired by students should be improved from what they have learned from the elementary schools.

Weaving. Weaving of protective covering by primitive peoples who learned to interlace vegetable and animal fibers together is a common heritage of all races. The technique of weaving was known before recorded history. (20, page 372)

In Thailand, weaving is one of the most important handicrafts, as Ingram wrote:

> ...Weaving was the most important handicraft in Thailand in 1934 although it did not yield much cash income because most weaving was for home use--- In

> the Northeast, household weaving, was so widespread that little or no clothing had to be bought from necessity, although some was purchased for reasons of fashion and taste. Weaving in the Northeast was not developed commercially except in the towns of Korat and Ubol. In the North, household weaving was also widespread...(28, page 118)

If the school teacher neglects this craft, the art of this type, expecially textile weaving, may disappear from all the homes. To lose this valuable handicraft would be a great pity. Weaving in school may be started with an easy type on simple looms. Some types of simple looms which are easy to make are illustrated in Figures 6, 7, 10, 11, 12, 13, 14 and 15. As a school activity for educational purpose and as a home handicraft for recreation and industry, hand weaving can be done at a low cost.

A. Weaving with Navaho Looms. This type of loom is used by women of Navaho (Navajo) Indian tribes to make rugs, or cloth, or similar material. The making of the loom utilizes trees or branches and is easy to make. (Figure 6 and 7) The first project given here is good for a group project; the second, an individual project.

1. A grass mat: The loom of Figure 6 is used. The pole A is lifted up and a long bunch of grass (size of fist) is put in. Then the pole A is dropped down and another bundle of grass is placed next to the first bundle. The procedure is continued to the end of weaving. The strings at the stakes and poles are cut and the ends tied together, then the ends at the sides of the mat are trimmed off.

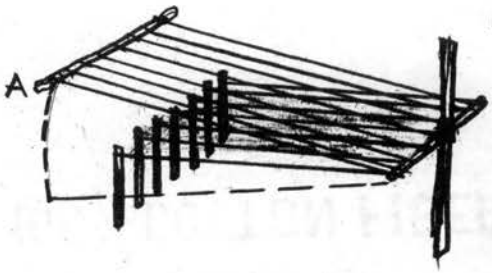


FIGURE 6.

LARGE NAVAHO LOOM.

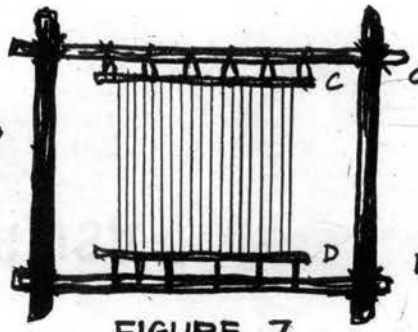


FIGURE 7.

SMALL NAVAHO LOOM.

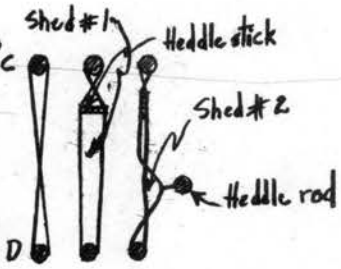


FIGURE 8.

HEDDLE STICK AND ROD

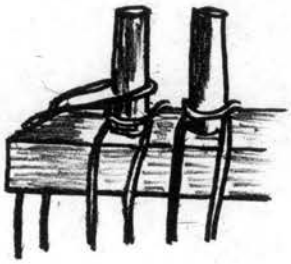


FIGURE 9

HOW TO STRING PURSE LOOM

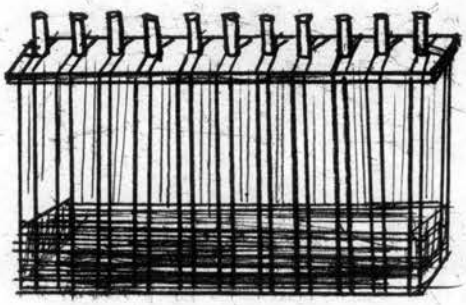


FIGURE 10

PURSE LOOM

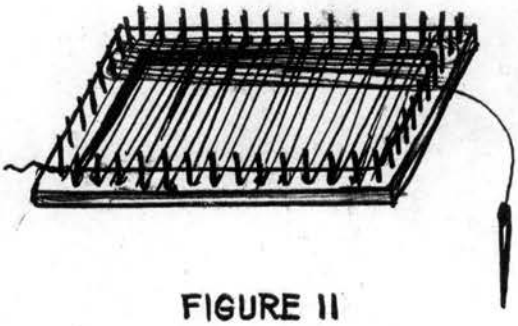


FIGURE 11

SQUARE WEAVER LOOM

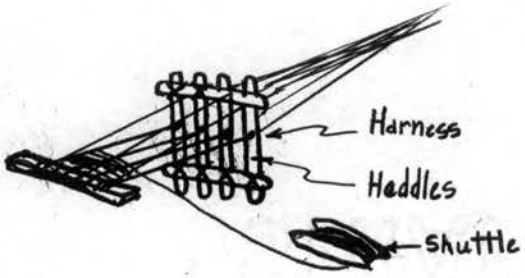


FIGURE 12

T-D. LOOM

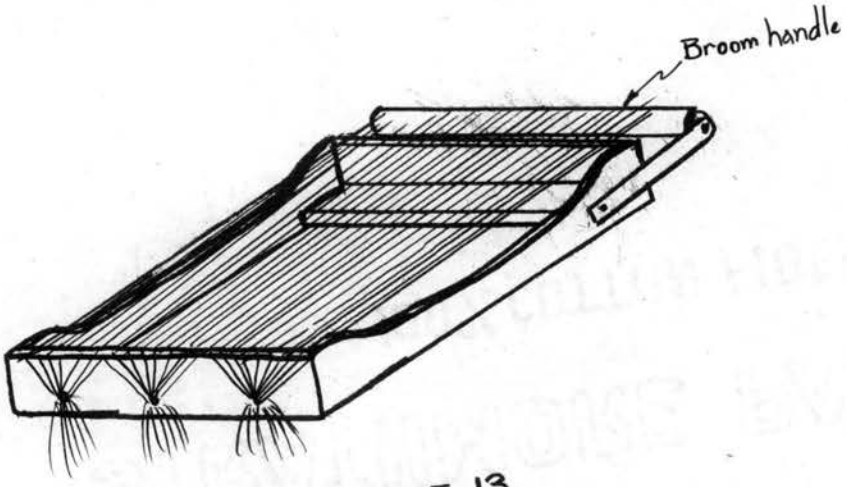


FIGURE 13
CIGAR BOX LOOM

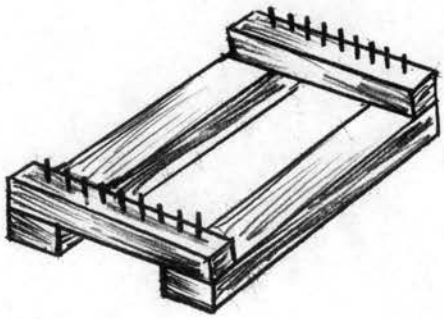


FIGURE 14
FRAME LOOM

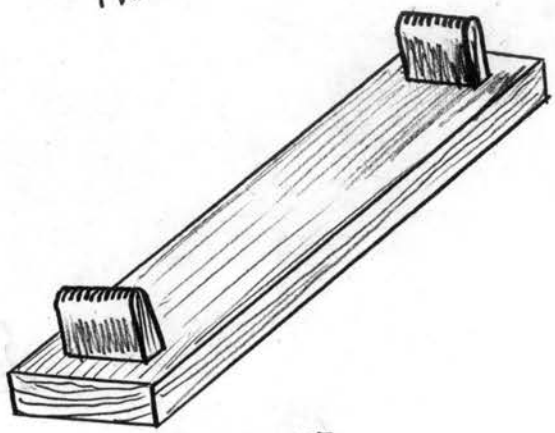


FIGURE 15
BELT LOOM

2. Cloth: The loom of Figure 7 is used. This project calls for progressions in weaving, in construction, and in making a design of interesting colors and shapes. The heddle stick is passed under odd-numbered warp threads (stationed and vertical threads) and over even-numbered warp threads. The heddle stick is turned so that its top edge is toward the weaver to make shed No. 1. The heddle rod makes shed No. 2 (Figure 8). The shuttle of colored yarns is passed through shed No. 1 from right to left and through shed No. 2 from left to right. When the weaving is finished, the warp threads are cut and tied in pairs. (27, page 214)

B. Weaving with a Purse Loom. This loom is made with a piece of three-ply wood with a stripe of wood added on top of the loom, about 1/4 in. thick, to hold the warp threads away from the loom to facilitate weaving. Holes about 1/4 in. apart are drilled to receive 1/8 inch pegs which are always an odd number (Figure 10). A small slit is cut at two lower corners to hold the thread while stringing the loom. To string the loom, a yarn, with its end about an inch left for holding, is fastened to the slit in lower left-hand corner of the loom around the first peg from left to right, then down the same end of the loom. The yarn then comes up front of the loom around the first peg from left to right down front of the loom and up back around the first peg from left to right. The yarn is brought down back of the loom then up front around the second peg left to right, down front and up back around the second peg and so on until all pegs have two loops around them (Figure 9).

