

GILBERT
CARPENTRY
FOR BOYS

BY

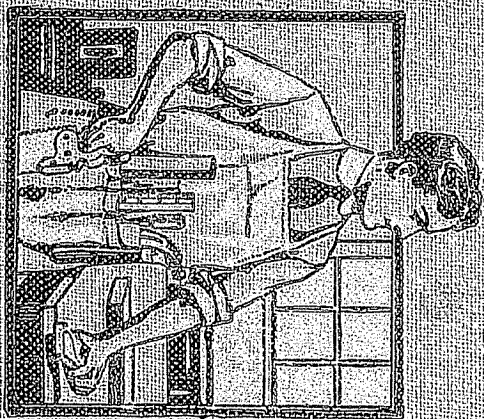
ALFRED C. GILBERT
YALE UNIVERSITY • 1909

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GILBERT REGULATOR CARPENTRY



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INTRODUCTION

CARPENTRY opens to the boy a field that is both interesting and instructive. The boy of imagination will find no end of amusement, fun, and instruction in taking up this interesting subject.

The boy who can do things, plan things, build things will win leadership among boys. The boy who knows how to tell the different kinds of wood and other interesting information, necessary to a real carpenter, has a distinct advantage over most boys. Whether you are going to be a carpenter or not, the fun and information you will derive from reading this book will be a source of inspiration and pleasure to you as long as you live. The boy of to-day wants to acquire a knowledge that most boys do not possess. Although you may know how to work with tools, it is sincerely recommended that you read this book carefully and gather from it the fundamental information that is necessary in carpentry work. You will then be able to do things better than your associates.

An endeavor has been made in writing this Manual on Carpentry to cover all the fundamentals and make it the most complete reference book of its kind ever compiled. In the back of the book, reference is made to other excellent books which treat the individual subjects in a more complete manner. After completing this work should you become interested in obtaining more knowledge, further study might be made of the books mentioned on page 36.

If you are already the possessor of a set of carpenter's tools, or contemplate obtaining one, you will not only derive great pleasure from its use, but the experience gained from practice with it will be extremely useful to you all your life, no matter what branch of industry you may follow later on when you start your career in the business world. As soon as you have learned the proper care and use of your tools and are able to turn out neatly constructed articles, you will find that the time spent in your carpenter shop will bring you profitable returns. There are an unlimited number of things you will be able to make with your set, such as furniture for your own room, toys for yourself and younger brothers and sisters, bird houses, book-racks, etc. In addition you may be able to sell many of the products of your workshop.

Cordially yours,

A. C. Gilbert

LUMBER

One of the most important things the carpenter should have is a knowledge of lumber. He should know the distinction between lumber and timber. Lumber is the term applied to timber that has been sawed into boards. Timber is an expression used for the growing trees, or the cut trees sawed into large pieces. There are certain fundamental things that every one should know about timber and lumber. First, let us consider the tree itself. You should look at a tree after it has been cut down and examine closely the cross-sections of it. The center of the tree or that

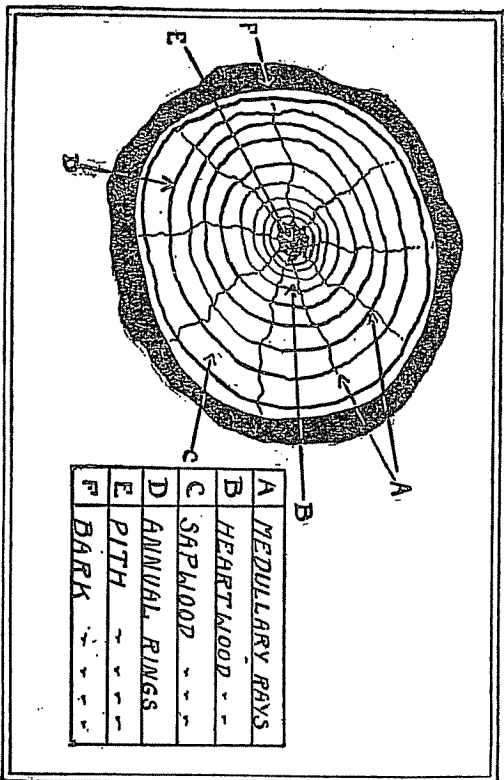


Fig. 1

portion of it with little dots and circles, is known as the pith. (See Fig. 1.) Next to the pith are the concentric rings, called annual rings. These are important because they show the age of the tree. Each ring represents a year of the tree's growth. Heartwood is the wood next to the pith. Outside of the heartwood comes the sapwood, and on the outside of this, the bark. Medullary rays are the lines in the tree that radiate from the center.

