A HISTORICAL STUDY OF THE USE OF WOOD AND THE KINDS OF WOODS USED IN THE CONSTRUCTION OF IMPLEMENTS, FURNITURE AND BUILDINGS

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A HISTORICAL STUDY OF THE USE OF WOOD AND THE KINDS OF WOODS USED IN THE CONSTRUCTION OF IMPLEMENTS, FURNITURE AND BUILDINGS

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CHAPTER I

INTRODUCTION

From the beginning of time man found in wood the answer to many of the problems pertaining to his existence. Wood grows in many different parts of the world and in many cases can be worked with the simplest of tools. Too many people have taken for granted the so-called endless supply of wood through the ages, and, therefore, through misuse and carelessness, have diminished and almost destroyed this natural material.

Many people do not realize that the tree is the highest form of plant life, just as man is supposed to be the highest form of animal life. Man should remember that this outstanding material has been important in the building of many great empires and deserves its proper place in civilization.

As civilization progressed, so did man's knowledge of the useful material which mother nature had supplied in such abundance. Greater skill in the handling of better tools and a more accurate knowledge of the medium through which man worked resulted in the craftsman in woodwork becoming one of the best known and most popular members of each succeeding civilization. The story of wood and its use is one
of steady progress and is not yet by any means finished. Modern research workers find more uses for wood every day, and the long list of products coming from one tree is amazing. Timber is unique, vital, and no substitute has been, or is likely to be discovered to replace wood for many essential purposes.

A study of wood should make one more conscious of the length of time it takes for a tree to reach the timber stage and how man has destroyed the forest woods without planting trees to replace those cut down. Man has not always been conscious of conservation of the woods, as evidenced by the fact that Ancient China, with its vast store of knowledge, once had great forests and is now practically a desert. Similarly, in the northern section of America are found large areas of scrub timber and very few reforestation projects. The same thing is happening in the great Northwest and in other parts of the United States. The education of individuals, vast public relations programs, propaganda for reforestation, and the attention of all conservation bodies are all necessary if man is to conserve and propagate the present supply of wood.

Statement of Problem

This is a study of the woods used by man in the construction of implements, furniture and buildings from the first known use of wood to the present day use of this material.
Purpose of Study

One of the purposes of this study was to compile the information about wood and the use of wood in the construction of weapons of war and tools for the production of food. Another purpose was to compile and present the available material on the subject of wood used in the making of furniture for private dwellings and public buildings. The study also includes information concerning the kinds of woods used in the construction of private and public buildings. It was also another purpose of this study to present data which would indicate whether or not wood is used less at the present day for the making of implements, furniture and in buildings than it was in earlier periods of history.

Definition of Terms

Furniture.---Webster defined the word "furniture" as follows:

...articles of convenience or decoration used to furnish a house, apartment, place of business or of accommodation, etc., especially movable articles such as chairs, tables, beds, cabinets, desks. Styles, ornamentation, etc., in furniture are usually named after the period, or a sovereign reigning when they were in vogue, as Renaissance, Empire, or from their chief maker, as Chippendale, etc. 1

Cubits.---This term is used in the Old Testament of the Bible and is a form of measure. This measure was taken

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1  Noah Webster, New International Dictionary of the English Language, p. 1021.
from a man's elbow to the tip of his middle finger and varied from eighteen to twenty-one inches.

**Primitives**—The term "primitive" is defined as timeless and is related only to knowledge, custom and circumstance.²

**Implements**—This term is defined as tools of relatively simple construction and personal manipulation. In a broad sense the term implies that by which any operation is carried on.³

**Wood**—The term "wood" is defined as follows:

. . . . the hard fibrous substance which makes up the greater part of the stems and branches of trees or shrubs beneath the bark and is found to a limited extent in herbaceous plants. . . . the trunk or large branches of trees sawed or otherwise prepared for commercial use.⁴

**Source of Data**

Much of the information used in this study was found in libraries at Southern Methodist University, Dallas, Texas; Texas Christian University, Fort Worth; North Texas State College and Texas State College for Women, Denton; Southwestern Baptist Theological Seminary, Fort Worth, and the public libraries in Fort Worth and Dallas, which form the


³ *Webster, op. cit.*, p. 1250.

North Texas Regional Union List of Serials. Also bulletins from the United States Department of the Interior and some bulletins published by various universities were used.

Limitations of Study

The study was limited to the use of wood in the construction of furniture, private and public buildings, and implements used as weapons of war and tools for the production of food. The subject was treated from the earliest recorded history concerning the use of wood to the present day.

Procedure of Study

A study of history books, books about furniture and architecture, and other books containing historical material pertaining to the subject was made to find information concerning the first uses of wood in the construction of implements, furniture and buildings in order to determine the kinds of different woods used in these three groups of general construction. The study was organized as follows:

Chapter I presents an introduction to the problem, including the statement of the problem, the definition of terms, the source of data, the limitation of study, and other recent and related studies.

Chapter II gives a brief historical study of the woods used in the construction of implements, weapons of war, and
tools used in the production of food from the earliest known use of this material to the present time.

Chapter III is a historical treatment of wood used in the construction of furniture for private and public buildings from the earliest recorded history until the present time.

Chapter IV is concerned with the treatment of the different kinds of woods used in the construction of buildings, both private and public, from the beginning of recorded history to the Contemporary Period.

Chapter V summarizes the study and presents the conclusions and recommendations that resulted from the study.

Related Information

There are a few studies which have treated the historical importance of wood used during the various periods of time that had a direct influence on this study. In the preface of Egon Glesinger's book, The Coming Age of Wood, was a very pertinent statement which parallels the idea advanced in this study. It is as follows:

As Secretary General of Committee International du Bois, he got an insight into the plotting of the Nazi government of Germany to get control of the timber of Europe and ultimately of world supplies. The Nazis seem to have had the only government in the world which realized the economic and political potentialities of wood. While other governments thought of wood as structural material, the Nazis saw it as the source of food for man and beast, of motor fuel, textiles, and plastics. They reasoned rightly that if Germany could get a sufficient supply of wood she could be 'blockade-proof' in war. The best scientists were mobilized and
some seventy factories built for the conversion of wood into these and other essential products. The story of the economic and political moves to get control of the wood supply by German-dominated Cortels, of the setting up of the Centre International de Sylviculture in Berlin to absorb or replace the Genuine Committee International du Bois, and of the degree of success which attended the technical and political drive to make Germany more self-sufficient for war by using wood as a material for a wide range of products, might well have formed a separate booklet of more interest to the future historian than the details of the military campaign. 5

This statement is pertinent to this study in that it reveals the necessity for people to understand and help with the problems of waste, misuse and rapid consumption of the vital supply of wood.

Another statement in the preface of Glesinger's book concerning the waste of wood in industry was as follows: "Out of four trees felled, the equivalent of less than one reaches the consumer in finished commodities. The rest is wasted." Further in the book there is a statement dealing with the industrial waste of wood. It is as follows:

The forest industry tonnage of wasted wood is identical in substance with the wood that goes into useful products. It represents more than 75 percent of the material processed by the forest industries. No other industry could conceivably throw away anything approaching this percentage of its raw material. The fact that the forest industries can absorb losses on such a scale is a measure of our failure to understand the nature of wood. 7

In the *Dallas Morning News* there was an article closely related to the foregoing statement taken from Glesinger's book. The research director of the National Lumber Manufacturers' Association stated that "Research will revolutionize the furniture wood industry in the next twenty years." Revealing the efforts of the lumber organizations to help conserve the wood supply, Rishell said that new equipment is being designed to cut down waste and speed production. A further statement indicated, in part, one solution for waste in the wood industry. He further related that "Waste, which has been a major problem in the woodworking industry, can be turned into profit by molding sawdust into various furniture parts."  

Many references were found concerning the use of wood in the construction of implements, furniture, and buildings. This study, however, failed to reveal a thorough treatment of the uses of wood and the types of woods used in the construction of implements of war, furniture, and buildings.

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8 "Research Expected to Bring Advances in Furniture Wood," *Dallas Morning News*, August 2, 1951, Section 1, p. 12.
CHAPTER II

THE KINDS OF WOODS USED IN THE CONSTRUCTION OF IMPLEMENTS
USED BY MAN FROM 3000 B. C. TO 1950 A. D.

Wooden War Implements Used by Primitive Man

Primitive man, conscious of the basic needs for food, clothing, and shelter, met these needs in a simple way. One of the earliest and most useful weapons of man was a stout tree branch. Arms or weapons were invented or came into use when primitive man first learned to throw stones and to wield a club to augment the striking force of his bare hands. Stones held in the hand or thrown were probably the first weapons used. The club, obtained from the branch of a tree, was possibly the second. The next probable improvement of primitive man's weapons of war and tools for food production was the handle. A stone tied on to a short wooden handle was much more effective than a stone used in the hand. This development was a combination of the stone and the club.

The lack of differentiation between the primitive weapons and implements is discussed in a pamphlet by


Cutting instruments early became differentiated into weapons and implements. No difference existed originally between implements and weapons. The digging stick is also the first weapon form. A heavy stick is also a club. A club with a knob becomes a still more effective weapon when sharpened to an edge on one of its surfaces, thus becoming an axe. Point the stick and it becomes a spear for a combat at a distance. If the stick is short it becomes a dagger suitable for defensive or offensive use at close quarters. Flatten the stick and prolong its sharpened edge to the full length of the stick and it becomes a sword. A short flat stick with sharpened lateral edge becomes a hoe. The stick which has acquired a knife-blade is also a useful household implement. 2

Primitive man found the club and the stone fitted with a wooden handle inadequate for his needs, and the next improvement in the first weapons used by man was the development of the dart and spear. Darts and spears could be thrown only a short distance and were not accurate enough for man's pursuit of food. The bow and arrow had greater range and accuracy and came into use during prehistoric times. 3

The weapons of man may be classified into three types: Pointed weapons designed to pierce some vital part of the body; edged weapons designed to cut the muscular tissues and even to chop the bony structure; and, striking weapons used to stun, to bruise and to break the bones. These

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3 Ibid., p. 8.
weapons are used in five ways: (1) held in the hand; (2) attached to the end of a shaft; (3) hurled from the hand; as a javelin; (4) shot from a bow arbalest, catapult or gun; (5) thrown from a sling, throwing stick or balista. 4

Clubs were used by the Polynesians and were called uls, mace, talavalum, lipped, pandanus, and ave-bit. It is believed that the first Polynesian clubs were made of stone or shell secured to a wooden handle. Wood was easier for the clubwright to work with a stone knife, and this is probably one of the reasons for the change from stone weapons to hardwood clubs. The Polynesians used ironwood for clubs because this heavy, dense wood was practically indestructible except by fire and it made a very durable weapon. The ula was the simplest of the Polynesian clubs and was carved out of one solid piece of wood but looked as if the handle had been driven down through the club head. The head of the club was a round ball shape. Wooden war clubs from New Caledonia, New Hebrides, New Guinea, the Solomon Islands, Fiji, and Melanesia were developed from the stone-headed clubs of earlier years. The stone heads of the early clubs were attached to the wooden handles by means of fiber lashing and gum from trees. A description of the structural form of a Melanesian club has been given by Churchill:

4 Ibid., pp.899.
The obsidian lance-heads are secured in a socket of wood attached to the end of the shaft by means of a cement and by being bound round with fine twine. The socket is hollowed out in a separate piece of wood, and in order to facilitate the scooping out process two slots are usually cut in the faces of the socket. The shaft of the lance is spliced into a V-shape slot in the lower part of the socket piece. A rounded strengthening piece is retained in the socket piece between the actual socket and the narrowed part of it in which the slot for the shaft is cut. A very hard and solid gum is used to bed the lance-head in its socket and the shaft in its slot, and to mass together the turns of fine twine which secure the whole. In some lances the entire socket-piece and the turns of binding twine are concealed by an even thicker layer of the gum, whilst in others the gum is used more sparingly and the turns of twine and the wood of the socket-piece are exposed to view. . . . The wood of which the socket-pieces are made is hard when dry and old, but probably much softer when cut in the fresh condition. 5

The gum used for making these weapons was obtained from the nuts of the parinarium laurinum.