To weave, the weft thread (crosswise thread) is put in a weaving needle and begins at the lower right-hand corner under one thread and over the next all the way across to the left of the loom. The beater is pushed down. After two rows of weaving, the weft threads are forced down under the loom with the needle to make the bottom of the purse. Weaving is continued until the top of the purse is reached. The pegs are pulled out and the purse is removed. Weaving is continued through loops until they are filled. A zipper is lines and sewed across the top of the purse. (25, page 304)

C. Weaving with a Square Weaver. This loom is designed for weaving of four-inch squares which can be sewed together to make any article in which yarn is employed. The needle should be five to six inches long to pick up the warp threads in one operation.

To make the loom, four pieces of wood 1/2 x 1/2 x 5 inch are mitered and glued together. A nail is driven in each of two corners diagonally across from each other, and fifteen nails 1/4 inch apart are added along the four sides. A guide line in the center of the frame should be drawn first to insure a perfect square.

To string the loom, the corner of the loom having a nail is placed on the left-hand side of the weaver, and a yarn is tied onto this nail. The yarn is carried back and forth around each nail until all nails are completely filled. The yarn should then be at the upper right-hand corner and

ready for weaving. The yarn is wound around the outside of the nails eight times in order to measure the amount of yarn needed for weaving the square. Weaving is done with the needle put over and under each warp thread and is continued back and forth until each nail is covered when the needle is out beside the nail of the starting point. The square is pushed carefully off the nail and the two ends of the yarn are woven into the edge of the square (25, page 305)

D. Weaving with T-D and Belt Looms. A belt, a head band, or a narrow fabric is made from this type of loom (Figures 12 and 15). The method of weaving on this type of loom is well illustraded in Figure 12.

E. Weaving with Cigar Box and Frame Looms. These looms are easy to make (Figure 13 and 14). The method of weaving is the same as described.

Rope Making. The object of rope making is to combine, into a continuous length, the strength contained in the fibers which are mostly hemp. This procedure is done in five successive stages: (1) hackling or heckling the fibers, (2) spinning fibers into a yarn, (3) winding the yarn on a reel, (4) twisting the yarn into strands, (5) laying the strands into a rope. Usually three strands are made into a rope, and three ropes twisted in a similar manner form a cable. The fibers are so twisted that friction between and among them effectively prevents them being withdrawn from the mass.

Procedure. The fibers used are mostly hemp from Asia measuring between three and four feet in length. The Manila hemp, stronger and ligher, measures between six and ten feet. The loose hemp is converted into a yarn, solid, even, and round to the required size with spinning wheel, three to four feet in diameter and the crank handle turned at a speed as constant as possible. The spinner holds the end tightly to prevent the twist from unravelling after the desired length has been spun. A moment of distraction may cause the entire length of elastic hemp to spring into a tangled mass. The roper brings the ends of each strand together and draws them through the fixed ring of a wrought iron ring-bolt driven into the top of a stake and tied into a knot. This end, at the foot of the walk (or ground) is a movable sledge, whose base is loaded with stones or weight to regulate its slow movement up the walk. The fore end (principal end) is the tackle board, a vertical plank made rigid by posts and braces. At the top is a series of four revolving hooks, operated by means of a hand-winch with a wheel acting on all of them. When the cranks are operated the double movement twists all the threads of the yarn around. To equalize the hardness of the twist or "lay" of the rope, a cone of hardwood, known as a top is inserted between the three strands at the sledge end. This top is cut with three semi-circular lengthwise grooves to contain the strands. It insures that the strands twist only in the direction of its smaller end. A roper, working immediately behind the top, compresses the rope with

a simple tool which makes a hard, firm twist. As the rope closes the top is gradually squeezed in the direction of the tackle board. (23, page 79)

Metal Craft. The word metal is derived from the ancient Greek "metallon", meant originally "something dilligently sought". Gold, silver, and copper were known to the craftsmen of the earliest civilization, and thousands of years later, about 2000 B.C., the craftsmen discovered the secret of making bronze of steel hardness by a method of fusing copper and tin. Metals for jewelry work include gold, silver, pewter, German silver (18 or 20 Brown and Sharp gauge), brass and copper. Others are aluminum, tin, steel, etc.

Decoration of metal can be done in many ways. The following processes are popular:

Etching. Etching may be done on silver, gold, German silver, copper or brass. The design is made by using an acid to eat lines and areas into the metal. To resist the action of acid, a "ground" is applied in those parts which are not to be eaten away. This ground is wax, black enamel paint, or liquid asphaltum. The acid consists of 30 per cent solution of nitric acid to 70 per cent water. Half by half mixture may be used for quicker results. Stippling may be applied to the eaten surface with chasing tool. (37, page 85)

Planishing. The many facets of hammered steel present a more attractive surface than a plain surface and will not

reveal scratches nearly so readily. This technique is known as planishing, and requires a ballpein hammer, called a planishing hammer. Lay the piece of metal, thoroughly cleaned with steel wool and cut slightly larger than the pattern, on the smooth metal block or flat surface of the anvil. Hammer the oblong shape or margin in parallel lines, but hammer a circle from the center and work to the edge in concentric circles. The metals hardened by this process must be annealed before any shaping can be done. (20, page 275 and 37, page 87)

Repousse. For this decoration the metal is placed face down on a large block of lead or hardwood, and metal stamping tools (called dapping tools) are then pounded with a hammer, resulting in the face of the metal yielding a raised surface. When the design is sufficiently raised, file the raised surface to eliminate any rough exposures.

Chasing. The chasing tools perform a work just the opposite from the dapping tools, and are used on the upright face of the metal. Their stamping edges are very sharp, and may be circular, giving the outline of a circle; or they may be small dots, five straight lines or five line arcs. These tools may be used for stippling, raising or lowering the surface.

Piercing and Sawing. In fine bits of metal cut-out work, jewelers' saws and drills are used. For ordinary work, the No. 0 saw blade is preferable. Drill small holes in

those parts of the design to be pierced. If the area to be pierced is large enough, slip the saw blade, teeth pointing toward the handle, through the hole to permit sawing inside the metal.

Soldering. Soldering is the process of joining two ends of a metal together with an alloy metal.

For soft soldering, a soldering iron which must either be heated in a flame or with electric heating. Its copper tip must be cleaned for each use. A cake of sal ammoniac is included in kits for this purpose. A flux paste is also supplied but some soft solders come with a core of self-contained flux. The metal surfaces to be joined must be cleaned with steel wool.

For hard soldering, a blow torch is essential and is satisfactory for all types of soldering. Apply flux, either the paste, having borax base or powered borax in water, to the edges but not beyond the edges. Heat is gradually applied until the borax solution dries. Too rapid application of heat will evaporate the water and frequently dislodge the solder. (20, page 287)

Raising of a Metal Bowl. Mark a circle on a disc of metal to be raised and strike the disc which is placed on the stake, just outside the guide circle while the disc being rotated between the series of blows. The process continues until the desired curve is established.

Punchwork. Punchwork is often used on tin. A punch

with a needle-like point is struck with a hammer, outlining the design. This type of craft is largely for children.