STRUCTURE OF WOOD. The tree structure must be taken into consideration in cutting up logs. Various methods of sawing the logs are employed; the method depends on the purpose for which the wood is to be used.

First Method — PLAIN SAWING. This method of sawing causes very little waste. (See II, Fig. 2.) The only waste is the sawdust from the bark itself. By referring to the illustration, you will notice that, with the exception of the board cut through the very center of the log, which is the pith, the annual rings cross the boards obliquely. This is what causes warping. It is along the annual rings that the greatest amount of shrinkage occurs. The longer the arc of the ring in the cross-section of the

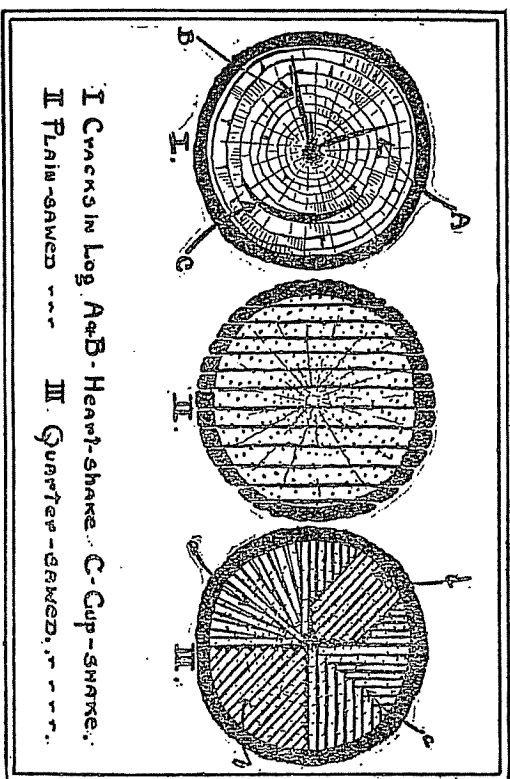


Fig. 2

board, the greater the shrinkage will be. In plain-sawed stuff (See II, Fig. 2) you can readily see that the different boards taken from the log will have arcs of different length.

Second Method — QUARTERED SAWING. In quartered sawing (See III, Fig. 2) the log is sawed into quarters; then, each quarter is sawed

independently so that the boards will be parallel with the medullary rays. Naturally, there is a big waste in this method of sawing, and the price for quarter-sawed lumber is, of course, greater than for ordinary sawed lumber.

The irregular pieces that are left over can be utilized in various places where narrow pieces are required, doing away with some of the waste. Quartered sawing shows up the grain and brings out the beautiful markings of the various kinds of wood. The big advantage, however, is in the uniform shrinkage and the fact that it is not very apt to warp.

KNOTS. If you pick out your own lumber, you can generally find plenty of clear wood or, if it does have knots, you can work up your wood in such a way as to practically eliminate all knots.

CUP-SHAKES AND HEART-SHAKES. Cup-shakes are cracks between rings. (See 1, Fig. 2.) Heart-shakes are cracks along the medullary rays. You will find them in only the poorest grades of lumber. You should not let a lumber dealer give you lumber of this kind for good material.

CHECKS. In drying, boards sometimes split at the ends. These are known as checks. This cannot be wholly avoided, but you should not accept the lumber where checks extend too long down the piece.

Lumber is divided into boards, planks, and timber; up to 2" it is known as boards; 2" or over, it is known as planks; and 4" or over, it is called timber.

SPECIAL NOTE ON STOCK SIZES OF LUMBER. It is well to remember that when boards are dressed, $\frac{3}{8}$ " in thickness and $\frac{3}{4}$ " in width are taken off from the original dimensions. Remember that a board 1" thick and 12" wide in the rough will measure about $\frac{7}{8}$ " thick and $11\frac{3}{4}$ " in width when dressed.

SAP. The growing tree contains a large amount of sap. Sap is, principally, water. When timber is cut, a large amount of the sap remains in it; consequently, before the lumber can be used for wood-working and building, it must be dried out to prevent warping and shrinking. This brings us to the important subject known as seasoning.

SEASONING. Why seasoning is important. 1. It increases the strength and reduces the weight of the lumber. 2. It tends to prevent shrinking, warping, decaying, and checking of the lumber.