The Polynesian weapons were usually of symmetrical shapes and were made of wood, bone, stone, and jade. The carved wood hand club was well balanced and well designed, and the finely wrought curve of the wooden shark-hook had a barb of human bone. 6

The warriors of the Fiji Islands carried many clubs. Two throwing clubs were carried in one hand and a third club for throwing was carried in the warrior's belt. A heavy

5 William Churchill, Club Types of Nuclear Polonesia, pp. 105-119.

two-handed club used for close hand-to-hand fighting was carried in the other hand. The heavy club was laid on the ground while the natives threw the smaller clubs, and then the heavy club was picked up to use for closer fighting.

Wooden weapons from early Palestine are not in existence today because of the natural decay of the material; however, it has been assumed that early shepherds used wooden clubs much like those used in Palestine today. The club used by shepherds in Palestine today is a heavy bar of hard wood about two and a half feet long with a pear or egg-shaped head studded with flat-headed iron nails. A leather thong is threaded through a hole in the handle of the club and is used to secure the club to the hand.

The wooden club became a more deadly weapon when equipped with a sharp edge, usually of a harder material. Man learned to form knives, daggers and axes which were more effective than the club for close primitive fighting.

Another weapon which dates from prehistoric times is the bow and arrow. This weapon has been used for thousands of years and was used in the first battles of war recorded in history. The use of the bow has been widespread throughout history in both time and location. The bow was used

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7 Churchill, _op. cit._, p. 147.

by the ancient Egyptians and is still used by primitive tribes today. The bow and arrow have been important both as tools for killing game and as weapons of war.

Wooden Implements Used by Primitive Man for Obtaining and Consuming Food

"Man has been called the only tool-making animal, and the tool has been an important lever in the uplifting of the human race." It has been questioned whether man's learning to use tools or learning to use fire has been more important to civilization, however, both of these skills are necessary in the production and preparation of food.

Paleolithic man had to do more than defend himself; about one half of the year his food had to be chiefly the flesh of animals. Consequently, he soon learned to use both the club and the spear in order to make himself a match for the wild game animals that surrounded him. Cave men have been found buried with such weapons at hand, indicating that even then man believed in a life after death.

Prehistoric Hopi hunters used a curved wooden boomerang-like club or rabbit stick to slay rabbits for food after

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driving a herd into a wide netted area. Such drives were also used to kill antelope, turkey and other game.

After man learned to use fire and cook his food, he needed a device for making fire. Archeologists and scientists generally agree that man first made fire by the friction of wood against wood. A hard pointed stick was held in the hand and twirled in a hole or rubbed in a groove in a softer piece of wood until the little splinters caught fire. Later a fire-drill was made from a flexible stick and a cord.

The use of tools for growing food began with the domestication of plants, credit for which, according to Ashley, was attributed to prehistoric woman, who had to walk long distances to the meadows to gather edible seeds because man chose to live near good hunting grounds which were far from where the seed-grasses grew. Returning with a basket of seed, the woman would spill some along the way, and the next year, if the camp had not been moved, the woman would find the grasses growing along the way. After a lapse of time the woman noticed that the blades of grass sprouted from the seeds. Then the woman scattered seed, and after a few hundred or thousand years, some woman scratched up the

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13 Ashley, op. cit., p. 19.
ground or dug holes to plant seed. The sharp pointed sticks which were used for digging might be considered an early form of the hoe.

The story of the development of tools to be used in eating started with the use of the fingers and hands to carry food to the mouth. The knife, fork and spoon have existed since primitive times, but were not always used for eating purposes. Many authorities agree that the fork was the first tool for eating, being simply a wooden stick or skewer used to spear food and carry it to the mouth. However, it is not actually known if the first tool used for picking up food to eat was a knife or a skewer, but it is plausible to assume that a pointed stick was used before a stone was shaped to function effectively as an eating spear.

The knife has sometimes been made entirely of wood, as was the wooden-bladed knife of the Solomon Islands. More often the knife blade was of a harder material and the handle was made of wood. Knives with stone or steel blades and wooden handles are made by primitive people today, and knives with flint blades and wooden handles were used in prehistoric days. The first knife was a flint semicircle

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14 Ibid., p. 24.

with a wooden handle placed on the slant edge. The knife was used by primitive people as a scraper, cutter and weapon.

The early spoon was a bowl with a wooden handle attached and was often used more as a plate. The primitive American Indians used wooden spoons, and in other places shells and coconut shells attached to wooden handles were used. The first spoons in occidental history were generally fig shaped, as were Etruscan and Roman spoons. The round spoon has been used throughout history, but after the eighteenth century the elliptical shaped spoon became more common. Among primitive people the spoon has been an object to be decorated, often at the expense of the usefulness of the spoon. Many wooden handles of spoons were carved with designs of ceremonial significance.

Wood was among the first materials used for making containers for food and has come into vogue again with the modern trend toward casual living. The kitchen utensils used in the Fiji Islands are mainly pots and pans made of burnt clay, wooden bowls, and other crude containers.

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16 Ibid., pp. 16-22.
17 Ibid., pp. 7-39.
The American Indians did not have metal kettles or containers for cooking. They cooked by repeatedly dropping hot stones into vessels of bark containing liquid and in this manner the food was cooked. Sections of bamboo fitted with fiber handles have been used as buckets for carrying water or milk. In Panama among the standard household equipment is a wooden mortar and pestle for hulling rice. Oily nuts of the Congo palm are ground up in a wooden mortar made from a large tree trunk.

Wooden War Implements Used by Ancient Man

Wooden weapons of the ancient Egyptians have been preserved because of the dry climate in Egypt, hence much has been learned about Egyptians weapons from the scenes painted on the walls of tombs. During the Middle Kingdom (2400 B.C. to 2000 B.C.) there was a powerful noble, Khnumhatep II, who lived at Beni Hasan. In his tomb were found scenes showing Asiatics carrying spears, bows, and throw-sticks.

The chariot was used in early warfare by the Egyptians, Assyrians, Greeks, Romans, and Chinese. In Egypt the chariot was used as early as the year 1200 B.C. during the time of Ramesses II. Most chariots were made of wood with

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some metal parts. The chariots of the ancient Chinese were two-wheeled and were similar to Greek and Roman chariots, but the Chinese chariots had wheels with from seventeen to nineteen spokes. 22

The Egyptians were probably the first people to use large besieging weapons such as the battering ram, the testudo, and the scaling engine. The Egyptian army was highly organized and had much of this kind of equipment made partially or completely of wood. Egyptian war engines were later copied by the Romans.

An Egyptian noble of the Middle Kingdom was Amenhapatep II, who was distinguished as being unsurpassed in archery. History reports that Amenhapatep II rode in a chariot at great speed and shot arrows at a copper target. This was the first record of such archery shots. In 1898 the mummy of Amenhapatep II was found in the Valley of the Kings of Thebes. The great archer’s famous bow, which he boasted no other man could draw, was still near the archer’s side. 23

The bow and arrow was the chief offensive weapon in China from the Shang State of about 500 B. C. down to the advent of firearms from the West. The reflex bow of the

22 Herrlee G. Creel, The Birth of China, p. 133.

23 Finegan, on. cit., p. 92.
Shang State was twice as powerful as the ordinary European or English bow and sometimes had a pull of 160 pounds. It was made in the Cupid's bow shape from flexible wood combined with horn and sinew. Ancient Chinese of the Shang State also used the pellet bow which was designed to throw small stones. The pellet bow was made from a forked stick and resembled the ordinary sling shot.

Arrow shafts used in the Shang State (500 B.C.) were made of bamboo. Many bows and arrows lacquered with cinnabar or otherwise richly decorated were awarded to military commanders for victories. Archery was one of the "six arts" in which every Chinese aristocrat was tutored. Archery contests were held before the Imperial Court of China as late as the present century.

The Assyrians used the bow as the main weapon of war, but lances, spears and javelins were more commonly used by them than by the Egyptians. Greece, during the time of Homer (900 B.C.), used the javelin, spear, and lance as the principal weapons for Greek soldiers. The Greeks used heavy wooden spears which were twenty to twenty-four feet long. These spears were held out in front of the foot soldier. As the enemy stopped on the ends of these spears,

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24 Creel, op. cit., pp. 98-145.

25 Ibid., p. 102.

26 Ibid., p. 132.
another line of Greeks advanced with other spears to break up the attacking force. The Romans used the "pilum," a kind of javelin with a wooden shaft.

The ancient Aztecs of Mexico used an interesting device to increase their arm-power when throwing a javelin. This device was a throwing-board, or atl-atl, which lengthened the arm, thereby giving the javelin more propulsive force. Made of wood, the throwing-board was often delicately carved in Aztec design.

The lance in the Shang State of ancient China was made of a wooden shaft which was from sixteen to twenty feet long and had a head of stone, bone, or bronze. This Chinese lance, called a "mao," was used in somewhat the same manner as the Greek lance. The "mao" was held by soldiers riding in chariots toward enemy lines.

The long spears of the Japanese were beautiful in both design and workmanship. These spearheads were made with great precision and were marked with the name of the maker. The spear shafts, made of many different kinds of hardwood, were light and strong and afforded an excellent grip. The shafts were highly ornamented and were finished with lashing. The Japanese did not use the crossbow, but in the mounting

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27 George C. Vailant, Aztecs of Mexico, p. 146.

28 Creel, op. cit., p. 140.
of polearms the Japanese developed a high degree of skill that was never equaled in Europe.

The early Saxon spear shaft, in early English writing, was usually spoken of as being made of ash wood. The word for ash, "aesc," was used to form the old English word for soldier, "aesc-berend" or "aesc-born," meaning spear bearer.

Sharpened wooden poles were also used as defensive weapons early in history in much the same way as barbed wire entanglements are used in modern warfare. English archers carried wooden stakes sharpened at both ends. These stakes were driven into the ground in front and behind the enemy lines of archers as a defense against the cavalry.

On the Thames River near Brentford, England, at low tide fire-hardened stakes of wood put there by Roman soldiers nearly two thousand years ago may still be found today. Caesar's army in about 55 B.C. also used wooden stakes in trench lines against the army of Gaul. The trenches were five feet deep, and the bottoms of these trenches were planted with sharp wooden spikes. In front of these trenches were

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traps three feet deep, and planted in the bottom of the
traps were one-foot wooden stakes which were hidden by
briars and bushes.

Almost all of the body armor used in the past was made
of metal, but there is some evidence of wooden armor having
been used. On one of the Aleutian Islands, Kagamil Island,
now known as Ship Rock Island, parts of wooden slat armor
were found along with mummies, weapons and household ar-
ticles. Ancient Chinese armor was made of wooden plates
and sometimes bone plates were used. The plates were sewn
into leather garments. The Tso Chaun records state that in
575 B.C. two officers set up coats of armor, shot them with
bows and arrows, and pierced seven thicknesses of plates at
one time. The Chinese word used to mean plate includes the
symbol for wood. This statement in the Tso Chaun records
dates the use of wooden armor very early in civilization.

Wooden Implements Used by Ancient Man for
Consuming and Obtaining Food

The ancient Acomas Indian Tribes of the North American
Continent used wooden digging sticks to cultivate the fields

32 Tom Wintringham, The Story of Weapons and Tactics, p. 87.

33 Alan G. May, "Mummies from Alaska," Natural History
Magazine, LX (March, 1951), 114-119.

34C Creel, op. cit., p. 87.
of maize, squash and beans. These crops were raised before the coming of the Spanish who introduced other crops, cattle, and sheep. 35

The plow was probably adapted from the ancient Egyptian hoe. The handle was lengthened to have animals pull the plow and help work the land more easily. The early plow varies according to the different countries. A tree trunk of oak or some other strong wood of a diameter of three or four inches was cut off just below a good size branch and cut again fifteen or twenty inches above that. The upper end of the tree trunk was pointed to form the share, and between this and the side branch was fitted a brace. The plowman guides the plow with one hand and guides the oxen with the other. The second Sumerian or Aryan king, known under many names, Gan or Can, Sir Gawain or Cain, invented the plough, according to Waddell. Simple wooden ploughs made with as little iron as possible were used in ancient Palestine. 38

The murals and sculpture of Egypt tell us of their great agricultural land and show the use of the plow, sickle,

35 Stirling, op. cit., p. 512.


38 MacAlister, op. cit., p. 232.
implements of husbandry and hoe. The culture of the vine was Egypt's early high accomplishment in agricultural knowledge. In Genesis XL, 9-11, Osiris was the first to cultivate the vine, and he extracted wine from the fruit of the vine.  