Applique Work. This type of work is often done for book ends. Metal applique work is contrived by making a cut-out design from metal and decorating the design as described. Such design is then mounted on another sheet of the same or different metal by riveting. The rivets should be cut so that they are projected about 1/8 inch beyond the hole, then clinched with a hammer. (37, page 95)

Metal Tooling. Metal foils of 36 and 30 Brown and Sharp guage are available in copper, brass, aluminum, and an alloy called oriede or jewelers' bronze. These foils provide materials for tooling. Tools used are a tracing tool, a deer foot, or a ball-end modeler are required. The procedure starts by tracing the design on the metal foil which is placed on a hard surface. Retrace the impressed outline with the tracing tool. Then place the metal foil face down on the yielding surface, such as rubber, sponge rubber, folded newspaper, or double faced corrugated box paper, and depress the areas in the design to be raised. The background may be stippled, hammered, or left smooth. (20, page 297)

Copper Enameling. Silver is sometimes used for enameling, but copper is very suitable. The surface of the metal must be thoroughly cleaned by rubbing it with steel wool and removing any particles of the wool with a damp cloth, then dip it in pickling solution (fifteen parts water and one part

sulphuric acid) before enameling. Enameling require a special kiln, either gas or electric type. However, pieces with one surface enameled may be successfully fired with a blow torch or Bunsen burner. A coat of enamel is applied to the under side of large enameled area to prevent breaking caused by unequal tension of the surface. (20, page 300)

Mobile. The first mobile was created in the early 1930's by Alexander Calder. A mobile is related to sculpture, painting, drawing, design, and the space in which it moves. In a mobile, the elements of space, form, and color are combined mechanically to produce a balanced abstract composition. The best mobile has a life of its own and appears to move according to a plan; the forms are purposeful and often point to one another or indicate directions in which the observer should look. The mobile is best hung at eye level or a little higher; it is particularly effective hung from the ceiling.

Tools and Materials. Mobiles can be made from cardboard, sheetmetal, wire (No. 12, 14, 16, or 18 guage galvanized iron wire is about the cheapest), thread (nylon is strong, light and attractive), wood, plaster of Paris, plastic, glass, etc. Actually there is practically no limit to the kind of material that can be used to make mobiles, provided it is not too heavy and will hold its shape. The paints used are poster paint (water mixed) for cardboard mobile, and oil paint for metal or other materials. Turpentine for brush cleaning and oil-paint thinning is also necessary. Tools used are pliers,

long nosed (3 or 4 inches) with wire cutter at the side, metal shears, scissors, a knife or razor blade, and brushes.

Procedure. Mark up and cut materials into rectangular pieces. This method controls the maximum size of each piece and makes it possible to cut out without bending or cracking the cardboard which is remained from the cut-out. The knife and scissors must be sharp to cut a clean, sharp edge. The pieces of material for a mobile should be drawn freehand and irregular shaped related to one another in form and feeling.

The wires are cut with a variety of lengths. They are customary curve lines which are more graceful than straight ones and lend more interest and movement to the design. The pieces of the cutout material may be attached with a small ring and should hang freely without falling off the arms' loops. A small round loop is formed with pliers at each end of these wire arms. With two pieces attached on each arm, a string is tied around the arm approximately at its center to check the balance point at which one piece should be a little higher than the other. A loop at the balance point is made with tips of pliers bending the wire back toward the mobile maker until the loop is three-quarters made. Then the pliers are shifted to the top of the loop until the wire is aligned, forming a smooth arc along its entire length.

The mobile must be built from the bottom up, otherwise the balance is almost impossible with making adjustments to every piece added. The mobile is hung with a string at a convenient height, then paint can be applied. (30, pages 1-28)

Graphic Arts.

Block Printing. Secure a block of linoleum equal to the size of the design. If the linoleum is thin, mount it with glue or liquid cement on a one-inch-thick block of wood which must be the same size as the linoleum. If the surface of the linoleum is uneven, smooth it with sandpaper.

The design to be drawn on the linoleum must be reversed. This procedure is very important if lettering is involved. If block printing tools are not available, an ordinary pen-knife may be used. The knife if held so that it slants away from the design for making the first cuts, but for the finishing cuts the knife is held at right angles to the surface. The finer details are cut out first; the larger surfaces and background are left until last, when the gouges and chisels may be used. If the linoleum is warmed, it will be cut more easily.

For textile or paper printing, printer's ink is a color-fast medium. Oil paint may be used with mordant added. This mordant may be bought as a commercial product, or prepared by using two ounces of acetic acid and one quart of turpentine. For an acceptable odor, two ounces of wintergreen are added to this formula.

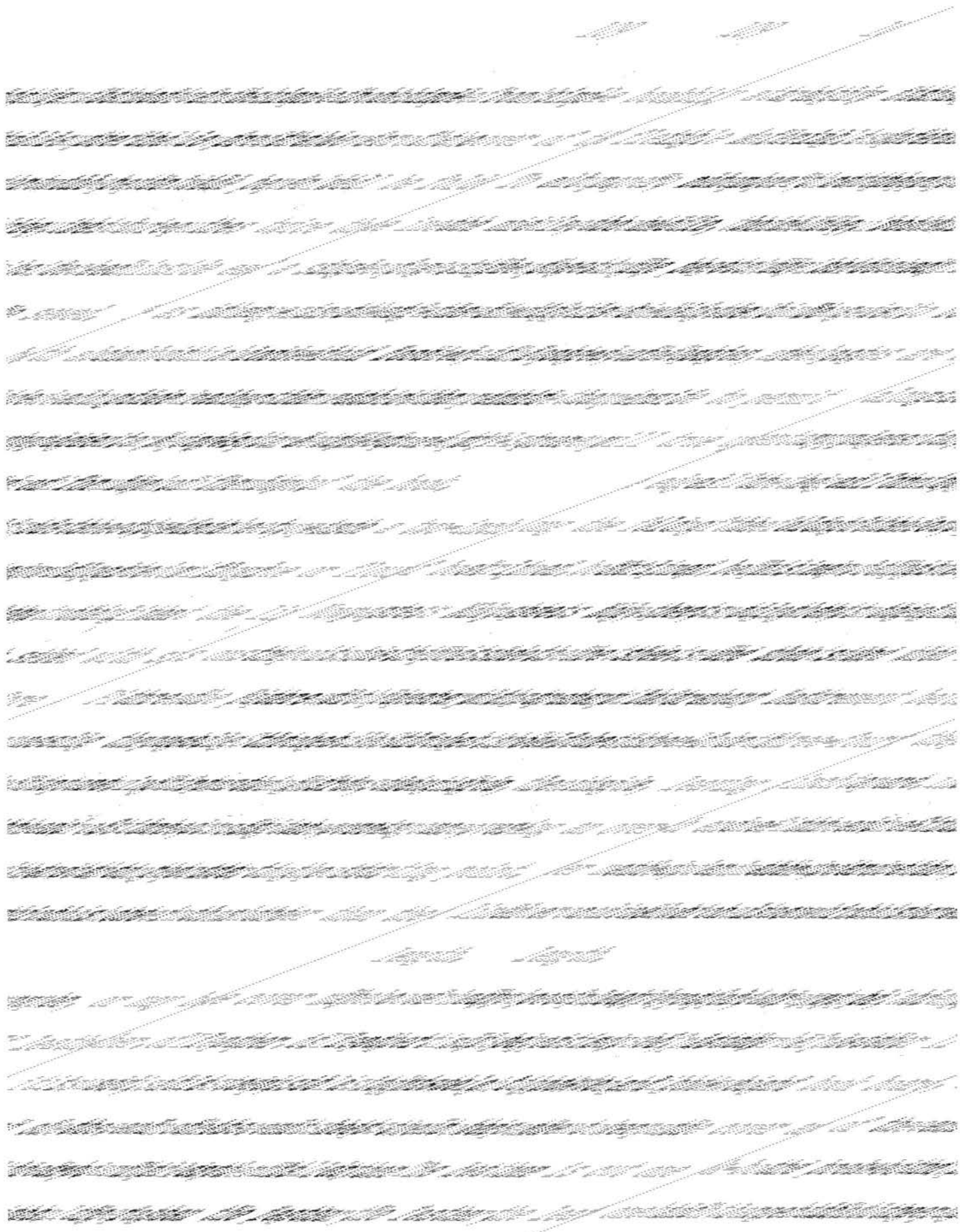
To print on fabric, the sizing or dressing from cotton or linen materials is removed by laundering in warm water. Then press them with an iron. Chiffons, silks and fine cloths should not be washed. To print on cards or paper, a

quarter-inch margin all around the design should be allowed to the size of paper. A rubber roller or brayer is used to spread the ink which is placed on a piece of glass, then the roller is rolled on the linoleum block. The block is placed face down on the fabric or paper to be printed. Place thin paper on the back of the block and press by rubbing a large tablespoon over the back of the block. Place the index and the middle fingers in the bowl of the spoon, and press hard while the spoon is being pushed in a circular motion to traverse the block. (37, page 139)

Silk Screen Printing. The silk screen printing is the process of this century. By this method the craftsman is able to print large areas with identical duplications and at less expense of time and effort. The screen is a piece of porous cloth, originally silk, attached firmly to a wood frame. Fine cotton cloth, organdy, or muslin will be satisfactory for limited use if all starch or other filling is removed. A mesh of 140 threads per square inch is best.