METHODS OF SEASONING. 1. Air Seasoning. This is natural seasoning, the most common and, generally, the best. In air seasoning the wood must be carefully piled and protected from the sun and rain.

It is also piled in such a manner as to allow the air to circulate freely about the boards. In piling lumber for seasoning it must be kept off the ground. Lumber piled in this manner for seasoning is prevented from warping. Unfortunately, air seasoning is slow; therefore, a quicker method, known as kiln drying, has been resorted to.

2. Kiln Drying. In buying lumber you would probably have to specify kiln dried, because that is the method commonly used, especially in lumber that is to be used for inside finishing work. It has one advantage over air-seasoned lumber, in that the drying is more complete. The best practice in kiln drying is to see that the temperature is gradually raised. It is important that the surface does not become entirely dry before the moisture or sap in the inside is heated. This is accomplished by wet steam kiln drying. Consequently, the most improved kiln drying is accomplished by moist air drying. This is absolutely imperative, but it is sometimes neglected.

STORING LUMBER. As a rule, lumber that is purchased from a mill is not thoroughly kiln dried, and the best results in wood-working are obtained by storing wood and piling it for further seasoning, allowing the air to circulate about it for some time. In storing lumber for further seasoning, it should always be piled flat with intervals between to allow the air to circulate. As a rule, we depend upon the weight of the lumber to keep it from warping. When boards are very thin, it is sometimes necessary to clamp them together. In doing this, be sure always to put the two concave sides together. This straightens the lumber. In the process of working with lumber it is a good idea to cover up small parts of the work with cloth or paper, so as to prevent their warping.

Another important thing to remember is that if you should plane one side of the board it is very apt to warp, particularly if it has been air dried. Therefore, remember to plane both sides if the piece is not intended for immediate use.

PURCHASING LUMBER. How to Measure. It is necessary to know how to measure lumber before purchasing it for wood-working so as to facilitate ordering and checking up when received. A board 1" thick, 12" wide, and 12' long measures 12 board feet. Boards less than 1" thick are sold usually by the face measure or square foot. Prices are usually quoted per thousand feet. Multiplying the length in feet by the width and thickness in inches and dividing by twelve will give the number of feet. When we designate the length, we mean the way the grain will run.

CARPENTRY TERMS FOR LUMBER

UNDRESSED LUMBER. This is lumber just as it comes from the saw. **DRESSED LUMBER.** This is lumber when the rough saw marks have been removed by the planer and is marked "D."

One side dressed lumber is technically known in carpentry as "surfaced one side," and will be marked "S-I-S."

MATCHED LUMBER. Specified as "M." This is lumber where the boards are tongued and grooved.

MATCHED AND BEADED. Specified as "M.E.B." This is lumber that is tongued and beaded.

SPECIES OF WOOD

WHITE PINE ✓

Grain: Straight
Color: Nearly white
Weight: Very light
Elasticity: Medium
Strength: Moderate
Qualities: Nails well; nice wood to work with; warps very little

Uses: Pattern making, boxes, cabinet work, matches, doors and windows

YELLOW PINE X

Grain: Straight
Color: Sapwood white
Weight: Light
Elasticity: Medium
Strength: Very strong
Qualities: Hard to work, splits easily, brittle, warps easily

Uses: All kinds of lumber work, props and floor beams, ceiling beams, etc., and has great strength. It supports great weight, and is the only type of wood we have in this country for such work

SUGAR PINE

Grain: Straight
Color: Cream white
Weight: Very light
Elasticity: Medium
Strength: Weak
Qualities: Nails well; nice wood to work with; warps very little

Uses: Novelty wood-working; toy making, interior decorating, boxes, shingles, cooperate

SPRUCE

Grain: Straight
Color: Light yellow
Weight: Light
Elasticity: Very resilient
Strength: Strong
Qualities: Warps easily, finishes to a nice surface, easy to work, splits easily, hard to chisel neatly

Uses: Paper pulps, sounding boards, novelty wood-work, ladders

HEMLOCK X

Grain: Crooked
Color: Reddish brown
Weight: Light
Elasticity: Medium
Strength: Medium strong
Qualities: Splits easily, consequently difficult to work; very brittle, not durable; warps and checks easily, the poorest of lumber

Uses: Rough work and where cheap lumber can be used; plank walks, lathe

Uses: Novelty work, construction work of all kinds, shingles

CYPRESS ✓

Grain: Nearly straight, but beautifully figured
Color: Heartwood reddish brown, sapwood nearly white
Weight: Light
Elasticity: Medium
Strength: Medium
Qualities: Apt to check; durable, easy to work, nails well, warps a little