In ancient Palestine sickles were made of wood and flint even after metal was in general use for tools. Flint flakes were fixed into the concave side of a wooden curve which extended down to become the handle.  

A crude type of olive press was also used in ancient Palestine. Heavy stones were tied on the end of a stout wooden beam, the other end of which was engaged in a vertical standard which made a lever. The beam was raised and the smooth-surfaced stones dropped, mashing the olives.  

After metal came into general use, most agricultural tools were made principally of metal, wood being used mainly for the handles of small hand tools as is the case today. However, in heavy farm machinery wood is sometimes more practical for some parts because wood is light and economical.

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39 Holy Bible, Genesis XL, 9-11.  
40 MacAlister, op. cit., p. 232.  
41 Ibid., pp. 233-235.
Wooden Implements of War Used by Man During the Middle Ages

In Western Europe the crossbow came into general use about the eleventh century. The crossbow was a bow mounted on a stock and was made of two short flexible arms of wood extending from a roughly shaped stock with a string stretched from the ends of the two arms to form a bow. This weapon was fired by stretching the string back to a notch in the stock and placing an arrow in a groove in the stock. Then the string was released to shoot the arrow. The stock was held against the shoulder and the bow took a horizontal position when ready to be fired. The crossbow was the weapon of the foot soldier and had enough velocity to pierce armor.

The arbalet, a refinement of the crossbow, was a popular weapon of the Italians and was later introduced in the thirteenth century in England and was made of wood. The special arrows for this weapon were called "Quarrels." This heavy crossbow used during the fourteenth and fifteenth centuries was fitted with a stock and a sight resembling those of modern firearms. The arbalet was hard to draw manually, so mechanical devices were provided to speed the loading, thus increasing the efficiency of the weapon. The arbalet, aimed or pointed in the same manner as modern firearms, was a very accurate weapon. The long bow was much faster and easier to load than the arbalet, but the quarrels of the arbalet had enough velocity to pierce a
suit of body armor. The arbalest was one of the principal weapons of the Crusaders and was used also by William Tell. Later the crossbow was forgotten during the Dark Ages (476 A. D. to 1200 A. D.) when fighting was done by armored men on horseback, and the crossbow, too heavy for archers on horseback, was replaced by the long bow.

The long bow which was made of wood was the favorite national weapon of England. The battles of Crecy, in 1346, Pointeers, in 1356; and Agincourt, in 1415, were won with the use of the long bow. An English chronicler of the times described the fate of the French armored knights at the hands of the Welsh and English archers in the Battle of Crecy (1346) in the following words: "So the knights in the first French battle fell, slain or sore stricken, almost without seeing the men who slew them." 43 This was the beginning of long-range fighting of the modern age.

The long bow used in England was made of elm, yew and ash. The bow was almost twice the size of ordinary bows, and the arrows were usually about half the length of the bow. The English learned to use the long bow during the long, scrambling campaigns against Welsh chiefs in England, but the long bow did not become an important weapon until the reign

42 Wintringham, op. cit., pp. 67-68.
43 Ibid., p. 67.
of the fifth Plantagenet king, Edward the First (1272-1307 A.D.). The English chronicler of the Welsh War described the Welsh bows as being "ugly unfinished-looking weapons, but astonishingly strong, large and stiff." One tale of the power of the Welsh bow describes a Welsh arrow penetrating a four-inch oad door. Another tale was told of a Welsh arrow piercing the skirt of a knight's breeches and skirt made of mail, the knight's thigh, and the wooden board that formed part of the saddle, pinning the knight and saddle firmly to the horse.

For many years the conservative English kings were reluctant to give the long bow equal standing with the crossbow. In 1281 Welsh archers hired by the English were paid four pence a day as crossbowmen and two pence a day as longbowmen. Archers were paid different amounts because the crossbow was still believed to be a better weapon than the long bow.  

Daggers were an important part of the fighting equipment in Europe as late as the fifteenth century. Bashford Dean, in his book, *Handbook of Arms and Armour, European and Oriental*, divided daggers into four typical forms: (1) The kidney dagger which had a heavy blade and a stout wooden

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handle out of which a guard was curved in two rounded lobes, suggesting the name "kidney." In later years the lobe became smaller and could hardly be recognized. The dirk carried by the highlander regiments was a modified form of this dagger. (2) The dague arrouelle, the guard and pommel were shaped like disks, and the blade passed through the center. Originally the guard was thick and shaped like cylindrical boxes. The blade was later made narrower, thicker and longer. (3) The eared dagger, influenced by the Oriental model, the hilt ended not in a pommel, but in a pair of flattened ear-shaped lobes. (4) The ox tongue dagger, had a long blade about five fingers wide. 46

Wood was used over a longer period of time for the making of shields than for the making of armor. Wooden shields were found with ancient mummies on Ship Rock Island, one of the Aleution Islands. 47 Wooden shields played an important part in the siege wars of the Middle Ages (500-1400 A.D.), and are probably still used among primitive cultures.

Bashford Dean divides shields into three types according to use: (1) the fist shield, a very early shield made of wood or metal and sometimes garnished with velvet, was

46 Dean, op. cit., pp. 103-106.

47 May, op. cit., LX, 115.
used mainly in Northern Africa and in the East; (2) the arm shield, broadly triangular, sometimes square and generally made of wood covered with rawhide, was used in the fifteenth century; and (3) the standing shield, made of wood sheathed with canvas or hide, the surface was sometimes covered with gesso or painted. These shields were usually the property of a city or state. The best examples of standing shields still in existence can be found in the New York Metropolitan Museum of Art.

The shields used by the ancient Scandinavians were made of wood. The shields were flat, round and from twenty-two to forty-four inches in diameter. The Scandinavians used bronze and iron to mount and to boss their shields. In the poem of "Beowulf" it is revealed that some early shields were made of lindenwood. The early Saxons used leather to cover their wooden shields. These shields were round or oval shaped, and the leather was finished with a high conical boss.

The shield of the early Cretan warrior was made of hide stretched on a wooden frame and was used to protect the warrior from the ankles to the shoulders. Indented in the middle of both sides, the shield resembled the shape of a figure eight.

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48 Dean, op. cit., p. 102.  
49 Cutts, op. cit., p. 312.  
50 Gustave Glotz, The Agean Civilization, p. 84.
The *pavis*, a shield used by archers during the Middle Ages, was broad at the top, tapered to a point at the bottom, and curved toward the sides to partly envelop the archer. Crossbowmen were protected behind these shields while they wound up their bow for another shot. Sometimes these shields were simply three planks of wood nailed together to stand upright on the ground and give protection on three sides.

Another wooden shield used during the Middle Ages was the mantelet. This shield was larger than the pavis, and could be fixed upright by means of a prop. The mantelet formed a movable fort for the bowman. Huge mantelets of timber were used in later years to flank cannons and to protect the cannoniers.

A military formation called a "testudo" was sometimes formed by a group of soldiers holding their shields close together over their heads. Much later the penthouse or movable hut was often used in place of individual shields. Besieging armies sometimes constructed a breastwork or erected a fort of timber which served in the place of many shields. Historians say that in the eleventh century the army of William the Conqueror used a timber fort.

53 Wintringham, *op. cit.*, p. 84.  
Much wooden equipment of war was used in the Middle Ages (500-1400 A.D.) in laying siege to castles. Some of the more simple pieces of equipment were scaling ladders, used for climbing the castle walls and wooden planks to serve as bridges over the castle moats. Among the complicated pieces of sieging equipment were the war "engines" such as the catapult and the arbalest.

Movable wooden towers used in siege warfare were commonly made beforehand and then were taken apart to be transported. The towers were put together a short distance from the castle wall and pushed forward on wheels. A movable part of the tower was designed to swing out and form a bridge upon the castle wall. Wooden towers and ramps were made high enough to give the attacking force the advantage of firing down on the castle defenders. The defenders usually tried to set these towers on fire.

Sometimes the besieging forces attempted to break down the castle wall through the use of undermining. Attackers from a distance dug a shaft toward the castle wall and mined out beneath the wall foundation. The shaft structure was supported with wooden props which were set on fire when the work was completed. When the props were burned, the castle wall usually collapsed. A protection for the miners was called a "cat" or "sow." The "cat" was made of slight timbers and was mounted on wheels to make it movable. The
roof was covered with boards and wickerwork, and the sides were covered with undressed hides. The "cat" was made strong enough to resist stones thrown down from the castle wall, and attempts were made to make the roof of the "cat" liquid proof to resist boiling oil and scalding hot water. Using wooden spikes, the castle defenders tried to make holes in the roofs of the "cats" so that the liquids could run through.55

One defense against a mining operation was a sort of scaffolding of timbers and planks built on the inside of the castle wall where the wall would probably collapse. This scaffolding enabled the defenders to maintain communications along the wall, and soldiers posted along the top of this wooden wall could offer new resistance as the enemy came through the opening in the castle wall.56

The battering ram was another siège weapon of the Middle Ages and was used mainly to break down the gates of the castle walls. The first form of the ram was probably the trunk of the largest tree available. The soldiers simply carried the tree trunk and swung it in their hands. Later a more effective weapon was made by hanging the ram from two perpendicular wooden beams. When rams were used

55 Cutts, op. cit., p. 85.

56 Ibid., p. 86.
in the siege of Jerusalem in 1099 A. D., defenders used forked wooden beams to push the battering ram downward or to one side so that the ram could not be swung. Similar to the ram, the bore was rotated to pierce the castle wall. The bore consisted mainly of a wooden pole with a sharp iron point.

The ram was the chief weapon of ancient warships. These rams were pointed and tipped with bronze or iron and projected several feet beyond the prow of the ship. The whole forward part of the ship was arranged to give the ram strength. The first Greek warships had the rams placed above the water line, but later these weapons were fixed below the water surface to make them more effective.

The ideas of engines of war constructed for the purpose of hurling missiles came to the Saxons from ancient nations. Most ancient machines worked on the principle of the bow, and most mediaeval machines worked on the principle of the sling. Among the machines that used the principle of the bow were the arbaelest, the spurgardan and the espringale. These huge crossbows mounted on wheels threw great pointed bolts with enough force to pass through several men. The balliste, catapult, mangon and trebuchet hurled heavy stones or metal balls.

57 Wintringham, op. cit., p. 90.

The mangon of the Middle Ages developed from the ancient Roman "onager," or "wild ass." The mangon was called the "wild ass" probably because the weapon leaped off the ground with all four wheels when fired. From the wooden base of the mangon rose two stout posts between which was twisted a double or quadruple set of ropes. A wooden beam was then twisted into the ropes, and a spoon-shaped hole in the end of the beam or an attached sling held the rock or ball of lead. When the mangon was fired, the ropes, untwisting, would rotate the beam and throw the missile high into the air.

The trebuchet consisted of a long horizontal wooden pole balanced on a pivot supported by two wooden uprights and placed near the butt end. The longer end of the pole was pulled down to the ground and held by catches, then loaded with a missile placed in a hole in that end or placed in an attached sling. The butt end of the pole was weighted with iron or stone in a kind of box tied on with cords. When the catches were released, the weights pulled the short end down and the long end flung the missile.

The same types of war engines used on land were mounted on ships. Towers and battering rams of wood were erected on the decks of ships to attack harbor fortifications.

Wintringham, op. cit., p. 92.
Such engines as the balliste and catapult were mounted on ships to use against land fortifications and later against other ships at sea. Ballistae and catapults were usually used to throw stones or metal balls, but occasionally these weapons were used to throw burning coals. Hannibal once won over a greater fleet by hurling potfuls of poisonous snakes into the enemy's galleys.