For printing, textile paints in a paste form are now available. Dyes are sometimes used, but some thickening such as dextrin or starch paste is required. After a stencil for a silk screen is made from lacquered stencil paper, the color is applied to the screen with a squeegee, a piece of rubber held in a grooved piece of wood. (20, page 114)

Bookbinding. The method of bookbinding was developed during the Dark Age. Albums, guest-books and scrapbooks in



cover the book-boards with glue or flour paste mixed with a little glue. Place the leather, fold the book and rub all parts to insure adhesion. Put it under pressure. After the leather has been dry, it can be laced with leather thong or fine-grade cords. (37, page 279)

Wood Craft.

Wood Carving. The earliest recorded history mentions wood as a carving material, and the tools used are much like the modern types. The Bible mentions "graven images" which must have been carved of wood as were the "idols" which "were burned". The Greek and Roman artists and sculptors were often wood carvers. Through all the centuries, particularly in the Renaissance period and into the 18th Century, the art of carving in both wood and stone will always thrill the craftsman. Duncan Phyfe also used carving in his furniture. (20, page 422)

A. Wood for Carving. In the hardwood class are hickory, oak, walnut, ash, elm, sycamore, maple, apple, pear, cherry, holly, and many others not so common. Classified as soft wood are pine, juniper, cypress, redwood, yew, cedar, poplar, birch and aspen. The preferred woods are black walnut, cherry, mahogany and oak. Beginners may use soft wood.

B. Manner of Carving. Stop cuts are made to insure the termination of carving strokes at the desired point. This cut severs the grain and is similar to the horizontal cut that a

wood chopper makes before he drives the downward slant stroke that clips the chip out. The cut must always be made with the grain. The carver does not complete one section at a time, but roughly goes over the entire work, and then retraces several times until completed.

The outline of the design is cut to the second layer of wood with a carving knife, slanted at an angle of 45 degrees away from the parts to be left raised. In removing large sections, successive lines are scored 1/8" apart, parallel to the grain of the wood. To chip out the wood, the blade of the knife is inserted in a score line, and the slivers are forced out with a slight twist.

C. Types of Carving. Low-Relief Carving: decorate a surface of wood by cutting away the surface surrounding the design, so the design is the raised portion and the background is cut away.

High-Relief Carving: merely low-relief carving cut more deeply. This carving requires more sculpturing than does low-relief.

Wood Sculpturing or Carving in the Round: the figure is made in three dimensions--length, breadth and depth. It requires proper proportion so that it will look nice at any angle.

Chip or Norch Carving: a simple form of surface decoration which is basically small patterns of incised triangles or squares all over a surface. (37, page 180 and 20, page 423)

Intaglio. Sink carving or relief inside out which means a mold or impression taken from intaglio produces a relief. Earliest carving was just crude incising to sink the design. Egyptian and Assyrian kings 5,000 years ago sealed their orders, (written in picture characters in soft clay) with intaglio cylinders. Intaglio in wood is done almost entirely with gouge, carving first with a veiner, then enlarging the cuts with gouges. (43, page 244)

Intarsia or Inlay. The process of the recessing of contrasting color materials into a solid background is at least 4,000 years old. An Egyptian stool dating from 2000 B. C. has crossrails and legs with duck heads carved on their ends. Eyes and markings are ivory and ivory inlays. In the Odyssey, Ulysses, describing to Penelope the bridal bed he had made, said, "...I wrough at the bedstead until I had finished it, and made it fair with inlaid work of gold and silver and of ivory." Pompeii, too, had its silver and copper inlays.

The procedure starts with drawing the design, then cutting with an incising knife and a small veiner for fine lines, and with a gouge for large areas. Carving must be done very carefully; the accidental removal of a chip beyond the margin line may spoil the design. The base of the intaglio should be as smooth and flat as possible, and the sides slightly beveled outward. Form a model for the inlay with modeling clay, making it in sections for easy removal. Trace the inlay-design on contrasting wood, 1/8" to 1/16" veneers being suitable. Cut the inlay with a jig saw in sections indicated

in the design, and file a slight bevel on the lower edges to slope inward and match the outward slope of the intaglio. File or sand the inlay and apply good glue to set the inlay into place. It is a precaution to inset a few 1/4" splines in the back of the wood that may warp before gluing in place. (43, page 245)

Painting on Wood. All of the wood surfaces must be clean without wax or grease spots, and all the cracks must be filled with wood filler. One or two thin coats of shellac or varnish, or two coats if the wood is coarse, is applied as an undercoat and is left to dry overnight. Fine steel wool will smooth the under cut and a cloth dampened with turpentine will clean all the final dusting. The surface is painted with enamel. Blue or white is favorite color. The contrast or vivid colors will be toned down by antiquing. Antiquing is done with some burnt umber oil paint mixed with turpentine applied to the surface with a soft brush. The design and antiquing is protected by a coat of clear, hard varnish added with a few drops of linseed oil to prevent it from drying too quickly. (27, page 21)

Marquetry or called "tarsia" in Italy, is the forming of elaborate designs or pictures by putting various materials together without a background--a glued-together jigsaw puzzle which may be only 1/28 inch thick. It is glued to a background or held in a frame. Marquetry is also very old. Jean Mace of Blois was the first French marqueteur, and the greatest

was Andre Charles Boulle, who in 1672 became a king's marqueteur. From the Netherlands in the sixteenth and seventeenth centuries marquetry spread to England during the time of the later Stuarts, reaching its peak during the reign of William and Mary. It was supplanted by carving during the Georgian period, but in 1760 the classic revival of the Adam period caused it in turn to supplant carving. In the latter part of the eighteenth century South German marqueteurs, leaders included Roentgen, Riesener, Oeben, and Foulet, were making elaborate instruments, weapons, and bride chests.

While modern marquetry is usually done with a scroll saw, it can also be done with a knife. For several marquetries, put pieces of wood together and saw them perpendicularly. If one marquetry is desired, the cut should be slanted to create a wedge and later a tight fit. (43, page 252)

Pyrography or Wood-Burning. Wood burning is one of the choice ways of making decorative pieces. Almost any kind of wood may be designed with burning. For wall decoration or any other non-utility purpose, three-ply wood is most satisfactory.

A. Tools. A wood-burning tool will be needed. The most practical and convenient tools is an electric wood-burning tool, sometimes called pyrograph. The old-time iron poker which is heated in a hot flame may also be used.

B. Procedures. A design is contrived and transferred to the wood by means of carbon paper. Before burning,

practice should be done on an old board. Work for easy strokes. To start, the point of the tool is turned up and then pulled along in the same manner as pulling a sled. To avoid making a darker spot at the beginning and end, the burning tool must be moving before placing on the board, and be removed before stopping the stroke.

Backgrounds are usually dark for contrast. Either the edge or the side of the tool is used and make long strokes to give a dark color. The lines are burnt closely together and evenly.

After having finished the burning, fine sand paper is applied lightly over the article, then two coats of shellac are applied. (37, page 188)

Leathercraft. Leather was known by ancient people of Egypt. It was used as clothing, furniture ornamentation, shields, and covering for ships. According to the Hebrew Talmud, the Babylonians knew how to make leather. The Romans also learned how to tan hides with barks and roots, and the word tan comes from the Latin "tanare" meaning "oak bark". Another modern word which seems far removed from leather is "pecuniary" which comes from "pecus" or hide and refers to the fact that leather was once used as money by the Romans. (20, page 142)

A. Classification of Leather. Leather is classified by the name of animal from which it is taken, such as cowhide, horsehide, calfskin, sheepskin, genuine alligator, etc.

Leather is also classified by the kind of tanning processes--vegetable, and mineral or chrome tanned.

B. Methods of Decoration: Outline tooling, flat modeling, embossing, beveling, stippling, stamping, carving, and lacing.

C. Tools: A swivel knife, punches, a fid, a metal rule, a mallet, etc. All other stamping tools may be made out of 16 or 20 penny nails (using files) or from wood dowels. Others are a glass or marble base, a snap fastener and materials for finishing such as oxalic acid to clean the leather, dye and lacquer.

D. Procedure. The leather, vegetable tanned, must be uniformly damp all the way through, but not so wet that water oozes from it when it is tooled or carved. Place the leather on a glass base or hard wood table for tooling or carving. Start tooling or carving outline of the design first and work on the background last. (25, page 179 and 20, page 142)

Ceramics. Of all the skills which mankind has developed through the ages and continuously employed to the present time, none is more ancient or fascinating than that of working with clay. The ancient Egyptians had mastered techniques of pottery making which are not surpassed today. Earthen ware was mentioned in Mosaic writings and baked clay tablets have been found which inscriptions dated and verified many periods of Biblical reference. The Egyptians and the Persians had

both learned the art of color glazing on brick and used it in decorating the walls of their buildings with scenes and figures of religious or mythological significance. The glazing of baked clay was perfected in Greece and Italy and is said to have been introduced by the Arabs into Spain, where the making and decorating of ceramic tile was developed to a high degree. The Indians in America were also experts in pottery.