Uses: Ties for railroads, boat constructions, shingles, posts, interior work, and novelty wood-working

FIR X

Grain: Straight and coarse
Color: Sapwood white
Weight: Medium
Strength: Strong
Elasticity: Very elastic
Qualities: Splits easily, difficult to work, warps

Uses: Railway ties, piles, flag-poles, masts

REDWOOD

Grain: Straight
Color: Reddish
Weight: Light
Elasticity: Good
Strength: Weak
Qualities: Soft, but brittle, does not warp much; splits easily; works easily

Uses:

Interior finishing, novelty working, canoes, shingles, cabinet making, pencils, cigar boxes, cedar chests, scroll-saws

RED CEDAR X

Grain: Coarse, straight
Color: Dark red, sapwood white
Weight: Very light
Elasticity: Medium
Strength: Medium
Qualities: Not apt to check; does not warp easily, splits easily in nailing. Very durable

WHITE CEDAR

Grain:	Straight	Qualities:	Warp, does not split
Color:	Pinkish or brownish		very easily, subject to boring insects, extremely hard to work, dries slowly, checks badly, not durable when exposed to weather
Weight:	Very light		
Elasticity:	Not elastic; too brittle		
Strength:	Weak		
Qualities:	Splits easily, but nails well. Very durable, warps very little; works nicely	Uses:	Handles for tools, sled runners and wheels, manufacture of carriages and implements, machinery, cooperage, harness work, timber
Uses:	Canoes, ties, posts, shingles		

BLACK WALNUT

Grain:	Straight	Grain:	Straight
Color:	Brown	Color:	Reddish, sapwood white
Weight:	Medium	Weight:	Medium
Elasticity:	Medium	Elasticity:	Very elastic
Strength:	Strong	Strength:	Very strong
Qualities:	Hard wood, very durable, easy to work, difficult to split, nails hold well, warps very little	Qualities:	Medium hard, easy to work and does not split, nails well, warps, takes good finish
Uses:	Cabinet making, novelty wood-working, used in veneering, gun-stocks (which is the most popular use), wood-turning	Uses:	Birch bark for canoes is very popular; small pegs, spools, small turnings, finishing lumber and buildings, furniture, wooden shoes, wood-carving, hubs for wagons

HICKORY

Grain:	Straight, coarse, with large open ducts	Grain:	Straight
Color:	Dark brown, sapwood nearly white	Color:	Reddish
Weight:	Heavy	Weight:	Light
Elasticity:	Very elastic	Elasticity:	Medium
Strength:	Very strong		

CHESTNUT

Grain:	Straight
Color:	Reddish
Weight:	Light
Elasticity:	Medium

Strength: Medium

Qualities:	Warp badly, very durable, works easily
Uses:	On account of its durability, when grounded it makes good posts, railway ties, telegraph poles, interior finishing and novelty wood-working, heavy construction and cooperage

OAK

Grain:	Crooked
Color:	Reddish brown
Weight:	Heavy
Elasticity:	Very elastic
Strength:	Strong
Qualities:	Hard wood, checks and warps badly, rarely attacked by insects, splits easily, hard to nail, shrinks and checks

Uses:	Furniture, interior finishing, desks, boxes, shipbuilding, car and wagon work, cooperage, wood-turning, piles, machinery
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WHITEWOOD

Grain:	Straight
Color:	Yellow, sapwood cream color
Weight:	Light
Elasticity:	Very elastic
Strength:	Medium

Qualities: Brittle but does not split easily, nails well, warps a little, durable

Uses:	Boxes, furniture, interior work, boats, novelty wood-working, turnings
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GUMWOOD

Grain:	Close, straight
Color:	Light reddish brown; sapwood, almost white
Weight:	Medium
Elasticity:	Medium
Strength:	Medium
Qualities:	Hard, but works nicely, splits badly in nailing, polishes nicely, warps and twists, does not check

Uses:

Boxes, cabinet work, novelty wood-working, cooperage, pavement blocks, carpentry, cut veneer for wood plates, furniture, wagon hubs

SYCAMORE

Grain:	Cross
Color:	Reddish brown
Weight:	Medium
Elasticity:	Medium
Qualities:	Medium hard, very durable, warps a little, splits badly, hard to nail, hard to work

Uses:

Dying-out blocks, furniture, chopping blocks, tobacco boxes