Wooden War Implements Used by Man of the Modern Age

The long bow continued in general use in England until the end of the reign of Queen Elizabeth in 1603. As late as 1627 English archers were under the pay of Richelieu at the siege of La Rochelle. The bow and arrow later declined as a major weapon of war in England with the use of explosive firearms. In the later part of the fifteenth century archery as a pastime in England was being replaced by tennis and football, and much legislation was passed to encourage people to participate in archery. One piece of legislation was a regulation on the price of bows, and this price control kept yew wood, the wood of the English bow, from being imported. So in 1483 another statute was passed requiring all merchants sending merchandise to England from any place from which bow staves were usually exported to

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60 Shepard, op. cit., p. 31.
send four bow staves with every ton of other merchandise.  

The bow was used until a comparatively recent date in some countries and is still used among some primitive tribes. Frank F. Hildebrand of the Bureau of American Ethnology was sent to the Philippine Islands in 1900 to make a collection of ethnological objects for the Pan-American Exposition to be held in Buffalo, New York, in 1901. From the Island of Jalo he collected bows made of bamboo, bow cords made of braided rattan, and arrows made of cane and fitted with palm wood arrowheads. The spear points were made of steel, and the shafts were made of hardwood. Another type of spear had a steel blade fastened into a wooden socket with adhesive gum and was fixed to a bamboo shaft.

Wooden Implements Used by Modern Man for Consuming and Preparing His Food

As late as the sixteenth century even kings did not provide eating tools for their guests. A knife, fork and spoon were personal possessions to be carried everywhere as a necessity. Many of these eating tools folded or screwed on to the handles to make the utensils more compact, and were fitted into wood, leather, or silver carrying cases.

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61 Cutts, op. cit., p. 446.
63 Ibid., p. 30.
It is interesting to note that the word "spooning," meaning courting or love-making, came from the use of a wooden spoon. In remote times men conveyed affectionate sentiments to their sweethearts by means of wooden gifts. Spoons were among these gifts and were given as a symbol rather than as a useful object. These spoons were hung on a wall of the girls home during the time of the courtship, and sometimes there might be several wooden spoons hanging together. From these love-spoon gifts came the word "spooning." The love-spoons were usually made of syeamore or beech, but yew, pear, apple, plum, lime, holly, walnut, box elder, elm, and pine were also used.

Among the wooden pieces found in modern dinnerware today are sugar and cream service, salt and pepper shakers, salad forks and spoons, salad bowls, and serving plates. The finest wooden dinnerware is made of mahogany and is ideal for picnics or formal dining. A wooden bowl can be a delicate decorative piece or a sturdy container for food, but whether the wooden bowl is a finely turned masterpiece by Prestini or a heavy hotel-kitchen salad bowl, the wooden bowl is likely to have a forthright informal quality that goes with informal entertaining.

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CHAPTER III

WOODS USED IN THE CONSTRUCTION OF FURNITURE
FROM 3080 B. C. TO 1950 A. D.

The evolution of furniture has been slow and the history of the first furniture is very dim. In the beginning primitive man did not have elaborate furniture. The first so called furniture was probably a stone or log that was used for a seat. A bed which consisted of soft grass or straw may have been used to sleep on at night.

Woods Used by Primitive Man

At the present time in the primitive dwellings of the natives on the Fiji Islands there is very little furniture. In Fiji, honored visitors or guests sleep upon mats or beds of sweet-smelling grass. The pillows are made of wood and are cut so that the neck just fits into a circular notch. These pillows are also used by the Orientals. The people of the Fiji Islands sit on the floor or on mats.

The furniture used by the primitive natives of the Philippine Islands is also simple and consists of a few

chairs, tables, and a bed of bamboo framework with a netting of rope over which straw mats are stretched. Bamboo is the favorite wood used by the people of the tropics for the construction of furniture.

Wooden Furniture Used by Ancient Man

After man had advanced from the primitive stage of hunting and fishing and lived in a settled state in a more permanent home, furniture was deemed essential, and many types of furnishings were made. The history of furniture in the countries where it can be traced follows closely the character, environment, and customs of the people and is directly related to the development of the civilization, its refinement, the skill of the workmen, and the use of improved tools.

Modern archaeological discoveries reveal that the history of Egypt is far older than the Egyptians claim. Furniture that has withstood the sands of time is lasting proof that Egypt was the first country which made wood furniture. Some of this furniture has been preserved in tombs of Egypt and indicates that centuries before Helen

\[\text{Ibid.}, \text{ pp. 39-40.}\]

\[\text{W. L. Kimerly, How to Know Period Styles in Furniture, p. 13.}\]

\[\text{T. R. Glover, The Ancient World, p. 87.}\]
of Troy or Alexander the Great furniture was built in Egypt. Egypt has a dry climate which made it possible for samples of the first wood furniture made there to remain in good condition, and as a result, much of the Egyptian furniture that exists today is actually older than the oldest known existing Greek furniture. Many pieces of Greek furniture have been found in Egypt, probably because of the wars and a small amount of travel between the two countries. There are pictures of Egyptian chairs which are believed to have been made about 1500 B.C. The Egyptian wooden furniture which has been preserved, although ancient, has good quality. More ancient furniture made in Egypt has been found than furniture from all the other countries combined. Some carving and inlay were used, even though the most common method of decoration of furniture was painting. The principal woods used in the construction of the furniture were cedar, sycamore, and some varieties of palm.

Located in the Metropolitan Museum of Art in New York is an ancient Egyptian stone house which was erected in the twenty-seventh century B.C. This house was buried for centuries under the drifting sands but was recently excavated


and brought stone by stone to this country to be used for the architectural and the decorative study of our ancestors. This stone house is called the "Mastaba of Perneb," meaning the death house of Perneb, who was a high Egyptian official of the Pyramid Age. On the walls of the house there are colored relief murals showing Egyptians in action, and these murals may be studied as well as the construction of the building. They show Egyptian furniture such as ox-leg style chairs in which Perneb was seated. The murals also show other ancient Egyptian chairs and stools of many varieties, also stands, tables, couches, and beds.

Most of the existing wooden furniture made in ancient Egypt was made in the fourteenth and fifteenth centuries B.C. The three most important sources of ancient Egyptian furniture were the tombs of Iouya, Touya, and Tutankhamen. Some stone furniture from ancient Egypt which has been preserved dates back a thousand years before the wooden chairs.

The "ox-leg" style of furniture was earlier than the "lion-leg" style of furniture and testifies to the importance of agriculture in early Egypt. The design of a lion's leg carved on furniture was used later, perhaps to indicate the importance of armies and of the lion-like bravery typical of Egypt as it developed into a mighty empire.  

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8 Hunter, op. cit., p. 5.  
9 Ibid., p. 5.
The ancient wooden furniture of Egypt included chairs, stools, couches, beds, head rests, benches, tables, cabinets and chests. Some beds and chairs were designed so as to fold, and leather, plaited fibres, plaited string, upholstery, and huge squash cushions were used for chair seats. Inlays of tile, ivory, ebony, shell, bone, and stone also were used for decoration.

The Assyrians, Babylonians, and Jews were next in the order of civilization after the Egyptians and did not develop a different style of furniture. Little or none of the early furniture made in these countries exists today; this is probably because of the climate and the lack of permanent building stone. In the early periods, the furniture of the Assyrians was made of wood and sometimes inlaid with metal, and the amount of the early Assyrian furniture which has been found is very small.

The art of the ancient Greeks with respect to construction work reached a peak of perfection in the third and fourth centuries B.C. The most famous constructions of the Greeks were temples and large buildings, but a variety of furniture was also constructed. Made of stone, bronze and wood, the Greek furniture consisted of chairs, tables, chests, couches, and a few other pieces. Because of the wet climate of Greece,

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10 Kimerly, op. cit., p. 9.
little of the wooden furniture has been preserved, and most
of the Greek wooden furniture existing today was found in
Egypt and in the Crimea. Little can be learned about Greek
furniture from the limited examples now existing. A better
source of information is the representations of furniture
often found on Greek vases, pottery, and sculpture.

The Romans, who had little culture or art of their
own, conquered the Greeks and absorbed Greek culture and
11 Ancient Roman furniture made of marble and
bronze has been found, and it can be assumed that similar
models were made of wood, but of heavier outline. In the
Field Museum of Natural History, Chicago, Illinois, there
are pieces of Roman furniture which are made of marble and
bronze which were incomplete when found, but the missing
pieces have been restored with wood. Many specimens of the
Roman Classic Art were found when the buried cities of
Pompeii and Herculaneum were unearthed in 1748. Because
the wooden part of Pompeian furniture crumbled when exposed
to air after being buried 1,800 years, it was often dif-
ficult to reassemble the bronze parts correctly. One in-
teresting Roman chest which is now in the Museum is made
of wood, sheathed with iron, and trimmed with bronze. The
wooden part was restored by the Museum. 12

11 Hunter, op. cit., p. 58.
12 C. R. Clifford, Period Furnishings, p. 27.
During the fourth and fifth centuries a style of art called Byzantine developed in the eastern part of the Roman Empire. Furniture produced during this period was richly decorated and carved, and the most distinctive motif of design was the pointed acanthus leaf. Chairs of the Byzantine style followed the Roman style. The legs of the chairs were often turned of wood, and the wood was inlaid with gold or bronze. One of the interesting pieces of Byzantine furniture preserved today is the chair of "Saint Peter" in Rome. This chair is one of the oldest known pieces of wooden furniture in existence and is inlaid with ivory and gold.

Wood Furniture Made by Man During the Middle Ages

The Gothic style of furniture came into use about 1200 A.D. and followed closely the architecture of that period. Chests and cabinets were often given facades that were simple buildings in miniature. Gothic style chairs were cumbersome and stiff, and the posts often resembled church spires. Many panels were carved or carved-and-pieced in low relief, resembling the tracery of cathedral stained glass windows. The linen-folds, columns and pilasters,

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13 C. R. Clifford, Period Furnishings, p. 27.

14 Joseph Arinson, The Book of Furniture and Decoration, p. 27.
finials and pendants used in furniture design were also taken from church architecture. 15

The chest was a common piece of Ancient Gothic furniture and was usually made of oak. Early Gothic chests were made in the Romanesque style of furniture and were banded with iron for strength and not for ornamentation. Gothic chests which were made later during the thirteenth and fourteenth centuries were heavily banded with iron and painted. Gothic chests of the fifteenth century were carved and were designed according to Gothic architectural form. 16

Renaissance Style of Furniture

During the Middle Ages in the later part of the fourteenth century the Renaissance style of furniture began in Italy and was spread over Europe. Great progress was made in the construction of furniture and architecture. Some of the various types of furniture which developed under the many reigning monarchs were given the names of the sovereigns, and other types of furniture took the names of the builders. 17

15 Kimerly, op. cit., p. 10.

16 Clifford, op. cit., p. 55.

17 Kimerly, op. cit., p. 10.
Most Italian Renaissance style of furniture was elegant and costly and could be afforded only by rich people. Stamped leather and rich velvets were used, and carving was the principal ornamentation used on this furniture. Decorative motifs of the Renaissance period included acanthus leaves, Arabesque scrolls, ribbons, flowers, swags of fruit, and grotesque human and animal forms. Italian Renaissance chests, cabinets, tables, and chairs usually were made of walnut.

During the Middle Ages the chest or "cassone" was an important piece of Italian Renaissance furniture. When moving from winter to summer homes, Italian nobles took everything including clothes, linens, and dishes in the chests, and furniture being scarce, used the chests to sit on, eat on, and sometimes even to sleep on. In the fifteenth century life became more settled and the chests became more elaborate. Sculpture, gesso relief and painting by famous masters were used to decorate the chests. From the chest developed the "cassapanca" or chest-bench, which was a large, low flat-topped chest on a low platform, enclosed on three sides by a straight back and arms.

The chairs made during the Italian Renaissance were of two principal types: chairs with straight legs, and chairs

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with legs that crossed and formed an "X." Other furniture included outstanding examples of beds, beautiful chests that had many convenient drawers and shelves, and tables which were copied from Roman marble tables but were simplified to suit Florentine taste.

About 1600 A. D. the maker of household furniture of an inferior grade was known as "arkwright." Chests were always referred to as "arks" and the term "wright" has survived and is referred to in our words as "wheelwright" and "shipwright." Arkwright furniture was usually made of oak, but occasionally poplar or deal were used. Walnut was an unknown wood in England at this time.