In the East, the ceramic arts needs no emphasis. It is something with hardly parallel elsewhere, even among the creators of Greek vase painting. The pottery of the Shang and Yin periods (1760-1120 B.C.) were slightly artistic but proved that glaze of a sort was already in use. There is some evidence of finer work being done in the time of civil strike known as the Warring-States Period especially during a short period of stabilization under the Chin Dynasty in the third century when the Great Wall was built. By the ninth century the porcelain was being made and even exported. By the fourteenth century the green-glazed celadon wares were being exported far and wide to Persia, India, Egypt, East Africa, and the islands of South-West Pacific but about the same time under the Yuan Dynasty (1279-1367) the fashion was changed to a blue color.

Fine pottery wares of Chinese type were also made in Siam and exported to other countries. The Chinese ceramic art was brought to Siam in the Yuan period about 1300 when the king of Siam had visited Kublai Khan. A type of Japanese

grey stone ware painted in brownish black, obviously imitated from the Siamese, was known as "Sunkoroku", a Japanese version of the word "Sawankhalok" the name of the Siamese pottery ware. (22, page 160)

A. Clay. Many potters seek raw or natural clay, preferring blue clay, which fires cream white. The clay dug from hills and stream beds should be processed. The clay is washed free of stones, grit, sand, and leaf mold, and when not being used is stored in damp keeping. There are also forms of self-hardening clay, to which dextrin has been added, that needs no fire. The air hardens the clay after it has been molded.

B. Method of Working. (1) Modeling: shaping of figures and small articles from a mass of clay. (2) Coil: building sides on a base by adding coils of clay. (3) Slab: using a wooden slab, rolling pin, and guide sticks to roll out the clay in a flat piece. The guide stick is used to obtain a piece of clay of the desired thickness. (4) Casting: using a mold of plaster to make specific shapes or designs. (5) Sculpturing: carving a piece of clay in a free standing form. It is related to modeling, but the clay is drier and the work is done with modeling tools or knives. (6) Throwing on the wheel.

C. Methods of Decorating. (1) Incising: removing clay from the surface, either leaving the design raised, or cutting the design into clay leaving the background raised. (2)

Embossing: adding clay to the original piece to raise the design. (3) Inlaying: adding new bits of clay into the excavations left by incising. (4) Slip painting: apply slip on the article at the lather hard stage; the article is then bisque fired, glazed with light or transparent glaze, and fired again. (5) Sgraffito (Italian means "scratch"): scratching or inscribing a design on a coating of slip, so that the design shows the original color of the clay. (6) Glazing: coating the article with glaze of transparent or varieties of single colors. (21, page 88 and 37, page 61)

D. Firing. Articles made of clay must be completely dry before firing. The firing is done in an oven or furnace known as a kiln which may be wood burning, gas or electric. The firing, slowly increased in intensity up to a maximum of 3000 degree Fahrenheit, requires about twenty-four to thirty-six hours. Eight hours are usually needed for firing the material into the creamy-white stage. Let the kiln cool off before taking out the objects. Sudden changes of temperature either of heating or cooling may cause the clay object to crack.

A primitive kiln may be made in a pit which is lines with stones or fire brick. The green wares are put in an iron kettle or similar container with a cover. The fire is built of hardwood and allowed to burn to coals. The kettle, with the cover slightly open to allow evaporation, is lowered into the pit. The kettle having been warmed, the fire is rebuilt around it and kept burning from five to eight hours,

then allowed to die out gradually. The primitive kiln is inconvenient, gas and electric types are generally used.

After the first firing, the product is glazed with a preparation made up of components of glass, feldspar and flint, and metal oxide for coloring. The temperature needed for firing this glaze depends upon the fusing temperature of the glaze base. To test heat intensity, pyrometric cones are used. The more fusible cones are number 02, 03, to 022; the less fusible from 1,2,3, to 36. These cones are observed through the spy hole in the kiln door.

The formula for transparent glass:

Feldspar	18.0 parts
Flint	14.4 parts
Georgia clay	6.2 parts
White lead	57.8 parts
Whiting	4.5 parts

To convert the above formula into a colored glaze, merely add an oxide for the color desired. The colors that the oxides yield are as follows:

Cobalt	blue
Copper oxides	green
Iron	reddish brown
Manganese	black
Nickel oxide	gray
Uranium	yellow

Mixtures of these oxides will make different shades of their own colors, and sometimes different colors.

For painted design, underglaze is often used before applying overglaze. However, this is not necessary. Underglaze has slip clay mixed with it, and is applied while a lather-like consistency, rather than a creamy texture.

The colors are painted in, following a drawn design or in free hand. The piece may be finished off with a transparent overglaze. In applying overglaze, brushing, dipping or spray methods are used. (37, page 64)

Basketry. Basket making is a craft that is ageless; the one that is found in every part of the world. The word "basket" comes from the Old English meaning a vessel made of vegetable fibers. There are three general types of materials used in basketry: (1) Round materials: reed, the pith of rattan; vines, such as honey suckle; supple shoots of willow, etc. (2) Flexible materials: grasses - sweet grass, rye, broom straw, etc.; pine needles, especially from the long-needle pine; husk---cornhusks, etc. (3) Flat materials: splint--long narrow strips obtained from logs of ash, maple, oak, etc. (that have been soaked for a month or more so that the layers are loosened. The bark is stripped off, and the log is pounded lengthwise with a mallet to separate layers); rushes--cattail, etc.; strips of large leaves, such as palmetto, lauhaula, etc.

The material is picked, while it is still green, dried slowly, and turned often to dry. Most materials will need moistening or soaking before they are used in making of baskets.

Techniques. (1) Weaving, (2) coiling, (3) plaiting or braiding. Weaving is a method used for a long, supple strand, or "weaver", over and under a series of spokes which form the

framework. Coiling is used with reeds or vines, or with short lengths of grasses, pine needles, rushes, etc. These are would into coil or core, and stitched together with raffia, grass, thread or twine, using a large-eyed needle. Plaiting is a braiding method used with rushes, cornhusks, and other broad-leafted and soft materials. (21, page 65)

The handicraft activities for all classes of elementary and secondary schools suggested in this chapter with the addition of other art subjects in the elementary level and the industrial arts in the secondary level may be enough for all year's work. The teacher may choose some activities that he feels fit for his class from these suggested ones and add other activities that he sees suitable to teach his students. From these activities the suggested courses have been made in Chapter IV.

CHAPTER IV

SUGGESTED COURSES OF HANDICRAFT FOR SCHOOLS IN THAILAND

Suggested courses of handicraft for schools in Thailand are made for guidance of the Thai teachers' instruction and of the Thai students' learning. A good result can never be received from teaching of handicraft, or any subject, without a course of study. A good result can never be expected from the teacher who teaches by his memory or by a day-to-day planning. Having used these suggested course of handicraft, the teacher ought to know how these courses can be improved. The author does not assume that these courses are completed; it is just started.

These suggested courses are divided into two principal parts: Part A for elementary schools, and Part B for secondary schools (to be exact, for junior high schools). The teachers have freedom to choose the activities they like to teach, and they should let the students have freedom for the activities they like to learn. The suggested projects are not important, but to develop certain skills of using certain tools and to have first-hand experiences are necessary. To the Thai teachers, the author presents these courses of handicraft for their consideration.

Part A

A Suggested Course of Handicraft for the Elementary School

The handicraft for the elementary school is the introductory step in the industrial arts program. Because the child's interests revolve primarily around the home, the school, and the neighborhood, the activities of handicraft should be based on the interests of these environments, to furnish the initial knowledge of industrial activities in the community and far-away lands. Handicraft for this level should be taught correlating and fusing with other units of the classroom's subjects directed toward the democratic foundation. (56, page 33 and 34, page 17)

Objectives: The objectives of handicraft in the elementary school are as follow:

1. To offer the student an objective medium for expressing his ideas.
2. To provide the student with a manipulative form of creative leisure-time expression.
3. To acquaint the student with various materials and common tools.
4. To develop in the student the ability to plan and complete projects.
5. To develop in the student the social understanding and ability to work with other students. (33, page 5 and 34, page 17)

Pratoms (Grade) One and Two. The teacher should give a close guidance and supply the information that the children require. Since the children learn more readily by imitation than by being told why and how certain things are done, the

teacher should demonstrate the correct method of handling each tool as needs arise. The skills of working and using the tools should not be overemphasized because the children are awkward due to the lack of muscular control and strength and immaturity. Moreover, the teacher must not dominate the class, and must not force the students to learn but he or she should satisfy the students' interests. (34, page 21)

Activities and Processes	Related Learning
1. Paper Craft	Information how paper is made. Brief history.
Cut paper with scissors to make simple cutouts of animals, trees, houses, etc. Cut pictures from old magazines to make scrapbooks.	Children learn how to use scissors.
Make picture writing (writing mixed with pictures to tell a story). Fold and cut paper to make various forms such as chainbaskets, windmills, etc. Make paper floats of a canoe, a floating house, etc. Make paper mosaic. Make jointed paper toys. Simple weaving with paper. Cut design for paper stencil. Make simple type of paper modeling: shaping a wire to form the structures of animals and human bodies. Methods of applying paper to make papier-mache animals, etc.	Develop learning according to children's interests. How to draw simple designs. Pictoral alphabets used by ancient Egyptians and American Indians. Parts of human's body and the comparison in sizes.
Make papier-mache masks. Make papier-mache from a mold such as a bowl and a plate. Make a simple kite from a light weight paper. Make a paper dart. Make a relief map of a community. Methods of finishing: shellac, paint, sandpaper.	Mask shows in the class. The student should be taught to avoid throwing scrap papers in the school room or on the school ground.
2. Doll Making	
Make cork dolls from bottle's stoppers. Methods of joining part of dolls with glue, wire, bamboo sticks, etc.	Designs and imagination.

Activities and Processes	Related Learning
Make dolls from egg shells. Make papier-mache dolls. Make a doll from an old stocking: sew, stuff and paint the doll.	Ability to create things out of scraps
Make a rag or padded doll.	Decorating the dolls.
Make dolls from corn-cobs and corn husk.	Group co-operation in keeping the classroom clean after handicraft activities are finished.
Make branch dolls.	
Make dolls from straw or grass.	
Make a clay doll.	
Make a spool doll.	
3. Toy Making	
Make a broom stick hobby horse: use paper bags, old stocking, etc. to make the head of the horse.	Safety practice
Make a cage and a bird from a balloon and string.	
Make a gourd Humpty Dumpty, use plaster of Paris or modeling clay or stone as weight.	How to grow gourd. Gourd's nutritional value.
Make a sail boat from coconut husk or Lampoo's knee.	How coconut is grown and where it is grown.
Make a rolling hoop from a discarded barrel or old basketwork; a hoop stick from a wood lath.	
Make bottle music by filling bottles with various quantities of water. Construct a structure for hanging the bottles.	Present the music with the shows to be held in class.
Make a come-back can by using a discarded can, a rubber band, and a stone.	
Make a wheeled-base toy.	Ability to use simple and basic hand tools.
Make a cutout of animal from cardboard, make a hole and put a string through the hole. The animal moves by the string's vibration.	
Make a jumping jack.	
Make a merry jack: the rooster and the duck.	
Make toys from clay.	
Make a mobile from light weight cardboard and strings.	
4. Making things for personal or household use.	
Make things out of cloth such as handkerchiefs, book-carriers, etc.	Production of cloth.

Activities and Processes	Related Learning
Dye cloth with a knot-tie-dyeing method and a string-tie-dyeing method. Make a design on cloth and color with crayon, then cover with wet cloth and press with a hot iron to make the design a washable, fast color design.	Kinds and qualities of dyes.
Make a coat hanger from a branch or bamboo.	Methods of finishing.
Make a New Year's greeting card.	Customs and practice of sending the card; how to send the card.
Make a fishing rod from bamboo and method of tying a string to a fishing hook.	
Make a coil basket from hemp or reed.	Materials used to make basket.
Make a mat from straw or grass.	
Make a planter from coconut husk or bamboo.	How to take care of the plant.

Pratoms Three and Four. The teacher should continue the integrated handwork which is the fundamental approach in grades one to two. Opportunities should be given to children to show their expressions and creative works. The activities of handicraft from the previous grades may be repeated in some extent but more workmanlike than the previous grades. The democratic way of life must be stressed in teaching and learning, and in the behaviors of the children in their social relations with others.

Activities and Processes	Related Learning
1. Puppetry	
Use scissors to cut designs and forms drawn on paper to make shadow puppets or stick puppets, jointed paper figures, paper bag puppets, etc.	Creative design and imagination.
Make uses of papier-mache for hand puppets, mask, etc.	Correct use of common hand tools.
Use combination of whittling, sewing, papier-mache, etc. to make marionettes and buffoons and give a show to the class.	Method of paper production.
	Practice the performance on the stage for educational purposes.

Activities and Processes	Related Learning
2. Vegetable Crafts	
Make uses of materials according to the local seasons. Work on the gourd craft, how to prepare a gourd for craft, how to decorate by carving, painting, and burning and make a gourd into an ash tray, a bank, a hanging bird house, etc.	To familiarize and utilize the native or local materials.
Use an awl to make holes through nuts and seeds to make a bracelet or a necklace for a show or for a doll.	Methods of using common hand tools.
Know how to make a twist strand with two, three or more strands around each other, and how to attach fasteners.	Economical use of resource products.
Make coconut rattle or maraccas.	Appreciation of the value of handicrafts.
Make uses of branch craft utilizing branches to make buttons, candle holders, window flower boxes, table center pieces, coat hangers, soap dishes, etc. and make a doll from twigs or branches, from straw or grass, etc.	Simple decoration of the house.
3. Marine Crafts	
Make ship models with soft wood or Lampoo knees, and the drawing may be made to decorate the ship so that it looks like a modern oceanic liner, etc. Make a motor boat, a paddle boat with rubber band as source of power and let it sail in water.	Ability to use simple hand tool to shape wood.
Make a rope from coconut husk, or hemp or jute, so that the student can use the rope at home or at school. Make a netting needle and a guage from bamboo and a net for catching fishes, shrimps, and lobsters.	Time and season for catching fish.
Know how to tie a string to a fishing hook.	
Work with shell craft: make dolls, figures, necklaces, bracelets from sea shells, and paint them.	
Make a periscope.	Principle of periscope.

Activities and Processes	Related Learning
4. Miscellaneous Crafts	
Preparation of sand painting: sketch, water color, apply glue, and spray colored sand on glue.	History of sand painting. Sand and scenery may lead to the nature study.
Mixture of colored sand, pebbles, and twigs to make a scenery.	
Make a peep show box.	
Make a paper relief map.	
Make a diorama with a curved background and with a straight background.	Students work in group.
Make a panorama of the school and its area, or of any place to fit the unit work of the class.	The topic is correlated with the unit work of the class.

To this course, the teachers should add more activities of the handicraft that are appropriate for their teaching and suitable for the elementary school level. The more the teachers acquire handicraft skills, the more they can make the handicraft more interesting to their classes. The students' interests of the handicrafts will increase more when they attend the secondary school. A suggested course of handicraft for secondary schools is recommended in the next part.

Part B

A Suggested Course of Handicraft for Secondary Schools

The handicraft in the secondary school should center around projects requiring the use of common hand tools, and it should be taught as an area of the industrial arts program. A part of the school shop should be set aside for the handicraft. The instructional content should be closely related to the problems of life in the home and the community, and the emphasis should be given to the educational growth of the boy or the girl in the democratic society.

Objectives. The objectives of handicraft in the secondary school are as follow:

1. To promote the development of creative expression in many different media.
2. To provide the student with a manipulative form of creative leisure time expression.
3. To develop in the student the basic skills in the use of common tools and machines, together with a knowledge of the working qualities and characteristics of various craft materials.
4. To develop in the student the ability to plan and complete projects.
5. To develop in the student an appreciation of good workmanship and to recognize, appreciate, and construct articles of good design.
6. To develop in the student the social understanding and the ability to work with other students. (34, page 193 and 51, page 27)

Matayoms (standards) One to Three. The teacher should expect the students of these grades to make further exploration of the handicraft with increased emphasis on the origin, preparation, and nature of materials used. The development of further skills in use of basic tools and processes involved is also expected. Various activities should satisfy the varied interests that the students of this level have.

Activities and Processes	Related Learning
1. Weaving	
Plan a design for weaving. Make a pot holder pad for cooking from the cardboard loom. Make a straw or grass mat for the front door by using a Navaho loom. Make a "kok" or rush mat by using a portable Navaho loom. Make a "toey" leaf mat by using free hand method.	Ancient history of weaving. Thai history in weaving. Appreciation of work by hand. Appreciation of domestic goods. The making of yarn. Quality of yarn, silk, etc. Kinds of looms and constructions.