During the reign of Henry VIII (1491-1541), the Renaissance style of furniture began in England about a century and a half after it began in France. During the reign of Henry VIII furniture was made exclusively of oak, but later Dutch walnut and French mahogany replaced the native oak. Italian furniture, textiles and ornaments were brought to England in great quantities, and Italian artists and craftsmen were induced to settle in England and continue their work. During the reign of Queen Elizabeth (1558-1603), Flemish artists also influenced the design of English furniture.

19 Herbert Ceseinsky and George L. Hunter, English and American Furniture, p. 25.
20 Arinson, op. cit., p. 80.  
21 Hjorth, op. cit., p. 13.
The English style of chest developed into a delicate, ornate piece of furniture during the Renaissance period in much the same way as did the French style of chest. Used first as a trunk and also a bench, the style of the chest embodied the use of legs and was lavishly ornamented. Later drawers were added to the chest, and it gradually was refined into the lowboy, dressing table and commode.

The Renaissance style of furniture began in France in the sixteenth century during the reign of Francis I. Furniture made during this period was coarser and heavier in ornamental detail than furniture of the Italian Renaissance. More highly carved than the Italian furniture of the same period, the furniture of the French Renaissance period appeared to be made for the sake of sculpture rather than for the furniture itself. Much of the carving on the furniture was almost completely in the round; portrait and caricature were used as well as purely decorative forms. French Renaissance furniture was usually made of walnut, a very suitable wood for carving. The style of furniture became constantly more massive and awkward, and chairs and tables had to be heavily braced to keep them from wobbling.

About the sixteenth century, or perhaps earlier, the festive board was the center of social life. The first

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dining tables of this period were of a crude trestle type of construction. Later a heavily carved refectory table with extension top developed, and still later the drop-leaf table was used as a space-saving device. Coffee was introduced in England as a drink in 1645, chocolate in 1657, and tea in 1658, and many new tables were designed for serving these drinks.

During the Renaissance period, Italian craftsmen were enticed to work in Spain as well as in England. Spain became a rich country after the discovery of the New World, and Spanish furniture was elaborate and costly. Carving, gilding, and inlays of ivory, bone, ebony, bronze, silver, colored woods, and tortoise shells were used for the ornamentation of furniture.

In the seventeenth century the Baroque Renaissance style of furniture and architecture developed, and under the influence of Michelangelo, furniture became overloaded with sculpture. Chair backs were made higher and were slanted more, and a style of chest of drawers which consisted of a smaller chest built on a larger chest became popular.


24 Arinson, op. cit., pp. 79-84.

25 Gould, op. cit., p. 29.
Baroque Renaissance styled furniture was often painted in polychrome on yellow, red, or blue grounds, as was some Queen Anne style furniture.

The furniture referred to as Jacobean design was introduced in England between the years 1603 and 1660. The Jacobean period was named after King James I; the Latin equivalent for James was Jacobus. The Puritan Revolt during the Jacobean period caused furniture to become plain and simple, undecorated, and often uncomfortably designed. The general outline of early Jacobean furniture was square, and mostly straight lines were used. Oak was ideally suited to this style of furniture.

The term Jacobean is commonly applied to English furniture that was made during the reigns of James I (1603-1625), Charles I (1625-1649), the Commonwealth (1649-1660), Charles II (1660-1685), and James II (1685-1688). A revolution in the style of Jacobean furniture came during the reign of Charles II when walnut was used instead of oak, and curved lines were used in the place of straight lines. A quotation from De Bles's book notes the difference between chairs made during the reign of Charles I and chairs made during the time of Charles II.


"Charles I chairs were made of oak. Those of Charles II were generally of walnut and more brilliantly carved in consequence." 29

The Dutch influence on English Renaissance furniture first came during the William and Mary period (1688-1702) and reached its climax during the Queen Ann period (1702-1714). Some walnut veneers were used during the Queen Ann period. 30

The Georgian period of furniture design in England dates from the beginning of the reign of George I in 1714 to the end of the reign of George IV in 1830. 31 Mahogany took the place of oak and walnut for furniture. George N. Lamb calls the period between 1725 and 1825 the Golden Age of Mahogany. 32 The exact date that mahogany was first brought to England is not known, but it is believed that mahogany was imported first for medical purposes and later for construction purposes. Mahogany was a substitute for Jesuit bark, Peruvian bark, or Cinchona bark from which quinine was extracted as a fever cure. 33

According to one authority mahogany was first used in England for building purposes when a sea merchant brought too

29 Arthur DeBless, Genuine Antique Furniture, p. 163.

30 Simon, op. cit., pp. 3-6.


32 Ibid., p. 9.

33 Arinson, op. cit., pp. 79-98.
large a shipment of the wood to be used for medicine. Grin-
ling Gibbon, a brother of the merchant, decided to use some
of the wood in a house he was building. The carpenters found
the wood too hard and laid it aside. Wollaston, a cabinet-
maker, when told to make a candle box out of this strange wood,
reported the wood was too hard for his tools. After getting
better tools, he made a beautiful candle box that was greatly
admired. A bureau was made next. The Duchess of Buckingham
begged for the remainder of the wood and had furniture made
for herself. 34

The Georgian period of English furniture includes the
work of four famous furniture builders and designers, Chipp-
endale, Heppelwhite, Sheraton, and Adam. The Regency style
of furniture was popular during the last part of the Georgian
period.

The greatest of the English furniture designers and
builders was Chippendale. Chippendale's furniture had good
shape and proportions and had splendid craftsmanship. The
generous size of chairs made by Chippendale was probably due
to the large costumes of the day. 35 Characteristic of Chippendal
style furniture is the claw-and-ball foot used on
furniture legs. The claw- and-ball foot or cabriole leg was

34 Ibid., pp. 79-80.

35 Robert Shakleton and Elizabeth Shakleton, The Book of
Antiques, p. 17.
used on the furniture of ancient Egypt and China. In China the claw-and-ball foot represented the three-toed claw of the Chinese dragon holding the mystic Buddhistic jewel.  

The claw-and-ball was also used in Queen Ann style furniture design. Another characteristic of Chippendale style furniture was the ship seat used for chairs.

Walter Rendell Storey in his book states that Chippendale used only carving for decoration: "Chippendale's work had this distinction, while French cabinetmakers were decorating their pieces with bronze mountings or ormolu work, and inlays of rare woods or tortoise shells, Chippendale used only carving." In the last part of Chippendale's book a statement was made to the contrary:

Chippendale is popularly noted for his furniture in solid wood, but he did produce pieces in which inlay and veneering were used. Some cabinetwork traceable to him, especially examples in the French fashion, display most beautiful inlay and marquetry decoration, using rare woods, and ormolu or bronze mounts.

The second of the great English cabinetmakers was Hepplewhite. Very little is known about this craftsman, and like other craftsmen of the day, Hepplewhite did not put a trademark on his pieces of furniture. This furniture and the

36 Arinson, op. cit., p. 95.


work of other furniture makers can be traced by their special
types of work. Hepplewhite furniture styles were lighter in
construction than early Georgian pieces of furniture, but were
not as delicate as Sheraton's tall, narrow styles. During the
Hepplewhite period (1760-1786), English decorative furniture
attained its culminating point in inventiveness in producing
new designs for cupboards, tables and commodes or chests. 39

Hepplewhite made many chairs, and chair backs of certain
shapes were characteristic of his designs. Shield back chairs
were made almost exclusively in mahogany and were believed
to have been originated by Hepplewhite because of his constant
use of this design. 40 Other chairs of Hepplewhite designs
had backs in the shapes of a heart, hoop, oval, and lyre.

Mahogany was the favorite wood for Hepplewhite style
furniture, but other woods such as tulipwood, ebony, and
rosewood were used. Sycamore was sometimes used for fancy
veneers, white holly for inlay and division lines, and satin-
wood as a base for hand painted decoration. 41

39  Alice Hepplewhite, "Hepplewhite Furniture Designs," 

40  "Out of the Scrapbook, the Man Behind Sheraton," 

41  A. B. Patton and C. L. Vaughn, Furniture Finishing, 
Decoration and Patching, p. 75.
Sheraton was the third of the great English craftsmen of the Georgian period of furniture design. Sheraton’s furniture was more delicate and fine or dainty looking than furniture of the early Georgian period. Sheraton’s fame today resulted from draughtsmanship rather than from actual productions. It is believed that Sheraton was influenced by the work of other craftsmen. Some of the furniture designs of Sheraton seem to have been inspired by the Chippendale style furniture; others by the designs of Robert Adams and Shearer. Early Sheraton furniture designs were to a degree modern by reason of the utilitarian and straightforward construction. Smooth mahogany decorated only with light inlaid banding was often used for chests, and simple escutcheons cut out of metal sheets ornamented the drawers. Sheraton’s later work began to use curved forms instead of straight lines, and curved lines were used still more in the furniture patterns of 1810.

Sheraton in his later years was forced to build to suit the people. This fact is brought out in a book by Reveirs-Hapkins in this statement about popular demands for furniture:


43 Herman Schmitz, Encyclopedia of Furniture, p. 55.
... the style... English Empire... was the very worst of taste and even Sheraton, who was capable of better things, was compelled by sheer force of circumstances to fall into line... one might say he was starved into it. 44

Many of the furniture designs by Sheraton were intended to be used in mahogany, although the mode of the day was satinwood. The larger pieces of Sheraton style furniture and some chairs were designed for satinwood. Many cabinetmakers used styles from Sheraton's book, so that it is not surprising that a great quantity of furniture was made in the Sheraton style. 45

Hepplewhite and Sheraton were influenced by the furniture designs of the Adam brothers. The Adelphi building is one of the few buildings left to show the achievements of the Adam brothers in architectural and furniture design. The Adam brothers designed buildings, rooms and furniture and were very powerful during the latter half of the eighteenth century. The elder brother, Robert, studied in Italy and Dalmatia and became the appointed architect of the King of England and later gave the honor to his younger brother, James. 46


45 Gould, op. cit., p. 201.

46 Shakleton and Shakleton, op. cit., pp. 24-25.
In the book, *Decorative Furniture of All Ages*, Hunter states that English furniture is classified according to the usage of certain woods for construction:

... English furniture is so illogical that its greatest historian, Percy MacQuoid, in his monumental book classifies it, not by the reigns of kings, but by the woods of which it is made. The classification is a just and proper one, and should always be kept in mind when using the lesser terms Jacobean, Charles II, Georgian, Adam and others.

MacQuoid groups the furniture of England in four ages: I. The Age of Oak. III the Age of Walnut. III. The Age of Mahogany. IV. The Age of Satinwood.\(^{47}\)

In colonial America, Jacobean furniture was the first type of furniture brought to the colonies by the Puritan fathers. The frugality, conservatism, and intolerance of the English Puritans was practiced for years by the first American colonists and influenced the design of colonial furniture. Furniture was made in the severe rectangular style of the Jacobean Period of English furniture and oak was generally used. Occasionally furniture was made of combinations of softer woods such as pine and other local woods such as ash, hickory, maple, chestnut, acacia, red cedar, beech and whitewood. The American Chippendale and Hepplewhite style furniture of the colonies was made usually of mahogany and walnut, but occasionally maple, cherry, pine, and bilsted or gumwood were used.

\(^{47}\) Hunter, *op. cit.*, p. 317.
The chest was one of the most useful and important pieces of furniture that American colonists brought with them to the New World. The chest was used to store small articles and clothes to be shipped to America. The first chests made in America during the early part of the seventeenth century did not have drawers and were made of oak. Traditional English style panels were used on the tops of the chests. The colonial carpenters and joiners realized early that chests with drawers were more convenient pieces of furniture than those without drawers. Shortly afterwards, chests were made with one drawer, and other drawers were soon added. Later furniture builders constructed chest-of-drawers. Still later one chest was built on top of another chest and called a chest-on-chest. The chest-on-chest was mounted on legs and became the highboy.

The colonists could not make elaborate furniture because their tools were simple, and skill to use such tools was rare among the people. The furniture constructed by the colonists was sturdy and utilitarian. Most of the later furniture was made in the Elizabethan style of furniture, but some was of Gothic design. Oak, traditionally English, was used, but wide pine boards were used on some chest tops. It is hard to determine whether much of the furniture made in the seventeenth

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18 Ethel Hall Bjorkerke, "Cabinetmaking in America During the Seventeenth and Eighteenth Centuries," *Hobbies*, LVII (July, 1952), 60.
century was made in America or in England. The American oak was usually lighter than the English species. Pine, fruitwoods, tulipwood and other local woods were also used in early American furniture.

During the middle of the eighteenth century much Victorian style furniture was made and sold in the United States. Meticulously fashioned from rosewood and walnut, the Victorian style furniture was too good to be destroyed when it went out of style. In the Gay Nineties much of this furniture was handed on to newly-married couples, and later it was stored or given away. In 1942 Victorian style furniture came back in style.

One of the outstanding American cabinetmakers of the American Empire Period (1800-1825) was Duncan Phyfe, born in 1768 near Inverness, Scotland. Phyfe came to America in 1784 and settled in New York State. He got his start from a member of the Astor family. 49

The colonists in America used Empire style furniture from France as well as the English styles of furniture. During Napoleon’s leadership in France the Empire style of furniture was a combination of Egyptian and Roman furniture styles, but in a short time French Empire style furniture became ugly and overloaded with carving. Long after

49 Hjorth, op. cit., p. 18.
Napoleon's Empire had crumbled, the Empire style of furniture came into use in America. Duncan Phyfe in New York and other cabinetmakers in the Northeast made furniture of the Empire style in great quantities. The American colonists believed in adopting the French style of furniture as a favor to France for being an ally against England. Rich San Domingo mahogany was used for Empire style furniture in America.

During the colonial period in America and the years that followed, all furniture styles of the old countries have been used and are still being used in home furnishing. In some homes today, for example, there may be a living room furnished in modern style furniture, a dining room in Duncan Phyfe style furniture, and Chippendale style chairs may be used in other rooms of the house.

Woods Used in the Construction of Modern Style Furniture

The theme of modern furniture design today is functionalism, unhampered by tradition and decoration. The main concerns of the furniture designer today are the use of his product, the proper use of the materials from which the furniture is made, and the beauty of proportions, lines, and combinations of natural color and texture. Functionalism and crowded living conditions have brought into popularity such

ideas as folding furniture, furniture designed to be stacked and stored, and convertible furniture designed to serve double purposes. A new trend in modern design is the attempt to make furniture look light. This trend has brought about a greater use of glass, stretched steel, webbing, cord and metal.

A popular type of modern furniture is the tubular metal or pipe furniture. There is a large amount of wood used in making this type of furniture. The chair seats, table tops, and other construction of pipe furniture are often made of wood which is sometimes covered with plastic. The bending jigs to fit bench vises and many other tools used in making tubular metal furniture are made of wood. In the process of bending the metal tubes, sand is poured in the tube, and hardwood plugs are driven in both ends of the tube to prevent the sand from falling out during the bending. The plugs are made of hardwood so that they will not shatter or split.

A recent study and survey by the United States Department of Commerce contains this statement concerning the use of metal for furniture:

Wood is rapidly being replaced in kitchen furniture design by metal. Metal furnishings have zoomed from a fourteen million dollar figure in 1939 to a one hundred million dollar figure in 1947. Half of this 1947 figure was spent for metal kitchen cabinets, while

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tubular metal breakfast sets accounted for fifty-seven million dollars. 52

George N. Lamb, in his article "There's Been No Revolution in Furniture," feels reasonably safe in predicting that household furniture will be made principally of wood for a long time to come. The durability, warmth, individuality, and natural beauty of wood have made it the preferred material for furniture for many centuries. Lamb points out that in addition to the almost universal regard for wood, modern technology is steadily overcoming the inherent faults of a complex material produced by nature.

The modern designer of wooden furniture must appreciate the natural beauty and other properties of wood. Wood has eye appeal, and if correctly handled it appeals to the touch, while certain woods appeal to the sense of smell. Modern designers use finishes that do not alter the texture and pattern of wood grain, but sometimes enhance it. Because of the many desirable qualities of wood, furniture has been made mainly of wood throughout the years and probably will be for many years to come. 54


53 George N. Lamb, "There's Been No Revolution in Furniture," Furniture Age, LIX (May, 1950), 62.

54 William H. Varnum, Creative Design in Furniture, p. 91.
CHAPTER IV

WOOD USED IN THE CONSTRUCTION OF PRIVATE DWELLINGS
AND PUBLIC BUILDINGS

Wood Used in the Construction of Dwellings
of Primitive Man

Besides providing man with material for his first
weapons, the trees of the forest also provided the first
summer shelter of man. Early man crowded around the trunks
of trees to keep out of the sun and rain and climbed into
the branches of trees to be safe from wild animals. In
winter man sought caves for protection from the bitter cold.
The fires that warmed the damp cave dwellings and kept wild
animals at bay were built from small tree branches and brush-
wood. It is believed that the first dwellings of man were in
the caves of Europe, Asia and China. Much later primitive
man in the southwestern part of the United States also lived
in caves.

After the Ice Age many types of huts and tree-houses
came into use. Primitive man learned to form shelters by
twisting branches together and chinking these with mud. The
roofs of these crude shelters were made of grass of skins of
wild animals.

The Cro-Magnons, a race of people which lived after
the last Ice Age, may have lived in huts. Private dwellings
were easily formed from stone, clay or wood. These huts were small and were built over pits in order to increase the ceiling height and to necessitate as little construction as possible. This form of pit hut was also used by the Eskimos.

The Eskimos used the pit hut type of dwelling more than they used the ice igloo. The Eskimos dug a pit five or six feet deep and constructed a hut over the pit by placing whale bones or pieces of wood at the sides of the pit to form the walls. The roof of whale ribs or wood was covered over with moss and earth. The earthen lodge, popular in other parts of North America, was made in the same manner, but was constructed of a framework of saplings covered with bark and finally with a layer of sod. The Navajo, Wichita, and other Indian tribes of California built homes of similar construction.

Early man of the Aleutian Islands housed the dead as well as the living in wooden structures. A sarcophagus which resembled a storm cellar was built in the ground and was used to place the mummies in when caves were not available. A pit in the ground was lined with logs, and logs were placed in an upright position to form the walls. After a body was

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1 Albert F. Bemis and John Berchard, The Evolving House, pp. 20-22.
placed in the pit two layers of logs, usually driftwood, were placed in a criss-cross manner over the top to complete the hut. 2

Because primitive man lacked a method of quick and easy conveyance, it was necessary to build shelters from the materials at hand. This is substantiated by a statement made by Matlock Price, as follows:

Always the prehistoric and primitive peoples used the materials most immediately at hand and most easy to work. One very early form of dwelling was the 'wattle-and-daub,' meaning a hut constructed by driving stakes in the ground, interlocking them, like a woven basket, with light branches or reeds and daubing both sides with mud or clay. 3

Wood Used in the Construction of Ancient Buildings

When man was able to visualize a more substantial shelter that would keep out the rain and stand against the strong winds, the cane and brush huts were replaced in many countries. The first real houses were probably built by stacking up stones to form a rough wall, and some type of roof was added, probably of wood. It is believed that civilization began in Egypt, Mesopotamia, and the area around the Mediterranean Sea. In the history of Lower Mesopotamia, stone was not used in village house construction. Mud, Reeds,

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and a small amount of timber were available, and the marsh dwellers built houses of the materials readily at hand. 4

The warm, dry climate of Egypt was one of the reasons for the preservation of many important historical specimens portraying the ancient Egyptian culture. The first homes, other than tents, used in the desert areas of Egypt, were made of reeds, woods, and mud secured from the Nile River. The one-room huts had doors made of wood, skin or cloth. A little later the ancient Egyptians built better houses of mud and bricks. Flat roofs were added which were made of wood and mud. These houses were designed for outdoor living in the desert environment. The people gradually advanced in the building of wooden and brick houses, and many of the one-room Egyptian houses had wooden doors with a wooden sill and lintel built into the wall. 5 In Egypt, wood suitable for building was not easily available, because only small forests of palm and acacia grew there. 6 The date palm, acacia, sycamore and tamarisk were the principal trees. Wood was probably imported for most of the larger construction, as was the cedar used in the funeral Temple of Seti I, built during the time of Rameses I and II (1355 B.C.). 7

4 Jack Finegan, Light from the Ancient Past, p. 16.
5 Hermis and Burchard, op. cit., p. 105.
6 Banister Fletcher, History of Architecture, p. 20.
7 Baldwin Smith, Egyptian Architecture as Cultural Expression, p. 137.
The home of the ancient Maya commoner was about twenty-two feet long and twelve feet wide. Rectangular in shape, the house had end walls made of saplings. The studs of the house were about seven feet in height and supported the framework of the roof which had a ridgepole twelve or more feet higher. A sharply pitched roof of thatch covered this framework. The side walls made of saplings were daubed with mud and plastered white.

The Maya cultural center was the temple compound, and there the finest architecture and most lavish art of pre-historic America has been found. First the Toltecs, and later the Aztecs, developed cities in which houses were graded or classed. On the outskirts of the city were the huts of the farmers; then located further in were the adobe dwellings of the well-to-do, and in the center of the city were palaces and temples. A chief's house had adobe walls set on a stone foundation, and wooden pillars supported the roof.

Excavators in Palestine have found remains of ancient houses made of stone set with mud mortar. The flat roofs of these houses were made of wood and they of ten collapsed. An external wooden staircase led to the roof, which was used as a living room. In these houses the doors were made of

8 S. G. Marley, The Ancient Maya, p. 34.
wooden flaps that rotated on horns projecting above and below from the inner edge of the doorway. Windows were presumably filled with wooden lattice in the same way that many windows in Palestine are built today.

The Sudanese of the Indian Archipelago were superstitious about the use of certain woods in the building of their homes. These natives believed that the lives of people living in a house built from trees which had thorns or prickles would be full of trouble. If a house was built of that had fallen or lost their leaves through age, the belief was that the inmates of this house would die soon or have a hard time earning food. It was also believed that wood from a house which had partially burned should never be used in building another house because a fire would break out in the new house.

Another form of ancient dwelling was the tent. In Genesis of the Bible, Jacob "was the Father of such as dwell in tents, and of such as have cattle," and Abraham "sat in the tent door in the heat of the day." It is believed that the tent came into use in the early stages of civilization when people depended mainly on hunting for food and needed a form of shelter which could be carried to the places

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11 *Holy Bible*, Genesis.
where game was more plentiful. Later the tent became the home of people who made a living by raising cattle and sheep. The tent was used because it was easy to carry when the cattle were driven to better feeding grounds.

The first tent was probably made of leaves or skins which were sewed together and stretched over a framework of saplings or the branches of trees. This tent may have been similar to the wigwams in which the Indians of America lived.

The summer homes of the Eskimos in the northern part of the North American continent are actually tents made of skins.

Tents made of skins are used by some of the natives of Siberia who travel about in reindeer sleds. Also the Mongols of the Desert of Gobi and the region beyond the Great Wall of China use some type of tent.

Probably since the beginning of wars, soldiers have slept in tents of one kind or other. Armies have used larger tents for hospitals, warehouses, stock pile protection and offices. The supports for these tents were usually wooden poles, and wooden stakes were used to hold the tent in place.

Recorded history indicates that the tent of Alexander the Great was enormous and that one hundred people could sleep in this tent. The cloth roof of the tent was upheld

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by eight wooden pillars plated with gold. Another famous commander had a beautiful tent made of rare cloth and was supported by carved wooden poles inlaid with mother-of-pearl. 13

The first tents made of cloth, similar to those now used by the Persian nomads or by the Kirgiz of Western Asia, were probably made of felt. The round tent of the Kirgiz was larger than the ordinary skin tent. The folding wooden latticework frame of this type of tent was made in sections which could be opened and closed so that the tents were easy to pack on horses and move to new grazing grounds. Thick felt cloth was stretched over the wooden frames and fastened at the bottom with stones or wooden pegs. There was only one door in this type of tent. 14

After primitive people learned that if they joined together it was easier to fight off their enemies, houses were built close together for protection. This development was probably the forerunner of apartment houses. Three-story buildings were built in the crowded fortress cities as early as 3000 B. C. 15

As tools became better, the dwellings of man continually improved. Trees were chopped into logs and smooth walls of

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15 Bemis and Burchard, op. cit., p. 22.
stone and wood were used to make houses. Roofs were made of flat stones or hewn boards and later covered with shingles and slate. The people of the Oceanica Islands of the Pacific made houses of carefully cut boards, and the wooden house was evolving into a skillfully finished piece of construction.