Activities and Processes	Related Learning
Make a cloth for a dinner plate from the portable Navaho loom.	Kinds of rushes for mat making.
Make a book carrier or a purse from a purse loom.	The growing and age of rushes.
Make a handkerchief from a square weaver loom.	Preparation of "Toey" leaves for weaving: how to cut, trim off thorns, and to dry, etc.
Make a belt from a belt loom or a T-D loom (tongue depressors).	Methods of putting in the design on cloth.
Make a scarf from a box loom or a frame loom.	Learn to create a design.
Make a rug by braiding method.	Method of sewing.
Make a fish net.	Season for fishing and different methods of fishing.
Make a fruit net for picking fruits from fruit trees.	
2. Basketry	
Learn to make splints from bamboo for basketry.	History of basketry.
Prepare reed, rattan, vines, grass or straw for making baskets. Make a basket from bamboo splints.	The story of Pra Ruang and his baskets for carrying water.
Make a fruit basket from reed by using coiling method.	Use and care of basketwork knife.
Braid using standard two-strand method.	Safety of working.
Braid using four-strand method.	Materials for basketry.
Make a basket by using plaiting or braiding method utilizing Toey leaves, rushes, or cornhusks.	
Finishing of basket work.	Appreciation of work done.
3. Metal Craft	
Select and develop a project design.	History of metal work
Transfer the design to a metal piece.	Principles of design in metal work.
Make metal tooling project from metal foils: outline, tool, and raise thin metal.	Thickness of different gauge metals.
Make a design using stippling method or punch work.	How metal is produced.
Clean copper with steel wool, antique with liver of sulphur, and fill the back of a raised part of metal.	How to keep metal away from rust and corrosion.
Decorating with repousse method using a dapping tools.	General characteristics of metals.
Decorating with chasing method using a chasing tool.	Safety practice in metal work.
	Techniques of use of metal tools.

Activities and Processes	Related Learning
Decorating with planishing method using a planishing hammer. Make a design to be used in piercing and sawing and use a jeweler's saw and a hand drill to decorate the metal surface.	
Make a bowl by raising method. Make book ends by using applique work. Make a mobile from metal foil. Make a metal box and solder the seams.	Why metal become harden when being worked on. Where and how the mobile is hung. Principle of heat.
Method of finishing: painting, applying clear lacquer.	
Method of etching	How to mix acid with water.
Copper enameling: cleaning with steel wool, dipping in pickling solution, applying gum solution, enamel, and firing.	
4. Graphic Arts	
Select and prepare a design and a linoleum block. Draw the design and carve the linoleum. Apply color and print on paper or cloth.	
Method of book binding: trim paper, assemble and jog papers and make a booklet by sewing. Repair a book. Make New Year's greeting cards using silk screen method with a simple design.	How paper is made. Use of paper cutter. Methods of figuring and cutting stock.
5. Rope Making	
Prepare hemp for rope. Hackling the fiber, spinning the fibers into a yarn. Make a rope with three strands of hemp fiber. Make a rope from coconut husk fiber.	Kinds of rope Quality of various plant fibers. Methods of knot-tying. The difference between a rope and a cable.
6. Wood Craft	
Draw a dimensional sketch.	History of wood work.
Make a bill of material. Cut a board to length with a saw, plane the board, check with a try square. Draw a design and paint on the board.	Planning a logical sequence of operation. Identification of wood grading and sizes of lumber.

Activities and Processes	Related Learning
Antique the painting with burnt umber oil paint mixed with turpentine.	Develop ability to create the design.
Use a scroll saw to make a marquetry.	Good taste in decoration.
Make a simple design and burn the design with a wood burning tool.	Correct use and safety practice of simple hand tools.
Carve a design on a board using intaglio or sunk carving method, using a veiner and a gouge.	Stories of some artists in woodcarving.
Make wood inlay or intarsia.	
Make a low relief carving.	
Make a high relief carving.	
Make a simple sculpture or carving in the round.	Appreciation of work done by hand.
7. Ceramics	
Prepare clay for working, sift clay with wire mesh, wedging, and kneading.	History of ceramics. History of Thai ceramics. How to select clay.
Make a pot with coil method, slab method, and fold up method.	Methods of using basic tools in ceramic.
Make a figure, or a sculpture.	How to make a mold.
Mold making and casting of slip in one piece mold, two or three piece molds.	
Brush or spray on colored engobes.	
Decorate with a ware with combs, modeling tools, and various shaped sticks.	Mixture of colored engobes, glaze, and clay.
Process of (a) sgraffito, (b) slip or engobe painting, (c) incising, (d) embossing or raised modeling, (e) inlaying, (f) overglaze painting (g) underglaze painting.	
Throw a bowl or dish on a potter's wheel.	Kinds of wheels
Preparation of glazes.	Colors produced by various metallic oxides.
Application of glazes: brushing, dipping, pouring, spraying.	Pyrometric cones
Stack the kiln for firing.	
Fire the projects.	Prevention of fire hazard.
8. Leathercraft	
Select or make a design.	History of leather.
Transfer the design to leather.	Kinds of leather.
Dampen leather	Economic use of leather.
Tool a simple design on a coin purse. Flat modeling, beveling, beading, and stippling tools.	Uses of leather tools. How to make leather tools.

Activities and Processes	Related Learning
Make holes with a thonging chisel and a lacing punch. Methods of lacing, splice and terminate lacing. Carve leather with a swivel knife. Steps of carving of a project. Stamping tools, veiner, pearshader, stop, backgrounder, seeder, etc. Decorating cut with a swivel knife. Make a billfold using these mentioned processes. Fastening a snap. Make a belt: burnish leather edges carve and decorate as mentioned above. Method of cleaning, dyeing, and finishing.	Techniques of cutting a piece of leather. How leather is sold. Unit for measuring of thickness. Reasons for following the steps of carving and stamping. Create designs for tooling and carving.

The Suggested Courses for Handicraft, an Area of Industrial Arts for Schools in Thailand have been presented to the Thai teachers. The present task of this study is close to the conclusion, but it is not completed, and it will never be. It needs more study and more improvement which can be done when these suggested courses are put into practice.

CHAPTER V

CONCLUSION

The reader in studying this thesis, the Suggested Courses for Handicraft, an Area of Industrial Arts for Schools in Thailand, will find that a large part of this study was set aside to the history, philosophies, and the development of the industrial arts. It was the purpose of the author to study about these and to present them in this way. The author believes that the handicraft must go along together with the industrial arts, and the industrial arts program still needs the handicraft or arts and crafts as an area of it.

One can find in this study that the handicraft has been a part of the life of man since man came into existence. The crafts-works of ancient Egyptians and Babylonians are the evidence that the handicraft was quite developed thousands of years before Christ. There were times when the handicraft had been neglected and looked down upon by some philosophers, but the craftsmen never gave up their works and beliefs; they handed down their craftsmanship to their descendants so that the later generations might be able to admire their works. There were times also when the handicraft was promoted to a great extent. The work of the Christian monks who kept handicraft in existence and growth will be long remembered. The

attempts of educators and philosophers like Rousseau, Pestalozzi, Luther and others who started the campaign and put the handicraft in a significant place in education will never die from the memories of the peoples. The philosophies of Dewey and recent educators who stressed the industrial arts or craftswork as an essential part of the modern education in the democratic society will stand in a prominent place in the history of education.

The variety of courses suggested in this study will lead the reader to the point how the handicraft, as a part of the industrial arts program, can be improved for schools in Thailand instead of the repetitions of only few activities year after year.

The author would like to recommend that the teacher who is going to use these suggested courses needs not follow the suggestions line by line, but he or she should use judgment to use them according to the seasons, to the locations of the schools and to the materials available. These handicraft courses, especially for elementary school, should be taught integrated with the units of teaching or school work. These courses were grouped so that two grades or classes might study continually throughout the courses. In teaching, the teachers should consider the individual student's interest. By suggestions or advices of various activities, the student should like to explore more with various projects instead of repeating the same one. The native or local crafts should be added to these suggested courses. To visit craftsmen of the

community will be beneficial to the teacher. If the opportunity permits the teachers should invite the craftsmen to school and ask for their advices or suggestions in particular crafts. Valuable comments might be received from them more than the teacher expects.

The author hopes that the suggested courses of handicraft for schools in Thailand presented here will be helpful for the Thai teachers in their teachings and that these suggested courses will inspire the school administrators and teachers to help improve the handicraft program by developing a better plan based on their own experiences and local conditions. Thus the industrial arts program as a whole will be improved and the Thai children will benefit more from the industrial arts. The author also hopes that this study will serve as a step for further study in this area of education.