Ancient public buildings consisted principally of tombs and monuments to the dead and were among the first structures that could be termed "architecture." Durante says that architecture began "when for the first time a man or a woman thought of a dwelling in terms of appearance as well as of use." The effort to give beauty and sublimity to a structure was made very early in the history of civilization and was accomplished to a high degree by many cultures. The houses of the dead of early peoples were developed into great structures of architectural beauty while the houses of the living remained insignificant. The tomb developed into a temple and the monumental pillar developed into statuary. To ancient people the dead were more important and powerful than the living, and also the dead remained in one place while the living often moved about too frequently to raise permanent homes.

17 Ibid., p. 87.
18 Ibid., p. 87.
The Egyptians regarded life after death as very important and had many complicated beliefs about death that influenced their daily lives. Egyptians tombs, temples, sphinxes and pyramids, all monuments to the dead, reached a high level of architectural beauty and are rated among the wonders of the world. Because wood had to be imported and is not a permanent material, there was little use of wood in the construction of the public buildings of the ancient Egyptians.

Wood was often used in the construction of public buildings by the ancient cultures along the Western Mediterranean shore. During the Neo-Sumerian period (2070-1960 B.C.), cedar was brought all the way from the Amonus Mountains in northern Syria. The Forests of Lebanon from which King Solomon cut cedar for the temple at Jerusalem are found in this mountain range.

Wood was used for the interior of King Solomon's Temple, and much of the wood was covered with gold. The walls of the temple were covered with cedar and olive wood carved with winged decorations and lily forms in styles like the Assyrian stone sculptures. The door of the temple had posts of olive trees and the doors were made of fir. The ceiling was made of cedar boards and the floor of fir planks. Cherubim was carved

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20 Finegan, *op. cit.*, p. 42.
from olive wood formed part of the decorations. Algun trees were used for pillars in both the temple and Solomon's palace. The oracle, with doors made of olive wood, and the altar were overlaid with fine gold.

The Clainous Palace had upper walls of wood, as did the palaces of Nineveh and Persepolis. Solomon's palace at Jerusalem was built with stone used for the lower part of the walls, and wood was used for the upper part. The stone was covered with overlays of gold. In contrast, the Cathedral Salonica was principally made of stone, and wood was practically excluded from the building.

Wood from the forests of Lebanon was also used to build Noah's ark. In Genesis 6:14 the Vulgate says that the ark of Noah was made of "smooth" or "planed" wood; the Septuagint Version of the Bible uses "squared wood," the Hebrew "gopher wood" and the Aramaic paraphrase "cedar wood." The great ark had a cubic area of $450,000$ cubits. Oak timbers were used for the floor and were laid down and fastened to vertical timbers the height of four cubits, making the sentina of the ark. There are various views as to how the window was placed in the ark, but Kircher decided that the window was in the middle of the third floor where the birds lived, and that

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21 Holy Bible, Second Chronicles 2:8-9:27.
22 Thomas Graham Jackson, Architecture, pp. 2, 3, 6, 28.
23 Don Cameron Allen, The Legend of Noah, p. 41.
the window was made of crystal or selenite. The placing of the ark's door also confused the authorities. Kircher thinks the door was hinged at the first floor and let down by pulleys in the same manner as a drawbridge or a modern gangplank.

Wooden temples were built to honor the gods of the ancient Scandinavians of the ninth and tenth centuries. Beyond the sacred grove of trees where human and animal sacrifices were hung, was the temple, a huge building made of wood and decorated with gilded adornments on the roof and eaves. In the dark interior of the temple were wooden images of gods.

Some temples were big enough to receive hundreds of guests for feasts and festivals.

Although the public buildings of ancient Rome were made principally of stone, it is believed that seating in the Coliseum was made of wood and was repeatedly consumed by fire. Authorities say that above the upper row of stone steps the amphitheater was encircled and elevated with several stages of wooden galleries which were burned and restored by the emperors.

Wood Used in the Construction of Buildings During the Middle Ages

During the Middle Ages the construction of private


25. Axel Olrik, Viking Civilization, p. 44.

dwellings was not radically changed; people lived in houses very similar to the houses built by the more advanced ancient cultures. It was not until the beginning of the Renaissance that people began to live in spacious and scattered homes of a more complicated type of construction.

Although the large public buildings of the Middle Ages were made principally of stone and other building materials, the lack of building knowledge made it necessary to use wood for the construction of the roofs and ceilings. Many churches and large public buildings standing today originally had wooden roofs and ceilings. In Italy the early Christian churches built during the tenth century had flat low-pitched wooden roofs which easily collapsed or caught fire. In later years, after many such experiences the roofs were replaced with a more enduring vaulted stone construction, as were the roofs of the cathedrals of Gloucester, Durham, and Exeter. The stupendous wooden roof of Westminster Hall was built during the time of Richard II, between 1394 and 1398, and is now considered the finest wooden roof in the world. Trusses of hammerbeam wood construction are supported by huge buttresses outside. Timber roofs were used in England on many college halls, the finest of these being Wolsay's Hall at Hampton Court.

During the fourteenth and fifteenth centuries in Persia, much wood was used in the construction of buildings, and woodworking developed into a fine art. Although there was little timber on the plateau of Persia, along the coast of the Caspian Sea there was a great abundance of forests, the Hyrcanian Forests where Jason sought the Golden Fleece. Master woodcarvers of the fourteenth and fifteenth centuries developed great skill and worked mainly on ecclesiastical furnishings such as Koran stands, mosque and pulpit doors, and sarcophagi. While building heavy construction of stone and brick the Persians used wooden structures to support the vaults and archways until the mortar and brick was set or the keystone could be placed in order.

Another use of wood in construction is the piling supporting buildings in the City of Ravenna, in Amsterdam on the Zuider Zee, and in Venice. The wooden piles used in Venice are said to be largely of alder, a tree that usually grows in moist land and is not readily destroyed by water. Other writers say that the Rialto in Venice is built on 12,000 elm wood piles.  


Wood Used in the Construction of Buildings from the Renaissance to the Twentieth Century

During the Renaissance period in Europe, great changes were made in the design of houses. When the invention of gunpowder made the city wall obsolete, there was more room for spacious and scattered homes. The influence of the Renaissance brought to the homes of the middle and upper classes an increased elegance of rich carving and splendid glass. Interior woodwork changed from the simple panelling of 1200 A. D. to ornate decoration of complicated design. Ceilings before the Renaissance period had been left with the beams exposed; during the Renaissance the beams were commonly finished in plaster which was decorated with interlacing patterns in bas relief. In the fifteenth century merchants in towns began to build fine homes three stories high and to use the ground floor as their shops.  

As the early settlers came to the New World to live the story of the development of housing seemed to start over again. While waiting for permanent housing to be built, the settlers had to live in temporary shelters of a crude type of construction, and wood in its natural forms was used to meet this need. When the Mayflower landed in 1620 at Massachusetts in midwinter, the Englishmen built huts of bark because the

32 Joseph Agonson, Book of Furniture and Decoration, p. 81.
log cabin was not known to them. Other crude shelters were formed by constructing a framework of sticks and branches over holes dug in the side of the hills and covering the framework with leaves and grasses. In the South the settlers used grass and deerskins to cover the wooden poles of wigwam resembling those used by the Indians.

Probably the first log cabins in America were built by Lief Eric rather than by the Pilgrims as is popularly thought. In 1000 A. D. Lief, the son of Eric the Red, landed in America, it is believed, near Cape Cod with a party of men who explored the land, chopped down trees and built log cabins. The Vikings made several trips to North America to collect lumber for building ships.

In some places the walls of log cabins were made by placing the fourteen to eighteen feet long logs side by side in a perpendicular position in deep trenches and then packing the ground firmly around the logs. The logs were then fastened together by cross-pieces and wooden pins. The open spaces were chinked with mud. The roof was usually made of hewn boards with cross-pieces fastened on with wooden pins, and hinges of vines or leather were used.

33 *America's Forests*, p. 2.
34 *Carpenter*, op. cit., p. 56.
36 *Carpenter*, op. cit., p. 56.
Colonial houses rapidly improved as refinements and conveniences were added. Early two-room houses in Massachusetts had a bedroom and a living room that also served as a kitchen. Wooden partitions between the rooms set off closets, or sometimes a stairway to the attic formed the partition. Studs and beams were left exposed in natural wood against a plastered background on the outside walls.

Later the Georgian style of architecture became popular in the United States. Houses were still made compact for warmth. Mount Vernon is an excellent example of the Georgian style of houses.

From about 1820 to 1840 houses were built in the Federal style of architecture. Houses during this period were constructed to withstand the assaults of time and tornadoes, and many houses of the Federal style can still be found in the Eastern states. Most of the woodwork and architecture of these houses is simple and unmistakably national in character. Thomas Jefferson's Monticello is an outstanding example of the Federal style of house.37

The Victorian style houses of America were designed more for show than for living comfort and more for decoration than for convenience. The outside walls were ornamented with elaborate wooden scrollwork, domes, cupolas, and towers

were placed without any relationship to the interior of the house. The houses had narrow windows that were heavily draped, and the interior colors were dull and dark. The famous Wedding Cake House located in Kennebunk, Maine, is an example of the Victorian style of house. This house has decorations of wooden "gingerbread" all around the sides and even on top. The sixty year old Victorian style governor's mansion of North Carolina was visited by Franklin D. Roosevelt in 1928. Roosevelt was so impressed with the wooden mansion that he described the house as "the most beautiful interior in America."  

From the time of the ancient Greeks and Romans to the end of the last century, there was little basic change in house construction. Among the reasons for the lack of change were the facts that methods of heating remained the same and few new building materials were introduced. Limited construction methods were based on the tested abilities of wood, stone and brick to support loads.

Soon after the beginning of the Renaissance, advances in architectural knowledge made it no longer necessary to use wood for the roofs and ceilings of large public buildings, and wood was used principally for interior finishing and


decoration. The Cathedral of Mexico City was built in 1573 and is an outstanding example of the Renaissance style of architecture. Although the cathedral was built mainly of marble and plaster, wood is an important material for the lavish interior furnishings. The wooden doors, the grill of the Altar of Pardon, the organ and the pews were made principally of cedar, but some mahogany was used. Most of the wood for the altar and the choir section was imported from Havana, Cuba, and various woods were used to make the artistic choir chairs.

Public buildings in Colonial America were made of logs, as were the early houses. As the country progressed, the construction of public buildings improved in much the same manner as did private housing. Later town halls, schools and churches were built of clapboards and hewn timber slabs, and the buildings were more comfortable and attractive.

Wood Used in the Construction of Private and Public Buildings During the Modern Period

Many advances in technical knowledge and building materials in the past sixty years have altered home building. The use of aluminum tile, sheet-rock, rubber, plastic and asphalt tile, asphalt shingles and steel casement windows has given homes a new look both inside and out. The single

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M. Gomez, Guide to the Cathedral of Mexico, pp. 7-29.
family house in America in 1951 consisted of wood floors, wood framing, wood partitions, plastered walls and ceilings, and exterior walls of brick, wood siding or shingles. The modern emphasis on the function of the home has made the house more livable, and the emphasis on texture and the contrasts of materials has given the modern home a new natural beauty. Finishes on wood are often used to bring out the interesting grain pattern, and more wood is used for paneling, slab doors and floors.

The home of Albert Ford of Aurora, Illinois, is an outstanding example of the use of wood in combination with other materials in modern home building. This house is built of steel, glass and cypress siding and was designed by architect Bruce Goff, one of the few U. S. architects considered by Frank Loyd Wright to be creative. Goff, who scorns houses that are "boxes with little holes," believes that a circle is "an informal, gathering-round, friendly form," and designed the Ford home in a circular rather than an angular shape. 41

Although the impermanence and comparative weakness of wood soon made it unsuitable as the main material of construction for large public buildings, the beauty, economy, lightness, ready availability and ease of use of wood has made this material practical for interior building trim and

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finishing. Wood in public building is now used primarily for doors, windows, wall paneling and floors.

The one-room wood frame schoolhouse is rapidly being replaced by the modern two and three-story school building of several acres in area. Constructed of brick, stone, steel and other materials, these buildings still have a large amount of wood used in the interiors. A large number of schools have windows, doors, and other trim of wood. The floors of modern school buildings are often made of wood, usually birch, pine or maple, and if properly laid will outlast the building. Wood floors are warm, resilient and reasonably quiet and do not show marks or scratches readily. The lower cost, beauty, and ease of maintenance are some of the reasons for the continued popularity of wood floors. 42

Even in modern times there is much use of buildings of a primitive type of construction. The easy workability and availability of wood makes it one of the materials more often used in primitive construction of today.

In 1948, Japanese prisoners held by the Russians in Siberia were housed in wooden huts which were built over pits. The lower part of the barracks was below the ground, and the upper half, constructed of logs and wood, was above the

ground and was covered over with dirt and snow.

The writer observed during a recent visit to Mexico that many of the old traditional Maya customs of house-building are still being used in Mexico today. Many of the adobe houses which have only wooden doors for letting in air and light are still used. The most primitive homes, the farm houses, are made of cane, grass, leaves, small tree branches, and even cacti. Some homes are built of adobe bricks and have roofs of wood or cane and are covered with thatch. The doors, two or four in number, are of wood, and windows are seldom used in this type of house. When windows are used they are set high in the wall and are very small. In the mountainous region between Monterey and Mexico City some houses are built of stone, and a wooden framework supports the thatched roof. Some tile roofs are used, mainly on the middle class houses. Some of the primitive homes are built on a slope of a mountain side, and the back of the house is supported on stilts or poles. The animals are kept in the underside of the house for shelter. Fine, Mexican mahogany, cedar and date palm are some of the woods used to build these dwellings.

Another primitive type of dwelling used in modern times is a type of tent made of skins and wooden poles. This type

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of dwelling is used in Northeastern Siberia among the Reindeer Chuchi. The nomadic herdsmen of Mongolia and Central Asia also live in a form of tent called a "yurt." This tent is close in form to the wigwam, but is covered with felt.

On the high plateau of East Africa the Masai live in dwellings which are made of woven canes and elephant grass plastered over with mud. In this country near Lake Tchad is located the large city of Kuka. Houses in this city have walls built with reeds covered with mud and have roofs which are made of straw thatch.

In some of the primitive tribes all of the families live together in one big hut. The "long house" was used by the early American Iroquois Indians and is still used in South America, Melanesia, and Malaysia. The "long house" which is used today by primitive natives is constructed high above the ground on poles and is of enormous size. The tribal huts of the Borneo tribes are several hundred feet long and usually sixty feet in width and may house as many as fifty families. This type of structure usually has a framework of poles covered with thatch of grass or palm leaves. A hall placed in the center divides the building into two rows of stalls, and each stall houses a family. The tribal house of the Kayan

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44 Bemis and Burghard, op. cit., p. 22.

45 Carpenter, op. cit., p. 32.
tribe of Borneo is built with a room for each family, and all the rooms open out on a veranda.

Bamboo is a very valuable building material which is used throughout the tropics. Bamboo grows to a diameter that equals that of a person's leg and to the height of a four-story building. When the cane is split and pressed out it makes bamboo splints which can be woven like basket-work to take the place of wide boards. In regions where the weather is warm the year around, the bamboo is suitable for use in the construction of huts that are needed for protection from the rain only. Bamboo is used also for the framework and rafters of houses. Doors and windows are made of bamboo woven splints. Whole canes are used in constructing the floors, and the cracks in the floor make little sweeping necessary.

The bamboo huts of the Manos of the Sulu Islands and of the natives of the Malay Archipelago are built on poles which extend above the water some distance from the shore for added protection. These bamboo huts are reached by crude make-shift wooden bridges or by canoes. It has been found through travel and inquiry that houses of grass, cane and leaves are constructed by the poorer classes of people living in Puerto Rico, the Samoan Islands, and Guam and that such houses were

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46 Bemis and Burchard, op. cit., p. 22.
used until recently by people who live in the Hawaiian Islands, the Fiji Islands, and in the Tonga Islands.

In the low country of Western China people live in cave-like dwellings and use wood to support the doors and windows. In this area of China the top-soil is many feet deep, and the streams and roads have cut deep crevices through the soil, forming perpendicular walls. In these walls people have cut out rooms and fitted in wooden doors and windows, thus forming comfortable and dry dwellings.

In the islands around the Strait of Magellan, the primitive natives of today move about while fishing and hunting and make crude temporary shelters wherever they stop. The shelters are made by choosing a brushy location and bending the branches of the bushes together, then tying the branches at the top to make a framework. Other branches are cut and leaned against the framework which makes a small hut about three feet in height. The natives crawl into these shelters to sleep at night.

The primitive tribes of black people who inhabit the wilder parts of Australia build shelters by tearing off pieces of bark from fallen trees and leaning the pieces of bark together so that the bark stands. It has been said

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47 Carpenter, op. cit., p. 1.

48 Ibid., pp. 11-12.
that at the time of their discovery, these Australian tribes did not build dwellings but built crude windbreaks when the weather made it necessary.

The black dwarfs of pygmies in the Congo of Central Africa also live in huts. The huts of the pygmies are oblong in shape and have two doors, one door in front and the other door in back. If attacked in the front part of the hut the pygmies can run out the back door. The dwellings are made of branches of trees which are stuck into the ground and leaned toward each other at the top. The branches are tied at the top, and the sides and top of the hut are roughly thatched with leaves and grass.\textsuperscript{49}

The type of hut used by pygmies of the Philippine Islands and other parts of Southeastern Asia today is made from forked saplings which are driven into the ground to hold smaller sticks which support the palm leaf roofs. Some of the better huts have raised platforms which serve as floors and beds, but many huts have dirt floors and sides which are open. This type of dwelling is easily made and is used extensively where the climate permits.\textsuperscript{50}

\textsuperscript{49} Bemis and Burchard, \textit{op. cit.}, pp. 12-13.

\textsuperscript{50} \textit{Ibid.}, p. 77.
CHAPTER V

SUMMARY

This study indicates that wood has been an important material used in the construction of buildings, furniture, and implements. Wood was one of the few building materials used by primitive man, and as other materials came into use, wood became less important in the construction of implements and buildings, but is still the main material used for furniture.

Wood was first used by man for implements in the form of a club. Soon harder materials were used to form the cutting, crushing, and piercing parts of weapons, and wood was used to form the handle or shaft of such weapons as the axe, knife, spear, lance, javelin, and sword. The bows and arrows were generally made from wood, and the crossbow and the longbow were the major weapons used in the European wars until firearms came into use. Huge war engines such as the catapult and ballista were made from wood and worked on the principle of the crossbow and slingshot. Wood has also been used to form such defensive weapons as armor, shields, and sharp spikes driven into the ground.

Primitive wooden weapons such as clubs and slingshots were also implements for getting food, and the first
implements for eating food were simple wooden skewers and spoons with wooden handles. Wooden vessels for containing food have been used by many primitive cultures and are used in modern kitchens and dining rooms.

Wood has always been an important material used in furniture construction, but little furniture was made before man began to live in permanent homes. The oldest existing furniture was found in Egyptian tombs and is around 5,000 years old. Early Egyptian furniture was made of wood, stone, and metal and included tables, storage furniture, chairs and couches. The Babylonians, Assyrians and Jews made furniture which was very similar to the Egyptian style of furniture. The Greeks also used Egyptian furniture designs, but added ideas of their own. In Greek and Roman furniture the turned leg was often used. About 1200 A.D. European craftsmen made Gothic style furniture and used oak. During the Gothic period, chests, high-backed sideboards, and benches were common pieces of furniture. Walnut was the main wood used in the construction of Renaissance style furniture, and two-story furniture developed during this period. In England mahogany came into use for furniture in the eighteenth century.

English furniture styles from 1558 to 1830 were named after English rulers, and three English furniture designers, Chippendale, Hepplewhite, and Sheraton, became famous
during the Georgian period (1714-1830). Furniture in colonial America was styled after English furniture, but native woods such as pine and fruitwoods were sometimes used in addition to the regular woods used in furniture construction. During the Empire Period, Duncan Phyfe was the outstanding American furniture designer. The Victorian style of furniture was used in the middle eighteenth century. Modern nineteenth and twentieth century style furniture is made principally of a variety of woods, but many other materials such as glass, plastic and metal are used.

The first homes were built of the materials readily at hand, and some form of wood has nearly always been available in all parts of the world. In various localities cane, logs, brush, or driftwood were combined with mud, stone, grass, leaves, cacti, skins, and cloth to form primitive dwellings. After woodworking tools were improved, homes were built of hewn boards and shingles. During the Renaissance houses became more spacious and scattered, and home interiors were finished with elaborate wood paneling and carving. From the time of the ancient Greeks and Romans to the end of the last century there was little basic change in home construction. Although advanced technical knowledge, better heating methods and new building materials have changed home design, wood is still one of the basic materials in modern home construction.
The first public buildings of architectural importance were tombs and temples, and when possible, these buildings were usually made of a more permanent material than wood. The lack of building knowledge often made it necessary to use wooden roofs on early churches and temples, and these roofs collapsed easily or burned. Later, temporary wooden structures were used to support masonry arches and vaults while the mortar hardened. Wood has always been an important material for the interiors of public buildings and the beauty, economy, lightness, and other qualities of wood make it a practical material for floors and interior finishing of modern public buildings today.

Conclusions

During the slow development of the complex civilization of today wood has been an important material for the construction of buildings, furniture, and implements. Based upon this study, the following conclusions have been drawn:

1. It is impossible to compare the actual amounts of wood used for these constructions in the past with the actual amounts used today. However, history does give us some indication as to the proportionate amount of wood as compared to the amount of other materials used for the construction of buildings, furniture, and implements during certain periods of time.
2. There has been little decline in the use of wood for furniture construction, more decline in the use of wood for buildings, and the most decline in the use of wood for the construction of implements.

3. From the beginning of recorded history wood has been the principal material for the construction of furniture, and most furniture is made of wood today.

4. Wood remained the principal material for buildings for a shorter period of time than for furniture, and wood is used less for buildings than for furniture today.

5. Wood was replaced as the primary material for implements early in history when metal came into general use, and wood is used less for implements than for furniture or buildings today.

6. Wood is more suitable for the construction of furniture than for buildings or implements, and is more suitable for buildings than for implements.

7. Wood is used in a different way today for the construction of furniture and buildings. Wood is used more today in combination with other materials, while in early history, when man had fewer building materials, most construction was entirely of wood. Primitive huts were often made entirely of wood, while homes today are made of wood combined with stone, metal, glass, concrete and many other building materials.
8. Few implements today are made entirely of wood, but wooden parts are often used.

9. Today wood is also combined with other materials to make new building materials. Furniture is often upholstered with rayon made partly from wood, and plywood is used in the construction of furniture and buildings. Plastics, made partly of wood, are used for table tops, eating tools, floors, upholstery, and many other purposes.

10. Wood has certain properties that make it more suitable for some kinds of construction than for others. Wood has warmth, visual interest, lightness, and strength; these qualities made wood a good material for furniture construction and a desirable material for some uses in buildings.

11. When compared to stone, concrete or metal, wood has good insulating qualities, but certain decisive limitations of wood make it unsatisfactory as the major material for large building construction because wood swells, warps, checks with changes in temperature and humidity, is weak across the grain, and is subject to fire, rot and vermin.

12. Wood lacks the hardness, strength and durability needed for the construction of most modern day implements.

13. As a material for construction wood is cheap and easily worked, and modern research is making progress in overcoming its limitations.
Recommendations

The recommendations for this type of study are limited to the degree of a person's interest in this subject, and in the main, further study would not be of importance to all industrial arts teachers.

While there are limitations concerning the design of wooden furniture, it is safe to say that only those teaching woodworking would have a special interest in continued study of design and characteristics of the different kinds of wood.
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