BIBLIOGRAPHY

A. Books

1. Anderson, F. H., The Philosophy of Francis Bacon, University of Chicago Press, Chicago, 1948, 312 pages.

2. Bacon, Francis, Advancement of Learning and Novum Organum, P. F. Collier and Son, New York, 1900, 476 pages.

3. Bakamis, William A., The Supervision of Industrial Arts, The Bruce Publishing Company, Milwaukee, 1954, 219 pages.

4. Bennett, Charles Alphens, History of Manual and Industrial Education up to 1870, The Manual Arts Press, Peoria, Illinois, 1926, 461 pages.

5. Bennett, Charles Alphens, History of Manual and Industrial Education, 1870 to 1917, The Manual Arts Press, Peoria, Illinois, 1937, 566 pages.

6. Bonser, Frederick G., and Mossman, Lois Coffey, Industrial Arts for Elementary Schools, The Macmillan Company, New York, 1924, 491 pages.

7. Bonser, Frederick G., Life Needs and Education, Bureau of Publications, Teacher College, Columbia University, New York, 1932, 288 pages.

8. Blanchard, Wendell, Thailand, Human Relations Area Files, Inc., New Haven, Connecticut, 1958, 528 pages.

9. Bridenbaugh, Carl, The Colonial Craftsman, New York University Press, New York, 1950, 214 pages.

10. Cole, Luella, A History of Education, Socrates to Montessori, Rinehart and Company, New York, 1950, 700 pages.

11. Dewey, John, Education Today, G. P. Putnam's Sons, New York, 1940, 373 pages.

12. deFrancesco, Italo L., Art Education, Harper and Brothers Publishers, New York, 1958, 652 pages.

13. Eaton, Allen H., Handicrafts of New England, Harper and Brothers Publishers, New York, 1949, 374 pages.

14. Eby, Frederick and Arrowood, Charles Flinn, The History and Philosophy of Education, Ancient and Medieval, Prentice-Hall, Inc., Englewood Cliffs, New Jersey, 1940, 966 pages.

15. Eby, Frederick, The Development of Modern Education, Prentice-Hall, Inc., Englewood Cliffs, New Jersey, 1953, 719 pages.

16. Friese, John F., Exploring the Manual Arts, The Century Company, New York, 1926, 412 pages.

17. Friese, John F., Course Making in Industrial Education, Charles A. Bennet Company, Inc., Peoria, Illinois, 1958, 299 pages.

18. Gaitskell, C. D., Arts and Crafts in Our Schools, Charles A. Bennet Company Ltd., Inc., Peoria, Illinois, 1949, 62 pages.

19. Giachino, J. W. and Gallington, Ralph O., Course Construction in Industrial Arts and Vocational Education, American Technical Society, Chicago, 1954, 146 pages.

20. Griswold, Lester, Handicraft, Prentice-Hall, Inc., New York, 1952, 480 pages.

21. Hammett, Catherine T., and Horrocks, Carol M., Creative Crafts for Campers, Association Press, New York, 1957, 431 pages.

22. Honey, William Boyer, The Ceramic Art of China and Other Countries of the Far East, Faber and Faber Limited, London, 1946, 186 pages.

23. Hughes, G. Bernard, Living Crafts, Philosophical Library, New York, 1954, 192 pages.

24. Hutchins, Mabel Reagh, Creative Handicrafts, Leisure League of America, New York, 1938, 93 pages.

25. Ickis, Marguerite, Handicrafts and Hobbies for Pleasure and Profit, The Greystone Press, New York, 1948, 310 pages.

26. Ickis, Marguerite, and Esh, Reba Selden, The Book of Arts and Crafts, Association Press, New York, 1954, 275 pages.

27. Ickis, Marguerite, Folk Arts and Crafts, Association Press, New York, 1958, 269 pages.

28. Ingram, James C., Economic Change in Thailand Since 1850, Stanford University Press, Stanford, California, 1955, 254 pages.

29. Lodge, R. C., Plato's Theory of Education, Harcourt, Brace and Company, New York, 1947, 322 pages.

30. Lynch, John, How to Make Mobiles, The Studio Publications, Inc., New York, 1953, 96 pages.

31. Mattil, Edward L., Meaning in Crafts, Prentice-Hall, Inc., Englewood Cliffs, New Jersey, 1959, 133 pages.

32. Newkirk, Louis V., and Greene, Harry A., Tests and Measurements in Industrial Education, John Wiley and Sons, Inc., New York, 1935, 253 pages.

33. Newkirk, Louis V., Integrated Handwork for Elementary Schools, Silver Burdett Company, New York, 1940, 342 pages.

34. Newkirk, Louis V. and Johnson, William H., The Industrial Arts Program, The Macmillan Company, New York, 1948, 357 pages.

35. Pelton, B. W., How to Build Games and Toys, D. Van Nostrand Company, Inc., New York, 1951, 264 pages.

36. Perry, Evadna Kraus, Art Adventures with Discarded Materials, Wetzel Publishing Company, Inc., Los Angeles, 1933, 180 pages.

37. Reynolds, H. Atwood, Complete Book of Modern Crafts, Greenberg Publisher, Inc., New York, 1938, 305 pages.

38. Reynolds, H. Atwood, Low-Cost Crafts for Everyone, Greenberg Publisher, Inc., New York, 1939, 322 pages.

39. Roberts, Roy W., Vocational and Practical Arts Education, Harper and Brothers, New York, 1957, 637 pages.

40. Rusk, Robert R., The Doctrines of the Great Educators, Macmillan and Company Ltd., London, 1955, 311 pages.

41. Silvius, G. Harold, and Curry, Estell H., Teaching Multiple Activities in Industrial Arts Education, McKnight and McKnight Publishing Company, Bloomington, Illinois, 1956, 484 pages.

42. Struck, F. Theodore, Foundations of Industrial Education, John Wiley and Sons, Inc., New York, 1930, 492 pages.

43. Tangerman, E. J., Whittling and Woodcarving, McGraw-Hill Book Company, New York, 1936, 293 pages.

44. Teague, Walter Dorwin, Design This Day, Harcourt, Brace and Company, New York, 1949, 285 pages.

45. Ulich, Robert, Three Thousand Years of Educational Wisdom, Harvard University Press, Cambridge, Massachusetts, 1954, 668 pages.

46. Warner, William E., Policies in Industrial Arts Education, The Ohio State University Press, Columbus, Ohio, 1928, 90 pages.

47. Watson, William Henry Lowe, "Apprenticeship" Encyclopaedia Britannica, Vol. 2, Encyclopaedia Britannica, Inc., Chicago, 1958, 1015 pages.

48. Wilber, Gordon O., Industrial Arts in General Education, International Textbook Company, Scranton, Pennsylvania, 1948, 362 pages.

49. Winslow, Leon L., "Craft", Encyclopedia of Modern Education, The Philosophical Library of New York City, New York, 1943, 902 pages.

50. "Handicrafts", Encyclopaedia Britannica, Vol. 11, Encyclopaedia Britannica, Inc., Chicago, 1958, 1001 pages.

B. Bulletins

51. California Industrial Arts Committee, Suggested Courses of Instruction in Industrial Arts for the Junior High School Level, California State Printing Office, Sacramento, 1953, 48 pages.

52. Kansas Industrial Arts Committee, Kansas Tentative Guide to Teaching Industrial Arts, Kansas State Printing Office, Topeka, 1949, 95 pages.

53. Oklahoma Industrial Arts Committee, Industrial Arts in Oklahoma, Oklahoma State Printing Office, Oklahoma City, 1951, 129 pages.

54. Pennsylvania Industrial Arts Committee, Ceramics as an Area of Industrial Arts Instruction in Pennsylvania Public School, Pennsylvania State Printing Office, Harrisburg, 1955, 94 pages.

55. United States Department of the Interior, Office of Education, Industrial Arts, Its Interpretation In American Schools, Bulletin No. 34, United States Government Printing Office, Washington, D. C., 1937, 125 pages.

56. Wisconsin Cooperative Educational Planning Committee, Philosophy and Objectives for Industrial Arts in the Wisconsin Schools, Wisconsin State Printing Office, Madison, 1949, 51 pages.

C. Magazines

57. Bakamis, William A., "A New Look at Industrial Arts", The School Arts, Vol. 58 No. 5, The Davis Press, Inc., Worcester, Massachusetts, January 1959, 48 pages.

58. Mattil, Edward, "Handicrafts and the Teacher," Design, Vol. 60 No. 5, Design Publishing Company, Columbus, Ohio, May - June, 1959, 35 pages.

59. Schmitt, Marshall L., "Discernible Trends in Industrial Arts for the Past Half Century", Industrial Arts and Vocational Education, Vol. 47. No. 5, The Bruce Publishing Company, Milwaukee, Wisconsin, May 1958, 81 pages.

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